Preventing Toxic Pollution: Toward a British Columbia Strategy

A Report to the B.C. Hazardous Waste Management Corporation

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To our children, and the seven generations to follow.

British Columbians are demanding that the provincial government take action to prevent toxic pollution. Residents of Howe Sound, Prince Rupert, Cowichan Bay and elsewhere want to be able to catch, and eat, local crabs again. Residents of Port Moody want to be able to catch fish that aren't riddled with pre-cancerous lesions. Parents in Trail want toxic lead out of local air, and out of their children's blood. People in Abbotsford want pesticides and nitrates out of local well water. People from Vancouver to Chilliwack want air pollutants removed from the air they breathe. Commercial fishers want to stop toxic anti-sapstains from threatening fish stocks. Parents throughout the province want to eliminate the minute traces of toxics that are now found in mothers' milk. All of us want to leave future generations an environment free of persistent toxic contaminants.

The purpose of this report is to propose the broad outlines of a provincial

government strategy for preventing toxic pollution in British Columbia. This report is addressed to the provincial government because it must take the lead in passing laws and establishing government policies that will cut pollution. However, the report is addressed not only to the provincial government but also to members of the public, businesses, institutions, organizations, and other levels of government. This is essential, because the provincial government's strategy will be effective only if it reflects widespread input from all affected parties. Moreover, the provincial government's strategy will be effective only if all the other parties adopt strategies to complement the provincial effort.

We hope that this report will spark a constructive public dialogue regarding the best way to prevent toxic pollution. And we trust that such a dialogue will lead to an effective British Columbia strategy for combatting toxic pollution.

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EXECUTIVE SUMMARY

West Coast Environmental Law Research Foundation is a non-profit society that provides legal research and education to promote protection of the environment and public participation in environmental decision-making. This report was

prepared for the British Columbia Hazardous Waste Management Corporation.

Toxic pollutants from a wide variety of large and small sources have contaminated -- and continue to contaminate -- the B.C. environment. The Province of British Columbia has taken various measures against this problem, but it lacks a comprehensive provincial strategy to prevent toxic pollution. This report outlines some of the major elements that should be included in such a strategy.

Principles

The strategy should be based on three fundamental principles:

- the precautionary principle, that action should be taken to prevent contamination before there is conclusive proof of harm;
- the preventative approach principle, that it is far better to prevent the generation of toxic pollutants than it is to try to cope with such pollutants after they have been created; and
- the polluter pays principle, that those who pollute should pay for the ensuing costs and damages.

There are four pillars to the proposed pollution prevention strategy:

1. Closing the gaps in the existing regulatory system (Chapter 2)

New legislation should mandate eliminating persistent toxic contaminants according to urgent and realistic timetables. It should establish a mechanism for prioritizing pollution problems. The **use** of certain substances should be banned. Enforceable regulations should set minimum standards, and site-specific pollution permits should add requirements that are more stringent. These standards should be updated periodically, e.g., every five years. Pollution prevention should be advocated by Ministry of Environment officials in land use planning and environmental assessment processes. The report recommends several ways in which enforcement should be strengthened. And it recommends new legislative and policy measures for cleaning up contaminated sites, keeping pollutants out of landfills and sewers, and reducing or eliminating pollution from nonpoint sources.

2. Providing education and technology transfer (Chapter 3)

Many businesses would actually save money by reducing their pollution discharges. Yet, lack of information about pollution prevention techniques prevents many businesses from cleaning up their operations. The government should establish a British Columbia Pollution Prevention Centre to provide information and technical assistance to industry. The government should fund pollution prevention research and demonstration projects. It should also require that generators of toxic materials prepare comprehensive toxics use reduction plans.

3. Implementing a system of economic incentives and disincentives (Chapter 4)

The marketplace could be a powerful mechanism for preventing pollution. The report outlines a variety of economic instruments that the government should implement to induce both polluters and consumers to replace polluting practices with practices that prevent pollution, beyond the levels required mandatorily by the regulatory system. Such instruments should include emission charges on industrial emissions, and environmentally-based product taxes. Deposit/refund systems should be established to ensure the return of products containing toxics, as part of a general requirement that businesses take direct responsibility for ultimate disposal of such products. The civil liability of polluters to pay for environmental damage should be expanded, and polluters should be required to post adequate insurance or security to pay for potential pollution damage. Government purchasing policies and subsidy policies should be restructured to encourage clean industry.

4. Enhancing public participation and revamping the Province's information system (Chapter 5)

Citizen participation is the key to a successful strategy for preventing toxic pollution. The report calls for new legislation to recognize public rights to participate in pollution-prevention decision-making, and to have access to information held by government. Dissemination of environmental information should also be required in certain circumstances. These reforms are closely linked to the need to modernize the Province's system of handling information on environmental standards, compliance and environmental impact, so that all concerned can have efficient access to timely information.

Conclusion (Chapter 6)

In conclusion, the provincial government needs to consult widely with affected parties and the public, in order to formulate a comprehensive strategy to prevent toxic pollution. The principles, purposes and structures of the strategy should be enshrined in legislation.

CHAPTER 1 POLLUTION, PRECAUTION AND PREVENTION

Every year millions of pounds of toxic[1] materials are generated and disposed of in British Columbia.[2] Such toxics include everything from heavy metals to solvents, from car exhaust to pesticides. While some of that material is captured, stored, treated and disposed of properly, a great deal is not.

Many toxics are emitted from industrial air stacks. Other toxics flow from industrial waste pipes into lakes, rivers and the ocean. Still other industrial toxics are dumped on land, where they contaminate soil and groundwater supplies.

Industry is not the only problem. Individual British Columbians collectively release a large amount of hazardous waste into their household garbage and sewage -- perhaps as much as 30 pounds per household annually.[3] From paint thinner that is dumped down thedrain to mercury batteries dumped into the garbage can, much of this toxic material eventually finds its way into the environment.

Other nonpoint[4] sources of toxics -- for example, agricultural and forestry pesticides and storm sewers contaminated with urban street run-off -- contribute additional tonnes of toxic contaminants to the environment.

TOXIC POLLUTION IN B.C.

Although toxic contamination is obviously a significant problem in this Province, authorities have gathered surprisingly little detailed data about the situation.[5] Yet, the information that we do have on the toxics problem is disquieting.

