



Environmental Guide for Federal Real Property Managers



Environmental Guide for Federal Real Property Managers

Treasury Board Advisory Committee
on Real Property

November 1999



Published by
Treasury Board of Canada Secretariat

©Minister of Public Works and Government Services 1999

Catalogue No. BT22-60/1999E-IN
ISBN 0-662-28184-5

The complete Guide is available on
the Treasury Board of Canada Secretariat Internet site:
www.tbs-sct.gc.ca/

Employees who do not have desktop Internet should
check with their departmental, public, or university library.

For your convenience, this version also has hyperlinks to other areas.



Our Environmental Philosophy

Our philosophy for good environmental practices is to ensure federal Real Property managers are well informed so that they avoid contamination and manage federal lands and facilities in a safe and efficient manner. The Environmental Guide for Federal Real Property Managers is intended to be a good reference for managers throughout the country in the life-cycle management of Real Property from the acquisition phase to the disposal or demolition and dismantling of the property. We encourage 'green practices' and are attempting to keep the paper copies of this guide to a minimum. The paper version of this document will likely be out of date very quickly due to the fact that new changes to policies, legislation and regulations will occur on a continuous basis and new environmental technologies and practices will continue to develop. We encourage you to check the electronic version of this document which will be kept current on our TBS Web site. We will not be re-printing this guide. The electronic version is hot - linked to legislation and other important cross references for ease of use, and we will keep these links up to date so that as amendments are made you will have the latest information available to you. We hope to be continuously improving this document and invite you to send us your comments and to keep us up-to-date on any changes we have missed by contacting Nancy Carpenter at carpenter.nancy@tbs-sct.gc.ca or by phone at (613) 957-7063. You can also reach the Real Property Management Division at (613) 957-8385.

Thank you!



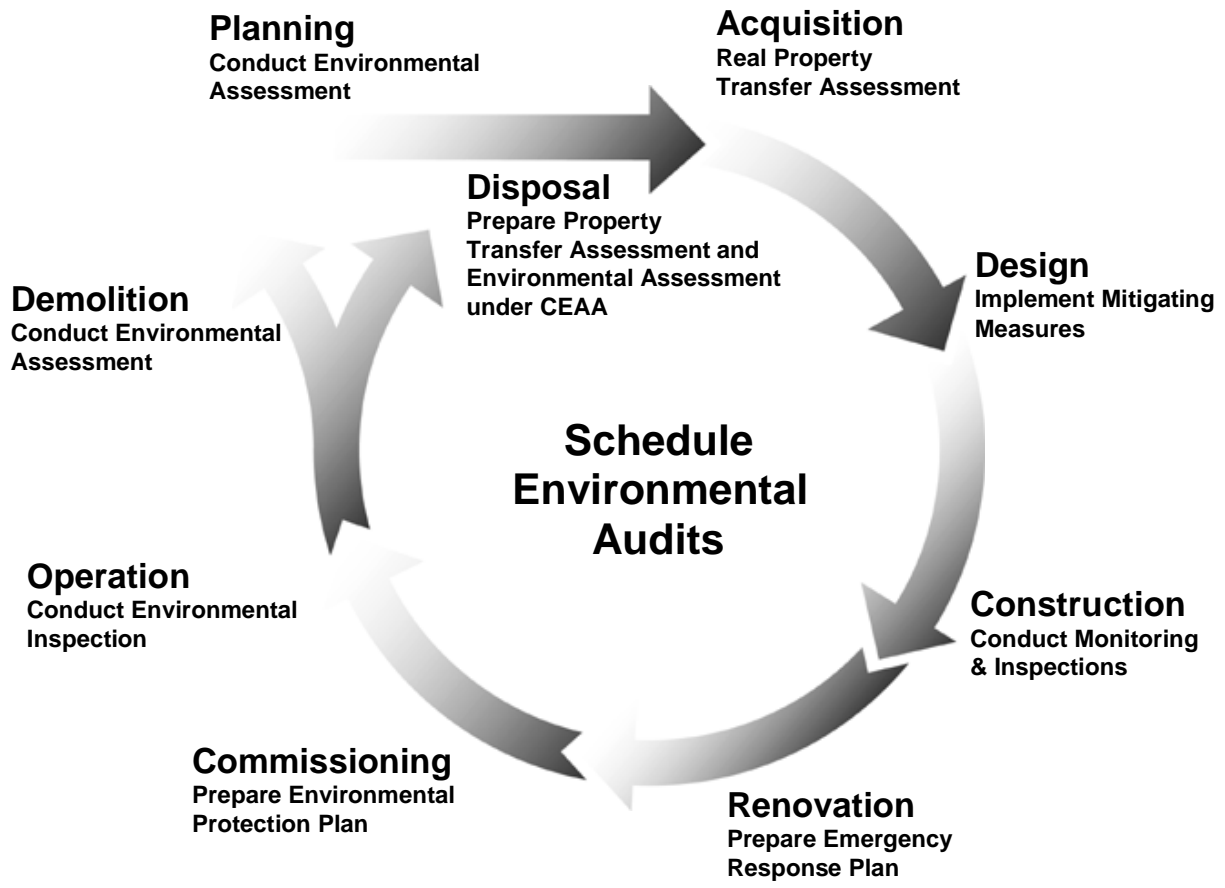
Table of Contents

Our Environmental Philosophy

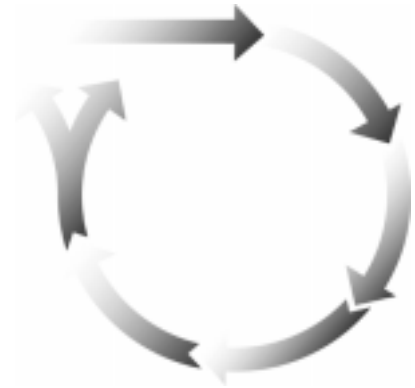
Thank you!

Introduction.....	1
Planning.....	3
1. Environmental Considerations	3
2. Guidance.....	7
3. References.....	9
Acquisition and Disposal.....	13
1. Environmental Considerations	13
2. Guidance.....	17
3. References.....	21
Design.....	27
1. Environmental Considerations	27
2. Guidance.....	28
3. References.....	31
Construction	35
1. Environmental Considerations	35
2. Guidance.....	37
3. References.....	39
Commissioning.....	43
1. Environmental Considerations	43
2. Guidance.....	45
3. References.....	46
Demolition and Dismantling	47
1. Environmental Considerations	47
2. Guidance.....	48
3. References.....	49
Operation and Maintenance.....	53
1. Environmental Considerations	53
2. Guidance.....	67
3. References.....	94

Acronyms	113
Definitions	115
Appendix A Offices of Environment Canada.....	119
Appendix B Code of Environmental Stewardship	121
Appendix C Summary of Provincial Environmental Legislation	123
Appendix D PCB Disposal Companies Operating in Canada	147
Appendix E Index.....	153



Introduction



This guide is designed to provide a useful environmental reference for each activity in the real property management process, from planning to demolition and disposal. It covers a wide variety of topics at all stages of a property's life cycle. These include strategic management issues such as acquisition, leasing, licensing and disposal, as well as day-to-day operational and maintenance issues such as air quality, PCB management, building cleaning and waste management. The guide does not provide exhaustive detail but points to sources of further information.

Each stage of the life cycle is covered in a separate chapter, which contains three parts.

1. The 'Environmental Considerations' section gives a brief description of the significance of the subject, and the approach the federal government takes to it.
2. The 'Guidance' section describes the process and procedures in detail. It indicates how organizations may or must address each issue to effectively manage the issue in an environmentally sound manner that reflects the requirements of relevant authorities.
3. The 'References' section contains titles of related legislation, policies, regulations, codes, standards, specifications and advisory publications. Each chapter is designed to stand-alone and contain all of the pertinent reforms within it.

Some of the environmental topics discussed in this guide are subject to provincial and territorial requirements. Often, these are quite different from those of the federal government. Be aware that this document focuses on the requirements of federal government policy and legislation, and that provincial and territorial requirements are discussed only in general terms.

Environmental Guide for Federal Real Property Managers

Federal, provincial and territorial governments are constantly revising environmental legislation and related policies and regulations, as well as standards and specifications. Users of this guide are advised to ensure that they are referring to the most recent version of these documents in their decision-making. Environment Canada officials are familiar with current requirements. Refer to Appendix A for locations and phone numbers of their regional offices.

Planning



1. Environmental Considerations

Planning for environmental management must encompass overall policy development and program management of an organization, as well as the planning for specific projects. Program planning deals with the way an organization plans and manages its environmental issues. Project planning concentrates on assessing the actual environmental effects of a project as early as possible, before the organization makes irrevocable decisions about its implementation.

1.(a) Program Planning

A sustainable development strategy is an environmental management system which, with regular environmental audits is a key element of good program planning.

Sustainable Development

Sustainable development is a ‘master plan’ or, as the United Nations’ World Commission on Environment and Development (the Brundtland Commission) defined it in 1987, “development that meets the needs of current society without compromising the ability of future generations to meet their own needs.”

Sustainable development can also be seen as a balance between economic and environmental criteria and objectives.

The philosophy of sustainable development is built on two basic premises: first, that environmental issues must be incorporated fully into the economic decision-making process at the outset, and not left aside until late in the process; and second, that resources must be treated on the basis of both their present and their future value.

The promise of sustainable development is that economic development can and must be sustained by the environment. The environment and the economy must be mutually supportive to maintain their long-term viability.

The Canadian government endorses the principle of sustainable development and has taken steps to incorporate it into its management framework and its operations. Examples of steps taken include:

- (a) convening round tables to discuss the environment and the economy;
- (b) establishing the House of Commons Standing Committee on Environment and Sustainable Development;
- (c) establishing the requirement for federal government organizations (as defined in schedules I and II of the *Financial Administration Act*, or FAA) to develop and implement their own sustainable development strategies;
- (d) enacting environmental legislation (the CEAA, and revisions to the CEPA, the FAA and other legislation); and
- (e) coordinating environmental policy with provincial governments.

Commissioner of the Environment and Sustainable Development

Amendments made to the *Auditor General Act* (passed in December 1995) further demonstrate the federal government's commitment to sustainable development. This revised legislation establishes the position of a Commissioner of the Environment and Sustainable Development, who monitors and reports on the effectiveness of federal government organizations in incorporating sustainable development into their operations and management. The Commissioner will monitor each organization's progress against the sustainable development strategy that the new legislation required it to produce.

Sustainable development strategies, as described by the House of Commons Standing Committee on the Environment and Sustainable Development, "will provide leadership in the shift to sustainable development, in setting goals and objectives, action plans, and benchmarks, against which to measure progress. They will be developed in consultation with the key stakeholders."

Each minister has tabled an initial sustainable development strategy in the House of Commons for his or her organizations. These sustainable development strategies must be dynamic. To deal with constantly changing economic conditions, approaches to environmental protection, government policies and legislative frameworks. Consequently, the amendments to the *Auditor General Act* require each organization to update and table its strategy in the House of Commons every three years.



The Commissioner reports on each organization's progress towards its environmental goals and objectives. The Office of the Auditor General summarizes the Commissioner's findings in its Special Green Report, which it tables annually in the House of Commons.

Environmental Management Systems

An environmental management system ensures that an organization implements its sustainable development strategy. Such a system is a central, coordinating framework through which an organization will plan, undertake and report on its environmental activities. It is to be an integral part of existing management systems. It consists of the policies, systems and procedures used to plan, control, report on and evaluate program policies and operations to ensure that the organization is protecting the environment and using resources sustainably, as specified by environmental legislation and authorities.

An environmental management system must:

- (a) clearly and comprehensively define the environmental responsibilities of an organization;
- (b) formulate an environmental policy, along with responsibilities, roles and accountabilities;
- (c) integrate environmental considerations into decision-making processes;
- (d) provide for the sound management of environmental risks and liabilities;
- (e) ensure that plans exist for targets and resources to comply with environmental requirements;
- (f) establish procedures for monitoring and updating environmental responsibilities; and
- (g) provide for the systematic and objective review of the environmental function.

The private sector has been actively developing and implementing environmental management systems. Such systems provide opportunities for economic benefit, because they can protect companies from liability and prosecution.

Most companies use the International Standards Organization's guideline ISO 14004, *Environmental Management Systems – General Guidelines on Principles, Systems and Supporting Techniques*, as their model. The Commissioner of the Environment and Sustainable Development will use the ISO 14004 guideline as a benchmark when assessing departments' environmental management systems.

Developing and implementing an environmental management system creates several benefits. For instance, an environmental management system will establish and clarify the roles of managers and other supporting employees; they will understand how their responsibilities are integrated into the environmental management process. Furthermore, the strict exercise of due diligence is often the only defence that organizations can use in incidents of environmental non-compliance. An environmental management system can confirm that an organization has deliberately pursued due diligence.

Environmental Auditing

An organization should incorporate a program of environmental audits into its environmental management system to monitor environmental progress. The audits should use the policy objectives, regulatory requirements and operational guidelines of the organization as the criteria for evaluation.

Environmental audits determine the degree to which programs and specific projects meet these criteria. As well, the audits will identify activities that do not comply, or which could lead to non-compliance. The audits should not only determine whether environmental problems exist but also, if problems do exist, help establish priorities for correcting them.

Environmental audit programs for specific properties or facilities should be based on a standardized audit protocol, designed to examine the issues that relate to the activities of the organization being audited. Such an audit protocol will ensure that all of the environmental concerns of the organization are examined and assessed, while also ensuring that the audits are conducted consistently in different locations on different dates.

The audit program will provide information consistently, to allow effective comparison with previous reports. This will help the organization identify problems that are specific to one location. As well, the organization can track its progress in correcting environmental problems over a period of time, if it conducts audits regularly. The frequency of audits will depend on the policy and the management requirements of the organization. Many organizations find a three- to five-year cycle satisfactory.

A truly effective audit program will not be limited to identifying problems and describing the general conditions of a site. It will also establish a priority ranking of the concerns or problems identified, providing a basis for implementing corrective measures. The audit should help organizations incorporate all of the concerns identified by the audit into a facility's long-term operational plan and its budget. If organizations follow this approach, then the environmental audit will become an indispensable tool for meeting the organization's goals and objectives as defined in its sustainable development strategy and environmental policy.



An additional benefit of using a standardized protocol to conduct environmental audits is that the results of individual audits done at specific sites can be collected, compared and analyzed on a regional or national basis. In this way, organizations can identify systemic problems and take corrective action.

1.(b) Operation and Maintenance

Refer to the Operation and Maintenance chapter for more details on conducting environmental audits.

1.(c) Project Planning and Site Selection

Most projects that are subject to the exercise of a power, duty or function under section 5 of the *Canadian Environmental Assessment Act* (CEAA) must be assessed for their effect on the natural environment before being allowed to proceed. This assessment must be conducted in accordance with the Act and its regulations “as early as is practicable in the planning stages of the project and before irrevocable implementation decisions are made.” Whenever more than one available site is under consideration, site selection must be included as part of the environmental assessment under the CEAA so that it will be defensible on environmental grounds.

2. Guidance

The purpose of an environmental assessment under the CEAA is to identify and evaluate both the negative and the positive environmental implications of a proposed project before irrevocable decisions are made to proceed with the project.

Initially, it must be determined if the proposal is a ‘project’ as defined by the Act.

Under the CEAA, a project can be either

- (a) a proposed undertaking in relation to a physical work, such as constructing, modifying or decommissioning (e.g. dredging that is required to place piers related to the construction of a bridge); or
- (b) a proposed physical activity, not relating to a physical work, that is listed in the CEAA Inclusion List Regulations (e.g. the annual dredging of a shipping channel).

If the project corresponds to the definition in the previous paragraph, then it is not excluded from environmental assessment under the CEAA Exclusion List Regulations.

If the project is not excluded from assessment, then it must be determined whether a federal authority — including a minister, an agency of the Government of Canada or any departmental corporation set out in schedules I or II of the *Financial Administration Act* — is:

- (a) the proponent of the project;
- (b) funding the project through the proponent or is providing financial assistance to the proponent;
- (c) selling, leasing or otherwise disposing of federal lands or an interest in federal lands, so that the project can be carried out; or
- (d) issuing, or is recommending that the Governor in Council issue, another form of authorization under a statutory or regulatory provision that is listed in the CEAA Law List Regulations.

These four scenarios are commonly referred to as CEAA ‘triggers.’

When a project meets one of the conditions described in the previous paragraphs (a), (b), (c) and (d), an environmental assessment of the project must be done to comply with the CEAA.

If the project corresponds to one of the projects listed in the Comprehensive Study List Regulations under the CEAA, then all federal decisions that would permit the project to proceed must be withheld until the required assessment is completed.

The obligation to ensure that an environmental assessment is conducted under the CEAA lies with the ‘responsible authority.’ The responsible authority is a federal authority that is involved in one of the CEAA triggers. It can ask a third party to conduct the environmental assessment and prepare the report. However, it cannot delegate any decision related to one of the CEAA triggers.

There are several situations where more than one federal authority may be the responsible authority for the same project. To ensure that CEAA requirements are met, all potential responsible authorities must discuss and together determine the manner in which to perform their duties and functions under this Act and its regulations.

The CEAA outlines various mechanisms, such as a public registry, public consultation on environmental screenings, a comprehensive study report, and public hearings before a mediator or a review panel, to ensure that there will be an opportunity for public participation in the environmental assessment process.



When projects include more than one site option, each site should be compared against consistent, identical environmental criteria and against the project requirements to determine which site is the most suitable from an environmental point of view. This will form part of the overall environmental assessment for the project.

If the results of the environmental assessment show that the potential adverse environmental effects of the project will be insignificant, and that there is no public concern, then the federal authority may exercise its power, duty or function.

However, if the effects are likely to be significant or public concerns are substantial, the federal authority can either refuse to be involved in one of the CEAA triggers or can refer the project to public review before a mediator or panel.

Based on past environmental assessment experience, most federal projects that must be assessed under the CEAA will be dealt with by means of an environmental screening. Comprehensive studies are not often required, and public reviews by a mediator or a review panel, although highly publicized, are very rare.

3. References

LEGISLATION

Canadian Environmental Assessment Act (CEAA)

Regulations

Law List

Inclusion List

Comprehensive Study List

Exclusion List

Regulations Respecting the Coordination by Federal Authorities of Environmental Assessment Procedures and Requirements

Federal Authorities Regulations

This Act, along with the first four listed regulations, was proclaimed into law on January 19, 1995, and replaces the *Environmental Assessment and Review Process Guidelines Order* of 1984.

Since the CEAA is law, the process outlined by the Act must be followed. The purpose of an environmental assessment under the CEAA (in most cases, an environmental screening) is to evaluate both the negative and positive

environmental implications of a proposed project, before irrevocable decisions to implement it are made. While there are no penalties incorporated into the CEAA legislation, failure to conduct the required environmental assessment could allow an interested third party to obtain a court injunction against proceeding with the project.

Canadian Environmental Protection Act (CEPA)

The CEPA, proclaimed into law in 1988, is designed to protect Canadians from various forms of pollution caused by toxic substances. It provides the power to regulate the entire life cycle of toxic substances.

A person or organization whose property is affected by the release of a toxic substance in contravention of the CEPA regulations is required to report the matter to an inspector. Costs related to measures required to prevent further release may be recovered against the landowner, to the extent of the owner's negligence in relation to the release.

Also, if contamination is occurring on a property then there is the potential for liability even if that property has just been acquired and the contamination occurred before the acquisition. Penalties for an infraction under the CEPA can be as severe as fines of \$1,000,000 per day and/or imprisonment for five years. When a person in contravention of the Act "shows wanton or reckless disregard for the lives or safety of other persons and, thereby, causes bodily harm or death," that person may be prosecuted under the Criminal Code.

Auditor General Act

Amendments to the *Auditor General Act* have created the office of a Commissioner for the Environment and Sustainable Development within the Office of the Auditor General.

Fisheries Act

The *Fisheries Act* is concerned with the protection of fish and fish habitat, and use of fish. Any activity or physical work that may or does negatively affect any of these can result in charges being laid under the *Fisheries Act*.

The *Fisheries Act* has penalties for violations of the Act, including requirements to repair damage to the habitat, substantial fines and/or prison terms resulting in a criminal record. Convictions for multiple offences involving introducing deleterious substances into a fish habitat can be as severe as fines of \$1,000,000 per day and/or three years in jail.



Migratory Birds Convention Act

The *Migratory Birds Convention Act* commits Canada to protecting the special habitats and spaces used by migratory bird species in North America. The Act prohibits the deposit of “oil or oil wastes or any other substance harmful to migratory birds, in any waters or any areas frequented by migratory birds.” Mitigation measures must be incorporated into any project that may cause this result.

POLICY

Treasury Board Risk Management Policy

“It is government policy to identify, and reduce or eliminate, risks to its property, interests and employees, to minimize and contain the costs and consequences in the event of harmful or damaging incidents arising from those risks, and to provide for adequate and timely compensation, restoration and recovery.”

Risk management applies to all aspects of government operations, including hazardous materials and pollution. It must be part of a sound and complete project plan.

Treasury Board Guide to Monitoring Real Property Management

Organizations must fully assess the life cycle costs of each investment decision, including costs of acquisition, operation, maintenance, leasing and fit-up, renovation, divestiture and restoration; other costs related to the real property accountability framework (such as those incurred to preserve heritage buildings, to meet accessibility standards and to preserve the environment); direct and indirect costs of disposing of the property, such as realty fees, survey fees and decontamination costs; and grants in lieu of taxes.

Organizations should always be aware of the effect that their use of real property has on the environment. Government policy requires organizations to acquire, use and dispose of real property in a manner consistent with the principle of sustainable development.

Treasury Board Real Property Environment Policy

It is government policy to acquire, use and dispose of real property in a manner consistent with the principle of sustainable development. The Government of Canada has also made a commitment to implement a code of environmental stewardship, which affects some aspects of real property management.

ADVISORY PUBLICATIONS

The Responsible Authority's Guide to the Canadian Environmental Assessment Act
Canadian Environmental Assessment Agency

Sustainable Development Strategy, Department of Justice, December 1997

Acquisition and Disposal



1. *Environmental Considerations*

When acquiring or disposing of property through purchase, lease or sale, federal government departments and agencies must comply with Treasury Board policy, as well as with the sustainable development initiatives of the federal government.

On entering into such transactions, the organization must first determine the environmental condition of the subject property and establish whether it is, or can be made to be, environmentally compatible with its intended use. It must do so to avoid assuming potential environmental liabilities, in the case of acquisition, or the costs generated by such liabilities, in the case of disposal.

Before entering into a property transaction, an organization should conduct a property transfer assessment to establish whether any contamination exists.

Initially, this process will normally involve a document search and a review, supported by interviews with key people with knowledge of the property and obtain air photo analysis. This will confirm current and past ownership and the uses of the property. Depending on the results of the document search and interviews, the organization may make site visits to carry out an environmental site assessment for the property. This assessment will determine whether there is a need to investigate the situation further using sample collection and analysis.

When the custody of a property is being transferred from one government organization to another, there is not the same requirement to carry out a full environmental site assessment. However, the disposing organization must inform the acquiring or receiving organization of any conditions known to it.

There are benefits to both parties conducting an environmental site assessment. For the disposing organization, this will establish the state of the property at the

time of transfer, so that any subsequent contamination will then clearly be the responsibility of the acquiring or receiving organization. For the acquiring organization, the assessment will establish what the organization is acquiring or purchasing, including any identified environmental liabilities, which could substantially affect the value of the asset.

1.(a) Purchasing

The results of the site assessments will help ensure that the departments or agencies involved are environmentally and fiscally prudent in making their property acquisition decisions.

If the organization acquiring the property is acquiring it to allow a project to be delivered, then it must also ensure that the proposed project meets the requirements of the *Canadian Environmental Assessment Act* (CEAA), as described in the previous chapter, 'Planning.'

When an organization acquires a property, it may not need to get an environmental assessment done for the proposed operation of an existing physical work. The CEAA Exclusion List Regulations exclude such operations from assessments, provided that the operation has already been assessed and approved under either the CEAA or the previous Environmental Assessment Review Process Guidelines Order.

1.(b) Leasing

A leased property should be subject to the same property transfer assessment as that applied to a purchased property, to ensure that the lessor will inherit no environmental liabilities.

For leased properties, the environmental issues may be viewed from either the custodial or the tenant perspective. Although the actual environmental issues are similar, awareness of the differences between these perspectives should be maintained in reviewing the descriptions in this guide.

The leasing of real property falls under section 5(1)(c) of the CEAA.

If a federal authority is leasing out a property and the lease on that property is for the purpose of allowing a project to be carried out in whole or in part, then the project must be assessed for its environmental effects. The assessment must state, in detail, what the lessee intends to do with that property. Therefore, the lessor must ask the lessee to accurately describe all related functions and activities that will take place on the property.



If an environmental assessment indicates that significant negative effects are likely to result from the functions or activities to be carried out on the property, and that these effects cannot be mitigated, then the lease should not proceed.

It is not necessary for the lessor to conduct the assessment, but the lessor must ensure that the assessment meets the requirements of the CEAA. The decision to lease must be based on that prescribed assessment report.

Similarly, if a federal authority is the lessee of a property and proposes to carry out a project on that property, an assessment of the environmental effects of that project according to the CEAA will be required before the project can proceed. Additional details on the requirements of the CEAA can be found in the previous chapter, 'Planning.'

Aside from the requirements of the CEAA, other environmentally significant issues may be addressed in the leasing contract. These may include responsibility for operating and maintaining the building or the land, or responsibility for whatever environmental damage may result from certain activities or special circumstances, such as the operation of laboratory facilities, health care facilities and the like.

The agreement should require the lessee to properly clean up any contamination that occurs during the lessee's use of the property.

The environmental obligations for a short-term leased property are ordinarily more onerous for the owner (the lessor) than for the tenant (the lessee). In long-term leases of 25 years or more, the lessor's degree of legal responsibility for protecting the environment is less clear. In these cases, the courts may place a greater obligation on the lessee than is typically applied in short-term leases.

To ensure that lessees meet their environmental obligations, lessors may include clauses in their lease agreement that require the lessee to adhere to prescribed environmental requirements.

To ensure that they are protected from liability, lessors may require access to operational records at any time, and may conduct periodic site and facility inspections and environmental audits. Lessors should always include clauses in lease contracts to permit these activities. Consult the Department of Justice Canada regarding the wording and legal implications of these clauses.

Depending on the terms of the lease, the lessor may share environmental obligations or responsibilities with the lessee, but the lessor can never fully abrogate its responsibility to protect the environment. Similarly, as a lessee, the federal government will be responsible for adhering to the environmental obligations defined by the lessor in the leasing contract.

1.(c) Licensing

Like a lease, a licence granted on a federal property may have required the prior application of the CEAA. Although the licensor need not conduct the assessment, it must review the assessment and base its decision on that report. Additional details regarding the requirements of the CEAA can be found in the previous chapter, 'Planning.'

Under federal legislation, the owner of a property (the licensor) is ultimately responsible for any environmental obligations associated with a licence on a property for any activity. Depending on the terms of the licence, the licensor may share these environmental obligations or responsibilities with the licensee, but the licensor can never fully abrogate its responsibility to protect the environment.

To meet these obligations, licensors should include clauses in their licence agreements that require the licensee to adhere to environmental requirements, including the prescribed cleaning up and disposal of contaminants.

To ensure that they are protected from liability, licensors may require access to operational records at any time, and may conduct periodic site and facility inspections. Licensors should always include clauses in licence contracts to permit these activities. Consult the Department of Justice Canada regarding the wording and legal implications of these clauses.

1.(d) Disposal

When an organization has decided to dispose of a piece of real property, it must carry out the process in an environmentally responsible manner. As well, it must identify and address all potential legal liabilities, and any resultant costs.

The basic approach for ensuring, under reasonable circumstances, that there are no unknown environmental liabilities associated with a property is to conduct a property transfer assessment, also known as an environmental site assessment, or a site audit.

One of the principal objectives of a property transfer assessment is to identify contaminants and their sources, so that responsibility for mitigating them can be assigned to the appropriate party or parties. A prescribed clean up and disposal will then be carried out, if required.



2. Guidance

General – For All Transfer Transactions

An environmental site assessment must be conducted before the acquisition or the disposal is completed so that parties can avoid assuming an environmental liability when purchasing, leasing or disposing of a property that may carry an environmental risk.

The vendor or lessor usually conducts this site assessment at its cost, but the purchaser or lessee may need to conduct it for its own protection if the vendor or lessor is unwilling or unable to conduct it.

The National Classification System for Contaminated Sites, produced by the Canadian Council of Ministers of the Environment, is a valuable tool for classifying sites according to their potential for adverse impacts on the natural environment and on human health.

The site assessment and remediation process, which is also part of a property transfer assessment, is conducted in six phases:

- site information assessment;
- reconnaissance testing program;
- detailed testing program;
- preparation of decommissioning and clean-up plans;
- implementation of decommissioning and clean-up plans; and
- confirmatory sampling and completion report.

Phase I determines the historical uses of, and activities on, the site to ascertain the potential for contamination or environmental hazard. The historical uses of, and activities on, the surrounding properties should also be identified and assessed, since contaminants can migrate from the source of contamination onto adjacent lands.

The methods used in Phase I of the site assessment process include interviewing people familiar with the property and its history. Investigators will examine any available records, such as those retained by the present and previous property owners or those on file at municipal building departments, community tax assessment offices, local libraries and air photo analysis.

If an environmental hazard is known, or if contamination has occurred and has been reported, records should be on file with provincial or federal environmental departments or agencies.

If the document review or other historical research indicates a problem, inspectors will conduct a walk-through of the property to search for and assess any physical evidence of contamination or any other environmental hazard.

If they find evidence of a possible environmental problem, then a reconnaissance testing (Phase II) and detailed testing programs (Phase III) must be carried out to determine the character and the extent of the problem.

Contaminants may include such items as:

- leaking underground or above-ground fuel oil, or other storage tank systems;
- materials or products that may contain asbestos;
- light ballasts;
- fluorescent lamps;
- electrical equipment containing PCBs;
- various toxic substances; and
- heavy metals such as lead, cadmium and mercury.

The degree of contamination will be based on such parameters as the types of contaminants and their concentrations, and on the intended land use, and will be determined by the perceived risk to the natural environment and to human health.

All federal, provincial and territorial regulations, guidelines and standards are based on the relationship between the level of contamination, which varies according to the substances in evidence, and the proposed or existing use of the land, such as for industrial, commercial, residential, or public or park land. Land used for industrial purposes is considered able to tolerate the highest level of contamination, while residential and parkland can tolerate the lowest level.

If a contaminant is identified, experienced government or private sector organizations can conduct specific assessments.

The staff of the nearest regional office of Environment Canada may be able to assist in identifying appropriate resources. Refer to Appendix A for a list of these offices.

There are situations in which natural processes will work to remediate the contamination, if given sufficient time. Determining whether contamination of a



site can be naturally attenuated requires input from professional environmental specialists and should not be taken lightly. An improper decision could increase future clean up and disposal costs. Property or facility managers should get detailed guidance if they plan to ‘mothball’ a contaminated site.

If an environmental hazard presents a real threat to human health and welfare, or to the preservation of wildlife and the natural environment, immediate action must be taken to correct the situation.

Acquisition

If the site assessment process determines that an environmental hazard exists on the property and that a remediation program may be necessary, then the purchaser or lessee must determine what action should be taken, if it still wishes to acquire the property. If appropriate, it may consult designated staff of Environment Canada. (Refer to Appendix D)

Since the next three phases (IV, V and VI) of the site assessment process can be very time consuming and expensive, the purchaser or lessee will have to carefully consider whether the need for the subject property warrants this additional time and cost.

The purchaser or lessee may wish to proceed with the acquisition if the contaminated land is to continue to have a similar land use, and if existing contamination has not migrated, is predicted not to migrate and is not a threat to human health or to the natural environment.

It would be prudent, however, to keep and file a record, signed by the vendor or lessor, of the environmental situation on site at the time of acquisition. In these cases, it is always advisable to consult with legal services staff to determine the potential for future liability and ways to reduce or avoid liability.

The acquisition of contaminated land can be a risky venture, especially if remediation is not to be carried out. Contaminants may migrate over time, and remediating contaminated groundwater can be very costly. Also, if the site is not remediated, it could be difficult to sell later.

The federal lessee should make sure that it will not be held liable for existing problems or defects and that it will be responsible only for damages or impacts caused by its own occupation of the site.

When negotiating a lease or licence contract, parties must specifically address potential environmental issues and expressly state the responsibility for their management.

Environmental issues that parties may address, depending on their relevance, include:

- the transportation, handling and storage of toxic and hazardous substances;
- the management of hazardous waste;
- the management and storage of PCBs;
- the management, phase-out and storage of CFCs and HCFCs;
- the management — including reduction, reuse and recycling — of solid waste;
- site contamination;
- water conservation; and
- uncontrolled releases of pollutants into the air, water or land.

Where the lessee or licensee is responsible for property management and, particularly, for an operation on the property that clearly has environmental risks — such as a fuelling station, repair shop or bulk handling facility — then the lessor or licensor should retain the right to inspect the operation, to review the maintenance records, and/or to conduct periodic site and facility inspections at any time. The conditions and circumstances under which these rights are to be exercised should be clearly stipulated in the contract.

The contract should outline procedures for handling any concerns that come to light after a review or inspection. The contract should explicitly state the responsibilities of the respective parties or detail a process for establishing environmental responsibility.

Disposal

Before disposing of a property, the federal authority should make reasonable inquiries regarding the purpose for which the property is being purchased from the Crown. Refer to the Guidance section in the previous chapter, ‘Planning,’ for a more detailed discussion of the application of the CEAA process.

When a federal authority disposes of a property, an environmental assessment under the CEAA will be required if all of the following situations apply:

- the disposal is for the purpose of enabling a project to be carried out, in whole or in part;
- the details of the project are known, or can reasonably be discovered, at the time of disposal; and
- the project is not excluded from assessment for emergency reasons (unlikely) or pursuant to the CEAA Exclusion List Regulations.



Transfers of administration and control, authorized by the Governor in Council pursuant to sections 16(1)(e) and 16(1)(g) of the *Federal Real Property Act*, are not subject to the CEEA. However, Treasury Board real property policy limits use of section 16(1) to special circumstances.

When disposing of a property, the environmental condition of the property should be investigated. An environmental site assessment should be conducted to determine whether there are any conditions that may constitute an environmental hazard. Such conditions may include old lead paint finishes, the presence of asbestos, and soil contaminated with petroleum products, PCBs and other toxic materials.

Refer to Appendix A for a list of offices of Environment Canada. Staff there will be able to identify organizations able to provide such assessment services.

If the environmental site assessment shows that there is an environmental hazard that requires remediation, then the organization should discuss the relative merits of correcting the situation before the property is transferred versus negotiating with the potential purchaser to determine who should conduct the remediation.

Should the purchaser agree to carry out the remediation work, the vendor should consider the potential cost of the required remediation work. The vendor could then deduct this cost from the selling price of the property, or pay separate compensation to the purchaser. In either case, the vendor should always consult legal services staff.

The risks attached to a potentially contaminated property should also be taken into account when establishing a fair market price for that property. Sometimes, the cost of remediating a property will result in a zero or a negative market value. When this is the case, vendors may also consider providing compensation to the acquiring party to cover the remediation costs.

3. References

LEGISLATION

Canadian Environmental Protection Act (CEPA)

The CEPA was proclaimed into law in 1988 and is designed to protect Canadians from pollution caused by toxic substances. It provides the power to regulate the entire life cycle of toxic substances.

A person whose property is affected by the release of a toxic substance in contravention of the CEPA regulations has to report the matter to an inspector.

Costs related to measures to stop further release may be recovered against the landowner to the extent of the owner's negligence in contributing to the release.

Also, if contamination is occurring on a property, there is the potential for liability, even if that property has just been acquired and the contamination occurred before the acquisition. Penalties for an infraction under the CEPA can be as severe as fines of \$1,000,000 per day and/or imprisonment for five years. When a person in contravention of the Act "shows wanton or reckless disregard for the lives or safety of other persons and, thereby, causes bodily harm or death," that person may be prosecuted under the Criminal Code.

There is no general requirement for an environmental emergency plan under the CEPA. However, the Storage of PCB Material Regulations do require organizations to put fire protection and emergency procedures in place for PCB storage facilities.

Canadian Environmental Assessment Act (CEAA)

Regulations

Law List

Inclusion List

Exclusion List

Comprehensive Study List

Regulations Respecting the Coordination by Federal Authorities of
Environmental Assessment Procedures and Requirements

Federal Authorities Regulations

This Act, along with the first four listed regulations, was proclaimed into law on January 19, 1995, and replaces the *Environmental Assessment and Review Process Guidelines Order* of 1984.

Since the CEAA is law, the process outlined by the Act must be followed. The purpose of an environmental assessment under the CEAA (in most cases, an environmental screening) is to evaluate both the negative and positive environmental implications of a proposed project, before irrevocable decisions to implement it are made. While there are no penalties incorporated into the CEAA legislation, failure to conduct the required environmental assessment could allow an interested third party to obtain a court injunction against proceeding with the project.



POLICY

Treasury Board Real Property Environment Policy

The object of this policy is to help federal organizations protect and preserve the natural environment when they are acquiring, using and disposing of real property. It states that “before acquiring real property, departments must ascertain the environmental condition of the property and determine whether it is, or can be, made environmentally compatible with its intended use.”

It is government policy to acquire, use and dispose of real property in a manner consistent with the principle of sustainable development. The Government of Canada has also made a commitment to implement a code of environmental stewardship that affects some aspects of real property management.

The Real Property Environment Policy states, “In granting leases, licences, and easements, on federal real property, departments must ensure that the agreement provides for only those uses are consistent with the environmental condition of the property. The agreement must also require that the other party adhere to the relevant federal and/or provincial environmental legislation and clean up, to current federal standards, real property contaminated during the term of the agreement.”

Before disposing of real property, organizations must ascertain the environmental condition of the property. They are directly responsible for determining whether to undertake remedial action and for ensuring that such remediation is carried out

If it is advantageous to have the party acquiring the property carry out remediation, ensure that the acquiring party, as part of the transaction, guarantees that it will complete the remediation within a reasonable length of time.

These policy requirements do not apply to custody transfers between federal government departments or agencies. However, any information held by the transferring department or agency relating to the environmental condition of the property should be provided to the receiving organization.

STANDARDS

CAN/CSA-Z768-94, Phase 1 Environmental Site Assessment
CSA International

GUIDELINES

Treasury Board Guide to Monitoring of Real Property Management

Organizations must fully assess the life cycle costs of each investment decision, including costs of acquisition, operation, maintenance, leasing and fit-up, renovation, divestiture and restoration; other costs related to the real property accountability framework (such as those incurred to preserve heritage buildings, to meet accessibility standards and to preserve the environment); direct and indirect costs of disposing of the property, such as realty fees, survey fees and decontamination costs; and grants in lieu of taxes.

Organizations should always be aware of the effect that their use of real property has on the environment. Government policy requires organizations to acquire, use and dispose of real property in a manner consistent with the principle of sustainable development.

ADVISORY PUBLICATIONS

Sustainable Development Strategy, Department of Justice, December 1997

Standard Practice for Environmental Site Assessment: Phase I (Environmental Site Assessment Process)

ASTM Designation: E 1527 - 97

Standard Practice for Environmental Site Assessment: Phase II

ASTM Designation E1908-97

**Standard Practice for Environmental Site Assessments: Transaction Screen Process
Environmental Site Assessments, A Summary for Approved Lenders**

Canada Mortgage and Housing Corporation, 1994

**Contaminated Site Liability Report: Recommended Principles for a Consistent
Approach Across Canada**

Canadian Council of Ministers of the Environment, CCME-SPG-CGCSL-67E,
ISBN 0-919074, March 25, 1993

***Guidance Manual on Sampling, Analysis and Data Management for Contaminated
Sites, Volume I, Main Report and Volume II, Analytical Method Summaries***

Canadian Council of Ministers of the Environment, 1993, PN 1101

National Classification System for Contaminated Sites

Canadian Council of Ministers of the Environment, March 1992, PN 1005

Real Property Community Fact Sheet, Public Works and Government Services Canada



Guidance Document on the Management of Contaminated Sites in Canada
Canadian Council of Ministers of the Environment, 1997, PN 1279

Guidance Manual for Developing Site-Specific Soil Quality Remediation
Objectives for Contaminated Sites in Canada
Canadian Council of Ministers of the Environment, 1997, PN 1197

Sustainable Development Strategy, Public Works and Government Services Canada,
1997

Phase I Environmental Site Assessment Interpretation Guidelines
Canada Mortgage and Housing Corporation, 1994

Design



1. ***Environmental Considerations***

The *Canadian Environmental Assessment Act* (CEAA) states that a construction project must be assessed for its effects on the natural environment at the earliest possible stage in the delivery process, and before any irrevocable implementation decisions are made. This requirement applies to all new buildings and, in some cases, to an alteration to an existing building.

Regardless of any legal requirements, public concern for the natural environment may be such that a public information session related to the proposed construction is advisable in this case. An environmental assessment with reports — such as a financial analysis, space requirement studies, changed use demands or building condition reports — will be useful.

For new buildings, if the required environmental assessment can be completed before the programming and design of the project is finalized, the design must allow for measures to mitigate identified conditions that may threaten the natural environment.

The programming and design of the project should allow for a monitoring program. The CEAA requires a monitoring program to respond to the anticipated impact of the project's construction or operation on the natural environment and to determine the effectiveness of mitigation measures.

If the monitoring process shows that the mitigation measures are not as successful as expected, then the organization must devise more effective mitigation measures. This program is to be implemented early in the construction phase of the project and will sometimes proceed into the operation phase of the project.

With continuing government reorganization and review, property renovation, restoration, alteration, extension and reconstruction are becoming increasingly more important aspects of property management. The issues for renovation and reconstruction projects are similar to those for new construction.

For renovation or reconstruction projects, the CEAA requirements for an environmental assessment are limited by the scope of the project and its impact on the existing structure. A building or facility ‘footprint’ is the area occupied at ground level by that building and its ancillary structures, such as loading docks, covered access ways and connecting passageways. If the renovations or reconstructions do not increase the building footprint or height by more than 10 per cent, are not carried out within 30 metres of a body of water and do not involve the release of polluting substances into a water body, then no assessment is required under the CEAA. This is not to say that some form of environmental assessment will not be useful. It is always good environmental management practice to undertake an assessment to identify the likely effects of the project.

If the renovation or reconstruction project will result in an increase of greater than 10 per cent in the footprint or height of a building, will be carried out within 30 metres of a body of water or will involve the likely release of polluting substances into a water body, the CEAA will apply. Any mitigation measures identified in the assessment should be incorporated in the programming and design of the project and the management of its delivery. A more comprehensive description of the CEAA and its associated regulations is presented in the ‘Planning’ chapter.

To meet the commitment of the federal government to the philosophy of sustainable development, the project should be energy efficient and should use materials and methods effectively in order to preserve nature, including protected and endangered species and their habitat.

2. Guidance

The programming and design of a construction project can be an intricate and demanding task, proportional to the size and complexity of the project. It may involve a team of many professional designers and managers of various disciplines and backgrounds.

However, no matter what the size and complexity of the project, there will be opportunities to make choices between various alternatives with significant environmental implications.

When considering implementing any project, organizations should consult experienced design professionals, such as architects, engineers and other



specialists, early in the delivery process, and invoke the principles of responsible environmental design. Environmental assessment specialists should be working co-operatively with the design team right from the start of the design process.

If the environmental assessment has recommended mitigation measures, the organization must implement these measures to avoid any significant adverse environmental effects. These measures may relate to the actual facility design, such as measures to modify the design to reduce the unwanted effects of wind deflection. Or they may relate to the construction process, such as measures to protect a specific habitat during construction activities.

An organization should also include a monitoring program in the design and management process, to measure the effectiveness of the mitigation measures. This program will continue through the commissioning, occupation and facility operation phases of the project. The measures implemented for effective mitigation must be sufficiently flexible to permit the organization to incorporate alternative mitigation measures into the process if the monitoring program demonstrates that the original measures are not totally effective.

Organizations must address many subjects before and during the programming, design and construction process, including the following:

- the feasibility of, and the need to implement, the project;
- the facility location and siting options available;
- the predictable effects of their activities on land, water, air, and protected or endangered species of animals or vegetation;
- buffer zones, sensitive areas and noise abatement;
- the required integration with local services, such as power, communication, fuel, water supply, drainage and sewage systems;
- erosion prevention and dust control;
- any alternative design possibilities;
- the design's energy efficiency;
- mechanical systems, including heating, ventilation, cooling, plumbing and fire suppression systems;
- the design of lighting, power distribution, emergency power supply and communication systems;
- interior design, including finishes, furnishing and equipment;
- construction schedules, which should take into account periods when the environment is particularly sensitive;

- access to and from the site of the facility, and the effect on local traffic;
- equipment movement on land and over water;
- the effects of vegetation clearing, grubbing, stripping and disposal;
- methods of excavation, trenching, formation of embankments and grading;
- dredging and disposal of dredged material;
- the effects of site drainage, de-watering and water in-fill operations;
- drilling on land and over water;
- the management of solid waste disposal;
- the use, handling, storage and disposal of petroleum, oils, lubricant and hazardous materials;
- the use of quarrying and burrow pits;
- aggregate handling and storage; and
- measures and a monitoring program for mitigation.

For buildings that are to be altered, organizations should determine whether the planned renovation or reconstruction will

- increase the building or facility 'footprint' by more than 10 per cent;
- be carried out within 30 metres of a body of water; or
- involve the release of polluting substances into a water body.

If none of the conditions mentioned above occur, the project is excluded from assessment under the CEAA. If one or more of these conditions are met, the organization must assess the project for its impact on the natural environment.

In making environmentally sensitive design and specification decisions, and in an effort to achieve sustainable development, organizations should consider

- using products that minimize the use of original resources and energy, generate as little waste as possible and maximize the recovery of useful surplus reusable materials;
- using products that require less energy to extract, manufacture, ship, assemble and install than others;
- eliminating products that use tropical hardwoods or other rare or endangered tree species;
- using products or construction methods that minimize the use of sealants, adhesives and finishes that produce high levels of volatile organic compounds (VOCs);



- using products or types of equipment that do not contain or use chlorofluorocarbons (CFCs) or polychlorinated biphenols (PCBs); and
- using space dividers and other components that can be disassembled and reassembled for reuse when accommodation needs change.

This list is not exhaustive, but it does illustrate the general character and range of the issues an organization should address when undertaking a design to ensure that the design permits enhanced environmental performance.

Under environmental legislation, the property owner is usually responsible for compliance with regulations. The property owner may not be directly involved in an activity that results in an infraction, such as an infraction caused by a contractor working under the direction of a project manager. However, the owner may be held responsible if it cannot show that it exercised due diligence in maintaining its mandate, and that it ensured that proper procedures to protect the natural environment were defined and followed.

Requiring suppliers to reduce packaging when shipping, to ship in bulk or in reusable containers where possible, or to take back packaging material also reduces the environmental impact of the construction process.

3. **References**

LEGISLATION

Canadian Environmental Assessment Act (CEAA)

Regulations

Law List

Inclusion List

Exclusion List

Comprehensive Study List

Regulations Respecting the Coordination by Federal Authorities of Environmental Assessment Procedures and Requirements

Federal Authorities Regulations

This Act, with its first four regulations, was proclaimed into law on January 19, 1995, and replaces the *Environmental Assessment and Review Process Guidelines* Order of 1984.

Since the CEAA is law, the process outlined by the Act must be followed. The purpose of an environmental assessment under the CEAA (in most cases, an environmental screening) is to evaluate the negative and positive environmental

implications of a proposed project before irrevocable decisions to implement the project are made.

While there are no penalties incorporated into the CEAA legislation, failure to conduct the required assessment could lead to a court order forcing the proponent to stop the execution of the project until a CEAA assessment is completed.

Canadian Environmental Protection Act (CEPA)

The CEPA was proclaimed into law in 1988 and is designed to protect Canadians from pollution caused by toxic substances. It provides the power to regulate the entire life cycle of toxic substances.

A person whose property is affected by the release of a toxic substance in contravention of the CEPA regulations has to report the matter to an inspector.

Costs related to measures to stop further release may be recovered against the landowner to the extent of the owner's negligence in contributing to the release.

Also, if contamination is occurring on a property, there is the potential for liability, even if that property has just been acquired and the contamination occurred before the acquisition. Penalties for an infraction under the CEPA can be as severe as fines of \$1,000,000 per day and/or imprisonment for five years. When a person in contravention of the Act "shows wanton or reckless disregard for the lives or safety of other persons and, thereby, causes bodily harm or death," that person may be prosecuted under the Criminal Code.

There is no general requirement for an environmental emergency plan under the CEPA. However, the Storage of PCB Material Regulations does require organizations to put fire protection and emergency procedures in place for PCB storage facilities.

Fisheries Act

The *Fisheries Act* is concerned with the protection of fish and fish habitat, and people's use of fish. Any activity or physical work that may or does negatively affect any of these can result in charges being laid under the *Fisheries Act*.

The *Fisheries Act* has penalties for violations of the Act, including requirements to repair damage to habitat, substantial fines and/or prison terms with a criminal record. Convictions for multiple offences involving introducing deleterious substances into fish habitat can be as severe as fines of \$1,000,000 per day and/or three years in jail.



Migratory Birds Convention Act

The *Migratory Birds Convention Act* commits Canada to protecting the special habitats and spaces used by migratory bird species in North America. The Act prohibits the deposit of “oil or oil wastes or any other substance harmful to migratory birds, in any waters or any areas frequented by migratory birds.” Mitigation measures must be incorporated into any project that may cause this result.

Navigable Waters Protection Act

The *Navigable Waters Protection Act* requires approval for any work that may affect navigable waters, which are defined as “a canal and any other body of water, created or altered as a result of the construction of any work.” This general definition means that any water body is covered by the Act if it can be navigated by any type of watercraft, from a canoe to an ocean liner.

Fisheries and Oceans (FO) will grant approval only if the project has been assessed environmentally and has obtained a satisfactory screening decision from FO. Without a permit, the project cannot proceed. Failure to comply with the Act may result in a court injunction against continuing with the project, granted either to FO or to an interested third party.

Transportation of Dangerous Goods Act (TDGA) and Transportation of Dangerous Goods Regulations

To control the transportation of dangerous goods by air, sea, rail and road in order to promote public safety and protect the environment during transport, the TDGA was proclaimed in 1980. The Act and regulations require clear identification of dangerous goods under one of nine categories; proper containers and packaging; and training for employees shipping, receiving and transporting dangerous goods. The Act does not cover waste products, which are covered by separate legislation.

This list is not exhaustive. However, it indicates the variety and extent of federal legislation and policy positions that may affect the design and construction of a facility.

To ensure a comprehensive review of the legislative and regulatory requirements affecting a project, organizations should consult an environmental assessment specialist early in the planning process.

POLICY

Treasury Board Real Property Environment Policy

It is government policy to acquire, use and dispose of real property in a manner consistent with the principle of sustainable development. The Government of Canada has also made a commitment to implement a code of environmental stewardship, which affects some aspects of real property management.

STANDARDS

Model National Energy Code for Buildings, Natural Resources Canada, Office of Energy Efficiency

Design for the Environment, CAN/CSA-Z762-95,
CSA International

ADVISORY PUBLICATIONS

An Architect's Guide for Sustainable Design of Office Buildings

Public Works and Government Services Canada, March 1996

To order: e-mail : doc.centre@pwgsc.gc.ca, fax (613) 736-2029

C2000 Program for Advanced Commercial Buildings

CANMET Energy Technology Centre, Natural Resources Canada, April 1996

The National Master Specification

Construction Specifications Canada

This text base, devised as a master construction specification, will be used as a basis for contract documents for federal construction projects. It contains references to environmentally friendly methods and materials for construction and disposal

Construction



1. *Environmental Considerations*

1.(a) **New Construction**

New construction undertaken by a federal organization that is listed in Schedule I or II of the *Financial Administration Act* will be governed by the *Canadian Environmental Assessment Act* (CEAA). Consequently, construction works and methods are subject to CEAA requirements.

If the final design of the facility has met the requirements of the CEAA as outlined in the ‘Design’ chapter, the management of the construction phase of the project should also meet these requirements.

In most cases, the proposed facility will be constructed in accordance with the approved bid documentation for the final project design. However, in some cases, an organization may issue addenda during the bidding process or modify the scope of the construction contract using approved change orders during construction.