- It has been estimated that in 1989 approximately 110,000 tonnes of hazardous waste were generated and/or transported in British Columbia.[6] The storage, transport, treatment and disposal of this waste presents a risk of environmental release.[7]
- Over 300 British Columbia industries -- representing thousands of firms -- are known or suspected sources of hazardous waste.[8]
- In addition to the 110,000 tonnes of waste, B.C. industries annually discharge many millions of pounds of toxics from water and air waste pipes into the environment.[9]

- Hundreds of kilometers of British Columbia coastline -- in nine major areas on Vancouver Island and the mainland -- are now closed to shellfish harvesting because of dioxin and furan contamination from pulp mills.[10]
- Government officials have issued a general advisory recommending against consuming the livers of bottomfish such as rockfish and cod harvested in the vicinity of all coastal pulp mills, based on elevated levels of dioxins and furans.[11]
- Health warnings have been issued against eating three species of diving ducks around Port Alberni[12] and two species of waterbirds in Howe Sound[13] , evidence that these toxic pulp mill contaminants are moving up the food chain, as had been feared.[14]
- Very high levels of cadmium and elevated levels of lead and PCBs have been found in sediments near the Port Mellon pulp mill. High levels of PCBs and mercury were found in sediments near the Woodfibre pulp mill.[15] High levels of mercury have also been found in sediments near the Powell River mill and at various other sites.[16]
- Anti-sapstain pesticides sprayed on lumber to prevent fungus growth have caused widespread problems. A 1982 Environment Canada report estimated that 400-600 tons of chlorophenol anti-sapstain chemicals were used annually in British Columbia, of which a significant amount escaped into the environment.[17] In the 1980s highly toxic levels of such chemicals were found in the waters adjacent to a number of sawmills around the Province.[18] Relatively high concentrations of chlorophenols were found in Fraser River sculpins and peamouth chub.[19] Moreover, chlorophenols have been widely found in human tissue.[20] Chlorophenols have been replaced by other toxic anti-sapstains, but problems continue. Eight hundred and seventy-six commercial fishers have launched a lawsuit against a company that allowed a different anti-sapstain chemical to spill into the Fraser River, triggering a one-day closure of the fishery.[21]
- A wide variety of hazardous materials enter -- and leave[22] -- sewage systems throughout the Province. For example, the Greater Vancouver Regional District sewer system receives:
    - petroleum refinery effluent;
    - metals including cadmium, lead and chromium from close to 50 metal and surface finishing operations;
    - phenols from the wood industry;
    - effluent discharges from a number of chemical industries, laboratories, printing and photography development operations, automotive shops, pesticide and paint formulation operations; and
    - a toxic mixture of cleansers, oils, solvents, paints, and biocides that get flushed down residential and commercial drains and toilets.[23]
- Household hazardous waste also contributes to the toxic problems of B.C. landfills. Automobile batteries contribute massive amounts of non-degradable lead. Household batteries add cadmium and mercury. To these are added household and garden pesticides, corrosive drain and oven cleaners, cleaning fluids, solvents and a variety of other toxics.[24]
- In Vancouver Harbour (Burrard Inlet), heavy metal pollutants such as mercury, cadmium, chromium and lead are found at concentrations known to harm marine organisms. In some areas of the Inlet up to 75% of sole examined have

liver lesions, including tumors and precursors to tumors. These lesions are likely connected to the PAHs (polynuclear aromatic hydrocarbons) released into the harbour from petroleum refineries, creosoted timbers and pilings and urban run-off.[25]

- Sediments in Victoria harbour show elevated levels of PCBs, mercury, lead, cadmium, copper and zinc.[26]
- The Columbia River near Trail contains toxic metals from the Cominco fertilizer plant and lead smelter. Elevated levels have been found in downstream organisms.[27]
- A recent study of children living near the Trail lead smelter indicates that they have high levels of lead in their blood -- a level considered to be of "serious concern in young children" by the U.S. Center for Disease Control. This level is associated with subtle mental deficits, attentional deficits, hearing damage, and blood abnormalities. This has led to calls for stricter controls on the smelter's air emissions.[28]
- In the Trail area, arsenic contamination from the smelter has been linked to the fact that arsenic levels in local root vegetables have occasionally exceeded the federal health guidelines.[29]
- Lead contamination has been documented near a phosphate fertilizer plant near Kimberley, a battery smelter in Richmond, in waters near pulp mills, in Victoria and Vancouver Harbours, and in parts of the Fraser and Brunette Rivers.[30]
- Kamloops has faced the problem of mercury contamination from a former copper mine/smelter.[31]
- Elevated levels of cadmium have been found in fish from Buttle Lake, likely due to the Westmin mine operations.[32]
- The fishery on the Tsolum River was virtually destroyed by acid mine drainage.[33]
- Sediments and aquatic organisms in Alice Arm were found to contain extremely high levels of heavy metals from old mining and smelting operations.[34]
- Fluoride and toxic polynuclear aromatic hydrocarbon (PAHs) emissions are released by the Kitimat smelter. Significantly elevated levels of PAHs have been detected in marine organisms near the smelter.[35]
- Cadmium has been found in elevated levels near the lead/zinc smelter in Trail and near the Richmond battery smelter.[36]
- Use of cyanide at a Grand Forks gold heap leaching operation led the Minister of Environment to declare an "environmental emergency" because of groundwater contamination.[37]
- The B.C. government may spend up to $60-million to clean up old industrial pollution at the Expo site in Vancouver.[38] Numerous other sites in the Province have been contaminated by industry and will eventually need cleanup.[39]
- Over two million kilograms of pesticides are used annually in British Columbia.[40] This has led to occasional fish and bird kills, and to concern about potential long-term impacts on farm workers and consumers.[41]
- The pesticide dinoseb, which presents a risk of birth defects and reproductive effects, has been found in Aldergrove wells.[42] The extent of pesticides in B.C. groundwater has not been adequately investigated,[43] but analogous studies in the U.S. and Ontario give cause for concern.[44]

- Pulp mill emissions may well be causing respiratory illness, according to a recent Port Alberni study.[45]
- Sulfur dioxide emissions from Vancouver area petroleum refineries, cement plants, and vehicles may be putting at risk the health of the 30,000-50,000 asthmatics who live in the Vancouver area.[46] A 1989 study by Dr. David Bates of the UBC Medical Faculty indicates a statistical relationship between local sulfur dioxide concentrations and hospital emergency visits for respiratory distress.[47]
- Ozone air pollution likely causes $8.8-million in Fraser Valley crop damage each year, according to a recent estimate.[48] Fraser Valley ozone sometimes reaches levels that are associated with increased respiratory-distress hospital visits.[49]
- Since 1984, when Canadian scientists started testing human tissue for toxic contaminants, every Canadian sample tested has contained a variety of toxic contaminants.[50] Health and Welfare Canada studies have discovered that the typical Canadian's body contains residue of dioxins and chlorophenols.[51] Other studies have shown that heavy metals such as lead are common contaminants in body tissue.[52] Some such chemicals stored in our body tissues can cause cancer, birth defects and other health problems.[53]