For construction projects, organizations should address issues related to the federal government’s commitment to sustainable development. These include matters such as reducing resource use, reducing waste generated by the federal government and its activities, creating efficient and effective design, using energy efficiently, and preserving special natural spaces, as well as any protected or endangered species. Refer to the ‘Guidance’ section of this chapter for details.

When a government organization owns a property, many pieces of environmental legislation hold this owner ultimately responsible for ensuring that the requirements of that legislation are met. Organizations should recognize these requirements and integrate them into the bid documents and construction contracts for the project.

Consult legal services staff to ensure that the clauses covering these matters, in addition to causing the implementation of the necessary protective practices, adequately protect the organization from environmental liabilities and possible prosecution.

1.(b) Renovation and Alteration

Any federal government department or agency that undertakes a renovation, restoration, alteration, addition, extension or reconstruction project that directly affects and alters an existing structure or building related to a facility must meet the requirements of the *Canadian Environmental Assessment Act* (CEAA). For additional information, refer to the Design section.

Renovation or alteration activities, as with any construction operation, may also be subject to the requirements of other federal legislation, such as the *Migratory Birds Convention Act* or the *Fisheries Act*. These pieces of legislation are put in place to preserve and maintain a clean and healthy natural environment. Sound project management will ensure that the activities undertaken in delivering the proposed project will not contravene the provisions of these Acts by introducing pollutants, including hazardous or toxic substances, into the environment.

The federal government aims to reduce its overall waste by 50 per cent of 1988 levels by the end of this century. To contribute to this goal, organizations should identify and examine their construction waste from an environmental management perspective.

Construction waste constitutes close to a third of all solid waste in Canada, and efforts to divert it from landfill sites will have a significant positive impact on the environment. It is important to select and separate types of solid waste at source, and to prevent contamination on site. To manage solid wastes effectively, an organization will provide separate waste bins for separate waste streams, and will educate construction crews in the benefits of participation. The other important task is to find receivers, recyclers and reusers for the waste at realistic costs.

The paragraphs under ‘Construction of New Projects’ in this chapter also apply to renovation and alteration work. However, when a building is altered, the main difference in the construction process is that dismantling and removals are carried



out. Refer to the ‘Demolition and Dismantling’ chapter to find out more about the environmental concerns related to these activities.

2. Guidance

Constructing new buildings for facilities, or renovating or altering existing facilities, can be intricate and demanding undertakings, proportional to the size or complexity of the project. They may involve many skilled and experienced managers, expeditors, co-ordinators, tradespeople and professional consultants from a wide range of disciplines.

However, even relatively simple projects will present opportunities to make choices between various alternatives with significant environmental implications.

When undertaking a construction project, organizations should consult competent professionals — such as project managers, architects, engineers, technologists, specification writers, quantity surveyors, cost engineers and inspectors — early in the process, and invoke the principles of environmentally responsible project management and construction practices.

Environmental assessment specialists should be working with the entire project management team from the beginning of the process.

An organization must integrate measures to mitigate environmental hazards into the construction process and related practices. It must also monitor the effectiveness of these measures throughout the construction period and during the commissioning, occupation and operation phases of the project.

The mitigation measures must be sufficiently flexible to permit alternative measures to be incorporated into the process if the monitoring program shows that the original measures are not totally effective.

Under environmental legislation, the property owner is usually responsible for compliance with regulations. The property owner may not be directly involved in an activity that results in an infraction, such as an infraction caused by a contractor working under the direction of a project manager. However, the owner may be held responsible if it cannot show that it exercised due diligence in maintaining its mandate, and that it ensured that proper procedures to protect the natural environment were defined and followed.

Among the subjects related to the construction process that organizations must consider for their environmental impact are the following:

- the location, on site, of construction management facilities and services;

- the predicted effects of their activities on land, water and air;
- the protection of special, protected or endangered species;
- buffer zones, protection of sensitive areas and noise abatement;
- construction schedules, which should take into account periods when the environment is particularly sensitive;
- access and the effect on local traffic;
- the movement of equipment on land and over water;
- the clearing of vegetation, including grubbing, stripping and disposal;
- excavation, trenching, the formation of embankments and grading;
- drainage, de-watering and water in-fill operations;
- drilling, on land and over water;
- dredging and disposal of dredged material ;
- erosion prevention and dust control;
- specifications for structural elements, envelope and exterior finishes;
- mechanical systems, including steam/hot water, heating, ventilation, exhaust, cooling, plumbing, fire suppression, conveying and industrial processing systems;
- power generation, transformer, distribution, lighting and emergency power supply systems;
- connection and integration with local services, such as communication, power, fuel, water supply, drainage and sewage systems;
- solid waste disposal;
- the use, handling, storage and disposal of petroleum, oils and lubricants;
- the use, handling, storage and disposal of hazardous materials;
- the use of quarrying and borrow pits, as well as aggregate handling and storage;
- the continued safe, effective operation of existing facilities closely affected by construction operations; and
- required mitigation measures and a monitoring program.

To be environmentally responsible in the construction process, organizations should consider taking the following actions, if they have not already done so during the design and specification phase:



- using products that minimize the use of original resources and maximize the recovery of useful surplus reusable materials;
- scheduling construction activities and using procedures to minimize energy use as much as possible;
- using construction methods that minimize the use of sealants, adhesives and finishes that produce high levels of volatile organic compounds (VOCs);
- using products or types of equipment that do not contain or use chlorofluorocarbons (CFCs) or polychlorinated biphenols (PCBs);
- eliminating products that use tropical hardwoods or other rare or endangered tree species; and
- using mechanical fasteners that allow building elements to be disassembled and reassembled when accommodation needs change.

These matters should be discussed with the entire project team to maximize the efficiency and effectiveness of the construction program.

3. References

LEGISLATION

Canadian Environmental Assessment Act (CEAA)

Regulations

Law List

Inclusion List

Exclusion List

Comprehensive Study List

Regulations Respecting the Coordination by Federal Authorities of Environmental Assessment Procedures and Requirements

Federal Authorities Regulations

This Act, with its first four regulations, was proclaimed into law January 19, 1995, and replaces the Environmental Assessment and Review Process Guidelines Order of 1984.

Since the CEAA is law, the process outlined by the Act must be followed. The purpose of an environmental assessment under the CEAA (in most cases, an environmental screening) is to evaluate the negative and positive environmental implications of a proposed project before irrevocable decisions to implement the project are made.

While there are no penalties incorporated into the CEAA legislation, failure to conduct the required assessment could lead to a court order forcing the proponent to stop the execution of the project until a CEAA assessment is completed.

Canadian Environmental Protection Act (CEPA)

The CEPA was proclaimed into law in 1988 and is designed to protect Canadians from pollution caused by toxic substances. It provides the power to regulate the entire life cycle of toxic substances.

A person whose property is affected by the release of a toxic substance in contravention of the CEPA regulations has to report the matter to an inspector.

Costs related to measures to stop further release may be recovered against the landowner to the extent of the owner's negligence in contributing to the release.

Also, if contamination is occurring on a property, there is the potential for liability, even if that property has just been acquired and the contamination occurred before the acquisition. Penalties for an infraction under the CEPA can be as severe as fines of \$1,000,000 per day and/or imprisonment for five years. When a person in contravention of the Act "shows wanton or reckless disregard for the lives or safety of other persons and, thereby, causes bodily harm or death," that person may be prosecuted under the Criminal Code.

There is no general requirement for an environmental emergency plan under the CEPA. However, the Storage of PCB Material Regulations SOR/92-507 does require organizations to put fire protection and emergency procedures in place for PCB storage facilities.

Fisheries Act

The *Fisheries Act* is concerned with the protection of fish and fish habitat, and people's use of fish. Any activity or physical work that may or does negatively affect any of these can result in charges being laid under the *Fisheries Act*.

The *Fisheries Act* has penalties for violations of the Act, including requirements to repair damage to habitat, substantial fines and/or prison terms with a criminal record. Convictions for multiple offences involving introducing deleterious substances into fish habitat can be as severe as fines of \$1,000,000 per day and/or three years in jail.

Migratory Birds Convention Act

The *Migratory Birds Convention Act* commits Canada to protecting the special habitats and spaces used by migratory bird species in North America. The Act



prohibits the deposit of “oil or oil wastes or any other substance harmful to migratory birds, in any waters or any areas frequented by migratory birds.” Mitigation measures must be incorporated into any project that may cause this result.

Navigable Waters Protection Act

The *Navigable Waters Protection Act* requires approval for any work that may affect navigable waters, which are defined as “a canal and any other body of water created or altered as a result of the construction of any work.” This general definition means that any water body is covered by the Act if it can be navigated by any type of watercraft, from a canoe to an ocean liner.

Fisheries and Oceans (FO) will grant approval only if the project has been assessed environmentally and has obtained a satisfactory screening decision from FO. Without a permit, the project cannot proceed. Failure to comply with the Act may result in a court injunction against continuing with the project, granted either to FO or to an interested third party.

Transportation of Dangerous Goods Act (TDGA) and Transportation of Dangerous Goods Regulations

To control the transportation of dangerous goods by air, sea, rail and road in order to promote public safety and protect the environment during transport, the TDGA was proclaimed in 1980. The Act and regulations require clear identification of dangerous goods under one of nine categories; proper containers and packaging; and training for employees shipping, receiving and transporting dangerous goods. The Act does not cover waste products, which are covered by separate legislation. This list is not exhaustive. However, it indicates the variety and extent of federal legislation and policy positions that may affect the design and construction of a project.

To ensure a comprehensive review of the legislative and regulatory requirements affecting a project, organizations should consult an environmental assessment specialist early in the planning process.

POLICY

Treasury Board Real Property Environment Policy

It is government policy to acquire, use and dispose of real property in a manner consistent with the principle of sustainable development. The Government of Canada has also made a commitment to implement a code of environmental stewardship, which affects some aspects of real property management.

ADVISORY PUBLICATIONS

An Architect's Guide for Sustainable Design of Office Buildings

Public Works and Government Services Canada, March 1996

To order: e-mail : doc.centre@pwgsc.gc.ca, fax (613) 736-2029

British Research Environmental Evaluation Method (BREEM), The Building Research Establishment

C2000 Program for Advanced Commercial Buildings

CANMET Energy Technology Centre, Natural Resources Canada, April 1996

National Master Specification

Construction Specifications Canada

This text base, devised as a master construction specification, will be used as a basis for construction documents for federal construction projects. It contains references to environmentally friendly methods and materials for construction and disposal.

Commissioning



1. *Environmental Considerations*

Commissioning is the comprehensive process of verifying that a facility, and its systems, are designed and constructed in accordance with the construction contract documents and that it will function as the client, usually the owner, requires.

The process begins when the bid documents are virtually complete. It includes a systems risk assessment and a review of the approved, 90-per-cent completed technological design and specifications, along with related documents, such as the project manual. This process ensures that the documents, designs and specifications reflect the client's requirements, and that they effectively communicate these requirements to contractors and inspectors.

Once the construction contract is entered into, this process continues through the construction phase to ensure that the requirements described by the working drawings, schedules and specifications are properly executed, and that the resulting facility reflects the client's intentions.

Throughout the construction phase, commissioning is carried out using a systematic process of monitoring, testing, balancing, observing and recording observations. All of these activities are designed to transform the building systems from a static to a dynamic state of operation.

This testing applies first to individual components, and then to the integrated systems of the building or facility, such as the heating, ventilation and air conditioning systems; the plumbing and fire suppression systems; the electrical services; the communications systems; systems to detect fire or other hazards; the security and emergency response systems; the conveying systems, such as elevators, lifts and escalators; and the environmental impact monitoring system. Commissioning will continue after occupancy to ensure that all systems operate effectively under all anticipated conditions for at least a year and, in certain specified circumstances, beyond that.

The operation and maintenance conditions for the various individual and combined systems will be specific to the particular facility. The commissioning process must ensure that the property management staff is thoroughly familiar with these unique conditions.

To train staff effectively, the facility's chief of operations should work closely with the commissioning team from the day the first piece of equipment arrives at the construction site right through the construction process to occupancy.

This approach to training should extend to the entire operations and maintenance staff, with members brought into the commissioning process as the construction proceeds, until the entire staff has been included and the facility is ready for occupation.

In any complex facility, the primary integrated systems may be made up of many secondary and tertiary systems. To ensure that all the systems and subsystems operate as intended at their designed level of efficiency, a comprehensive program to monitor their performance is essential.

Before the design and construction team can turn over responsibility for running the building to the property and facility management team, it must compile complete documentation for the property managers. These documents include:

- contract design documents, including drawings and specifications, and related inspection reports, including the environmental screening, environmental assessment and other specialized reports;
- 'as built' drawings, schedules and specifications of the facility and of its various systems and subsystems;
- descriptive lists of materials, products and components used to construct the project;
- energy efficiency reports;
- response procedures for environmental and other emergencies;



- performance reports from the commissioning process itself; and
- operation and maintenance manuals, developed for the facility's systems and subsystems.

The environmental concerns at issue in the commissioning process are generally those that apply to the operation and maintenance phases of a facility. For more information, refer to the 'Operation and Maintenance' chapter. As well, the monitoring and mitigation measures described under 'Program Planning' and 'Project Planning and Site Selection' in the 'Planning' chapter may be relevant to the commissioning process.

2. Guidance

Activities that organizations should consider early in the design and commissioning stages include:

- conserving energy by using more efficient mechanical and electrical systems;
- improving indoor air quality for a healthier, more comfortable working environment;
- selecting more durable systems for better performance on a life cycle basis; and
- ensuring that systems are designed and constructed properly the first time so that the organization doesn't need to replace components or systems prematurely.

At the operational testing stage, the subsystems will be tested for the first time or, at least, for the first time as part of an integrated system. In that situation, the system as a whole may be more susceptible to failure. Care must be exercised to ensure that there are adequate procedures in place to deal with any toxic spills or excessive emissions that might occur.

Such procedures must be discussed with the property and facility managers, the project manager, and design consultants, inspectors, construction contractors, major installation trades and service suppliers, as well as the occupant representatives. This will ensure maximum awareness and co-operation during the commissioning process, and provide a sound basis for a continuing effective relationship throughout the extended post-construction and occupancy phase of the commissioning.

Interim commissioning reports should be made available at significant points of the project. These points include when the technological design is complete; when the bid documents are 90-per-cent complete; when construction is substantially

finished; after the integrated systems have been tested; and the end of the commissioning process.

The property and operations management and their support staff must review these interim reports and the final report, as well as the operation and maintenance manuals developed during the commissioning process. Such reviews will familiarize them with the characteristics and performance standards of the facility, and help them focus on potential concerns and any future enhancements that may be developed.

3. *References*

STANDARDS

Commissioning of Health Care Facilities, CAN/CSA-Z318.0-93
CSA International

Demolition and Dismantling



1. *Environmental Considerations*

It is sometimes necessary to demolish all or part of a structure or building that has served its purpose, and to remove that which is demolished. An organization can considerably mitigate the environmental impact of such work by carefully using dismantling and disassembly processes.

As part of its effort to reduce the amount of solid waste it generates, the Government of Canada is investigating opportunities to conserve and recycle building materials by dismantling or disassembling existing structures and buildings, rather than demolishing them. The solid waste generated during the demolition phase of these kinds of projects is a significant environmental issue.

Growing experience in North America indicates that dismantling can be more cost effective than the usual demolition approach, partly because it reduces the quantities of waste sent to landfills. Documented case studies in British Columbia, Ontario, New Brunswick (by CMHC) and Nova Scotia have demonstrated that organizations can divert a significant amount of waste, reducing landfill tipping fees and some costs for heavy equipment.

Considerable amounts of reusable and recyclable material can usually be recovered from buildings intended for demolition or major renovation.

Construction waste contributes almost one third of the solid waste being sent to landfill sites, with the products of demolition making up a significant proportion of this amount.

The careful dismantling or disassembly process, designed to yield reusable or recyclable materials, will often be more time consuming and labour intensive than current demolition methods. However, the labour is generally unskilled, and

organizations can usually avoid charges for expensive equipment and the use of sophisticated explosive systems. Modest revenues may be realized.

In time, as the practice of dismantling becomes more common, costs may actually decrease as more efficient techniques are developed. Savings may increase because tipping fees are likely to continue to rise, and revenue may increase if the construction industry's demand for reusable and recycled material rises.

2. Guidance

Determine whether the building to be demolished has a floor area of 1,000 square metres or more, and whether the demolition will have one or more of the following characteristics:

- it is carried out within 30 metres of a body of water;
- it involves the predictable release of polluting substances into a body of water;
or
- it is carried out within 30 meters of another building.

If so, an assessment under the CEAA will be required.

If mitigation measures can stop significant adverse environmental effects from occurring, an organization must plan, implement and monitor these measures as part of the project management process. Such measures may include specific procedures required to deal with hazardous substances, such as asbestos. As well, during demolition activities to renovate or alter a facility, an organization may need to take measures to protect the health and safety of the facility's users, as well as any environmentally sensitive areas.

The organization should review any renovation or alteration project with the design and management team to determine whether it can use the dismantling approach rather than conventional selective demolition. Discuss not only which materials can be directed away from the usual waste stream, but also which materials could be reused in the reconstruction of the project itself.

When submitting bids for a demolition or dismantling project, contractors should survey the structure in question and submit the survey as part of their bid. This survey will include an inventory of the type and quantity of material that can be reused, refurbished, recycled or discarded.

Business directories, such as the Yellow Pages, list companies that specialize in collecting and distributing reusable construction materials or reselling hardware supplies. The Canadian Waste Exchange, a local or provincial waste exchange,



and local construction associations may be able to provide a list of their members, some of which may be interested in purchasing materials from dismantling projects.

To protect workers and occupants, especially those in a facility being renovated or altered, a hazardous substances survey of the facility should also be done before work commences. This will generally include a list of toxic or hazardous materials recognized in federal or provincial regulations or guidelines. At a minimum, it should include common hazards such as asbestos, lead paint and PCBs. The staff of the local Environment Canada office (refer to Appendix A for a list of offices) or the provincial ministry of the environment may be able to help.

Currently, most companies specializing in dismantling are small, with limited assets and capital resources. Their labour force usually has lower levels of skill and training. The owner's project manager for a dismantling project should, therefore, make sure that all the required protection, liability insurance and worker's compensation coverage is in place. It will also be prudent to supervise the project closely, especially at particularly critical or risky stages.

Large demolition projects can benefit from a dismantling approach as well. Empire Stadium in Vancouver, a 30,000-seat outdoor track and field stadium, was successfully dismantled recently, and approximately 65 per cent of the materials removed were diverted from landfill. Other large-scale examples exist. Scale, therefore, is not necessarily the determining factor in making a decision to dismantle.

3. References

LEGISLATION

Canadian Environmental Assessment Act (CEAA)

Regulations

Law List

Inclusion List

Exclusion List

Comprehensive Study List

Regulations Respecting the Coordination by Federal Authorities of
Environmental Assessment Procedures and Requirements

Federal Authorities Regulations

This Act, along with the first four listed regulations, was proclaimed into law on January 19, 1995, and replaces the *Environmental Assessment and Review Process Guidelines Order* of 1984.

Since the CEAA is law, the process outlined by the Act must be followed. The purpose of an environmental assessment under the CEAA (in most cases, an environmental screening) is to evaluate both the positive and negative environmental implications of a proposed project, before irrevocable decisions are made.

While there are no penalties incorporated into the CEAA legislation, failure to conduct the required environmental assessment could allow an interested third party to obtain a court injunction against proceeding with the project.

Provincial legislation on solid waste management (anticipated)

Ontario may extend its waste audit and waste planning legislation to apply to renovation and reconstruction projects. Such an extension would mean that these projects would have to be redesigned to incorporate reuse, recovery and recycling possibilities in the demolition or dismantling phase of the work. The results of this revised plan would have to be kept on file and made available to the provincial government for review. Similar legislative approaches in other jurisdictions can be anticipated as well.

Canada Labour Code, Part II

“The purpose of this Part is to prevent accidents and injury to health arising out of, linked with or occurring during employment to which this Part applies.” (s122.1)

“Every employer shall ensure that the safety and health at work of every person employed by the employer is protected”. (s124).

Conviction for an offence under the Canada Labour Code can result in substantial personal fines, up to \$1,000,000 per day, and/or a prison term with a criminal record.

Code of Environmental Stewardship

POLICY

Treasury Board Real Property Policy

It is government policy to acquire, use and dispose of real property in a manner consistent with the principle of sustainable development. The Government of



Canada has also made a commitment to implement a code of environmental stewardship, affecting some aspects of real property management.

ADVISORY PUBLICATIONS

An Architect's Guide for Sustainable Design of Office Buildings

Public Works and Government Services Canada, March 1996

To order: e-mail : doc.centre@pwgsc.gc.ca, fax (613) 736-2029

Operation and Maintenance



1. Environmental Considerations

The operation and maintenance of real property owned by the federal government includes a wide spectrum of functions and activities that may require prior assessment under the *Canadian Environmental Assessment Act (CEAA)*.

Other federal legislation, such as the *Canadian Environmental Protection Act*, the *Fisheries Act*, the Canadian Labour Code, the National Fire Code of Canada, the *Transportation of Dangerous Goods Act* and the Workplace Hazardous Materials Information System, directs or influences the management of many operation and maintenance functions.

Commitments of co-operation between the federal and provincial governments, based on provincial legislation in areas such as air quality and emissions, water supply management and sewage disposal, waste management and management of storage tank systems, will significantly affect a facility's operation. Each of these issues will be addressed in this chapter.

1.(a) Environmental Audits

An environmental audit provides management with the information it needs to effectively manage any and all environmental issues on its properties.

An audit systematically applies criteria, determined by agreement among responsible parties, to evaluate how effectively the management of the audited property meets clearly defined objectives.

The scope of an environmental audit will vary depending upon the needs of the organization. To some degree, each audit will be unique. A basic methodology is described under 'Guidance' in this chapter.

Generally, environmental audits determine the status of management and operational practice with respect to environmental legislative and policy requirements.

This information will determine whether a property is being successfully managed, as well as whether regulatory and policy compliance is not satisfactory and management or operational practices need to be strengthened.

As well, this audit provides facility and property managers with clearly defined actions that they need to incorporate into their property management plans and budgets.

By conducting environmental audits, an organization can demonstrate 'due diligence' in its effective management of the property. This will be crucial if the organization faces charges related to an involuntary infraction of environmental legislation.

Environmental Emergency Planning

By establishing procedures to respond to an environmental emergency, an organization should be able to deal with such emergencies effectively, just as it deals with other emergencies, such as a fire.

The essence of environmental emergency planning is to designate on-site staff to carry out specific tasks in the event of an emergency, and to contact the appropriate authorities for assistance.

An environmental emergency response plan forms a basic, high-priority element in an overall facility environmental management plan and minimizes an emergency's effects. The plan can help an organization prove due diligence if Environment Canada or a provincial authority undertakes enforcement or prosecution actions as the result of such an emergency.

Asbestos

Asbestos has been incorporated into a wide variety of building products used in many kinds of buildings. These products include strengthening fibres in cement cladding and shingles, plaster wallboard, tile and flooring substrates, insulation for pipes and air ducts, sprayed-on insulation and fire protection materials.

The health hazards associated with asbestos are widely known and experienced. If the asbestos is in a fibrous, friable state – if it can be crushed to fine, individual fibres just by using hand pressure – it then poses environmental and health hazards.



When friable asbestos is disturbed, it can be inhaled so that it lodges in and damages the lungs, a condition called asbestosis. The asbestos fibres cannot be dislodged. Eventually, the fibres destroy much of the victim's lungs; the victim cannot breathe without assistance and may die from the condition. Consequently, strategies have been developed to protect workers and the public from asbestos in the environment.

Asbestos is specifically regulated under federal law in the Asbestos Mines and Mills Release Regulations of the *Canadian Environmental Protection Act*. Its use in the workplace, however, is regulated by the Canada Labour Code and by the Treasury Board Procedures for Occupational Exposure to Asbestos.

Solid Waste Management

By far the largest component of solid waste is paper. Other typical materials are cardboard, plastic, metals, glass, kitchen wastes and construction materials. Until recently, landfill sites were the most common method of disposing of solid waste. Incineration was less common.

However, throughout Canada, landfill sites are at or near capacity, and new sites are increasingly difficult to establish and expensive to acquire and operate. This situation has made it necessary to reduce and more effectively manage the solid waste produced from all sources.

The Government of Canada has made a commitment to divert 50 per cent of its waste from landfills by the year 2000, with 1988 as the base year. This has meant an increasingly higher profile for the principles of the 'four Rs': **reduce, reuse, recycle, recover**.

The first of these four principles, **reduce**, is by far the most effective of these options. Not only does it ease the burden that primary resource extraction, manufacturing processes, energy use and product distribution place on the environment, but it also greatly reduces the cost of operations. Some examples of effective reduction practices include purchasing only materials needed for the task at hand; using both sides of a piece of paper; circulating memos and periodicals instead of distributing individual copies; purchasing durable products that can be repaired instead of replaced; and designing and building for flexibility.

Reuse is the second-most effective strategy for waste reduction because it derives the maximum use from a product before it is discarded, and eliminates the energy and other material required for the recycling process. Reusable items include computer disks, envelopes, binders and file folders.

Recycling has become a very prominent element in waste reduction strategies at all levels of society. Most people support recycling programs if they do not

demand too much extra work. For a facility, the contribution that property management staff alone can make to the volume of material being recycled is considerably less than the contribution that can be made by involving building occupants.

There are two distinct situations: one in which the building is occupied by a custodial department or organization (the owner) and the other in which the building is either partially or fully occupied by a tenant. In the first situation, property management can influence the organization's decisions by setting out the costs and benefits of a strong waste management program and its contribution to the Government of Canada's solid waste reduction objectives. Property management can further support this initiative by setting up the recycling system and providing information for building occupants. In the second instance, property management should set an example by providing information on the costs and benefits of recycling, and should make it simple for tenants to participate in a recycling program.

Since the main imposition related to recycling is the need to carefully segregate materials at the source, the most effective way to encourage tenants to participate in a recycling program is to provide waste bins for each of the kinds of products to be recycled. Also, it is essential to issue helpful advice for simplified procedures and to engage contractors that will accept materials for recycling. With these initiatives in place, property managers can implement a highly effective and efficient recycling program.

The most common recycled product is fine paper, but a wide variety of other products can be recycled, including low-grade paper such as newsprint, corrugated cardboard, plastics marked with the 'recyclable' symbol, glass, metal, natural and synthetic rubber, wood products, and fabrics and woven materials.