The Precautionary Principle

The long-term impacts of the toxic contamination described above are difficult to calculate or predict. Scientists have insufficient data on long-term effects of many toxics, insufficient information about the impact of those toxics on complex interrelationships between organisms in the environment, and insufficient epidemiological information on long-term human health impacts. Therefore, prudence dictates that society should take a precautionary approach towards toxic contaminants because pollution has caused unpredicted and grave harm in the past. For example:

- Hundreds of Canadian lakes have been killed by acid rain, much of which originates in distant parts of the U.S. Midwest.[54]
- Canadian fish have been contaminated by pesticides applied in distant parts of the U.S. South.[55]
- The earth's protective ozone layer is gravely threatened by CFCs.[56]
- Eagle and falcon populations in B.C. were devastated by DDT contamination.[57]
- North American children incurred widespread neurological effects because of lead in gasoline.[58]
- Fetuses and infants in the Great Lakes basin are at "serious risk" of adverse health problems, because of toxics in their mothers' milk.[59]

Some may argue that it is sufficient to continue as we have in the past -- to continue to allow the release of pollutants until it is **proven** that a particular pollutant is harmful to humans or the environment. Then governments can respond by regulating the substance that has been proven harmful.

This traditional approach is based on the assumption that generally the environment has a capacity to receive, and render harmless, vast amounts of pollution -- that we can continue to release pollutants because the environment can assimilate them.

However, the above examples demonstrate just how little is really known about the multitude of pollutants that are released into the environment, and how little is known about the overwhelmingly complex web of life that such pollutants impact.[60]

Scientists have pointed out the danger of waiting for 'proof' of harm before taking action to cut pollution. The Great Lakes Science Advisory Board has stated:

The current requirement for 'proof' of harm creates a situation that can resolve itself only through costly errors. One by one 'proof' of harm can never keep pace with the rates of introduction of chemicals.[61]

As more and more countries grapple with the unanticipated impacts of pollution from distant places and distant times, they are beginning to adopt a new principle of international law. This new principle is one that should undergird British Columbia's new pollution prevention strategy:

... the precautionary principle ensures that a substance or activity posing a threat to the environment is prevented from adversely affecting the environment, even if there is no conclusive scientific proof linking that particular substance or activity to environmental damage. The precautionary principle is a guiding principle. [emphasis added][62]

Countries such as Norway, Sweden, the Netherlands and Denmark have embraced the policy of a precautionary approach.[63] Gro Brundtland, Prime Minister of Norway and former Chair of the U.N. World Commission on Environment and Development has stated:

... I will add my strong support to those who say that we cannot delay action until all scientific facts are on the tables. We already know enough to start to act -- and to act more forcefully. We know the time it takes from decision through implementation to practical effects. We know that it costs more to repair environmental damage than to prevent it. If we err in our decisions affecting the future of our children and our planet, let us err on the side of caution.[64]

The precautionary principle has been adopted by the United Nations Environmental Programme (UNEP) Governing Council, and accepted by four major international declarations on the dumping of waste at sea. It was reaffirmed by the North Sea Conference and referred to in the Montreal Protocol on Substances that Deplete the Ozone Layer.[65] Canada supported the inclusion of the precautionary principle in the

Bergen Ministerial Declaration,[66] a Declaration endorsed by 34 countries:

In order to achieve sustainable development, policies must be based on the precautionary principle. Environmental measures must anticipate, prevent, and attack the causes of environmental degradation. Where there are threats of serious or irreversible damage, lack of scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.[67]

In a recent decision on marine pollution, the UNEP Governing Council recommended that all governments base their marine pollution policies on the precautionary principle:

Recognizing that waiting for scientific proof regarding the impact of pollutants discharged into the marine environment may result in irreversible damage to the marine environment and in human suffering...[the Governing Council] recommends that all the governments adopt the "principle of precautionary action" as the basis of their policy with regard to the prevention and elimination of marine pollution ...[68]

The "principle of precautionary action" should likewise be the basis of a British Columbia strategy for preventing and eliminating toxic pollution.

Recommendation 1. The Province of British Columbia should adopt the precautionary principle -- taking action without waiting for conclusive proof of harm -- as the basis of its pollution policies and laws.

Preventing Pollution

It is time for a revolution in our thinking about protecting the environment from pollution ... The successful state and federal environmental legislation of the 1960s and 1970s attacked conventional pollutants by regulating their release into the environment. This forced the development of new pollution control technologies, but still permitted some discharge of materials ... To meet the emerging challenge of toxic pollutants, we must realize it is far more effective and cheaper to prevent them from ever entering the environment than it is to clean up our mistakes ... Our business economy, too, will benefit from the reduced material costs, slashed disposal fees, and increased efficiency that results from waste reduction technologies. Michigan Governor James Blanchard[69]

Like the U.S. legislation, Canadian environmental laws have traditionally emphasized pollution control. Maximum limits -- frequently defined as the limits attainable by current control technology -- have been set on the amount of pollution discharged. Unfortunately, these standards have not been stringent enough to prevent widespread contamination of the environment.

Too often these standards have been based on techniques such as filters and treatment ponds that deal with pollutants after they have been created -- rather than on techniques, such as using non-toxic raw materials, which would avoid creating the pollutants in the first place. These end-of-pipe techniques can fail because of equipment failure, inadequate maintenance or worker error. Even when they work consistently, such techniques typically allow a certain amount of discharge into the environment. And such control and treatment techniques frequently produce a new form of pollution that can have its own environmental impact.