The last 'R', for **recovery**, refers to the practice of recovering materials that have already entered the waste stream. It is most common with liquid wastes, but has been applied to solid wastes as well. In fact, some landfill sites in the north-eastern United States are being 'mined' to recover valuable materials that were thrown out years ago. Recovery, however, is not a very significant issue in property management at this time.

The federal government has minimal legislative and regulatory framework for diverting waste, but a much stronger framework is developing at the provincial level. Ordinarily, provincial laws and regulations do not apply to the federal



government, although some provinces are testing this concept with legislation that states that it is binding on the federal government.

As a demonstration of sound practical management, federal government operations should meet provincial requirements because provincially regulated companies handle wastes and dispose of them in municipally or provincially regulated landfills.

An example of the provincial regulation is Ontario's new Waste Audits and Waste Reduction Plans O. Reg. 102/94 and Industrial, Commercial and Institutional Source Separation Programs O. Reg. 103/94 under the provincial *Environmental Protection Act* — the 'three Rs' regulations. These regulations require facility audits and waste management plans for facilities that exceed a specified floor area. Similar initiatives can be expected in other provinces in the future.

Recycling programs can be carried out incurring only a slight expense, or they may even generate modest revenues, but they should never be a substitute for a strong effort to actually reduce the amount of material consumed. The cash benefits of a recycling program are estimated to be only one tenth of the benefit derived from reducing consumption by the same amount.

Chemical, Toxic and Hazardous Waste Management

Wastes that pose a hazard to human health or to the environment, which require special safe disposal techniques to eliminate or reduce the hazard, are considered to be hazardous wastes.

Dealing with hazardous wastes is one of the most challenging activities in the entire spectrum of property management.

A mistake involving hazardous wastes can have far more serious consequences than any similar incident involving other materials. In addition to the obvious danger, these consequences can include personal legal liability, resulting in fines or prison terms if negligence can be proven in court. Thus the extra care necessary to protect people and the environment is justified not only by a concern for human and environmental well being, but also by the possibility of legal liability.

In 1982, Environment Canada conducted an inventory of hazardous wastes generated at federal facilities. This survey showed that the hazardous wastes that posed the greatest concern with regard to type and quantity were as follows:

- waste oil;
- non-halogenated solvents, such as acetone, methylethyl-ketone and varsol;

- halogenated solvents, such as trichloroethylene, chloroform and methylene chloride;
- unspecified solvents, such as alcohols and mixtures of solvents;
- pesticides and wastes, including waste rinse water, in containers that are not completely empty;
- pesticide containers;
- lead-acid batteries;
- PCBs; and
- fluorescent lighting bulbs and tubes.

Both the federal and provincial governments have enacted legislation concerning the management, transportation and handling of hazardous wastes. The provincial legislation is of critical importance because, as with ordinary waste, the disposal of hazardous waste is generally regulated by provincial and municipal laws.

The Canadian Council of the Ministers of the Environment (CCME) Guidelines apply to disposal at federal sites, while the provincial requirements apply to waste that leaves the federal property for disposal at a provincially regulated site.

1.(b) Building Systems

Boiler and Incinerator Maintenance and Replacement

Operational efficiency, energy conservation and atmospheric emissions from exhaust stacks are the principal environmental issues associated with boilers or furnaces as part of heating plants, as well as with incinerators to a lesser degree.

Volatile organic compounds (VOCs), sulphur dioxide (SO₂) and nitrogen oxides (NO_x) are emitted when fossil fuels are burned. These compounds are the main cause of elevated concentrations of ground-level ozone. This ozone can have adverse effects on human and animal health and on vegetation, and may damage manufactured products and other materials by causing rubber to harden and by bleaching paint and coloured elements.

CCME National Emissions Guidelines for Commercial/Industrial Boilers and Heaters, released in May, 1998. Federal-provincial groups have been developing an approach to reducing these noxious emissions, but they have yet to define practically achievable emission and heater standards and an implementation timetable.



Under these circumstances, the practical alternative has been to upgrade to cleaner and more energy-efficient boilers when current boilers reach the end of their useful life. Retrofitting has proved to be impractical, as well as too costly.

Incinerators are primarily used to destroy solid, biomedical and hazardous wastes. This process releases a number of acidic gases, metals, and organic substances into the atmosphere.

Traditionally, provincial governments have regulated incinerator emissions. No regulations exist for incinerators owned and operated by the federal government. However, CCME has developed guidelines (refer to the List of References for this section).

Property managers should carefully follow the manufacturer's instructions when operating and maintaining incinerators. They must pay particular attention to the operating temperature that must be attained before incineration of wastes takes place, and to the type and quantity of wastes that they can dispose of safely by incineration.

The incinerator must be checked regularly to maintain its efficiency and ensure compliance with provincial air and emission requirements.

Air Conditioning and Refrigeration – Chlorofluorocarbons

Air conditioning systems exist in almost every modern building. As well, many facilities contain other kinds of refrigeration units, such as large refrigerated storage units, small refrigerators, water coolers or refreshment dispensers. The heat exchange medium (coolant) commonly found in these air conditioning and refrigeration units is usually some form of chlorofluorocarbon (CFC). CFCs are a group of substances that have been linked to the destruction of the upper atmospheric ozone layer through a series of complex chemical reactions.

CFCs release chlorine atoms, which attack ozone molecules to form oxygen and an unstable chlorine-oxygen molecule. This chlorine-oxygen molecule then attacks another ozone molecule to create more oxygen while releasing the chlorine atom to repeat the process all over again. This process is repeated until the chlorine atom leaves the equation by combining with some other element.

The destruction of the ozone layer increases the amount of ultraviolet light reaching the earth's surface. Ultraviolet light has been linked to skin cancers, eye cataracts, reduced crop yields and other environmental and health damage.

Air conditioning systems that use CFCs and related substances must be monitored and managed to prevent releases of these substances to the environment.

Because of this threat, CFCs cannot be imported into or made in Canada. This ban has made it necessary to conserve the existing stock of CFCs to service the air conditioners that use them until these air conditioners can be replaced with newer machines using less harmful coolants.

By signing the Montreal Protocol in 1987, the Government of Canada committed itself to reducing the use and ceasing the manufacture or import of CFCs on a predetermined schedule. In 1992, in Copenhagen, the protocol was strengthened to accelerate the schedule for eliminating CFCs and to include hydrochlorofluorocarbons (HCFCs), an allied product whose potential to destroy the ozone layer is only about five per cent that of CFCs. The protocol does not ban the use of these chemicals, but controls production and import. Since there have been no new sources of CFCs and HCFCs in Canada since January 1, 1996, products using these substances will become less and less available over time.

Since January 1, 1996, only recycled CFCs have been available in Canada. Users are reprocessing and stockpiling their own spent product, converting their equipment, or replacing their equipment with types that use products that do not destroy the ozone.

HCFCs, being less harmful to the ozone layer, have an extended phasing-out period. This extension will allow conversion to take place with the least possible economic and technical disruption. Canada has committed itself to eliminating HCFCs by 2020.

Since January 1, 1996, air conditioning chillers and refrigeration units that use CFCs are being recharged with products that are currently held in inventory or that have been recycled. CFCs have become more expensive and the equipment that continues to depend on them has become more costly to operate and maintain. Halons, important substances allied to CFCs, are discussed later in this chapter under 'Fire Suppression – Halons.'

Indoor Air Quality

An issue related to the subject of heating, ventilation and air conditioning is indoor air quality (IAQ). It is an important environmental concern that has risen in prominence over the past 20 years with the increased emphasis on energy efficiency and on the development of air-sealed buildings.

A number of situations can reduce indoor air quality. Air quality is a combination of temperature, humidity and oxygen content (freshness), as well as contaminants such as dust, pollen and organic compounds. As an environmental issue, poor air quality will affect the health and comfort of a building's occupants. This situation is referred to as 'sick building syndrome.'



The federal government is committed to providing a comfortable, healthy and safe work environment. Throughout Canada, conditions in the workplace are regulated under the Canada Labour Code, Part II, Occupational Safety and Health. The Treasury Board Use and Occupancy of Buildings Directive outlines health and safety requirements for the use and occupancy of buildings occupied by Public Service employees.

Canada Occupational Safety and Health Regulations, Part II (Permanent Structures) SOR/86-304 requires written instructions to be provided for the operation, inspection, testing, cleaning and maintenance of heating, ventilation and air conditioning (HVAC) systems. Organizations need performance targets and guidelines in order to comply with these requirements, and will find them useful when developing both design and monitoring procedures for construction, commissioning, operation, maintenance and use of a building's HVAC system and interior space. Such targets and guidelines will generally result in design that reflects good engineering practice and performance that exceeds current regulations and standards.

Organizations can protect and maintain air quality by carefully managing retrofit procedures and by selecting building materials, office furnishings and pieces of equipment that promote a 'green office environment.'

Fuel Storage Tanks

Fuel and petroleum product storage tank systems can be an environmental threat because of their potential to spill or leak.

Most tank systems are used for storing heating fuel, but they are also used to store fuel for electric generators and vehicles; solvents, lubricants and other petrochemicals; and other hazardous substances, such as corrosive or noxious chemicals.

Underground tank systems are generally considered to be a greater threat because they are more susceptible to corrosion and to leaks that are more difficult to detect.

A spill or leak can contaminate earth or groundwater. Contaminated earth can be very expensive to remediate. If the leaked or spilled product is gasoline or another flammable liquid, such earth can be dangerous. Eliminating contaminated groundwater is also expensive and time consuming because of the diffusion of the contaminant in the water.

Storage tank systems are found at a wide variety of locations. Typical examples include underground fuel oil tanks for boilers and generators in buildings; underground motive fuel tanks for vehicle refuelling facilities; dockside gasoline

or diesel tanks of either type for vessel refuelling; and small diesel above-ground 'day tanks' for supplying emergency generators in buildings.

It has been estimated that there may be more than 15,000 underground storage tank systems on federally owned or leased facilities across Canada and that, of these, between 10 and 15 per cent may have leaked or are presently leaking. In addition, there are aboveground storage tank systems on federal property, an unknown number of which may spill.

Leakage from either underground or above-ground storage tank systems is very likely to cause environmental damage, increase fire risks, create health and safety hazards, and result in costly remedial work. This situation represents a significant risk to the environment and may become a cause for liability. Owners, facility and asset managers, and property managers need to manage this issue carefully.

Several important elements should be part of an effective system for managing fuel tanks. These elements include:

- tank system registration and annual reporting as required under CEPA Regulations;
- site classification;
- tank system design requirements for new installations, focusing on:
 - the tank itself;
 - associated piping or delivery systems,
 - containment of the system,
 - corrosion protection for steel tanks and piping,
 - overfill protection, spill protection and leak detection systems,
 - vapour recovery systems and
 - proper installation; and
- tank operation and maintenance procedures for existing installations, including procedures for:
 - tank upgrading and replacement,
 - corrosion protection monitoring,
 - system testing,
 - inventory control,
 - filling, transferring operations and spill protection,
 - emergency preparedness,



- record keeping and
- tank closure, abandonment or removal.

Water and Sewage Systems

Municipalities provide water supply and sewage treatment for most federal properties, so the federal legislative framework may not be applicable. Provincial legislation and municipal by-laws usually regulate water and sewage management, and federal custodial departments must meet these standards.

Federal regulations prescribe the conditions under which water systems and sewage systems must operate in federal parks. Some properties, however, such as remote armed forces bases, federal penitentiaries and installations associated with native lands, supply their own water and treat their own sewage. In these cases, the organization may refer to the regulations governing national parks as a guideline for the design and operation of these facilities. The objective should be to attain the standards required by the relevant provincial and territorial jurisdictions where practical.

To ensure compliance with the relevant standards, property managers must understand the water supply and sewage discharge and processing systems on their properties, and know about tenants' practices and activities. They need this information to implement effective water conservation measures, to prevent improper disposal of substances that are harmful to the environment and to ensure that effluent issuing from the facility meets relevant standards.

Fire Suppression, Halons

This section deals with the environmental concerns associated with halon fire suppression systems.

Environmental concerns relate to halon fire suppression systems used in sensitive locations, such as laboratories, rare and fragile archives, and expensive computer equipment installations.

Halons, or bromofluorocarbons, are chemicals allied to chlorofluorocarbons (CFCs) and are highly destructive to the upper atmospheric ozone layer, which protects the earth from excessive exposure to damaging ultraviolet light from the sun. In fact, halons are up to 10 times more destructive than the most common CFCs.

Generally, halon fire suppression systems are elaborate automated systems designed to protect special facilities. These facilities need rapid-fire suppression that will not damage the equipment, materials or records housed in the facility. To date, acceptable alternatives have been found for only some halon systems. The other halon systems will continue to present a significant environmental risk while alternative approaches are sought.

Until 1994, halons were also used in portable hand-held fire extinguishers, but these are no longer available in Canada. It is possible, however, that some extinguishers of this type are still in service at some facilities. They represent a significant risk to the ozone layer through either accidental or intentional discharge.

Electrical Services – Polychlorinated Biphenyls

Polychlorinated biphenyls (PCBs), which were widely used as a dielectric fluid in electrical equipment, can cause serious problems for human health and for the environment if they spill or leak. With respect to human health and safety, a greater danger exists when they are involved in a fire. PCBs are not flammable at ordinary operating temperatures. However, when a fire subjects them to temperatures around 600 degrees Celsius, they will combust and emit dioxins and furans. These substances can cause cancer.

In 1980, the federal government banned the import and production of PCBs because of the potential threat these substances pose to human health and the environment. All federal organizations are removing electrical equipment containing PCBs from service and destroying all federally sourced PCBs. Until the early 1980s, PCBs were used in fluorescent lamp ballasts for interior lighting and in some high-intensity discharge (HID) ballasts for exterior lighting. Concentrations of PCBs in the dielectrics (electrical insulators) of these products were generally high, exceeding the 50 parts per million (ppm) legal limit for PCB waste. Consequently, when these products fail or are replaced, they must be treated as PCB contaminated waste and handled according to the PCB Regulations of the CEPA.

There are also electrical transformers and capacitors still in operation that contain PCBs in concentrations higher than 50 ppm. When this electrical equipment is taken out of service, it must be handled as PCB waste.

1.(c) Cleaning

Contractors commonly provide cleaning services for federal government facilities. To ensure that environmental issues for each contract and each situation are fully addressed, property managers should review the following points.



- The means to protect the natural environment should be an inherent part of the contract, and the contractor should be obligated to adhere to the standards set by departmental policy, as well as by regulated requirements.
- The work practices of the contractor's employees and its management, especially regarding the disposal of materials, should meet the organization's standards.
- The training of the contractor's staff should ensure that employees deal with environmental concerns properly. This training should include Workplace Hazardous Materials Information System (WHMIS) training when staff will be using hazardous products and cleaning chemicals.
- Waste should be recycled, where feasible, and the contractor's staff must be familiar with the requirements of such a program, particularly the importance of separating material at source and avoiding contamination.

The cleaning operations of most facilities involve chemicals. The contractor's staff should use chemicals that have been tested and approved for listing in the Qualified Products List of the Canadian General Standards Board (CGSB), or equivalent products. Further consideration should be given to using environmentally friendly cleaning products that meet performance criteria, such as citrus-based cleaners or those certified by the Environmental Choice/EcoLogo Program. Property managers should discuss these options with the facility management, operation and maintenance personnel, and cleaning contractor staff.

Some cleaning materials may contain hazardous chemicals, and so fall under the jurisdiction of the WHMIS under the *Hazardous Products Act*, and under the Canadian Occupational Safety and Health Regulations under the Canada Labour Code. This is particularly common in facilities where special activities are carried out, such as mechanical rooms, equipment maintenance and repair shops, laboratories, biomedical facilities, and animal care facilities. These hazardous materials must be appropriately labelled and stored in compliance with the provisions of WHMIS; material safety data sheets (MSDSs) must be posted; and only staff who have been properly trained in WHMIS and who are qualified to handle such materials should handle them. If these hazardous materials are shipped to or from a facility, the requirements of the *Transportation of Dangerous Goods Act* (TDGA), or its provincial equivalent, must be met. To comply with the TDGA Regulations, there must be staff on hand who are qualified to ship and receive these materials, and who can complete the required shipping manifests.

Facility maintenance may also involve using pesticides (insecticides, herbicides, fungicides and the like) to control rodents, insects and other pests. Since many of these chemicals are highly toxic, particularly when supplied in concentrated form, they must be stored, handled and applied with care. Because of the toxic nature of

these chemicals, organizations should explore the possibility of reducing or eliminating their use.

1.(d) Grounds Maintenance

At many federal government facilities, groundskeeping is an integral part of property maintenance. This maintenance has traditionally involved the use of chemicals and pesticides, such as insecticides, herbicides and fungicides, to control unwanted weeds, insects and other pests.

Many of these chemicals are highly toxic, particularly when supplied in concentrated form, and they must be stored, handled and applied with care. Organizations should seriously consider substituting less toxic, more environmentally responsible pest control products for these toxic substances.

Strategies for reducing or eliminating the use of toxins may include a conscious decision to allow the grounds of the facility to acquire a more 'natural' look. Other possibilities include reducing the effort made to maintain a consistently groomed appearance, using more resistant or indigenous species that require less maintenance and reducing pesticide use.

Organizations should implement an integrated pest management plan to achieve a semi-natural balance. This involves introducing complementary species of plants that support 'co-operative' survival, or insect or animal species that prey on, or otherwise reduce the effects of, destructive pests.

Groundskeepers also use significant quantities of coarse salt (sodium chloride) to keep walks and roads free of ice and snow. This type of salt can damage plants; corrode concrete and other building materials, roadbeds and asphalt; and eat into equipment and vehicles. Property managers should consider urea-based alternatives as a substitute, where conditions allow it. These products are less damaging to the environment, to built structures, and to equipment.

Pesticides and salt may produce long-lasting residues that can infiltrate the soil and contaminate groundwater supplies. Although this process may take a considerable amount of time to produce a noticeable effect, it would be better to avoid the situation altogether by reducing the use of these chemicals.

In grounds maintenance, there are significant opportunities for water conservation measures. Water use, and the resultant costs, can be substantially reduced through such measures as landscaping with minimal planting; using plants that use little water; using indigenous species of plants that can survive on the water supplied naturally; using 'grey water' for grounds irrigation; and irrigating when evaporation is slowest, generally early in the morning. Grey water is wastewater



diverted from the sewage system, such as wash and rinse water; it does not include sewage, such as human waste.

Contact the provincial ministry of the environment or Environment Canada before considering the use of grey water. Some jurisdictions prohibit its use for this purpose.

2. Guidance

2.(a) Environmental Audits

First, an organization must determine the scope of the environmental audit; in other words, it must clearly describe what the process will examine. The audit can examine all aspects of a facility's management and operation, or it may focus very narrowly on one aspect of particular interest. The audit may also cover any combination of subjects between the two extremes.

To conduct an effective and efficient audit, an organization must clearly define the audit's scope and ensure that everyone involved understands it.

It is equally important to prepare a list of criteria that will be used to evaluate site-specific environmental issues. The asset and facility management team must establish and accept these criteria before conducting the audit, and these criteria must reflect an objective and responsible attitude towards all the environmental issues.

Generally, regulatory requirements and the organization's environmental policy form the basis for the criteria, but operational guidelines and 'best practices' are frequently included as well.

Facility environmental audits must be carried out by objective persons who are independent of the property or facility being audited. Auditors must have the necessary knowledge and expertise in the environmental field. They must be familiar with the operational requirements of the facility being audited, as well as with the environmental legislation, policies, regulations, codes and standards that apply to these operational requirements. Private sector consultants can provide environmental audit services. Local Environment Canada offices can provide information on sources of these services. Refer to Appendix A for a list of these offices.

Managers can use an environmental audit to establish the conditions that prevail at any specific point in time. Such audits should be conducted periodically. Once

an audit has identified the key issues, an organization must prepare action plans to implement the necessary corrective actions.

Environmental audits can vary in their scope. The following list includes the elements of a full investigation; organizations may select elements from this list for a smaller-scale environmental audit. The list covers the major issues that could affect property management activities:

- environmental emergency response plans;
- PCB materials management;
- underground and above-ground storage tank management
- CFC management;
- halon management;
- asbestos management;
- pesticides management;
- management of hazardous materials;
- hazardous waste management;
- sewage management;
- solid waste reduction management;
- water management;
- energy management;
- management of indoor air quality; and
- air emissions management.

The initial step in an environmental audit is usually an interview with the facility manager, to get information on the scope and intent of the audit and, generally, to establish a sound working relationship. This interview commonly concentrates on a general description of the facility, including its age and history, its current and former uses, and the activities that operational staff and occupants carry out in the facility. The auditor will also identify and record any other related issues of which the facility manager is aware.

The auditor will review the ‘as built’ facility layouts for various floor areas at all levels, together with available construction drawings and specifications, including those for mechanical supply and disposal systems, plumbing and drainage layouts, and electrical and other pertinent systems, to locate areas of interest or concern. These drawings and documents will help the auditor determine where critical activities are carried out and where physical facilities such as chillers, furnaces,



incinerators, transformers, emergency power and other generators, repair shops, and storage and handling facilities are located.

The auditor will also interview members of the facility's maintenance staff to find out whether they are aware of any current or past situations that could present a problem.

The auditor will make a site visit to confirm the findings of recorded reviews and interviews or to identify specific issues and problems by physically inspecting them.

Environmental audit reports will vary, depending on the scope and purpose of the audit. They should include, at a minimum, observations of potential areas of non-compliance and recommendations for compliance with the requirements of relative regulatory and policy references.

Depending on the intended purpose, the audit report can also include the following:

- a description and history of the facility;
- a list and description of the criteria used to evaluate the conditions found;
- descriptions of the environmental regulations and policy requirements;
- observations of good environmental practices;
- comments or action plans prepared to help management staff address the issues raised by the audit; and
- a priority rating system for the recommendations.

Because the audit is to be carried out by an independent, objective third party, it should not include an offer of services to help the organization correct any problems cited.

The organization will review the environmental audit report with the responsible management staff to ensure the consistency and accuracy of the information presented.

Environmental Emergency Planning

An effective environmental emergency response plan details the procedures to be followed in the event of an emergency, such as an uncontrolled release of a hazardous or toxic substance in a spill. The plan will provide detailed instructions regarding the responsibility of each individual involved, the measures to be used to minimize the release and its effects, the people who must be notified and how to contact them, and the actions that should be undertaken to correct the situation.

The operation of a facility should be thoroughly examined to identify predictable situations that may lead to an environmental emergency. These include not only situations that will adversely affect the natural environment, but also those that may put the health and safety of workers or the public at risk.

In this regard, environmental emergency response planning shares many elements with the more familiar emergency response planning. The property owner will be responsible for ensuring that such a plan is developed and implemented. The facility management, operational personnel and tenants should help analyze the potential for emergency situations and ways they can best be addressed. A rehearsed, effective response plan can then be put in place.

An environmental emergency response plan will include descriptions of:

- all information about the various types of hazardous materials found on site;
- potential environmental impacts that such hazardous materials may have, if released from containment;
- the assignment of overall authority;
- an emergency organization within the facility, indicating responsibilities and authorities;
- all external, private sector, public sector, community and regional resources established to deal with environmental emergencies;
- internal and external communications plans;
- the actions that must be taken at the occurrence of each type of emergency; and
- measures that must be taken to mitigate the impacts of emergencies caused by a spill or other release of hazardous substances.

Organizations should give staff and tenants opportunities to learn and practise emergency response procedures, and allocate funds for these procedures in the facility budget.

A copy of the environmental emergency response plan should be kept in a separate, safe, remote location, in case an emergency requires the immediate evacuation of the related premises. Copies of the plan should be provided to local emergency response organizations, such as fire and police departments, and any civil defence organizations, so that they will be prepared should they encounter any toxic or hazardous substances.



Asbestos

The potentially serious consequences associated with the use or presence of asbestos require an effective management system to protect workers who may be exposed to it on a continuing basis, and to protect the public.

If the management system is sound, and if it follows the prescribed procedures established under federal policy, as well as the regulated requirements of provincial and territorial legislation, then the risk to anyone likely to be exposed is minimized and facilities will be safe.

To manage asbestos in a facility, an organization must determine the presence and condition of any asbestos on the property. This can be done with a thorough survey.

A person competent in asbestos control, such as a professional engineer with specific knowledge of the subject, a certified industrial hygienist or a registered occupational hygienist must direct this survey and sign the resultant report. It should be performed on a floor-by-floor and room-by-room basis, including all interstitial spaces such as service shafts and bulkheads, and areas above suspended ceilings. The surveyor must examine all of the potentially friable asbestos materials and applications, such as floor finishes, ceiling tiles and asbestos-reinforced cement products.

The survey can use any available building construction records to identify where, and how, asbestos could have been installed. In many cases, it will not be obvious that asbestos has been used in a particular application, and careful sampling will be necessary.

Sample analysis must be carried out to prescribed industrial standards. The results of the survey should be provided to anyone who will need to enter parts of the facility where friable asbestos may be present, including the property manager, tenants and maintenance employees, as well as contractors such as electricians, telecommunications firms, plumbers and boiler maintenance technicians.

Identification of asbestos, and a commentary on its condition, should be part of an environmental audit of any facility. In evaluating a building or other work, it is critical to determine the state or condition of the asbestos. A distinction is made between its state and its condition here, because in some applications, such as sprayed- or trowelled-on friable insulation, the asbestos may be in good condition but it is in an inherently hazardous state. In other situations, the asbestos may be in a stable, safe state, such as in mechanical insulation, but its condition may be degraded to the point where friable asbestos fibres may be released into the air and present a hazard.

Where the asbestos is, or could become, friable, it must be either sealed or removed. Removal is the preferred option.

Friable asbestos materials are materials that, when dry, can be crumpled, pulverized or powdered using hand pressure. They also include the dust or debris arising from non-friable materials that are, or will become, a freely dispersed powder, such as asbestos-containing plaster disturbed during demolition or alterations. Friable products that may contain asbestos include:

- sprayed products, such as fireproofing, thermal insulation, acoustic insulation or decorative finishing products, applied in 1974 or earlier;
- acoustic or textured plaster, applied in 1983 or earlier;
- mechanical insulation, jacketed or not, installed in 1983 or earlier; and
- compressed mineral fibre ceiling tiles and panels, installed in 1983 or earlier.

When deciding whether to remove sprayed or insulating material, consider conditions such as:

- the condition of, or evidence of damage to, the material;
- evidence of water damage, such as water stains or buckling;
- exposure;
- accessibility;
- vibration, or other mechanical activity, that can dislodge the material;
- exposure to an air stream; and
- friability.

Situations that may lead to hazardous conditions and that must be properly managed include those generated by repairs or renovations. In these circumstances, asbestos that was originally stable may be disturbed and become hazardous.

There are situations where it will be difficult to determine whether asbestos is present, such as cases in which asbestos is used as a binder in cement products, gypsum wall board, ceiling tiles or panels, floor tiles, or a flooring substrate. If the presence of asbestos is suspected in any of these components, spot testing or a sampling program will be necessary to determine the extent and type of asbestos use.

Effective management of the repair or removal of hazardous asbestos requires stringent controls to protect the health and safety of workers and the general public. To date, there are no federal government guidelines or regulations



covering these requirements; federal organizations adhere to provincial regulations. Property and facility managers should be familiar with these provincial requirements, and should know which local consultants and service companies are qualified under provincial regulations to carry out the work. (Refer to Appendix D)

When asbestos is being removed, an organization must notify the building occupants; isolate and clearly identify the work area; and, in some circumstances, pressure seal the work area and install an air filtration system.

Workers must use specially designed protective clothing and equipment to handle the asbestos in the prescribed manner. Once removed, the asbestos must be packaged as hazardous waste and sent to a specially licensed waste disposal site, designated to receive hazardous waste. Some additional handling, as well as record keeping, is also required. Refer to the 'Chemical, Toxic and Hazardous Waste Management' section of this chapter.

Training for anyone who may have some responsibility for, or contact with, asbestos is an important part of the overall management program. On-site maintenance employees who may carry out minor repairs and removals, and their managers and supervisors, should receive training in asbestos inventory and assessment reporting, health hazards of asbestos exposure, asbestos management, removal and emergency procedures, and the supervision of contractors.

As with other hazardous wastes, the property owner retains legal responsibility for the complete life cycle of asbestos waste from detection through disposal.

It is the responsibility of the owner to ensure that the hazardous material is packaged, transferred and disposed of in approved landfill sites, in accordance with the regulations of the applicable jurisdiction. Although all of these activities can be delegated to third parties, the responsibility for completing them cannot. The property owner must select accredited contractors and service providers and ensure that they have carried out the work in the manner required.

Encapsulating the asbestos, and sealing any damage, is an acceptable and cost-effective management technology, as long as it does not compromise the health and safety of the people involved, such as workers and occupants.

Appropriate records, such as waybills and receipts of acceptance, must be kept on file to demonstrate that the owner has pursued due diligence and has managed its obligations responsibly.

Solid Waste Management

To address the most effective strategy for managing solid waste, reduction, an organization should examine its purchasing policies and practices to identify measures it can take to eliminate excessive acquisition and use of materials. This would also be an opportunity to substitute environmentally responsible products, such as those labelled with the EcoLogo symbol, for items in the inventory.

A solid waste audit should be performed to effectively manage a facility's solid waste stream. If there are tenants in the facility, seek their co-operation to produce the most effective results and increase efficiency, while reducing the cost of the audit for each of the participants. The audit will determine the kinds of solid waste that are being generated at the facility, and should indicate opportunities for reduction.

Once the organization has the results of the waste audit, it can establish a plan of action. This may involve negotiating special clauses in the cleaning contract for the facility. These clauses could cover additional waste pick-up services; additional waste receptacles, such as blue bins, at individual work stations; and strategically located bins for special wastes, such as plastics, newsprint and low-grade paper, glass, and metal.

Facilities and equipment should be provided at a central location to separate and ship all solid waste generated on site. Separation at source is a fundamental requirement of an efficient, economically viable recycling industry. The costs of providing space and equipment for separation and processing may be the responsibility of the building owner or of the tenant, depending on the tenancy agreement.

At the very least, regardless of what other initiatives may be pursued, a fine paper-recycling program should be implemented. Such recycling services are available in most Canadian municipalities, and only a small effort is necessary to achieve this basic step in solid waste reduction.

Once it knows what types of solid waste are being generated, an organization will engage a recycling company to remove the recycled material. In the past, there has been a cost for this service. Now, however, recyclers can often earn modest revenues from some types of solid waste. Depending on arrangements made with tenants, this building owner may share this revenue, or retain the entire amount.



If food services are located in the facility, investigate the potential for composting the organic material in the solid waste stream. Although vermi-composting — using specific worm species to digest organic material in a pail or small chest — is possible for small amounts of organic material, a minimum amount of organic material is usually necessary to make composting viable for small office cafeterias.

Where this volume is not reached at a single site, investigate the possibility of sending organic waste to another site where composting is already being done. Alternatively, a number of sites could co-operate to initiate a composting program. Again, success depends on effective source separation. Every effort must be made to achieve this; otherwise, the composting facility will become a health hazard.

Modest revenues may be realized from the marketing of the composted product. Review the possibility of composting with the party responsible for solid waste management, or with the solid waste auditing firm.

The success of any recycling program depends greatly on the participation of all the people involved in or affected by it. Consequently, an aggressive and effective awareness program is critical to establishing a recycling program that will meet expectations.

Such a program should emphasize:

- the benefits to the natural environment of reduced resource exploitation and pollution;
- that reduction is always superior to recycling;
- the need for full participation by everyone in the facility; and
- the importance of separating recycled solid waste at the source.

Chemical, Toxic and Hazardous Waste Management

Property and facility managers must pay very careful attention to the management of hazardous or toxic waste to make sure it complies with all regulations, to ensure the health and safety of workers and of the public, and to protect the natural environment.

The responsibility for hazardous waste should be vested clearly in one designated individual who must have the authority, and the resources, to manage that waste. If more than one individual is involved, then the lines of authority between these individuals must be clearly drawn.

The responsibilities that these individuals will have include supervising staff, becoming familiar with the regulatory environment, maintaining the information necessary to manage the hazardous waste, managing the bid process, awarding contracts, and managing and monitoring the waste haulage and disposal contracts for the hazardous waste. By maintaining records, the organization will establish the pursuit of due diligence in its management of hazardous waste.

No matter who controls this waste — the facility owner, the tenant or a contractor — the property owner is legally obliged to ensure that the waste is managed in a way that protects health, safety, and the natural and built environments.

Everyone who might be exposed to this waste must be fully aware of the danger posed to them and of their responsibilities. They must be able to discharge those responsibilities effectively. To achieve this goal, organizations must take a waste inventory, train staff, and ensure that everyone understands the importance of these actions.

All employees who will come into contact with hazardous waste at a facility, and those who supervise them, must be trained to ensure that they handle, label, store, and ship the waste properly.

If staff members have already been trained in WHMIS and TDGA requirements, then they will have most of the background necessary to deal with hazardous waste. If not, Labour Canada, the provincial labour ministry, or a worker training office can provide this training.

An inventory of hazardous waste must be prepared for each facility. This inventory must identify the hazardous waste streams, the operations in the building that produce them, how and where the hazardous waste is handled and stored, and who is responsible for it. Keep this inventory in a remote, separate, safe but accessible location. The inventory must be available in the event of any emergency such as a fire, when such information could be critical to the safety of the emergency response crew, the staff and the tenants, and the general public.

Organizations must keep meticulous records of the hazardous waste. Such records should show that the organization tracks the hazardous waste from the facility through a provincially licensed or certified carrier to a waste disposal facility that is also licensed or certified by the province to accept hazardous waste.

Where hazardous materials are used on site, the owner or generator of hazardous waste is never entirely divested of responsibility for that waste. To fully satisfy the requirement to protect the environment and to demonstrate due diligence, the owner of the facility that generates the hazardous waste must examine the practices of the contractors who collect, carry and deliver the waste. The owner should investigate both the waste hauler and the waste disposal facility and



confirm that they comply with federal and provincial requirements in their respective fields.

If it is unknown or unclear whether a waste stream is hazardous, or contains hazardous waste, sampling and analysis must be conducted to determine the nature of the waste stream.

If a previously unknown hazardous waste is discovered, the organization must determine what had been happening with that waste stream up to the point of the discovery. If it was disposed of as part of an uncontrolled waste, report an uncontrolled release to Environment Canada, as well as to the provincial environmental protection agency. The activity that produces the hazardous waste discovered must be stopped immediately, and any uncontrolled waste that was released must be cleaned up and its effects mitigated.

The regulation of waste disposal is normally a provincial matter. In some jurisdictions, if a site is generating hazardous waste, the organization must register with the provincial environment ministry before an authorized carrier can ship such waste to an authorized hazardous waste disposal site.

Provincial restrictions apply to the amount of hazardous waste and to the duration of its storage at a facility, unless a special permit is obtained. In particular circumstances, such as those involving PCBs, specific requirements will be found in the *Canadian Environmental Protection Act (CEPA)*.

Provincial legislation also stipulates conditions for restriction of and records of access; ventilation; spill or release containment; and, where appropriate, an alarm system to raise the alert that a spill or release has occurred. Both property managers and the tenants responsible for hazardous waste must be made aware of these restrictions, and ensure that any on-site storage areas are clean and well maintained.

Hazardous wastes that could react with one another must not be stored together. As well, hazardous wastes must not be stored with flammable or explosive wastes. There must always be an up-to-date inventory of hazardous wastes stored on site, showing their exact location.

Organizations should try to reduce the use of any products that result in toxic or hazardous waste. Building operations and maintenance staff may be able to suggest less harmful, cost-effective alternatives to products currently used that produce hazardous waste.

Where tenants are involved, similar opportunities for reducing hazardous waste may exist and a co-operative effort could be very effective.

When possible, collect hazardous waste (particularly waste oil) for reprocessing. In some cases, suppliers or manufacturers may take back the waste generated by the use of their products. Investigate this option, along with other recycling opportunities, such as programs to recycle used lead acid batteries from vehicles or other installations.

2.(b) Building Systems

Boiler and Incinerator Maintenance and Replacement

An organization should do an inventory of boilers, heating units or incinerators within a facility. Note: any furnace installations will be dealt with as boilers in this section.

Collect the following information for each unit:

- manufacturer, make and model number, and serial number;
- size, capacity, and heat generation;
- age and condition;
- expected life and predicted decommissioning date;
- efficiency; and
- maintenance records, including any major refits expected or recently completed.

Boilers that generate 1.5 megajoules per second or more must be registered with Environment Canada.

Where applicable, ensure that each boiler has been certified or has received a permit from the appropriate provincial authority. Establish whether the boiler is operating within the limits set out in the certificate or permit. In some jurisdictions, these may include limits on impurities, or sulphur content, of fuels used in the boilers. Retain a copy of the certificate or permit on file.

The efficiency of a boiler or incinerator should be tested regularly. The property manager should have this testing carried out should there be a reason to suspect that operating performance is below standard. If the boiler or incinerator is not operating at, or close to, the designed performance level, the operating system should be adjusted to bring the functioning of the unit as close to these design specifications as possible.

In operating an incinerator, maintain contact with the relevant provincial authorities, and follow their established procedures rigorously.



Air stack emissions can be tested for concentrations of potential pollutants. Testing should be undertaken under calm conditions. At a minimum, tests should record the following conditions and detect the following pollutants, as specified by provincial and territorial regulations:

- wind speed and direction;
- temperature and pressure;
- suspended particulates;
- coefficient of haze (CHO);
- carbon dioxide (CO₂);
- carbon monoxide (CO);
- oxides of nitrogen (NO, NO₂, NO_x);
- ground-level ozone (O₃);
- volatile organic compounds (VOCs); and
- total hydrocarbons.

Stack testing is carried out for two basic purposes: first, to check the efficiency of the boiler or incinerator (for boilers, this is referred to as testing for the ‘trim’); and second, to check for pollutants.

The process can be a simple test with a portable meter, or a more thorough and complex procedure with multiple-point testing up the full height of the stack through fixed sampling ports. The full testing procedure is costly and would only be undertaken if previous testing or ambient air sampling indicated a serious problem with the boiler or incinerator. Boiler manufacturing, service industry, and engineering consulting firms specializing in this field provide stack-testing services.

When testing shows that emissions exceed recommended pollutant levels or that emissions do not meet air quality standards, the organization should propose a remediation program. It should discuss the situation with the property manager, the fuel supplier, and the boiler or incinerator manufacturer to find out whether it can correct the situation. Emissions monitoring should continue during these procedures to determine the effectiveness of the remediation program.

Once monitoring has established that a boiler is operating within the parameters stipulated in its permit and to the best practically obtainable level of emissions, then periodic testing should be done to ensure that the level of performance is maintained.

The organization should plan and budget for boiler or incinerator replacement in co-operation with the property manager.

Air Conditioning and Refrigeration – Chlorofluorocarbons (CFCs)

As a first step in the management of chlorofluorocarbons (CFCs), compile an inventory, for each facility, of equipment that uses the substances, as well as the amounts of CFCs that are in storage. Include small coolers and refrigerators in work areas in this inventory, as well as departmental vehicles on site that have air conditioning for occupants or cargo.

The inventory should include the following information for each unit:

- the type of equipment, such as an air conditioner, refrigeration unit, beverage or water cooler, or vehicle;
- the make, model, serial number and manufacturer;
- the capacity;
- the age and the expected service life;
- the general condition;
- the amounts and types of CFC coolant used (several types of CFCs with varying degrees of ozone-depletion potential are used commercially, and they are generally known as Freon 11, Freon 12, Freon 113, Freon 114 and Freon 115);
- the service records and maintenance schedules; and
- any records of the accidental release of CFCs.

This inventory of CFCs will form the basis for the reports submitted by the department either to Environment Canada or, through its sustainable development strategy, tabled every two years and audited by the Commissioner of the Environment and Sustainable Development.

Operational staff must be properly trained to service equipment using CFCs (provinces regulate certification for servicing CFC equipment, but individuals must complete a course approved by Environment Canada to become certified). Special training is available to instruct maintenance personnel on the proper techniques for servicing chiller and refrigeration equipment to minimize or eliminate the release of ozone-depleting substances. This training must include information on how to bleed and recover the spent product, how to recharge the equipment with replacement CFCs and how to properly store the used CFCs until their transfer to a recycling plant.



Environment Canada has produced a training and awareness course on the impact that CFCs and allied products can have on the environment. This course can be taken through the Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI) or the Refrigeration Services Engineering Society (RSES). It is supported by the provinces and is suitable for both management and operational staff.

Periodic leak testing by trained operational staff must be part of the routine operation and maintenance schedule for all equipment containing CFCs.

A management plan must be developed for the equipment containing CFCs in each facility. A useful approach is to classify the equipment by size or by cost to replace, convert or refurbish.

Maintain smaller units, such as beverage coolers, water coolers, small refrigerators and room size air conditioners, in sound working order. When they fail, replace them with equipment that does not use CFCs. Base the decision to replace the unit, or to convert it so that it can use a non-CFC coolant, on the expected life of the equipment and the cost of replacement or conversion.

Larger units, commercial-size refrigeration and freezer units in cafeteria kitchens and storage facilities, and the main building air conditioning chillers should be examined to establish their predicted long-term service life. If the organization expects to refurbish, refit or replace the equipment within the next 10 years, it should consult an expert in this field to properly evaluate the various options.

If equipment containing CFCs is to be taken out of service, this work must be done by fully qualified service technicians. The CFCs must be removed from the equipment, sent to a recycling facility and placed in secure storage for future use. When an organization no longer needs its stockpiled CFCs because it has converted or replaced its equipment, it may sell or transfer them to another user.

Any new or replacement refrigeration equipment purchased for a federal facility must use coolants that are not CFCs or hydrochlorofluorocarbons (HCFCs).

All uncontrolled releases of CFCs must be reported to the provincial environment ministry, as well as to Environment Canada.

Indoor Air Quality

There are two stages to a proactive indoor air quality program.

Stage I

The building air quality audit consists of a walk-through inspection. The inspector uses a checklist to assess the function and condition of the building systems and

the quality of the indoor environment. He or she pays attention to existing documentation and record keeping, operator knowledge, complaint resolution procedures, operating and maintenance practices, the condition of system components and the general indoor air quality.

Stage II

During this stage, an organization characterizes and measures indoor air quality contaminants and stressors, and evaluates the performance of the heating, ventilation and air conditioning (HVAC) system in detail. Stage II is usually done to resolve complaints about the indoor environment and occupant symptoms usually associated with 'sick building syndrome.'

The indoor air quality audit, including the building profile, follows established protocols and checklists. To have a proactive and effective indoor air quality program, the facility manager and the building operator should do an indoor air quality audit each year. They should also forward a copy of the audit to the building's Joint Occupational Safety and Health Committee.

The revised Canada Labour Code stipulates that new and retrofitted buildings should meet the design requirements promulgated by the American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE), Standard 62-1989, Ventilation for Acceptable Indoor Air Quality. The minimum ventilation rate is set at 10 litres of outside air per second per person.

The standard specifies the type of records required. These documents should include information on building design, level of occupancy, use of space, system operation, inspection testing, cleaning, maintenance, and the calibration of probes or sensors. A qualified person must compile this information; the organization must ensure that an appropriate maintenance person is properly trained, to compile these documents so that technology can be transferred effectively.

There is a procedure that organizations must follow to conduct indoor air quality building investigations when employee complaints initiate a Stage II protocol.

Implementing these initiatives will require a co-ordinated, multi-disciplinary approach in the areas of building design, system maintenance, HVAC operation, indoor air quality audits and inspections, building leases and property management.

Fuel Storage Tank Systems

Organizations should assess existing and proposed sites for underground motive fuel storage tank systems. The sites should be classified as Class A or Class B, based on the criteria in Schedule 1 of the Underground Storage Tank (UST)



Technical Guidelines. These criteria include protection of groundwater resources, public safety and the environment. Class A sites are considered more environmentally sensitive than Class B sites and require different design considerations.

Property or facility managers can classify their own sites on the basis of the published criteria if the specifics of the situation are clear and simple. However, if there is any doubt, consult a specialized engineering consultant. If it is not assessed or classified, a site is considered to be a Class A site.

Although not specified in the UST Technical Guidelines, other underground storage tank systems, such as those for storing burning oil, used oil and allied petroleum products, should undergo a site assessment as well.

There is no similar site classification system for aboveground storage tank systems.

As of August 1, 1997, managers of storage tank systems have had to register all their underground storage tank systems and all their outdoor aboveground storage tank systems that have a single or combined capacity of 4,000 litres or more. The systems must be registered with the appropriate federal department (AFD), which is defined as “the department, board or agency of the Government of Canada, a corporation named in Schedule III of the *Financial Administration Act*, that owns, leases, or otherwise controls, the federal land, on which a storage tank is located.”

The minimum information to be provided to an AFD is described in Schedule I of the Registration Regulations.

An AFD will have to maintain a registry and provide annual reports to Environment Canada. The minimal information that the AFD has to provide to Environment Canada is described in *Canadian Environmental Protection Act; Registration of Storage Tanks Systems for Petroleum Products and Allied Petroleum Products in Federal Lands Regulations*. Schedule II of the Registration Regulations.

Although specific storage tank systems have to be registered, organizations should register all systems. Consult the regulations for further details.

Some provincial and territorial registration regulations already exist. Registration with the provincial or territorial regulatory body is recommended for various reasons. In many jurisdictions, regulations prohibit commercial fuel suppliers from filling an unregistered tank.

Registration forms can be obtained from the provincial and territorial organizations responsible for storage tank management.

The underground storage tank and aboveground storage tank technical guidelines contain upgrading timetables that managers should consult. An organization must develop a management and upgrade or replacement plan for storage tank systems that reflects these timetables.

The first step in this management plan would be to establish an inventory of tank systems for each property and to gather all available information. The timetables then provide the upgrade or replacement schedule for systems not meeting current minimum standards. The organization can then develop a plan, including a budget and implementation schedule.

Systems that cannot, practically, be brought up to standard must be replaced. The Storage Tank Technical Guidelines and Codes of Practice describe other testing and verification to be conducted on tank systems, which should be included in a management plan.

Specialists should design and install tank systems. Most provinces issue a certificate, permit or other form of licence to trained storage tank installers to ensure that they follow proper design and installation procedures. This is especially necessary for underground systems, because the leak protection systems are elaborate and require a high degree of expertise to design and install. Expert supervision of the actual installation is also essential for underground systems. Experience has shown that poor installation procedures have been the cause of many of the leaks in such systems.

Fibreglass-reinforced plastics and steel are the most common materials used to make Canadian storage tanks. Both types of tanks have specific design and installation requirements, as outlined in the Storage Tank Technical Guidelines and Codes of Practice. One of the major differences between the two materials is that steel corrodes, so cathodic protection must be installed. The above documents outline the criteria for those cathodic protection systems. These criteria include:

- applicable ULC standards;
- required potential;
- potential testing;
- leak testing; and
- record keeping.

Steel, and combinations of steel with materials such as concrete, are the most common materials used for shop-fabricated tanks. Field-erected tanks are constructed of steel only. A preliminary investigation can help managers select the systems that best suit their needs.



The Technical Guidelines and Codes of Practice may require organizations to install systems for spill containment, overflow protection, secondary containment, dispenser sump and leak detection. Various systems are available for both aboveground and underground storage tank systems. The site classification and the purpose of an installation are the main factors that determine which systems an organization must install. Some examples of such systems follow.

- (a) Containment
 - double-walled tanks;
 - dikes for aboveground tanks; and
 - liners.

- (b) Leak detection
 - monitoring wells;
 - vapour wells;
 - liquid-detection systems in dikes or sumps;
 - vacuum monitoring; and
 - hydrostatic leak detection.

- (c) Overflow protection
 - vent alarms;
 - high-level alarms; and
 - overflow protection alarms.

- (d) Spill prevention
 - catch basin at fill pipe.

Once installed, tank systems can be tested for leaks as part of the tank management plan. Various testing methods are available, such as pressure tests or vacuum tests. The most appropriate test will be determined by the conditions on site. The organization should maintain complete records of such leak testing, which should contain the following information:

- storage tank registration number;
- location of test;
- date of test;
- test methods;
- name and address of testing agent;

- certification by testing agent that the test complies with acceptable procedures for conducting a precision leak test; and
- results of test.

Complete and accurate records of the product inventory should be kept, if a tank management plan is to succeed. Continuous gauging, with daily reconciliation or daily ‘dipping’ with the product reconciliation, is an effective way to detect leaks early.

Record any changes made to the storage tank system and the way those changes affected the storage capacity of the system. Such records are essential in establishing a defence to show pursuit and confirmation of due diligence, if an organization is prosecuted for an incident that contaminates the environment. Retain these records for five years, to prove an extended period of effective tank management, should such evidence be required.

When fuel is spilled during transfers to or from the storage tank, operational problems result. Only trained employees should handle such fuel transfers, and they must be present throughout the transfer process. To decrease fuel transfer problems, organizations must use equipment such as shut-off devices for fuel nozzles, overflow detectors and vapour escape prevention devices.

Emergency preparedness planning is an integral part of effective storage tank management. Such planning is designed to maintain the health and safety of employees and of the general public, and to minimize environmental damage should a leak or accidental spill occur.

An emergency preparedness plan should identify response personnel who are to be trained, and their responsibilities in the event of a leak or spill. Also, it should identify the appropriate local authorities that must be contacted, and the internal management procedures that must be followed to provide the resources needed to deal with an unexpected incident.

A storage tank system must be properly decommissioned when replaced or taken out of service. Only under special circumstances, and with the approval of the appropriate authority, can it be abandoned in place.

When a tank system is not located on federal land, or may disturb non-federal land, the provincial authority responsible for petroleum tank management must approve the abandonment.

An individual or company licensed, certified or issued a permit by the province to remove tanks must remove the tank system following standard procedures. If the tank is to be placed back into service, it must be refurbished to approved standards, inspected and certified.



If the tank system is not to be refurbished and reused, it must be made unserviceable by removing all product, vapours, and residual sludge or waste, and then cutting sufficient openings in the tank to render it unsuitable for use.

The organization must forward an affidavit of the destruction of a storage tank to its ‘appropriate authority’ — that is, the division in the organization responsible for overall management of storage tanks.

Water and Sewage Systems

Where they exist, self-contained water supply and sewage treatment systems should meet two basic goals: to provide high-quality, clean, potable (drinking) water, in a sufficient quantity and at the lowest possible cost; and to dispose of sewage safely, in the most efficient and effective manner.

Operational personnel must understand a facility’s water supply and sewage treatment systems. The following information is important.

- Does the water supply come from a municipal system, or from an independent source such as wells or a reservoir?
- Is the domestic water supply separate from the heating or and cooling water supply or the process water supply?
- Is the domestic water supply properly maintained and protected with cross-connection control devices?
- If the facility is not connected to a municipal system, is there an adequate water treatment system to ensure the supply meets the appropriate standards and normal demand?
- Are there water meters or discharge monitors in the system, and are the records for these available, up to date and complete?
- Is sewage discharge connected to a municipal system or is there an on-site treatment system?
- If connected to a municipal system, do sewers meet the requirements of that system?
- Are roof and storm drains separate from sanitary drains with no cross-connections?
- If there is a separate sewage system, does it meet the design and operational requirements of the appropriate jurisdiction’s regulations, as well as the federal guidelines?
- If the facility is not connected to the municipal system, is there a defensible reason why?

- Do boiler overflow drains discharge to a catchment basin or to a storm or sanitary drain?
- Has the preventative maintenance program been reviewed and evaluated, and have changes been made where necessary?

Investigate applicable provincial or territorial legislation and ensure that all required registrations, permits, licences and records are available, complete and up to date.

Whether the water supply system is connected to the municipal system or served by a self-contained system, organizations should investigate opportunities for water conservation.

If the facility is on a municipal system, reducing water use has the direct benefit of reducing charges for water. If the facility is on a self-contained system, reducing water consumption will decrease pumping and purification costs. For sewage systems, if less water is consumed there will be less water to be treated. This will reduce municipal sewage charges or the costs a facility incurs to operate its own sewage system.

Simple water conservation measures can reduce consumption. These include metering and charging users by volume, using flow-restriction faucets and low-flush toilet tanks, and reducing the frequency or hours of operation of automatic flushing systems. However, organizations using water-chilled air conditioning systems can achieve the greatest reductions in water usage. By retrofitting these systems to use water as a chilling medium on a 'once through' circuit, they will significantly reduce water consumption. Retain a consultant mechanical engineer to determine the mechanical and economic feasibility of retrofitting the system.