The U.S. Environmental Protection Agency recently stated:

It is increasingly clear that some treatment technologies, while solving one pollution problem, have created others. Air pollution control devices or industrial wastewater

treatment plants prevent wastes from going into the air or water, but the toxic ash and sludge that these systems produce can become hazardous waste problems themselves. Wastes disposed of on the land or in deep wells may contaminate ground water, and evaporation from ponds and lagoons can convert solid or liquid wastes into air pollution problems.[70]

Toxics that have been 'captured' by pollution control devices can be a problem of great magnitude. Twenty-five per cent of all wastes received at a major U.S. hazardous waste landfill originated from pollution control baghouse dusts and sludges. At a major petroleum refinery, 60% of its hazardous wastes came from pollution control devices.[71] Such captured toxics then pose potential risks when handled, stored, transported or treated.[72]

There is an increasing awareness that reducing the generation of pollutants at source is preferable to trying to control discharge at the end of the waste discharge pipe, or trying to safely treat and dispose of hazardous wastes. As the U.S. Environmental Protection Agency Science Advisory Board has stated:

End-of-pipe controls and waste disposal should be the last line of environmental defense, not the front line. Preventing pollution at the source is usually a far cheaper, more effective way to reduce environmental risk, especially over the long term.[73]

Reduction of the generation of pollution at source has numerous advantages. Such reduction can:

- reduce the possibility that pollution control technology or management will fail, leading to environmental damage and clean-up costs;[74]
- reduce the handling, storage, transportation, treatment and disposal of toxic materials, and the attendant risks;[75]
- avoid the problem of pollutants being kept out of air emissions only to be discharged to water or land, or vice versa;
- reduce occupational risks for workers who are presently exposed to toxics in the workplace;[76]
- reduce the risk to consumers and the environment from final products that are composed of hazardous materials;[77]
- allow companies to meet current discharge standards and not have to worry about future, more-stringent standards;
- reduce the amount of materials and situations that government must regulate;
- reduce the chance that treated emission streams will carry currently unregulated residual substances that may, in the future, be shown to be harmful;[78]
- conserve materials (by reducing raw material losses), slow the depletion of virgin resources, and frequently reduce energy consumption as well;[79]
- cut industry's costs, including direct costs for handling, storage, transport and treatment of wastes, as well as indirect costs of regulatory compliance, legal advice, insurance, present and future legal liability; and
- cut society's costs for cleaning up toxic problems.[80]

The Rs

The advantages of reducing pollution at source are reflected in 'the Rs,' the widely-accepted waste management hierarchy of preferred approaches to dealing with waste. Reduction is the first and most highly preferred option in 'the Rs.' What began as 'the three Rs' became 'the four Rs,' then 'the five Rs,' and lately a sixth 'R' is sometimes used:

(1) reduction -- reduction of the amount of waste generated;

(2) reuse -- reuse of wastes without altering their form;

(3) recycling -- changing the form of a waste so that it can be used again;

(4) recovery -- recovering recyclable components[81] from the waste stream;

(5) residuals management -- properly managing those wastes that remain after the previous four techniques have been exhausted; and

(6) remediation -- decontaminating and restoring areas damaged by previous pollution.

Source reduction is the first of the U.S. Environmental Protection Agency's hierarchy of waste management options.[82] In numerous U.S. states, reduction of hazardous wastes at source is explicitly stated to be the top priority, as a matter of official state policy.[83] The Model Hazardous Waste Reduction Act prepared by a Task Force of the U.S. Council of State Governments explicitly provides that a waste control hierarchy -- with waste reduction as the first option -- should be official state policy.[84]

In B.C., limited statutory recognition of 'the 4 Rs' is contained in the Hazardous Waste Management Corporation Act,[85] which specifies that one of the purposes of the corporation is to:

... encourage action in households, business, industry and government to minimize hazardous waste generation and maximize resource conservation through the promotion and facilitation of hazardous waste reduction, recycling, reuse and recovery at source and to thereby minimize the number of new hazardous waste management facilities that might be otherwise required ... [emphasis added][86]

In the solid waste field, the provincial government's guidelines for the content of solid waste management plans to be prepared by local governments officially sanction 'the 5 Rs'. The guidelines state:

The essential part of the strategy is the sequential hierarchy of the 5 Rs: reduce, reuse, recycle, recovery and residual management. [emphasis in the original][87]

The B.C. Ministry of Environment has emphasized reduction at source in its recent commitment to reduce the generation of hazardous waste in the Province by 50% by the

end of the decade.[88] In addition, the Ministry has proposed a new policy to define BACT (Best Available Control Technology).[89] This policy would be a move away from the traditional end-of-pipe approach, in that it expressly recognizes that fundamental source reduction changes in industrial process should be recognized as best available control technology in appropriate circumstances.[90]

However, the Province should now specifically legislate a requirement that, when making waste management decisions and policies, all provincial authorities must give primacy to reduction of hazardous waste and pollution at source.

Recommendation 2. The Province of British Columbia should enact legislation requiring provincial authorities to promote and adhere to a waste management hierarchy that places reduction of waste generated as the most preferred option.

Toward A Four-Pronged Strategy

In the following chapters, we discuss four major areas -- regulatory, educational, financial and informational -- in which initiatives should be taken to prevent pollution in British Columbia.

In Chapter 2, we address the existing regulatory system for preventing pollution in B.C. We make a number of proposals for strengthening the development of the regulatory system:

- legislating a goal of eliminating persistent toxic contaminants according to an urgent and realistic timetable;
- sunsetting key contaminants;
- identifying and prioritizing the worst pollution problems;
- setting minimum standards in regulations;
- periodically updating pollution standards; and
- promoting pollution prevention in **land use planning and environmental assessment processes**.

Next, we discuss ways to strengthen the enforcement of regulatory standards. Then, we outline three particular areas in which regulatory improvements should occur:

- contaminated sites;
- nonpoint sources of pollution; and
- keeping contaminants out of municipal sewage and landfill systems.

In Chapter 3, we examine the fact that "Pollution Prevention Pays" -- that many companies can reduce pollution and simultaneously increase their profits. Government should act as a catalyst to get this message out, along with technical information on exactly how firms can institute such pollution reductions. Just as B.C. Hydro has successfully used the "Power Smart" program to educate businesses about how they can profit when they stop wasting energy, the B.C. government needs to institute a "Waste

Wise" program to show industry how it can profit when it stops "wasting" pollutants.[91] Such a program should include:

- a pollution prevention centre to provide education and technical assistance to industry;
- **support** for the Pacific Northwest Pollution Prevention Research Center;
- demonstration projects; and
- preparation of toxics use reduction plans by polluters.

In Chapter 4, we discuss a range of economic incentives and disincentives that the government can use to encourage the elimination of pollution, and to implement the polluter pays principle. Key instruments that we recommend the government include are:

- an emission charge system for industrial emissions;
- a system of environmentally-based **product taxes**;
- a deposit/refund system to ensure the return of products containing toxic materials;
- a general requirement that manufacturers, distributors and retailers take direct responsibility for disposal of products containing toxics;
- a significant expansion of the civil liability of toxic polluters;
- mandatory insurance and/or **security** requirements for polluters;
- a government purchasing policy that gives preference to products produced with clean technology; and
- elimination of government subsidies for industries that create toxic pollution.

In Chapter 5, we address the importance of statutory recognition of public rights to participate in pollution-prevention decision-making, and to access to information held by government. We discuss the trend toward requirements on government to disseminate important environmental information, and we conclude with an examination of the need for a strategy to upgrade B.C.'s handling of **environmental information**, to allow all concerned to have efficient access to timely environmental information.

Chapter 6 is a brief conclusion.

ENDNOTES

1. This report focuses on the generation and release of toxic pollution -- in other words, the escape of toxic chemicals into the environment. Environment Canada has defined toxic chemicals as:

"Those chemical substances which, when released to the environment, or thereafter if chemically transformed through combination or otherwise, could pose a significant threat to natural ecosystems or to human health and well-being. They are often highly resistant to natural degradation and are frequently capable of causing biological changes

at trace concentration; many are bio-accumulative and pass through food chains. Some may also be rendered more toxic when combined in the environment with other chemicals. They are generally irretrievable once released into the environment and their effects can, within a time frame meaningful for human society, be effectively irreversible." [Source: C. Garrett, *Pacific and Yukon Region Toxic Chemicals Profile* (Vancouver: Environment Canada, 1982) p.2.]

2. See the discussion and footnotes below.

3. In the U.S. it has been estimated that the average household contributes 30 pounds of hazardous waste annually to the general hazardous waste problem. [Source: J. Hirschhorn & K. Oldenburg, *Prosperity Without Pollution: The Prevention Strategy for Industry and Consumers* (New York: Van Nostrand Reinhold, 1991) p.53.]

4. Nonpoint sources are pollution sources other than industrial or municipal waste pipes or chimneys.

5. For example, the Ministry of Environment has not collected comprehensive data on toxic industrial discharges. A Ministry study has stated: "In most cases the present permit system does not require permittees to report the quantities of contaminants emitted from their facilities. The permits only stipulate the limits on stack gas flow rates, concentrations of contaminants of concern, operating period, and discharge frequencies. Not all contaminants are listed in the permits, and often typical phrases such as `products of combustion of natural gas' are used in the permits instead of any emission parameters. Also scarce are the actual source testing data from the permitted facilities." [Source: Waste Management Branch, *1985 Emission Inventory: Point Sources: Summary Report* (Victoria: B.C. Ministry of Environment, 1989) p.9.] Even less data exists for businesses that dump effluent directly into municipal sewage systems and other waste into municipal landfills.

Virtually no data has been collected to quantify the amounts and characteristics of toxics coming from nonpoint sources. It should also be noted that biological effects monitoring -- determining the effect of toxics on organisms in the environment, including humans -- is in its infancy in this Province. *See* the discussion in Chapter 5 regarding the need to modernize the Ministry of Environment's information system, and to define protocols for biological effects monitoring.

6. Ministry of Environment, *Environment 2001: Strategic Directions for British Columbia* (Victoria: the Ministry, 1991) p.16. The Ministry cites the figure of 110,000 tonnes in 1989. However, there is evidence that this figure may be far too low. For example, the 1989 Ministry of Environment provincial inventory estimated the amount of PCBs located in B.C. schools, colleges and universities at 22,372 kgs. A recent census done by the B.C. Hazardous Waste Management Corporation found 125,050 kgs. in storage at such institutions, an error factor of 5.6. [Source: letter from B. Johnston, B.C. Hazardous Waste Management Corporation to West Coast Environmental Law Association, 21 August 1991.] This lack of dependable information is part of the reason why the B.C. Hazardous Waste Management Corporation is now embarking on a survey

to determine the characteristics and volume of industrial hazardous waste being produced in British Columbia.

7. For example, landfilling or illegal dumping of hazardous waste can present a hazard to groundwater and other parts of the environment. Proper treatment of such waste can pose a lesser hazard. Storage may prevent release -- unless there is an accident or fire (e.g., the PCB fire at St. Basile le Grand, Quebec). Transportation poses all the risks inherent in moving commodities on public highways and railways (e.g. the PCB highway spill at Kenora, Ontario).

8. *Request for Proposal for a Hazardous Waste Market Characterization Study for the B.C. Hazardous Waste Management Corporation*, RFP #98126 (Victoria: B.C. Purchasing Commission, 1991) [unpublished].

9. Unfortunately, comprehensive B.C. figures on this problem do not exist. However, it was estimated that B.C. pulp mills alone discharged approximately 58 tonnes of organochlorines a day in 1988. [Source: West Coast Environmental Law Research Foundation, "AOX Total Daily Loading by B.C. Pulpmills" (1990) 14:4 Special Pulp Pollution Edition Newsletter, p.3.]

10. Government of Canada, *News Release and Backgrounder* (29 November 1990). *See also* C. Sandborn & W. Andrews, "Pulp Mill Decision is a Disaster" *Vancouver Sun* (20 December 1990); and S. Simpson, "Mill Toxin Spread Lead to Warnings" *Vancouver Sun* (10 August 1991) p.A1.

11. *Ibid.*

12. Government of Canada, *News Release* 1990-34 (27 April 1990).

13. Government of Canada, *News Release* (29 November 1990).

14. Dioxins and furans are not the only pulp chemicals of concern. B.C. pulp mills discharge tonnes of organochlorines daily into the environment. Some, like dioxins, are highly toxic, persistent and bioaccumulative. Many other organochlorines have not been identified or characterized -- so their potential environmental and human health effect remains uncertain.

In addition, the so-called "conventional" pollutants from pulp mills -- BOD (biochemical oxygen demanding material) and TSS (total suspended solids) -- are also responsible for the deterioration of water quality around some pulp mills. Near the Port Alberni pulp mill, years of BOD and TSS discharge have led to critically low levels of dissolved oxygen in the Inlet, posing an increasing risk to the maintenance of sustainable fisheries. *See* Environment Canada, *Justification and Rationale for Special Regulation for MacMillan Bloedel Port Alberni Pulp Mill* (Vancouver, 1990) [unpublished]; and D. Stucchi et al., *Review of the Water Quality Issue in Port Alberni Harbour* (Vancouver: Environment Canada, 1990) [unpublished].