Conduct a water audit to determine the maximum cost benefit that can be achieved for a water and sewage system. Such an audit will examine the entire system and consider the potential for improving the service. In some cases, there may be no benefit due to local conditions. An organization can realize substantial benefits by applying some, or all, of the listed initiatives, as well as others that may be applicable to its particular system.

Water quality testing may indicate that the water is not up to the standard required for the designated uses, such as cooking and drinking. For example, some water systems accumulate lead from old piping and soldered joints.

Operational staff must be fully qualified to operate the sewage system and must be familiar with the applicable requirements.

Monitor the type of sewage discharge and be aware of the potential for leaks of harmful effluents into the environment. In particular, become familiar with the



processes tenants use and the ways they could result in harmful leaks through ignorance or neglect. Evaluate the need and develop response plans for an accidental spill. Refer to the 'Environmental Emergency Planning' section of this chapter.

Fire Suppression, Halons

The owner of a facility in which a halon fire suppression system is installed assumes responsibility for the complete life cycle management of the halons, from purchase and acceptance on site to final disposal and destruction.

To deal with this, an organization should develop a management plan for the halon fire suppression systems installed in each facility. The safe, effective operation of these systems is essential. However, there are now a number of acceptable substitutes for these systems that organizations should consider. As a first step in dealing with halons, compile an inventory of equipment that uses halons and of any halons in storage. The information about the equipment that must be included in such an inventory is very much the same as that collected for CFCs:

- type of equipment, such as installed automated systems and portable extinguishers;
- make, model, serial number and manufacturer;
- age and expected service life;
- general condition;
- service records and maintenance schedule;
- capacity of the unit, or the volume of halon contained in the system or the extinguisher;
- total amount and type of halon used; and
- records of any accidental release of halons.

Operational staff must be properly trained and certified to service halon systems. Special training is available to instruct maintenance personnel on the correct techniques for servicing the automated equipment to minimize or eliminate the release of ozone-depleting substances. This training includes information on how to bleed and recover the spent product, and how to recharge the equipment.

Organizations must replace all portable fire extinguishers containing halon with other types, such as carbon dioxide (CO₂) extinguishers.

Periodic leak testing must be part of the schedule for routine operation and maintenance of all halon fire suppression systems.

The management plan may include a review of the rationale for a fully automated system. Fully automated systems are subject to failure and the accidental dumping of a full charge of halon fire suppressant, which would result in a severe release of ozone-depleting halons.

If a fully automated system is installed in a building, the facility must be important enough to require 24-hour, on-site security. Under these circumstances, replacing the automated system with a manually activated system may add very little risk. If the expected damage resulting from this small delay is not excessive, then organizations should consider a manually activated system.

If a halon fire suppression system is to be taken out of service, the work must be carried out by service technicians who are provincially licensed or certified. The halons must be removed from the system, sent to a recycling facility and placed in secure storage for future use, if required.

If possible, new or replacement fire suppression systems for federal facilities should not use halon.

Electrical Services – Polychlorinated Biphenyls (PCBs)

Electrical equipment containing PCBs can legally remain in use, provided it has been removed from sensitive locations. These locations include schools, day-care centres, health facilities, water treatment plants, and food or feed processing plants where there would be a high risk of contamination if a spill or leak occurred.

Every facility using equipment that contains PCBs must keep an up-to-date inventory of that equipment. Inspect the equipment regularly to ensure that it is in good working order and that it is not leaking. The inventory must show the exact location of each piece of equipment related to a site plan and must be kept in a safe, remote but accessible place. The site plan must be used to inform emergency personnel, such as fire-fighters and spill response crews, of the presence and location of PCBs.

Transformers that typically hold large volumes of dielectric fluid must be tested to determine whether they contain PCBs in concentrations of over 50 parts per million (ppm).

All transformers that contain PCBs in concentrations of over 50 ppm must be identified with a prominent black and white, 15 cm x 15 cm, PCB label, which indicates a registration number. These labels must not be removed from the equipment. Owners should report any unlabelled transformers that contain PCB concentrations of over 50 ppm to the nearest Environment Canada office, listed in Appendix A.



Where transformers contain PCBs in concentrations of over 50 ppm, there are several ways of reducing the concentrations to below 50 ppm. One way is by using a chemical process of decontamination. If the transformer is easily accessible and the levels of PCBs do not exceed 10,000 ppm, licensed private sector companies can do this work. Another method is to remove the PCB-contaminated oil and replace it with a liquid that contains no PCBs. In this case, oil contaminated by PCBs must be stored according to the requirements of the *Canadian Environmental Protection Act* (CEPA), in specified containers in storage areas fitted up as prescribed by the regulations on PCB storage. Also, any transportation of PCBs or PCB-contaminated materials must reflect the requirements of the *Transportation of Dangerous Goods Act*.

Replace fluorescent light fixture ballasts containing PCBs as soon as possible. They can be used legally until a decision is made to remove them, or until they fail and have to be replaced. In either situation, the ballasts have to be stored according to the CEPA regulations entitled 'Storage of PCB Material Regulations.' The regulations outline procedures for determining whether an organization has exceeded the quantity limits for the items in storage.

When an organization removes PCBs from transformers, light ballasts or similar electrical equipment, it must store the PCBs in facilities registered with Environment Canada. An organization that does not have a registered storage facility may temporarily hold PCB-containing materials within the following quantity limits:

- a total of one kilogram of PCBs;
- 100 litres of PCB liquids; and
- 100 kilograms of PCB solids or PCB-containing substances.

If an organization exceeds these limits, it must establish a registered site at the relevant facility, or transport the PCBs or substances containing PCBs to a registered site.

A program for transporting and destroying PCBs stored at federal government site across Canada is in place, co-ordinated by Public Works and Government Services. A complete list of registered PCB disposal companies, as of this printing can be found in Appendix F. Alternatively, further information can be obtained from Environment Canada, Commercial Chemicals Evaluation Branch, telephone (819) 953-1670.

2.(c) Cleaning

Examine the cleaning contract for each facility to ensure that there are clauses dealing with potential environmental concerns, including the nature of the contractor's cleaning products and methods.

Discuss these issues with the property manager and with the contractor to determine what, if any, hazardous or toxic chemicals are being, or may be, used. Negotiate any necessary amendments to the contract to address environmental matters and the contractor's use of more environmentally safe products.

If hazardous or toxic chemicals are in use, both facility management and cleaning staff who may come in contact with the products should be aware of what they are, and should ensure that the organization has complied with WHMIS requirements. These requirements include posting and maintaining material data safety sheets. Review the training requirements of the facilities annually and update them when required.

An organization must provide proper storage facilities for hazardous or toxic materials.

If shipping and receiving staff receive hazardous materials, they should be familiar with federal and provincial laws and regulations pertaining to the transportation of dangerous goods, and they must be qualified to handle the materials.

Organizations must maintain storage sites for pesticides according to provincial regulations. Also, such a storage site must be well away from areas of public access and must be isolated from food storage and handling areas.

Staff members who handle pesticides or other chemicals must be qualified under the relevant provincial legislation and regulations. Check with the provincial agriculture or environment ministry to determine what training and qualifications may be required.

If an outside contractor applies pesticides, the facility staff should be responsible for managing pesticides and administering the contracts for that work. The contracting company must be licensed, certified or permitted under the provincial regulations, and the organization must keep a copy of the licence, certification or permit on file.

When pesticides are applied, personnel must follow procedures outlined in provincial regulations and federal government guidelines. If required, public notice must be properly posted in those areas where the pesticide is used.



Organizations should dispose of hazardous or toxic cleaning products and pesticides responsibly. Do not empty spent containers onto the ground or flush their contents down drains. Be aware that such materials, if they migrate to the surface of a body of water, or infiltrate groundwater, can cause serious environmental damage and may lead to prosecution under federal or provincial legislation.

Neither the WHMIS nor the TGDA cover the management of hazardous waste, as distinct from hazardous products. Hazardous waste comes under the waste management legislation of provincial governments. For further information, refer to the 'Chemical, Toxic and Hazardous Waste' section of this chapter.

2.(d) Grounds Maintenance

Determine whether personnel are using pesticides, fertilizers or other chemicals on the grounds of a facility and take an inventory of these substances.

Identify any chemicals used for grounds maintenance and stored on the property. Note where they are stored, in what quantities and for what durations.

Authorize and maintain storage sites in compliance with provincial regulations, where required. The storage sites must be well away from areas of public access and isolated from food storage and handling areas.

Review the need for the use of each pesticide with the designated pesticides manager and with the contractor to determine whether its use can be reduced or eliminated, or whether it can be replaced with a less harmful product.

Discuss the possible implementation of an integrated pest management plan with property management staff and with the contractor. Consider consulting a landscape architect to review this option.

Review the use of common salt (sodium chloride) to control ice in winter. Test substitute products, such as urea-based pellets, and use them instead of salt if possible.

Designate a responsible person or persons to manage and monitor the use of these chemicals, and restrict access to those persons and to those who are authorized to use the chemicals. Keep proper records of the acquisition and use of pesticides and other related toxic or hazardous chemicals.

Employees who handle pesticides, fertilizers or other chemicals must be qualified under the relevant provincial legislation and regulations. Contact the provincial

agriculture or environment ministry to determine what training and qualification is required for this activity.

If an independent company or individual applies pesticides, the staff member responsible for managing pesticides should administer the contract. The contractor must be licensed, certified or permitted under provincial regulations. Keep a copy of the licence, certification or permit on file.

Personnel applying pesticides must follow procedures outlined in provincial regulations and federal government guidelines. If required, public notice must be properly posted in areas where pesticides are used.

Consult with a professional landscape architect about the possibility of incorporating zero-scaping into the project plan or redeveloping the property over time. Consider using indigenous species to landscape the property.

An organization may use 'grey water' for irrigation only when a facility's plumbing has been built to allow this use. During a major retrofit, it could modify the plumbing system to permit the use grey water, but such modifications are likely unfeasible as an independent project.

Consult maintenance staff to develop water conservation practices. Consider the following measures:

- using automatic timed irrigation systems;
- setting irrigation times early in the morning or late in the afternoon to reduce high evaporation and the development of moss;
- watering less frequently (perhaps twice weekly instead of daily); and
- maintaining a higher grass level to maximize water retention (perhaps two inches high).

3. References

General

LEGISLATION

Canadian Environmental Protection Act (CEPA)

The CEPA was proclaimed into law in 1988 and is designed to protect Canadians from pollution caused by toxic substances. It provides the power to regulate the entire life cycle of toxic substances.



A person whose property is affected by the release of a toxic substance in contravention of the CEPA regulations has to report the matter to an inspector.

Costs related to measures to stop further release may be recovered against the landowner to the extent of the owner's negligence in contributing to the release.

Also, if contamination is occurring on a property, there is the potential for liability, even if that property has just been acquired and the contamination occurred before the acquisition. Penalties for an infraction under the CEPA can be as severe as fines of \$1,000,000 per day and/or imprisonment for five years. When a person in contravention of the Act "shows wanton or reckless disregard for the lives or safety of other persons and, thereby, causes bodily harm or death," that person may be prosecuted under the Criminal Code.

There is no general requirement for an environmental emergency plan under the CEPA. However, the Storage of PCB Material Regulations does require organizations to put fire protection and emergency procedures in place for PCB storage facilities.

Fisheries Act

The *Fisheries Act* is concerned with the protection of fish and fish habitat, and people's use of fish. Any activity or physical work that may or does negatively affect any of these can result in charges being laid under the *Fisheries Act*.

The *Fisheries Act* has penalties for violations of the Act, including requirements to repair damage to habitat, substantial fines and/or prison terms with a criminal record. Convictions for multiple offences involving introducing deleterious substances into fish habitat can be as severe as fines of \$1,000,000 per day and/or three years in jail.

Canada Labour Code, Part II

"The purpose of this Part is to prevent accidents and injury to health arising out of, linked with or occurring during employment to which this Part applies."
(s122.1)

"Every employer shall ensure that the safety and health at work of every person employed by the employer is protected" (s124).

Conviction for an offence under the Canada Labour Code can result in substantial personal fines, up to \$1,000,000 per day, and/or a prison term with a criminal record.

POLICY

Treasury Board Real Property Environment Policy

It is government policy to acquire, use and dispose of real property in a manner consistent with the principle of sustainable development. The Government of Canada has also made a commitment to implement a code of environmental stewardship, which affects some aspects of real property management.

Treasury Board Guide to Monitoring Real Property Management

Organizations must fully assess the life cycle costs of each investment decision, including costs of acquisition, operation, maintenance, leasing and fit-up, renovation, divestiture and restoration; other costs related to the real property accountability framework (such as those incurred to preserve heritage buildings, to meet accessibility standards and to preserve the environment); direct and indirect costs of disposing of the property, such as realty fees, survey fees and decontamination costs; and grants in lieu of taxes.

Organizations should always be aware of the effect that their use of real property has on the environment. Government policy requires organizations to acquire, use and dispose of real property in a manner consistent with the principle of sustainable development.

Treasury Board Risk Management Policy

“It is government policy to identify, and reduce or eliminate, risks to its property, interests and employees, to minimize and contain the costs and consequences in the event of harmful or damaging incidents arising from those risks, and to provide for adequate and timely compensation, restoration and recovery.”

Risk management applies to all aspects of government operations, including hazardous materials and pollution. It must be part of a sound and complete project plan.



3.(a) Environmental Audits

STANDARDS

Environmental Emergency Planning

LEGISLATION

Canadian Environmental Protection Act (CEPA)

There is no general requirement for an environmental emergency plan under the CEPA. However, the Storage of PCB Material Regulations does require organizations to put fire protection and emergency procedures in place for PCB storage facilities.

Fisheries Act

The *Fisheries Act* is concerned with the protection of fish and fish habitat, and people's use of fish. Any activity or physical work that may or does negatively affect any of these can result in charges being laid under the *Fisheries Act*.

The *Fisheries Act* has penalties for violations of the Act, including requirements to repair damage to habitat, substantial fines and/or prison terms with a criminal record. Convictions for multiple offences involving introducing deleterious substances into fish habitat can be as severe as fines of \$1,000,000 per day and/or three years in jail.

Auditor General Act

Amendments to this Act have created the office of a commissioner for the environment and sustainable development within the Office of the Auditor General.

In the annual review of each organization's sustainable development strategy, the commissioner will look for an environmental management system that supports that strategy. Environmental emergency planning is an integral part of this system.

STANDARDS

GUIDELINES

ISO 14004, Environmental Management Systems: General guidelines on principles, systems and supporting techniques
International Standards Organization

ADVISORY PUBLICATIONS

Greening Government: Environmental Management Systems – A Self-assessment Guide, Environment Canada

Asbestos

LEGISLATION

Canadian Environmental Protection Act (CEPA)
Schedule I of the CEPA, a list of toxic substances, includes asbestos.

Asbestos Mines and Mills Release Regulations
These regulations limit atmospheric releases from asbestos mines and mills.

Canada Labour Code, Part II, Occupational Safety and Health

Occupational Safety and Health Regulations

The Occupational Safety and Health Regulations require the employer to ensure that employees are informed of the presence of asbestos or asbestos-containing materials where these substances may affect the employees' health and safety. Employers also have the obligation to ensure adequate and current training for employees handling these products. Employees must follow applicable procedures in handling any asbestos-containing products in the workplace. Conviction under these regulations can result in a fine of up to \$100,000 per day, or a prison term of up to two years.

Provincial and territorial occupational health and safety legislation

Provincial and territorial regulations generally set out detailed procedures for handling asbestos, particularly where asbestos is present in a hazardous, friable state. These regulations cover procedures for repair and removal of asbestos that protect workers and the general public from the health and safety hazards associated with airborne asbestos fibres.



Provincial and territorial environmental protection legislation

Provincial and territorial environmental legislation addresses the presence of asbestos in the environment and outlines the steps that must be taken to ensure that it does not become airborne. It may include procedures for handling, packaging, storing, transporting and disposing of asbestos in a manner that protects human safety and health and the environment.

There are also provincial codes or guidelines on the management, removal and disposal of asbestos.

POLICY

Use of Real Property Facilities Policy, Treasury Board

Custodian departments must act to prevent friable materials containing asbestos from contaminating a building wherever such materials are in poor condition or when major alterations that would disturb materials are taking place. In all other circumstances, a management-in-place approach must be followed. Custodian departments must operate control programs that assess, and regularly reassess on a cyclical basis, those areas within buildings where friable materials containing asbestos are present, but no health hazard currently exists. Asbestos-containing materials in good condition must not be disturbed.

Treasury Board Procedures for Occupational Exposure to Asbestos

These procedures summarize the procedures organizations should follow when handling asbestos in government facilities, with references to general requirements, control of airborne asbestos dust, personal protective equipment, cleanliness of the workplace, and health and environmental surveillance.

Solid Waste Management

LEGISLATION

Codes of environmental stewardship

Ontario has the Waste Audits and Waste Reduction Work Plans Regulations and Industrial, Commercial and Institutional Service Separation Programs under the *Environmental Protection Act* (Regulations 102/94 and 103/94, respectively popularly known as ‘the three Rs Regulations’). These regulations outline the province’s requirement that organizations perform a waste audit for any of its office facilities or groups of facilities that are larger than 10,000 square metres. The audits must be performed by spring 1995, are subject to review by the

Ministry of the Environment, and must be updated annually. After the audit is finished, an organization must draw up a work plan within one year to reduce solid waste at each facility, and review this plan annually.

The Ministry intends to enforce the regulations by conducting periodic spot checks of both the audits and the work plans. If there is a contravention of the regulations, then the facility owner is liable for a fine and must comply with the regulations.

GUIDELINES

Code of Good Practice for Handling Solid Wastes at Federal Facilities

Environment Canada, EPS 1-EC-78-7

Guidelines for Compost Quality

Canadian Council of Ministers of the Environment, 1996, PN 1199

ADVISORY PUBLICATIONS

Green Office

Environment Canada

Making Your Work Place Work: Tips for Improving the Air Quality in your office
Public Works and Government Services Canada, March 1997 (brochure)

To order: e-mail : doc.centre@pwgsc.gc.ca, fax (613) 736-2029

Chemical, Toxic and Hazardous Waste Management

LEGISLATION

Canadian Environmental Protection Act (CEPA)

Management of waste on federal lands can be regulated under Part IV of the CEPA and the *Arctic Waters Pollution Prevention Act*.

Canada Labour Code, Part II, Occupational Safety and Health

Occupational Safety and Health Regulations

The Occupational Safety and Health Regulations require the employer to ensure that hazardous waste products are properly labelled and that information on their identification, proper handling and storage is available to employees. Employers must also ensure that employees handling these products receive adequate and current training. Employees must follow applicable procedures in handling any



hazardous waste in their work. Conviction under this regulation can result in a fine of up to \$100,000 or a prison term of up to two years.

Hazardous Products Act

Controlled Products Regulations

Suppliers must provide information on controlled products through labelling and material safety data sheets, in compliance with these regulations.

Pest Control Products Act

Pest Control Products Regulations

The *Pest Control Products Act* and regulations regulate compounds used to control pests (such as insects, fungi, bacteria, weeds and rodents) in Canada. All such products must be registered, labelled, used and stored in accordance with the provisions of the Act and regulations. Prosecution for a contravention of the Act, if successful, may result in a prison term of up to two years.

Provincial legislation regulates the certification and licensing of users and the conditions under which pesticides may be applied.

Transportation of Dangerous Goods Act (TDGA)

Transportation of Dangerous Goods Regulations

The TDGA was proclaimed in 1980 to control the transportation of dangerous goods by air, sea, rail and road in order to promote public safety and protect the environment during transport. The Act and regulations require clear identification of dangerous goods under one of nine categories; proper containers and packaging; and training for employees shipping, receiving and transporting dangerous goods. The Act does not cover waste products, which are covered by separate legislation.

There is also provincial legislation on environmental protection and hazardous waste management.

POLICY

Treasury Board Materiel Management Policy

This policy covers a wide variety of management issues, such as the following.

“Material and line managers must include environmental considerations in all aspects of managing material, from the planning phase through acquisition, use, and disposal of material.”

“Applying the four Rs (Reduce, Reuse, Recycle and Recover) at each phase of the material management life cycle helps protect the environment and reduce costs.”

“Hazardous material must be shipped, stored and handled in accordance with applicable federal and provincial law, and regulations.”

“When disposing of hazardous waste through a specialized waste management company, departments must ensure that the company is fully licensed and that the waste is being disposed of in an appropriate manner.”

Treasury Board Hazardous Substances Directive

Where reasonably practical, non-dangerous products or products that pose the least danger to employees, the public and the environment shall be substituted for dangerous substances in carrying out the activities of the federal government.

GUIDELINES

National Guidelines for Hazardous Waste Incineration Facilities: Design and Operating Criteria

Canadian Council of Ministers of the Environment, 1992
PN 1076 and PN 1078

National Guidelines for Land Filling of Hazardous Wastes

Canadian Council of Ministers of the Environment, 1991
PN 1080

Provincial guidelines regarding the management, handling, storage, transportation and disposal of hazardous wastes



3.(b) Building Systems

Boiler and Incinerator Maintenance and Replacement

LEGISLATION

Canadian Environmental Protection Act (CEPA)

National Ambient Air Quality Objectives for Air Contaminants

These objectives set environmental quality objectives which, among other things, establish guidelines that recommend limits — expressed as concentrations or quantities — of certain substances linked to the generating capacity of the installation. Unless incorporated into a federal or provincial statute or regulation, or in the terms and conditions of a permit issued under federal or provincial legislation, these guidelines have no legal authority.

Part II, Toxic Substances

Part II deals with toxic substances, some of which may be emitted from boilers. Emission of a toxic substance in contravention of CEPA regulations could lead to prosecution, and the operator and/or owner may be personally charged. Conviction can result in heavy personal fines and/or a prison term and criminal record.

Provincial Legislation

Provincial legislation and regulation varies considerably from jurisdiction to jurisdiction. The specific details on allowable pollutants and their concentrations, and the standards used to measure them are all different in each province or territory. More information on the local requirements can be obtained by contacting the provincial/territorial ministries of the environment.

STANDARDS

Provincial air quality standards

GUIDELINES

Management Plan for Nitrogen Oxides (NO_x) and Volatile Organic Compounds - Phase I

Canadian Council of Ministers of the Environment, 1990

National Emission Guidelines for Stationary Combustion Turbines

Canadian Council of Ministers of the Environment, 1992
PN 1072

Environmental Codes of Practice for Steam Electric Power Generation – Design

Phase, 1985, Environment Canada Publications, ISBN 0-622-13924-0
Report EPS 1/PG/1

Environmental Codes of Practice for Steam Electric Power Generation – Siting

Phase, Environment Canada Publications, 1987, ISBN 0-662-15360-X
Report EPS 1/PG/2

Environmental Codes of Practice for Steam Electric Power Generation –

Construction Phase, Environment Canada Publications, 1989, ISBN 0-662-17182-9
Report EPS 1/PG/3

Environmental Codes of Practice for Steam Electric Power Generation –

Operation Phase, Environment Canada Publications, 1992, ISBN 0-662-20064-0
Report EPS 1/PG/5

Environmental Codes of Practice for Steam Electric Power Generation –

Decommissioning Phase, Environment Canada Publications, 1992, ISBN 0-662-20065-0
Report EPS 1/PG/6

Operation and Emission Guideline for Municipal Solid Waste Incinerators

Canadian Council of Ministers of the Environment, June 1989

Air Conditioning and Refrigeration – Chlorofluorocarbons (CFCs)

LEGISLATION

Canadian Environmental Protection Act (CEPA)

Schedule I, List of Toxic Substances

This schedule lists chlorofluorocarbons as a toxic substance.

Chlorofluorocarbon Regulations, 1989

These regulations prohibit the use of CFCs as a propellant.

Ozone-Depleting Substances Regulations

These regulations restricts the manufacturing, import, export and sale of CFCs in Canada, as well as plans for their staged reductions and eventual elimination.

Ozone-depleting Substances Products Regulations



These regulations prohibit the sale of small amounts (less than 10 kilograms) of CFCs in pressurized containers.

List of Toxic Substances Requiring Export Notification, Part II, Schedule II
This schedule regulates the export of CFCs and other ozone-depleting substances.

Federal Halocarbon Regulations (in draft)

These regulations, currently under development (expected promulgation in 1998), will specify management procedures and responsibilities with respect to halocarbons at federal facilities. The regulations will prohibit any intended releases and will require personnel to report all unintended releases of halocarbons.

Other provisions will include prohibited new uses, and requirements for recovery, leak testing, performance standards, preventive maintenance and record keeping.

Provincial regulations controlling the use of chlorofluorocarbons and halons

Provincial regulations control the sale, use and management of halocarbons. These regulations also require the reporting of uncontrolled releases. Some provincial jurisdictions are also regulating a timetable for completely eliminating the use of ozone-depleting substances.

Montreal Protocol on Substances that Deplete the Ozone Layer, and subsequent amendments

The Montreal Protocol, and its subsequent amendments, commits the signatory governments to implementing controls on production, import and export of ozone-depleting substances. The timetable for terminating production of virgin stock varies for each group of substances. The production of CFCs and halons is already banned.

Environmental Code of Practice for the Elimination of Fluorocarbon Emissions from Refrigeration and Air Conditioning Systems

Report - EPS 1/RA, 1996, Environment Canada Publications ISBN 0-660-16430-2

Indoor Air Quality

LEGISLATION

Canada Labour Code Part II, Occupational Safety and Health

The code requires all departments and agencies, as employers, to ensure that

- the safety and health at work of every person employed by the employer is protected;
- all permanent and temporary buildings and structures meet the prescribed standards;
- the levels of ventilation, lighting, temperature, humidity, sound and vibration are in accordance with prescribed standards; and
- all hazardous substances in the workplace are controlled in accordance with prescribed standards.