15. B. Kay, *Pollutants in British Columbia's Marine Environment: A Status Report* (Ottawa: Environment Canada, 1989) p.51.

16. C. Garrett, *Chemicals in the Environment: Mercury* (Vancouver: Environment Canada, 1985) p.7.

17. C. Garrett, *Pacific and Yukon Region Toxic Chemicals Profile* (Vancouver: Environment Canada, 1982) p.28.

18. P.Krahn, J. Shrimpton & R. Glue, *Assessment of Storm Water Related Chlorophenol Releases From Wood Protection Facilities in British Columbia* (Vancouver: Environment Canada, Regional Program Report 87-14, 1987). This study examined chlorophenol chemicals, which are no longer in substantial use in the Province. The chlorophenols have been replaced by other anti-sapstains, some of which are less toxic -- though still toxic -- to fish. Other replacement anti-sapstains are actually **more** toxic to fish.

19. J. Carey, M. Fox & J. Hart, "Identity and Distribution of Chlorophenols in the North Arm of the Fraser River Estuary" (1988) 23 *Water Pollution Research Journal*, pp.31-44. *See also* H. Dorsey & J. Griggs, eds, *Water in Sustainable Development: Exploring Our Common Future in the Fraser River Basin* (Vancouver: Westwater Research Centre, 1991) pp.69-70 for the statement that chlorinated phenol concentrations in sculpins, peamouth chub and starry flounders exceeded the provisional provincial objective for such concentrations.

20. Agriculture Canada and Health and Welfare Canada, *Draft Discussion Document on Anti-Sapstain Chemicals* (Ottawa: the Ministry, 1989) pp.20-23.

21. *Clifton Bailey et al.* v. *Fraser Surrey Docks*, Vancouver Supreme Court Registry # C896347.

22. Sewage treatment does not treat or destroy most toxic materials. [Source: S. Lewis, *Boston Harbor Toxics Cleanup: Who Should Pay* (Boston: National Toxics Campaign Fund, 1990) pp.2-3.] The primary treatment of sewage that is used in Greater Vancouver usually removes less than half of most metals in the sewage. [Source: H. Dorsey & J. Griggs, eds, *Water in Sustainable Development: Exploring Our Common Future in the Fraser River Basin* (Vancouver: Westwater Research Centre, 1991) p.64.] The metals that are removed then contaminate the sewage sludge.

23. Greater Vancouver Regional District, *Greater Vancouver Liquid Waste Management Plan*, vol. 1 (Vancouver, 1988) pp.5-3 to 5-30, 5-32.

24. It should be noted that commercial and light industrial operations also contribute to the toxics that are disposed of at municipal landfills.

25. Greater Vancouver Regional District, *Burrard Inlet Environmental Improvements* (Vancouver, 1990) pp.18-20; and D. Goyette & J. Boyd, *Distribution and*

Environmental Impact of Selected Benthic Contaminants in Vancouver Harbour, British Columbia, 1985 to 1987 (Vancouver: Environment Canada Regional Program Report, 1989), Executive Summary. *See also* G. Bohn, "Port's Protection of Mudflat Praised, but Environmental Dangers Remain" *Vancouver Sun* (23 August 1991) p.B6.

PAHs are produced by automobile combustion processes, and are then deposited on streets and transported to the aquatic environment in stormwater runoff. "Urban stormwater runoff is an important source of many contaminants, especially trace metals, and the occasional high loading from surface runoff can exceed that from the sewage treatment plants." [Source: H. Dorsey & J. Griggs, eds, *Water in Sustainable Development: Exploring Our Common Future in the Fraser River Basin* (Vancouver: Westwater Research Centre, 1991) p.112.]

26. *Supra*, note 15.

27. *Supra*, note 17, at pp.14-15. *See also* letter from K. Ferguson, Environment Canada to A. Hillyer, West Coast Environmental Law Association, 2 August 1991.

28. C. Hertzman et al., *Trail Lead Study Report* (Vancouver: University of British Columbia, submitted to: Ministries of Health and Environment, 1990) p.11. *See also* Canadian Coalition for Lead-free Gasoline, Canadian Environmental Law Association et al., *Lead in 1988: More Urgent than Ever* (Toronto, 1988) [unpublished], C. Sandborn, "We're Taking Too Long to Get the Lead Out" *Toronto Globe and Mail* (18 October 1988) and C. Sandborn, "A Breath of Fresher Air" *Vancouver Sun* (16 July 1991).

29. C. Garrett, *Chemicals in the Environment*: *Arsenic* (Vancouver: Environment Canada, 1988) p.16.

30. C. Garrett, *Chemicals in the Environment*: *Lead* (Vancouver: Environment Canada, 1985) pp.6&14. Much aquatic lead contamination comes from shipbuilding and repairs facilities, marinas that use lead paint, storm sewers, road runoff, and mining and smelting operations.

31. *Supra*, note 17, at p.18. The smelter has closed down, but the mine continues to operate.

32. *Ibid*. at pp.23-24. It should be noted that metal levels in Buttle Lake have been reduced since pollution control measures were taken in the mid-1980s -- letter from K. Ferguson, Environment Canada to A. Hillyer, West Coast Environmental Law Association, 2 August 1991.

33. L. Erickson & J. Deniseger, *Impact Assessment of Acid Drainage from an Abandoned Copper Mine on Mount Washington* (Victoria: B.C. Ministry of Environment and Parks, 1987). Also, personal communication with J. Deniseger.

34. *Supra*, note 17, at p.26.

35. *Ibid*. at p.25.

36. C. Garrett, *Chemicals in the Environment*: *Cadmium* (Vancouver: Environment Canada, 1985) p.16.

37. B.C. Ministry of Environment, *News Release* (12 June 1989).

38. "Cost of Cleanup of Expo Lands Estimated at up to $60 million" *Vancouver Sun* (1 May 1991) p.A2.

39. For example, *see* C. Garrett, *Chlorophenols in the Environment* (Vancouver: Environment Canada, 1988) p.18, noting a study conducted in 1986.

40. Environment Canada and Agriculture Canada, *Pesticide Registrants Survey 1988* (Ottawa: the Ministry, 1988).

41. *Supra*, note 17, at pp.16-17.

42. D. Anderson, *Report of the Commission of Inquiry into Fraser Valley Petroleum Exploration* (Victoria: Government of British Columbia, 1991) p.61.