National Building Code of Canada, 1995, Part VI

STANDARDS

ASHRAE Standard 55, Thermal Comfort Conditions for Human Occupancy
American Society of Heating, Refrigeration, and Air-Conditioning Engineers, 1992

ASHRAE Standard 62, Ventilation for Acceptable Indoor Air Quality
American Society of Heating, Refrigeration, and Air-Conditioning Engineers, 1989

ADVISORY PUBLICATIONS

Guide for Indoor Air Quality: Investigative Services
Public Works and Government Services Canada, May 1995
To order: e-mail : doc.centre@pwgsc.gc.ca, fax (613) 736-2029

Indoor Air Quality in Office Buildings: A Technical Guide
Health Canada, 1995

Managing Indoor Air Quality: A Manual for Property Managers
Public Works and Government Services Canada and the National Research Council, 1992

Environmental Code of Practice for the Elimination of Fluorocarbon Emissions from Refrigeration and Air Conditioning Systems
Report — EPS 1/RA, 1996, Environment Canada Publications, ISBN 0-660-16430-2

Fuel Storage Tank Systems

LEGISLATION

Canadian Environmental Protection Act (CEPA)



Registration of Storage Tank Systems for Petroleum Products on Federal Lands Regulations

Fisheries Act

(annexed under section 53, Part IV of the CEPA)

GUIDELINES

Environmental Code of Practice for Underground Storage Tank Systems Containing Petroleum Products and Allied Petroleum Products

Canadian Council of Ministers of the Environment, March 1993, PN 1055

Environmental Code of Practice for Aboveground Storage Tank Systems Containing Petroleum Products

Canadian Council of Ministers of the Environment, August 1994, PN 1148

Environmental Guidelines for Controlling Emissions of Volatile Organic Compounds from Aboveground Storage Tanks

PN 1180, 1995

Federal Aboveground Storage Tank Technical Guidelines Environment Canada, August 1996

Federal Underground Storage Tank Technical Guidelines Environment Canada, February 1995

Installation Code for Oil Burning Equipment

CSA International, CSA - B139 - M91

ADVISORY PUBLICATIONS

National Master Specification

National Master Specification Secretariat

Section 13201 June 1996: Oil Storage Tanks — Underground
(currently under review)

Section 13202 June 1996: Oil Storage Tanks — Above Ground
(currently under review)

Specification sections are being developed to cover the decommissioning and destruction of both types of storage tanks.

Water and Sewage Systems

LEGISLATION

Canadian Environmental Protection Act (CEPA)

Fisheries Act

Provincial environmental protection acts

Municipal sewer use by-laws

POLICY

Treasury Board Sanitation Directive

This policy states that, where reasonably practicable to do so, federal facilities must be connected to municipal water and sewer services in accordance with applicable provincial standards or codes, or with Environment Canada guidelines (EPS-1-ES-76-1) where no such standards or codes exist. It also states that water used for drinking, washing and food preparation shall meet the standards set out in the Guidelines for Canadian Drinking Water Quality (Health Canada, 1996).

GUIDELINES

Federal Committee on Environmental Management Systems (FCEMS): Working Group on Wastewater Management (WGWM)

Environment Canada

Guidelines for Canadian Drinking Water Quality, Sixth edition

Health Canada, 1996

Canadian Water Quality Guidelines

Canadian Council of Ministers of the Environment, Environmental Health, Health Canada

Fire Suppression, Halons

LEGISLATION

Canadian Environmental Protection Act (CEPA)

Schedule I, List of Toxic Substances



This schedule lists bromofluorocarbons and hydrofluorocarbons as toxic substances.

Ozone-depleting Substances Regulations

These regulations restrict the manufacturing, import, export and sale of ozone-depleting substances in Canada.

Ozone-depleting Substances Products Regulations

These regulations prohibit the sale of small amounts (less than 10 kilograms) of bromofluorocarbons in pressurized containers, as well as the use of CFCs as propellants.

List of Toxic Substances Requiring Export Notification, Part II, Schedule II

This schedule regulates the export of bromofluorocarbons.

POLICY

Code of Practice on Halons

Report EPS 1/RA/3E, July 1996

Montreal Protocol on Substances that Deplete the Ozone Layer

The Montreal Protocol, and subsequent amendments, commit the signatory governments to implementing controls on production, import and export of ozone-depleting substances.

Electrical Services – Polychlorinated Biphenyls

LEGISLATION

Canadian Environmental Protection Act (CEPA)

Federal Mobile PCB Treatment and Destruction Regulations

SOR/90-S

Storage of PCB Materials Regulations

SOR/92-S07

Chlorobiphenyls Regulations

SOR/91-1S2

PCB Waste Export Regulations

SOR/97-109

Transportation of Dangerous Goods Act (TDGA) and Regulations

To control the transportation of dangerous goods by air, sea, rail and road in order to promote public safety and protect the environment during transport, the TDGA was proclaimed in 1980. The transportation of PCBs and of equipment containing PCBs is subject to this Act and its regulations.

ADVISORY PUBLICATIONS

Identification of Lamp Ballasts Containing PCBs

Environment Canada, August 1991

Handbook on PCBs in Electrical Equipment

Environment Canada, April 1988

PCBs in Use and in Storage

Environmental Law Centre, prepared for Environment Canada, 1995

3.(c) Cleaning

LEGISLATION

Canadian Environmental Protection Act (CEPA)

Hazardous Products Act and Controlled Products Regulations

Under this Act and these regulations, suppliers must provide information on controlled products through labelling and material safety data sheets.

Pest Control Products Act and Pest Control Products Regulations

The *Pest Control Products Act* and regulations regulate compounds used to control pests (such as insects, fungi, bacteria, weeds and rodents) in Canada. All such products must be registered, labelled, used and stored in accordance to the provisions of the Act and regulations. Prosecution for contravention of the Act, if successful, may result in a prison term of up to two years.

Provincial legislation regulates the certification and licensing of users and the conditions under which pesticides may be applied.

Transportation of Dangerous Goods Act (TDGA) and Regulations

To control the transportation of dangerous goods by air, sea, rail and road in order to promote public safety and protect the environment during transport, the TDGA was proclaimed in 1980. The Act and regulations require clear identification of dangerous goods under one of nine categories; proper containers and packaging;



and training for employees shipping, receiving and transporting dangerous goods. The Act does not cover waste products, which are covered by separate legislation.

Canada Labour Code, Part II

“The purpose of this Part is to prevent accidents and injury to health arising out of, linked with or occurring during employment to which this Part applies” (s122.1).

“Every employer shall ensure that the safety and health at work of every person employed by the employer is protected” (s124).

Conviction for an offence under the Canada Labour Code can result in substantial personal fines, up to \$1,000,000 per day, and/or a prison term with a criminal record.

Occupational Safety and Health Regulations

The Occupational Safety and Health Regulations require the employer to ensure that hazardous or controlled products are properly labelled and that Material Safety Data Sheets (MSDSs) are available to employees. Employers also have the obligation to ensure adequate and current training for employees handling these products. Employees are required to be trained and to follow the applicable procedures in handling any hazardous or controlled product use in their work.

GUIDELINES

Code of Good Practice for the Handling, Storage, Use and Disposal of Pesticides at Federal Facilities in Canada

Report EPS 1/CC/3, Environment Canada, February 1994

Official catalogue of Ecologo products and services as certified by the Environmental Choice program Terra Choice Environmental Services

3.(d) Grounds Maintenance

LEGISLATION

Pest Control Products Act and Regulations

The *Pest Control Products Act* and regulations regulate compounds used to control pests (such as insects, fungi, bacteria, weeds and rodents) in Canada. All such products must be registered, labelled, used and stored in accordance to the

provisions of the Act and regulations. Successful prosecution of a contravention of the Act can result in a prison term of up to two years.

Canadian Environmental Protection Act (CEPA)

Fisheries Act

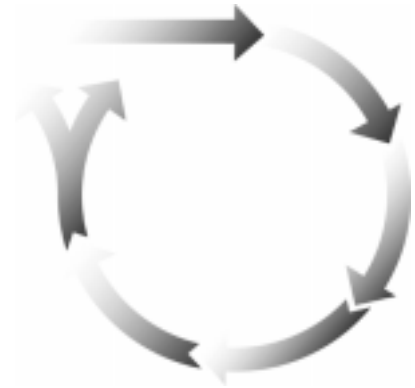
Provincial legislation also regulates the certification and licensing of users, and the conditions under which pesticides may be applied.

ADVISORY PUBLICATIONS

Code of Good Practice for the Handling, Storage, Use and Disposal of Pesticides at Federal Facilities in Canada

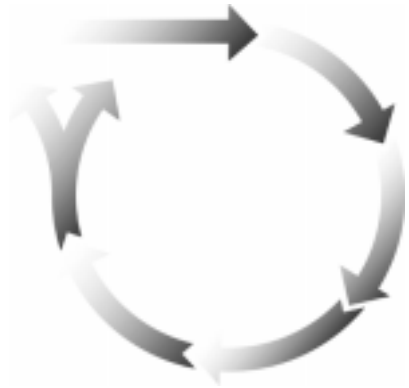
Report EPS 1/CC/3, Environment Canada, February 1994

Acronyms



AST	aboveground storage tank
BREEM	British Research Environmental Evaluation Method
CANMET	Canadian Centre for Mineral and Energy Technology
CCME	Canadian Council of Ministers of the Environment
CEAA	<i>Canadian Environmental Assessment Act</i>
CFCs	chlorofluorocarbons
CEPA	<i>Canadian Environmental Protection Act</i>
CMHC	Canada Mortgage and Housing Corporation
FO	Fisheries and Oceans
EMS	environmental management system
ISO	International Standards Organization
HCFCs	hydrochlorofluorocarbons
FRPA	<i>Federal Real Property Act</i>
NCS	National Classification System for Contaminated Sites (CCME)
ODS	ozone-depleting substances
PCBs	polychlorinated biphenyls
PTA	property transfer assessment
NCSRP	National Contaminated Sites Remediation Program
NO_x	nitrous oxides
NRCan	Natural Resources Canada
NWPA	<i>Navigable Waters Protection Act</i>
ppm	parts per million
PWGSC	Public Works and Government Services Canada
RA	responsible authority
SDS	sustainable development strategy
TB	Treasury Board
TDGA	<i>Transportation of Dangerous Goods Act</i>
UST	underground storage tank
VOCs	volatile organic compounds
WHMIS	Workplace Hazardous Materials Information System

Definitions



Biosphere

The ‘biosphere’ is that part of the earth and its atmosphere in which living things, both animal (including micro-organisms) and vegetable, are found.

Due Diligence

‘Due diligence’ refers to deliberate and careful actions taken by an individual or an organization to ensure compliance with legislation. It reduces threats to the natural environment, as well as risks of prosecution for offences under environmental legislation such as the *Canadian Environmental Protection Act* and the *Fisheries Act*.

EcoLogo

The Environmental Choice Program uses the ‘EcoLogo’ symbol to identify products that have been certified as being sensitive to the natural environment. A private sector firm operates this program on behalf of Environment Canada.

Ecosystem

An ‘ecosystem’ is a community of interdependent living things — including humans, other animals, micro-organisms and plant life — together with the environment that supports them.

Environment

The ‘environment’ refers to natural components and interacting systems of the earth. It includes the land, the water and the air in all layers of the atmosphere, as well as all levels of living organisms and all organic and inorganic matter.

Environmental Assessment

An ‘environmental assessment’ used to identify and understand the effects of proposed projects on the bio-physical environment as well as on the social and

economic environments of the people to be affected. It communicates information and proposes preventive or corrective measures to reduce undesirable changes in the natural environment, such as those that a proposed action or development may cause. These changes include any effect of such changes on human health and well being, or on the quality of the ecosystem upon which human survival depends.

This term is synonymous with ‘environmental impact assessment.’

An environmental assessment may be required under the *Canadian Environmental Assessment Act*, depending on the characteristics of a proposed action or development.

See also ‘Environmental Screening.’

Environmental Audit

An ‘environmental audit’ is a methodical examination that may involve sampling, tests, analyses and confirmation of the practices and procedures of an operation. An environmental audit verifies that these practices and procedures comply with criteria prescribed by legislation, internal policies or accepted industry standards.

Environmental Screening

An ‘environmental screening’ is a systematic, documented assessment of the environmental effects of a proposed action or development, as required under the *Canadian Environmental Assessment Act*.

Environmental Site Assessment

An ‘environmental site assessment’ is a systematic examination of a specific site, following an accepted protocol, such as CSA Z768 Phase I Environmental Site Assessment, to determine and report on the physical environmental condition of the site.

This assessment identifies and evaluates any possible environmental problems on the site that may affect the real value or potential use of the property.

Facility Manager

A ‘facility manager’ is involved in the specific operational and maintenance issues of real property on a site-specific basis, and ensures that corporate policy is translated into tangible actions to achieve policy objectives.

Facility Audit

A ‘facility audit’ is an environmental audit of a facility. See also ‘Environmental Audit.’

Hazardous Waste



‘Hazardous waste’ is used solid, liquid or gaseous material that may pose a substantial threat to the natural environment and to human health unless it is handled, transported, stored and disposed of properly.

Owner

For the purpose of this guide, the ‘owner’ (sometimes referred to as the ‘custodian’) is the department or agency of the Government of Canada that has administration and real property.

Pollution

‘Pollution’ introduces substances into the biosphere that natural recycling processes cannot readily process, because of their quantity, chemical nature or temperature. As a result, these substances will hurt the ecosystem.

Property Manager

A ‘property manager’ manages real property assets on an overall strategic basis, and helps develop and disseminate corporate policy and objectives related to those assets. A property manager may also be referred to as an ‘asset manager.’

Property Transfer Assessment

A ‘property transfer assessment,’ conducted before a property is acquired or disposed of, determines whether the property is contaminated, and whether that contamination could cause financial or legal liability. This is often referred to as an environmental site assessment, or a Phase I environmental site investigation.

Risk Assessment

‘Risk assessment’ refers to the process of gathering data and making assumptions to estimate the short- and long-term harmful effects of one or more substances, products or technologies on the natural environment and human health.

Risk Management

‘Risk management’ refers to the process of using risk assessment and other information to determine available options and make decisions in order to reduce or eliminate perceived risks.

Sustainable Development

‘Sustainable development’ is development that meets current needs without compromising the ability of succeeding generations to satisfy their own needs. It requires that the demands of our present economy on the environment reflect the environment’s ability to sustain present and future generations.

Appendix A

Offices of Environment Canada



	Regional Offices	General Inquiries	Environmental Emergencies
Atlantic		(902) 426-7231	(902) 426-6200
Québec		1-800-463-4311	(514) 283-2333
National Capital Area	Hull, QC	(819) 997-2800	(819) 997-3743
Ontario		(416) 739-4826	(416) 346-1971
Prairie and Northern	Manitoba	(204) 945-7100	(204) 994-4888
	Saskatchewan	(306) 787-2700	(306) 536-9991
	Alberta	(403) 951-8600	1(800) 642-
	Yellowknife	(867) 669-4700	3800(867) 920-8130
Pacific and Yukon	Pacific	(604) 664-9100	(604) 666-6100
	Yukon	(867) 667-3470	(867) 667-7244

Appendix B

Code of Environmental Stewardship



The Government of Canada fully supports the principle of sustainable development. To reflect this commitment in all aspects of its operations and activities, from facilities and real property management to procurement and waste management, the government commits

- to integrate environmental concerns with operational, financial, safety, health, economic development and other relevant concerns in decision-making;
- to meet or exceed the letter and spirit of federal environmental laws and, where appropriate, to comply with provincial and international standards;
- to improve the level of awareness, throughout the Public Service, of the environmental and health benefits and risks of operational decisions and to encourage and recognize employee actions;
- to apply environmentally responsible management practices to hazardous substances used in operations, including biological products, specifically with regard to the acquisition, handling, storage, safety in use, transportation and disposal of such substances;
- to ensure that environmental considerations are integrated into government purchasing policies and practices;
- to seek cost-effective ways of reducing the input of raw materials, toxic substances, energy, water and other resources, and of reducing waste generation and noise associated with day-to-day operations; and
- to acquire, manage and dispose of lands in an environmentally manner that protects ecologically significant areas.

Appendix C

Summary of Provincial Environmental Legislation



REGULATORY FRAMEWORK FOR ALBERTA

ACTS	REGULATIONS
<i>Energy Resources Conservation Act</i>	Rules of Practice Regulation
<i>Environmental Protection and Enhancement Act</i>	Activities Designation Regulation
	Administrative Penalty Regulation
	Approvals and Registrations Procedure Regulation
	Beverage Container Recycling Regulation
	Conservation and Reclamation Regulation
	Disclosure of Information Regulation
	Environmental Appeal Board Regulation
	Environmental Assessment (Mandatory and Exempted Activities) Regulation
	Environmental Assessment Regulation

Environmental Guide for Federal Real Property Managers

ACTS	REGULATIONS
	Environmental Protection and Enhancement (Miscellaneous) Regulation
	New Tire Advance Disposal Surcharge By-law
	Ozone-depleting Substances Regulation
	Pesticide (Ministerial) Regulation
	Pesticide Sales, Handling, Use and Application Regulation
	Potable Water Regulation
	Release Reporting Regulation
	Tire Recycling and Management Regulation
	Substance Release Regulation
	Waste Control Regulation
	Wastewater and Storm Drainage (Ministerial) Regulation
	Wastewater and Storm Drainage Regulation
<i>Fisheries Act</i>	Fisheries (Ministerial) Regulation
<i>Forest and Prairie Protection Act</i>	Forest and Prairie Protection Regulations (Part I)
	Forest and Prairie Protection Regulations (Part II)
<i>Forest Reserves Act</i>	Forest Reserves Regulation
<i>Forests Act</i>	
<i>Gas Resources Preservation Act</i>	Gas Resources Preservation Regulation
<i>Motor Transport Act</i>	Transportation of Anhydrous Ammonia and Other Fertilizers Regulation



ACTS	REGULATIONS
<i>Natural Resources Conservation Act</i>	
<i>Oil and Gas Conservation Act</i>	Oil and Gas Conservation Regulation
<i>Public Health Act</i>	Nuisance and General Sanitation Regulation
	Waste Control Regulation
<i>Soil Conservation Act</i>	Soil Conservation Notice Regulation
<i>Transportation of Dangerous Goods Control Act</i>	Transportation of Dangerous Goods Control Regulation
<i>Water Act</i>	Water Ministerial Regulation
<i>Wilderness Areas, Ecological Reserves and Natural Areas Act</i>	
<i>Wildlife Act</i>	Wildlife Regulation

REGULATORY FRAMEWORK FOR BRITISH COLUMBIA

ACTS	REGULATIONS
<i>Ecological Reserve Act</i>	Ecological Reserve Regulation
<i>Environmental Assessment Act</i>	Environmental Assessment Prescribed Time Limits Regulation
	Environmental Assessment Reviewable Projects Regulation
	Transition Regulation
<i>Environmental Management Act</i>	Environmental Appeal Board Procedure Regulation
	Environmental Data Quality Assurance Regulation
	Environmental Impact Assessment Regulation
<i>Fish Protection Act</i>	
<i>Greenbelt Act</i>	

Environmental Guide for Federal Real Property Managers

ACTS	REGULATIONS
<i>Health Act</i>	Sanitary Regulation Sewage Disposal Regulation
<i>Land Act</i>	
<i>Park Act</i>	Park and Recreation Area Regulation
<i>Pesticide Control Act</i>	Pesticide Control Act Regulation
<i>Sustainable Environment Fund Act</i>	
<i>Transport of Dangerous Goods Act</i>	Transport of Dangerous Goods Regulation
<i>Waste Management Act</i>	Agricultural Waste Control Regulation Antisapstain Chemical Waste Control Regulation Aquaculture Waste Control Regulation Beverage Container Stewardship Program Regulation Cleaner Gasoline Regulation Diesel Fuel Regulation Gasoline Vapour Control Regulation Minimum Requirements for Refuse Disposal to Land Motor Vehicle Emissions Reduction Regulation Oil and Gas Waste Regulation Ozone Depleting Substances Regulation Petroleum Storage and Distribution Facilities StormWater Regulation Pollution Control Objectives for Food-processing, Agriculturally oriented and Other Miscellaneous Industries Post-consumer Paint Stewardship Program Regulation



ACTS	REGULATIONS
	Post-consumer Residual Stewardship Program Regulation
	Production and Use of Compost Regulation
	Public Notification Regulation
	Sewerage Works Assessment Guidelines
	Special Waste Regulation
	Spill Cost Recovery Regulation
	Spill Reporting Regulation
	Storage of Recyclable Material Regulation
	Sulphur Content of Fuel Regulation
	Waste Management Permit Fees Regulation
	Wood Residue Burner and Incinerator Regulation
	Water Regulation
<i>Water Act</i>	Water Regulation
<i>Water Protection Act</i>	
<i>Weather Modification Act</i>	Weather Modification Act Regulation
<i>Wildlife Act</i>	

REGULATORY FRAMEWORK FOR MANITOBA

ACTS	REGULATIONS
<i>Contaminated Sites Remediation Act</i>	Contaminated Sites Remediation Regulation
<i>The Dangerous Goods Handling and Transportation Act</i>	Anhydrous Ammonia Handling and Transport Regulation
	Classification Criteria for Products, Substances and Organisms Regulation

Environmental Guide for Federal Real Property Managers

ACTS	REGULATIONS
	Environmental Accident Reporting
	General Federal Regulation (Parts I to IX)
	Generator Registration and Carrier Licensing Regulation
	Manifest Regulation
	PCB Storage Site Regulation
<i>The Ecological Reserves Act</i>	Ecological Reserves Designation Regulation
	Ecological Reserves Regulation
<i>The Endangered Species Act</i>	Threatened, Endangered and Extirpated Species Regulations
<i>The Environment Act</i>	Burning of Crop Residue and Non crop Herbage Regulations
	Classes of Development Regulation
	Disposal of Whey Regulation
	Environment Act Fees Regulation
	Environmental Assessment Hearing Costs Recovery Regulation
	Incinerators Regulation
	Joint Environmental Assessment Regulation
	Licensing Procedures Regulation
	Litter Regulation
	Peat Smoke Control Regulation
	Pesticides Regulation
	Private Sewage Disposal Systems and Privies Regulations
	Sensitive Areas Regulation



ACTS	REGULATIONS
	Storage and Handling of Gasoline and Associated Products Regulations
	Waste Disposal Grounds Regulations
<i>Fisherman's Assistance and Polluter's Liability Act</i>	
<i>The Forest Act</i>	Designation of Provincial Forests Regulation
	Spruce Woods Provincial Forest Activities Management Regulation
	Forest Use and Management Regulation
<i>The Ground Water and Water Well Act</i>	Well Drilling Regulation
<i>Manitoba Hazardous Waste Management Corporation Act</i>	
<i>The Land Rehabilitation Act</i>	
<i>The Mines and Minerals Act</i>	Drilling Regulation
	Lands Re-opened to Prospecting Orders
	Lands Withdrawn from Prospecting Orders
	Mineral Disposition and Mineral Lease Regulation
	Mineral Disposition Regulation
	Mines Closure Regulation
	Potash Exploration Regulation
	Quarry Minerals Regulation
<i>Oil and Gas Act</i>	Drilling and Production Regulation
	Geophysical Regulation
<i>Ozone Depleting Substances Act</i>	Ozone Depleting Substances Regulations
<i>The Provincial Park Act</i>	Park Activities Regulation
	Park Districts Designation Regulation

ACTS	REGULATIONS
<i>Pesticides and Fertilizers Control Act</i>	Park Reserves Designation Regulation Permits Park Lands Designation Regulation Subdivision of Land Regulation Pesticides and Fertilizers Licence Regulations
<i>The High Level Radioactive Waste Act</i>	
<i>The Regional Waste Management Authorities Act</i>	Solid Waste Area Management Project Establishment Regulation
<i>The Sustainable Development Act</i>	
<i>The Transboundary Pollution Reciprocal Access Act</i>	
<i>Waste Reduction and Prevention (WRAP) Act</i>	Multi-material Stewardship (Interim Measures) Regulations Tire Stewardship Regulations Used Oil, Oil Filters and Containers Stewardship Regulations
<i>The Water Resources Administration Act</i>	
<i>The Wildfires Act</i>	Burning Permit Areas Regulation
<i>The Wildlife Act</i>	Amphibians and Reptiles Regulation Designation of Nature Centres Regulation Designation of Wild Animals Regulation Designation of Wildlife Management Areas Regulation Posting of Crown Lands Regulation Refuge Regulation Special Area Conservation Areas Regulation Use of Wildlife Lands Regulation



REGULATORY FRAMEWORK FOR NEW BRUNSWICK

ACTS	REGULATIONS
<i>Beverage Containers Act</i>	Beverage Containers Regulation
<i>Clean Air Act</i>	Administrative Penalties Regulation Air Quality Regulation Appeal Regulation Ozone Depleting Substances Regulation
<i>Clean Environment Act</i>	Appeal Regulation Environmental Impact Assessment Regulation New Brunswick Tire Stewardship
	Petroleum Product Storage and Handling Regulations Regional Solid Waste Commissions Regulation
<i>Clean Water Act</i>	Water Quality Regulations Appeal Regulation Fees for Industrial Approvals Regulation Potable Water Regulation Protected Area Exemption Regulation Protected Areas Order Water Well Regulation Watercourse Alteration Regulation
<i>Ecological Reserves Act</i>	Ecological Reserves Regulations
<i>Endangered Species Act</i>	Endangered Species Regulations

ACTS	REGULATIONS
<i>Environmental Trust Fund Act</i>	
<i>Health Act</i>	General Regulations
<i>Pesticides Control Act</i>	General Regulations
<i>Transportation of Dangerous Goods Act</i>	General Regulations
<i>Unsightly Premises Act</i>	

REGULATORY FRAMEWORK FOR NEWFOUNDLAND

ACTS	REGULATIONS
<i>Dangerous Goods Transportation Act</i>	Dangerous Goods Ticket Offences Regulations
	Dangerous Goods Transportation Regulations
<i>Environment Act</i>	Air Pollution Control Regulations
	Environmental Control Water and Sewage Regulations
	Ozone Depletion Regulations
	Storing and Handling of Gasoline and Associated Products Regulations
<i>Environmental Assessment Act</i>	Environmental Assessment Regulations
<i>Packaging Materials Act</i>	Beverage Container Control Regulations
<i>Pesticides Control Act</i>	Pesticides Control Regulations
<i>Waste Material (Disposal) Act</i>	Storage of PCB Wastes Regulations
	Waste Material Disposal Areas
<i>Water Protection Act</i>	Sanitation of Ponds (No. 2) Regulations
<i>Wilderness and Ecological Reserves Act</i>	Botanical Ecological Reserve Regulations



ACTS	REGULATIONS
	Seabird Ecological Reserve Regulations
	Wilderness Reserve Regulations

REGULATORY FRAMEWORK FOR NORTHWEST TERRITORIES

ACTS	REGULATIONS
<i>Environmental Protection Act</i>	Asphalt Paving Industry Regulations
<i>Forest Management Act</i>	Forest Management Regulations
<i>Forest Protection Act</i>	Spill Contingency Planning and Reporting Regulations
<i>Pesticide Act</i>	Pesticide Regulations
<i>Public Health Act</i>	Camp Sanitation Regulations
	General Sanitation Regulations
	Public Sewerage Systems Regulations
	Community Parks Order
	Natural Environment Recreation Parks Order
	Outdoor Recreation Parks Order
<i>Territorial Parks Act</i>	Territorial Parks Regulations
<i>Transportation of Dangerous Goods Act</i>	Transportation of Dangerous Goods Regulations

REGULATORY FRAMEWORK FOR NOVA SCOTIA

ACTS	REGULATIONS
<i>Agricultural Operations Protection Act</i>	
<i>Clean Nova Scotia Foundation Act</i>	

ACTS

REGULATIONS

<i>Dangerous Goods Transportation Act</i>	Dangerous Goods Transportation Regulations
<i>Ditches and Water Courses Act</i>	
<i>Endangered Species Act</i>	
<i>Energy and Mineral Resources Conservation Act</i>	Withdrawal of Certain Substances from Application of Act Regulations
<i>Energy Efficient Appliances Act</i>	Energy Efficient Appliances Regulations
<i>Environment Act</i>	Activities Designation Regulations Air Quality Regulations Approval Procedure Regulations Asbestos Waste Management Regulations Dangerous Goods Management Regulations Emergency Spill Regulations Environmental Assessment Regulations Motive Fuel and Fuel Oil Approval Regulations Nova Scotia Environmental Assessment Board Regulations Nova Scotia Environmental Trust Regulations On-site Sewage Disposal Regulations Ozone Layer Protection Regulations PCB Management Regulations Pesticide Regulations Petroleum Storage Regulations



ACTS	REGULATIONS
	Protected Water Areas - Designations and Regulations
	Round Table Regulations
	Solid Waste Resource Management Regulations
	Sulphide Bearing Material Disposal Regulations
	Used Oil Regulations
	Water and Waste Water Facility Regulations
	Well Construction Regulations
<i>Fisheries and Coastal Resources Act</i>	
<i>Forest Enhancement Act</i>	
<i>Forests Act</i>	
<i>Gas Storage Exploration Act</i>	
<i>Halifax Public Gardens Protection Act</i>	
<i>Health Act</i>	Radiation Emitting Devices Regulations
<i>Marsh Act</i>	
<i>Marshland Reclamation Act</i>	
<i>Mineral Resources Act</i>	Mineral Resources Regulations
<i>Parks Development Act</i>	
<i>Petroleum Resources Act</i>	Petroleum Licences Exempted from Application of the Act Regulations Petroleum Resources Regulations
<i>Pipeline Act</i>	Land Acquisition Regulations Pipeline Regulations
<i>Trails Act</i>	
<i>Unightly Premises Act</i>	
<i>Water Act</i>	

ACTS	REGULATIONS
<i>Wilderness Areas Protection Act</i>	
<i>Wildlife Act</i>	Conservation Agreement-Exemption Regulations General Wildlife Regulations Sanctuaries Regulations Wildlife Management Areas Regulations

REGULATORY FRAMEWORK FOR ONTARIO

ACTS	REGULATIONS
<i>Aggregate Resources Act</i>	General Regulation
<i>Agricultural Rehabilitation and Development Act</i>	
<i>Boilers and Pressure Vessels Act</i>	General Regulation
<i>Conservation Authorities Act</i>	Conservation Areas Regulations Fill Regulations Fill and Alteration to Waterways Regulations Fill, Construction and Alteration to Waterways Regulations
<i>Conservation Land Act</i>	
<i>Crown Forest Sustainability Act</i>	General Regulation
<i>Dangerous Goods Transportation Act</i>	General Regulation
<i>Energy Act</i>	Compressed Natural Gas Storage, Fuel Oil Code, Handling and Utilization Regulation Fuel Oil Code Gas Utilization Code Regulation



ACTS	REGULATIONS
	Oil and Gas Pipeline Systems
	Propane Storage, Handling and Utilization Regulation
<i>Energy Efficiency Act</i>	General Regulations
<i>Endangered Species Act</i>	Endangered Species Regulations
<i>Environmental Assessment Act</i>	Designation Regulations
	Exemption Regulations
	General Regulations
<i>Environmental Bill of Rights</i>	Classification of Proposals for Instruments
	General Regulations
<i>Environmental Protection Act</i>	Air Contaminants from Terrons Foundries Act
	Ambient Air Quality Criteria Regulation
	Boilers Regulations
	Classes of Contaminants (Exemptions) Regulations
	Containers Regulation
	Deep Well Disposal Regulation
	Designation of Waste Regulation
	Effluent Monitoring and Effluent Limits Regulations
	Gasoline Volatility Regulation
	General: Air Pollution Regulation
	General: Waste Management Regulation
	Halon Fire Extinguishing Equipment Regulation

Environmental Guide for Federal Real Property Managers

ACTS	REGULATIONS
	Industrial, Commercial and Institutional Source Separation Programs Regulation
	Landfilling Sites Regulation
	Mobile PCB Destruction Facilities Regulation
	Motor Vehicles Regulation
	Ozone Depleting Substances Regulation
	Refrigerants Regulation
	Sewage System Regulation
	Solvents Regulation
	Spills Regulation
	Systems Regulation
	Waste Audits and Waste Reduction Work Plans Regulation
	Waste Management Regulations
<i>Fish and Wildlife Conservation Act</i>	
<i>Forest Fires Prevention Act</i>	Outdoor Fires Regulation
<i>Forestry Act</i>	
<i>Gasoline Handling Act</i>	
	General Regulations
<i>Health Protection and Promotion Act</i>	
<i>Lakes and Rivers Improvement Act</i>	Construction Regulation
<i>Niagara Escarpment Planning and Development Act</i>	Designation of Area of Development Control Regulation
	Designation of Planning Area
	Development within the Development Central Area Regulation
<i>Niagara Parks Act</i>	General Regulations
<i>Motor Vehicles Transport Act</i>	



ACTS	REGULATIONS
<i>Oil, Gas and Salt Resources Act</i>	Exploration, Drilling and Production Regulation
<i>Ontario Energy Board Act</i>	Exemption Regulation
<i>Ontario Mineral Exploration Program Act</i>	General Regulation
<i>Ontario Planning and Development Act</i>	
<i>Ontario Water Resources Act</i>	Sewage Works Subject to Approval under the Environmental Assessment Act Regulation
	Water Works and Sewer Works Regulations
	Wells Regulation
<i>Pesticides Act</i>	General Regulations
<i>Provincial Parks Act</i>	Designation of Parks Regulation
	General Regulation
	Mining in Provincial Parks Regulation
<i>Public Lands Act</i>	Conservation Reserve Regulation
	Land Use Permits Regulation
<i>Public Parks Act</i>	
<i>Public Utilities Act</i>	
<i>Topsoil Preservation Act</i>	
<i>Transboundary Pollution Reciprocal Access Act</i>	Reciprocating Jurisdictions Regulations
<i>Waste Management Act</i>	
<i>Weed Control Act</i>	General Regulation
<i>Wilderness Areas Act</i>	Wilderness Areas Regulations

REGULATORY FRAMEWORK FOR PRINCE EDWARD ISLAND

ACTS	REGULATIONS
<i>Dangerous Goods (Transportation) Act</i>	Dangerous Goods (Transportation) Regulations
<i>Energy-efficient Appliances Act</i>	
<i>Environment Tax Act</i>	
<i>Environmental Protection Act</i>	Air Quality Regulations Excavation Pits Regulations Lead-acid Battery Regulations Litter Control Regulations Ozone Depleting Substances and Replacement Regulations Petroleum Storage Tanks Regulations Plumbing Services Code Sewage Disposal Regulations Used Oil Handling Regulations Water Quality Certification Regulations Water Well Regulations
<i>Fisheries Act</i>	
<i>Forest Management Act</i>	
<i>Mineral Resources Act</i>	
<i>National Park Act</i>	
<i>Natural Areas Protection Act</i>	
<i>Pesticides Control Act</i>	Pesticides Control Regulations
<i>Plant Health Act</i>	
<i>Public Health Act</i>	Public Health Regulations
<i>Sea Plants Act</i>	
<i>Transboundary Pollution (Reciprocal Access) Act</i>	
<i>Unsightly Property Act</i>	



ACTS	REGULATIONS
<i>Water and Sewerage Act</i>	
<i>Weed Control Act</i>	
<i>Wildlife Conservation Act</i>	

REGULATORY FRAMEWORK FOR QUEBEC

ACTS	REGULATIONS
<i>Loi approuvant la convention de la Baie-James et du Nord québécois</i>	
<i>Loi modifiant la Loi sur la conservation et la mise en valeur de la faune</i>	Règlement sur les habitats fauniques
<i>Loi portant interdiction d'établir ou d'agrandir certains lieux d'élimination de déchets</i>	
<i>Loi sur la conservation et la mise en valeur de la faune</i>	
<i>Loi sur la protection des arbres</i>	
<i>Loi sur la provocation artificielle de la pluie</i>	Règlement sur la provocation artificielle de la pluie
<i>Loi sur la qualité de l'environnement</i>	Politique de protection des rives, du littoral et des plaines inondables Règlement relatif à l'application de la Loi sur la qualité de l'environnement Règlement sur certains organismes de protection de l'environnement et du milieu social du territoire de la Baie-James et du Nord québécois Règlement sur la prévention de la pollution des eaux par les établissements de production animale Règlement sur la protection des eaux souterraines dans la région de Ville de Mercier

ACTS

REGULATIONS

Règlement sur la qualité de l'atmosphère

Règlement sur l'eau potable

Règlement sur l'entreposage des pneus hors d'usage

Règlement sur les carrières et sablières modifié

Règlement sur les conditions sanitaires des campements industriels ou autres

Règlement sur les déchets biomédicaux

Règlement sur les déchets dangereux

Règlement sur les déchets solides

Règlement sur les eaux souterraines

Règlement sur les effluents liquides des raffineries de pétrole

Règlement sur les entreprises d'aqueduc et d'égout

Règlement sur les fabriques des pâtes et papiers

Règlement sur les matières dangereuses et modifiant diverses dispositions réglementaires

Règlement sur les pataugeoires et les piscines publiques

Règlement sur les substances appauvrissant le couche d'ozone

Règlement sur l'évacuation et le traitement des eaux usées des résidences isolées et déchets solides

Règlement sur l'évaluation et l'examen des impacts sur l'environnement dans une partie du Nord québécois



ACTS	REGULATIONS
	Règlement sur l'évaluation et l'examen des impacts sur l'environnement et le milieu social dans le territoire de la Baie James et du Nord québécois
	Règlement sur l'évaluation et l'examen des impacts sur l'environnement modifié
	Règlement sur l'usage du DDT
<i>Loi sur la vente et la distribution de bière et de boisson gazeuses dans des contenants à remplissage unique</i>	Règlement sur les permis de distribution de bière et de boissons gazeuses
<i>Loi sur le parc de la Mauricie et ses environs</i>	
<i>Loi sur le parc Forillon et ses environs</i>	
<i>Loi sur le programme d'aide aux Inuit bénéficiaires de la convention de la Baie James et du Nord québécois pour leurs activités de chasse, de pêche et de piégeage</i>	
<i>Loi sur le régime des eaux</i>	Règlement sur le domaine hydrique public
<i>Loi sur les espèces menacées ou vulnérables</i>	Règlement sur désignation de certaines espèces menacées
<i>Loi sur les parcs</i>	Règlement sur les parcs
<i>Loi sur les pesticides</i>	Règlement sur les pesticides
	Règlement sur les pesticides en milieu agricole
	Règlement sur les pesticides en milieu forestier
<i>Loi sur les réserves écologiques</i>	
<i>Loi sur les villages cris et le village naskapi</i>	
<i>Loi sur l'établissement et l'agrandissement de certains lieux d'élimination de déchets</i>	

REGULATORY FRAMEWORK FOR SASKATCHEWAN

ACTS	REGULATIONS
<i>The Clean Air Act</i>	The Clean Air Regulations
<i>The Conservation and Development Act</i>	The Conservation and Development Regulations
<i>The Conservation Easements Act</i>	The Conservation Easements Regulations
<i>Dangerous Goods Transportation Act</i>	The Dangerous Goods Transportation Regulations
<i>The Ecological Reserves Act</i>	The Representative Area Ecological Reserves Regulations
<i>The Environmental Assessment Act</i>	The Environmental Spill Control Regulations
	The Hazardous Substances and Waste Dangerous Goods Regulations
	The Mineral Industry Environmental Protection Regulations, 1996
	The PCB Waste Storage Regulations
	The Reservoir Development Area Regulations
	The Scrap Tire Management Regulations
	The Used Oil Collection Regulations
	The Water Pollution Control and Waterworks Regulations
<i>The Fisheries Act (Saskatchewan)</i>	The Fisheries Regulations
<i>The Forest Resources Management Act</i>	The Forest Resources Management Regulations
<i>The Grasslands National Park Act</i>	
<i>The Ground Water Conservation Act</i>	The Ground Water Regulations
<i>The Mineral Resources Act</i>	



ACTS	REGULATIONS
<i>The Natural Resources Act</i>	The Resource Protection and Development Services Regulations
<i>The Oil and Gas Conservation Act</i>	The Oil and Gas Conservation Regulations
<i>The Ozone-depleting Substances Control Act</i>	The Ozone-depleting Substances Control Regulations
<i>The Pest Control Products (Saskatchewan) Act</i>	The Pest Control Regulations The Pesticide Prohibition Regulations, 1980
<i>The Prairie and Forest Fire Act</i>	
<i>The Provincial Lands Act</i>	Provincial Lands Regulations
<i>Public Health Act</i>	Shoreland Pollution Control Regulations, 1976 Waste Management Regulations
<i>The Soil Drifting Control Act</i>	
<i>The State of the Environment Report Act</i>	
<i>The Water Corporation Act</i>	Regulations for the Administration of Water Rights The Drainage Control Regulations
<i>The Wildlife Act</i>	The Wildlife Regulations The Wildlife Landowner Assistance Program The Wild Species at Risk Regulations
<i>The Wildlife Habitat Protection Act</i>	The Wildlife Habitat Lands Designation Regulations The Wildlife Lands Disposition and Alteration Regulations

REGULATORY FRAMEWORK FOR YUKON

ACTS	REGULATIONS
------	-------------

ACTS	REGULATIONS
<i>Dangerous Goods Transportation Act</i>	Dangerous Goods Transportation Regulations Administrative Regulations Air Emissions Regulations Beverage Container Regulations
<i>Environment Act</i>	Contaminated Sites Regulations Ozone Depleting Substances Regulations Pesticides Regulations Special Waste Regulations Spills Regulations Storage Tank Regulations Yukon Council on the Economy and the Environment Regulation
<i>Public Health and Safety Act</i>	Camp Sanitation Regulations General Regulations Sewage Disposal Systems Regulations Rubbish Disposal Regulations

Appendix D

PCB Disposal Companies Operating in Canada



Company	Address	Phone/Fax
Thermal Destruction Systems		
Bennett Environmental Inc.	Suite 200, 1130 West Pender Street Vancouver, B.C. V6E 4A4	(604) 681-8828 (604) 681-6825
Bennett Environmental Inc. Facility	80, rue des Mélèzes Saint-Ambroise (Québec) G7P 2N4	(418) 695-3302 (418) 695-3303
Cintec Environnement Inc. (mobile system)	2401, rue Lapierre LaSalle (Québec) H8N 17B	(514) 364-6860 (514) 365-2964
Chem-Security (Alberta) Ltd.	4 Manning Close N.E. Calgary, Alberta T2E 7N5	(403) 235-8352 (403) 248-3430
Chem Security Facility	P.O. Box 180 Swan Hills, Alberta T0G 2C0	(403) 333-4197 (403) 333-4193
ELI Eco Logic International Ltd. (mobile system)	143 Dennis Street Rockwood, Ontario N0B 2K0	(519) 856-9591 (519) 856-9235

Environmental Guide for Federal Real Property Managers

Company	Address	Phone/Fax
Chemical Treatment (Dechlorination) Systems (mobile)		
B.C. Hydro	12388-88 th Avenue Surrey, B.C. V3W 7R7	(604) 590-7500 (604) 590-5347
Manitoba Hydro	1840 Chevrier Blvd. Winnipeg, Manitoba R3T 1Y6	(204) 474-4366 (204) 474-4756
Ontario Hydro Technologies	800 Kipling Avenue Toronto, Ontario M8Z 5S4	(416) 207-5876 (416) 207-6094
PPM Canada Inc. (also operates a stationary facility)	6 Chelsea Lane Brampton, Ontario L6T 3Y4	(905) 790-7227 (905) 790-7231
Rondar Inc.	333 Centennial Parkway Hamilton, Ontario L8E 2X6	(905) 561-2808 (905) 573-8209
Sanexen Environmental Services Inc.	579, rue Le Breton Longueuil (Québec) J4G 1R9	(514) 646-7878 (514) 646-5127
Transformer and Switchgear Services Co. Limited	158 Wallace Street Woodbridge, Ontario L4L 2P4	(905) 851-1803
Chemical Treatment (Dechlorination) Systems for High Concentration PCBs		
Ontario Hydro Technologies	800 Kipling Avenue Toronto, Ontario M8Z 5S4	(416) 207-5876 (416) 207-6094
PCB Transformer and Capacitor Decommissioning - Cleaning for Recycling		
Chem-Security (Alberta) Ltd.	4 Manning Close N.E. Calgary, Alberta T2E 7N5	(403) 235-8352 (403) 248-3430
Custom Environmental	7722-9 th Street Edmonton, Alberta T6P 1L6	(403) 440-1825 (403) 440-2428

Appendix D
PCB Disposal Companies Operating in Canada



Company	Address	Phone/Fax
ELI Eco Logic International Ltd. (mobile system)	143 Dennis Street Rockwood, Ontario N0B 2K0	(519) 856-9591 (519) 856-9235
Gary Stacey Dismantling Ltd.	General Delivery Colbourne, Ontario K0K 1S0	(905) 355-3046(905) 355-5480
Les Recyclage Larouche inc.	7475, rue Newman Suite 309 LaSalle (Québec) H8N 1X3	(514) 364-6860 (514) 365-2964
Ontario Hydro Technologies	800 Kipling Avenue Toronto, Ontario M8Z 5S4	(416) 207-5876 (416) 207-6094
Rondar Inc. (mobile facility)	333 Centennial Parkway Hamilton, Ontario L8E 2X6	(905) 561-2808 (905) 573-8209
Sanexen Environmental Services Inc. (mobile facility)	579, rue Le Breton Longueuil (Québec) J4G 1R9	(514) 646-7878 (514) 646-5127
Trans-Cycle Industries Ltd.	2884, rue Huntsman Saint-Lazare (Québec) J7T 2A1	(450) 458-1903 (450) 458-2760
	Facility Location P.O. Box 518 455 Archer Dr. Kirkland Lake, Ont. P2N 3J5	
PCB Transformer Cleaning for Reuse		
RONDAR Inc.	333 Centennial Parkway Hamilton, Ontario L8E 2X6	(905) 561-2808 (905) 573-8209
Westinghouse Canada Inc.	P.O. Box 2510 Hamilton, Ontario L8N 3K2	(905) 578-2959
Fluorescent Light Ballast Recycling		
CONTECH PCB Containment	P.O. Box 1011	(519) 622-8085

Environmental Guide for Federal Real Property Managers

Company	Address	Phone/Fax
Technology Inc.	Kitchener, Ontario N2G 4E3	(519) 622-8050
Green-Port Environmental Managers Ltd.	16 Melanie Drive Brampton, Ontario L6T 4K9	(905) 799-2777 (905) 458-1702
Les Recyclage Larouche inc.	7475, rue Newman Suite 309 LaSalle (Québec) H8N 1X3	(514) 364-6860 (514) 365-2964
Smart Environmental Services Ltd.	11 Pettipas Drive Unit 'N' Dartmouth, Nova Scotia B3B 1K1	(902) 468-9709 (902) 468-1613
Soil Decontamination		
Cintec Environnement inc.	2401, rue Lapierre LaSalle (Québec) H8N 17B	(514) 364-6860 (514) 365-2964
Octagon Environmental Services	20 Aguila Court Etobicoke, Ontario M9W 5J2	(416) 746-2098 (416) 746-3010
SCC Environmental	137 LeMarchant Road St. John's, Newfoundland A1C 2H3	(709) 726-0506 (709) 726-7905

Landfilling

CCME PCB waste landfill ban being implemented.

General PCB Management Services

A number of Canadian companies provide only general PCB management services, such as assisting PCB waste owners to identify, sample, analyze, label, package, transport, and export their PCB wastes; and to ensure that all federal and provincial regulatory requirements are met. The names of these companies will be added to this list at a later date. Most of the disposal companies listed above also provide some or all of these management services.

Appendix D
PCB Disposal Companies Operating in Canada



For further information on this list of PCB disposal companies please contact:

Environment Canada

Commercial Chemicals Evaluation Branch

Telephone: (819) 953-1670

Fax: (819) 775-4912

Appendix E

Index



American Society of Heating, Refrigeration, and Air-Conditioning Engineers

ASHRAE Standard 55, Thermal Comfort Conditions for Human Occupancy

ASHRAE Standard 62, Ventilation for Acceptable Indoor Air Quality

British Research Environmental Evaluation Method (BREEM), The Building Research Establishment

Canada Mortgage and Housing Corporation

Phase I Environmental Site Assessment Interpretation Guidelines

Standard Practice for Environmental Site Assessments: Transaction Screen Process
Environmental Site Assessments, A Summary for Approved Lenders

Canadian Council of Ministers of the Environment

Canadian Council of the Ministers of the Environment (CCME) Guidelines

CCME National Emissions Guidelines for Commercial/Industrial Boilers

Contaminated Site Liability Report: Recommended Principles for a Consistent Approach
Across Canada

Environmental Code of Practice for Aboveground Storage Tank Systems Containing Petroleum Products

Environmental Code of Practice for Underground Storage Tank Systems Containing Petroleum Products and Allied Petroleum Products

Environmental Guidelines for Controlling Emissions of Volatile Organic Compounds from Aboveground Storage Tanks

Guidance Document on the Management of Contaminated Sites in Canada

Guidance Manual for Developing Site-Specific Soil Quality Remediation Objectives for Contaminated Sites in Canada

Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites, Volume I, Main Report and Volume II, Analytical Method Summaries

Guidelines for Compost Quality

Management Plan for Nitrogen Oxides (NO_x) and Volatile Organic Compounds - Phase I

National Classification System for Contaminated Sites

National Emission Guidelines for Stationary Combustion Turbines

National Guidelines for Hazardous Waste Incineration Facilities: Design and Operating Criteria

National Guidelines for Land Filling of Hazardous Wastes

Operation and Emission Guideline for Municipal Solid Waste Incinerators

Canadian Environmental Assessment Agency

[Environmental Assessment and Review Process Guidelines Order](#)

[The Responsible Authority's Guide to the Canadian Environmental Assessment Act](#)



[Commissioner of the Environment and Sustainable Development](#)

[Construction Specifications Canada](#)

The National Master Specification

[CSA International](#)

CAN/CSA-Z768-94, Phase 1 Environmental Site Assessment

Commissioning of Health Care Facilities, CAN/CSA-Z318.0-93

Design for the Environment, CAN/CSA-Z762-95

Installation Code for Oil Burning Equipment

[Department of Justice Canada](#)

Auditor General Act

Canada Labour Code, Part II

Canada Labour Code, Part II, Occupational Safety and Health

Canadian Environmental Assessment Act

Canadian Environmental Protection Act

Federal Real Property Act

Financial Administration Act

Fisheries Act

Hazardous Products Act

Migratory Birds Convention Act

Navigable Waters Protection Act

Pest Control Products Act and Regulations

[Sustainable Development Strategy](#)

Transportation of Dangerous Goods Act (TDGA) and Transportation of Dangerous Goods Regulations

[**Environment Canada**](#)

Code of Good Practice for Handling Solid Wastes at Federal Facilities

Code of Good Practice for the Handling, Storage, Use and Disposal of Pesticides at Federal Facilities in Canada

Code of Practice on Halons

Environmental Codes of Practice for Steam Electric Power Generation – Construction Phase

Environmental Codes of Practice for Steam Electric Power Generation – Design Phase

Environmental Codes of Practice for Steam Electric Power Generation – Operation Phase

Environmental Codes of Practice for Steam Electric Power Generation – Siting Phase

Environmental Codes of Practice for Steam Electric Power Generation – Decommissioning Phase

Environmental Code of Practice for the Elimination of Fluorocarbon Emissions from Refrigeration and Air Conditioning Systems

[Federal Aboveground Storage Tank Technical Guidelines](#)

[Federal Committee on Environmental Management Systems \(FCEMS\): Working Group on Wastewater Management \(WGWM\)](#)

[Federal Underground Storage Tank Technical Guidelines](#)

Greening Government: Environmental Management Systems – A Self-assessment Guide

Green Office

Handbook on PCBs in Electrical Equipment

Identification of Lamp Ballasts Containing PCBs



[Official catalogue of Ecologo products and services as certified by the Environmental Choice program](#)

PCBs in Use and in Storage

Health Canada

[Canadian Water Quality Guidelines](#)

[Guidelines for Canadian Drinking Water Quality](#)

[Indoor Air Quality in Office Buildings: A Technical Guide](#)

International Standards Organization

ISO 14004, Environmental Management Systems: General guidelines on principles, systems and supporting techniques

Public Works and Government Services Canada

[Sustainable Development Strategy](#)

Public Works and Government Services Canada and the National Research Council

Managing Indoor Air Quality: A Manual for Property Managers

Standard Council of Canada

[Environmental Management Systems - General Guidelines on Principles, Systems and Supporting Techniques](#)

The Canadian Centre for Occupational Health and Safety

[Workplace Hazardous Materials Information System](#)

The Leadership Network

[Real Property Community Fact Sheet, Public Works and Government Services Canada](#)

Treasury Board of Canada Secretariat

[Treasury Board Guide to Monitoring Real Property Management](#)

[Treasury Board Hazardous Substances Directive](#)

[Treasury Board Materiel Management Policy](#)

[Treasury Board Procedures for Occupational Exposure to Asbestos](#)

[Treasury Board Real Property Environment Policy](#)

[Treasury Board Real Property Policy](#)

[Treasury Board Risk Management Policy](#)

[Treasury Board Sanitation Directive](#)

[Use of Real Property Facilities Policy, Treasury Board](#)