43. *See* H. Dorsey & J. Griggs, eds, *Water in Sustainable Development: Exploring Our Common Future in the Fraser River Basin* (Vancouver: Westwater Research Centre, 1991) p.71, which states that this problem has not been adequately investigated. Dorsey and Griggs also point out that chemical fertilizers have contributed to the extremely high nitrate pollution of Abbotsford area wells and, "raises public health concerns for infants who can develop [sometimes fatal] methemoglobinemia."

44. At least one-third of U.S. groundwater supplies are contaminated, with 19% of U.S. water systems now showing some toxic contamination. [Source: S. Lewis & M. Kaltofen, *From Poison to Prevention* (Boston: National Toxics Campaign Fund, 1989) p.iii.]

Thirty U.S. states have drinking water wells contaminated with one or more of 60 pesticides. *See* M. Morse, "US EPA Shifts Its Priorities to Pollution Prevention" Spring (1989) *Industry and Environment*, p.30. A 1985 study found that half of 351 wells tested in the southwestern Ontario corn belt were polluted with the pesticide atrazine and other pesticides. [Source: S. Hazell, Chair, *Greenprint for Canada: A Federal Agenda for the Environment* (Ottawa: Greenprint for Canada Committee, 1989) p.10.]

45. S. Vedel, *Port Alberni Respiratory Health Study Program: Progress Report to the Alberni-Clayoquot Regional District* (Vancouver: University of British Columbia, 1991) [unpublished].

46. City of Vancouver Task Force on Atmospheric Change, "Clouds of Change: Final Report of the City of Vancouver Task Force on Atmospheric Change" in *Clouds of Change: Final Report of the City of Vancouver Task Force on Atmospheric Change*, vol. 1 (Vancouver: the City, 1990) p.16.

47. D. Bates, M. Baker-Anderson & R. Sizto, "Asthma Attack Periodicity: A Study of Hospital Emergency Visits in Vancouver" (1990) 51 *Environmental Research*, pp.51-70. Although SO2 is not considered as toxic material *per se*, its serious effects on human health might well qualify it as a "toxic chemical" under Environment Canada's definition of the term. The same might be said of ozone (*see* below).

48. *Supra*, note 46, at p.17, cites the Atmospheric Environment Service Presentation to the task force. *See also* Concord Scientific Corporation & B.H. Levelton and Associates, *Greater Vancouver Regional District Air Management Plan - Stage 1: Assessment of Current and Future Air Quality* (Burnaby: Greater Vancouver Regional District, 1989) p.1-2.

49. Personal communication between D. Bates and C. Sandborn, June 1990. *See also* City of Vancouver Task Force on Atmospheric Change, *ibid*. at pp.13-17.

50. A. McIlroy, "Chemical Fingerprint: A Human Autopsy" in *Our Fragile Future* (supplement) *Vancouver Sun* (7 October 1989) p.22.

51. *Supra*, note 20, at pp.20-23.

52. C. Sandborn, "We're Taking Too Long to Get the Lead Out" *Toronto Globe and Mail* (18 October 1988). Recent U.S. EPA tests showed that 100% of the body tissue samples in a recent survey of Americans contained styrene, xylene isomers, 1,4-dichlorobenzene and ethylphenol. [Source: S. Lewis & M. Kaltofen, *From Poison to Prevention* (Boston: National Toxics Campaign Fund, 1989) p.iv.]

53. S. Lewis & M. Kaltofen, *From Poison to Prevention* (Boston: National Toxics Campaign Fund, 1989) p.iv.

54. P. Bird & D. Rapport, *State of the Environment Report for Canada* (Ottawa: Minister of Supply and Services, 1986) p.170.

55. Toxaphene pesticide used on cotton in the U.S. South migrated by wind and has been found in fish and birds in Canada's Lake Superior, as well as in Sweden. Similarly, DDT is apparently migrating to the U.S. from Mexico, Europe and Asia. [Source: M. Brown, *The Toxic Cloud* (New York: Harper and Row, 1987) pp.9-12.]

56. M. Doherty, "Ozone Depletion", in C. Sandborn ed., *Law Reform for Sustainable Development in British Columbia* (Vancouver: Canadian Bar Association, 1990) p.141.

57. *See* C. Shelford, Commissioner, *The Falcon is Telling Us Something: Report of the Committee of Inquiry on Falcons* (Victoria: Committee of Inquiry on Falcons, 1988) pp.2-3, for a description of how DDT "... nearly destroyed the falcon population in vast areas of all continents."

58. Canadian Coalition for Lead-free Gasoline, Canadian Environmental Law Association et al., *Lead in 1988: More Urgent than Ever* (Toronto, 1988) [unpublished].

This brief, submitted to the federal Minister of Environment, was instrumental in prompting the government to ban lead in gasoline. *See also supra*, note 52.

59. Great Lakes Science Advisory Board, *1991 Report to the International Joint Commission* (Windsor: International Joint Commission, 1991) p.40.

60. A 1984 U.S. National Academy of Sciences report showed that only 10% of pesticides have an adequate amount of information on toxicological effects, and that adequate toxicological information was unavailable for all of the chemicals in commerce investigated by the study. [Source: Great Lakes Science Advisory Board*, Report of the Great Lakes Science Advisory Board to the International Joint Commission* (Windsor: International Joint Commission, 1989) p.67.]

61. Great Lakes Science Advisory Board, Report of the Great Lakes Science Advisory Board to the International Joint Commission (Windsor: International Joint Commission, 1989) p.67.

62. J. Cameron & J. Abouchar, "The Precautionary Principle: A Fundamental Principle of Law and Policy for the Protection of the Global Environment" (1991) 14:1 Boston College International and Comparative Law Review, p.2.

63. Although they have not yet, for the most part, actually incorporated it into legislation. [Source: *ibid*. p.9.]

64. Supra, note 62, at p.1.

65. *Ibid*. at p.14.

66. *Ibid*. at p.10.

67. Bergen Declaration, Conference on "Action for a Common Future", Bergen, Norway , 8-16 May 1990, Article 7, quoted in ibid. at p.18.

68. United Nations Environment Programme Governing Council Decision 15/27, "Precautionary Approach to Marine Pollution, Including Waste-Dumping at Sea", quoted in supra, note 62, at p.14.

The Governing Council has also stated: "... numerous international forums, including ... the Summit of the seven major industrial nations, have recognized ... that waiting for conclusive proof regarding the impact of contaminants entering the environment may result in significant and irreversible damage to the environment and to the human population." [Source: Comprehensive Approach to Hazardous Waste, UNEP/GCSS Res. II/3, 2nd Spec. Sess., (1990) p.40.]

69. Governor James Blanchard of Michigan, quoted in U.S. Office of Technology Assessment, From Pollution to Prevention: A Progress Report on Waste Reduction (Washington, D.C.: U.S. Congress, 1987) pp.14-15.

70. U.S. Environmental Protection Agency, Pollution Prevention Strategy (Washington, D.C.: the Agency, 1991) p.4.

71. U.S. Office of Technology Assessment, *Serious Reduction of Hazardous Waste for Pollution and Industrial Efficiency* (Washington, D.C.: U.S. Congress, 1986) p.18.

72. For example, about 10% of the Superfund cleanup sites in the United States are sites of failed waste recycling and treatment facilities. [Source: *ibid*. at p.17.] Incineration of hazardous wastes can lead to poisonous air emissions such as dioxins, benzene and heavy metals -- and non-optimal operating conditions can lead to uncontrolled releases of such toxics. Incineration creates toxic ash that itself must be landfilled. Transportation and storage of hazardous waste has led to numerous accidents (e.g., the Kenora, Ontario PCB transportation spill and the St. Basil le Grand PCB fire in Quebec).

73. Supra, note 70, at p.1.

74. *Supra*, note 71, at p.17.

75. A good example of the unexpected risks and problems involved with handling toxics is seen in the history of landfilling toxics. Landfilling of hazardous waste was once considered a solution to the hazardous waste problem. It took a long time -- and hundreds of contaminated aquifers and soil sites-- before we recognized that land disposal of hazardous waste is not usually a safe option. [Source: *supra*, note 69, at p.1.]

76. K. Geiser, "Toxics Use Reduction and Pollution Prevention" (Spring 1990) *New Solutions*, p.4.

77. *Supra*, note 71, at p.14.

78. S. Friedlander, "Pollution Prevention: Implications for Engineering Design, Research, and Education" (1990) 31:4 *Environment*, p.14.

79. See the discussion below concerning the relationship between reducing pollution and reducing energy consumption.

80. The U.S. Congressional Office of Technology Assistance has estimated that it costs 10 to 100 times more to clean up toxic waste contamination problems than prevention would have cost. [Source: J. Hirschorn & K. Oldenburg, *Prosperity Without Pollution: The Prevention Strategy for Industry and Consumers* (New York: Van Nostrand Reinhold, 1991) p.3.]

81. Some definitions of "recovery" include recovery of energy. *See*, for example, Municipal Solid & Biomedical Waste Branch, *Guide to the Preparation of Solid Waste Management Plans by Regional Districts* (Victoria: B.C. Ministry of Environment, 1990) p.3.

82. D. Stephan & J. Atcheson, "The EPA's Approach to Pollution Prevention" (June 1989) *Chemical Engineering Progress*, p.54.

83. C. Stenberg & R. Brown, *State Actions for Reducing Hazardous Waste* (Lexington: Council of State Governments, 1989) p.5.

84. *Ibid.*, model Act, s. 4.

85. SBC 1990, c. 19.

86. Ibid., s. 3(2)(b).

87. Municipal Solid & Biomedical Waste Branch, Guide to the Preparation of Solid Waste Management Plans by Regional Districts (Victoria: Ministry of Environment, 1990) pp.1 & 3. The Guide's definition of "recovery" does include reclaiming both recyclables and energy from the waste stream. However, apparently because the `fourth R' has been used to justify incineration of municipal waste -- something not necessarily endorsed by others who endorse `the Rs' -- the government has astutely attempted to limit the impact of the `fourth R', recovery, on the debate over waste incineration by specifying that: "Recovery strategies involving incineration or the production of material or substances to be used as fuel shall not be considered as valid contributions toward the goal (of a 50% reduction in municipal solid waste by the year 2000)."

88. *Supra*, note 6, at p.17.

89. Ministry of Environment, *Waste Discharge Criteria Based on (BACT) Best Available Control Technology, Draft Procedure Manual Amendment* (Victoria: the Ministry, 1991).

90. *Ibid.*

91. Our thanks to Ann Hillyer for coining the term "Waste Wise".

CHAPTER 2 CLOSING THE GAPS IN THE REGULATORY SYSTEM

In Chapter 3 we will discuss how education and technology transfer can reduce toxic pollution and in Chapter 4 we discuss the use of economic incentives and disincentives to prevent pollution. Expanded use of these relatively new approaches is an essential component of a pollution prevention strategy for B.C. But these approaches are intended to **supplement**, not to replace, the primary component of the strategy -- strengthening the existing system for regulating activities that cause pollution.[92]

This chapter begins with a focus on seven basic aspects of the regulatory process itself:

- eliminating persistent toxic contaminants according to an urgent and realistic timetable;
- sunsetting (banning) the worst contaminants;
- establishing a mechanism to identify and prioritize pollution problems;
- using regulations to set minimum standards;
- ensuring periodic updates of pollution standards;
- promoting pollution prevention in land use planning and environmental assessment processes; and
- enforcing legal standards.

Then, the chapter turns to three particular areas in which the regulatory system in B.C. should be improved:

- cleaning up contaminated sites;
- keeping contaminants out of municipal sewage and landfill systems; and
- eliminating or controlling non-point sources of pollution.

Eliminating Persistent Toxic Pollutants

A fundamental goal of a B.C. pollution prevention strategy should be to eliminate pollution by persistent toxic chemicals in the province. Until very recently, it appears that there was no express fundamental goal for the province's regulation of persistent toxics or other pollutants. Instead, the government set pollution standards on the basis of what is now called best available control technology (BACT), or some other similar term. BACT is based on the presumption that it is acceptable to discharge whatever pollutants remain after applying the best proven current technology.

In August 1991, the Ministry of Environment released *Environment 2001: Strategic Directions for British Columbia*. This policy statement announced that:

Our long-term goal is to achieve zero pollution in the receiving environment.[93]

The ministry stated that the zero discharge goal will be incorporated into the Pollution Control Objectives, established in the 1970s to guide regional officials in issuing enforceable waste discharge permits:[94]

By 1995, the ministry will complete a thorough review and updating of all the pollution control objectives dealing with the major categories [chemical, petroleum, mining and smelting, forestry, municipal and agricultural]. ... The long-term goal of this initiative is zero discharge of pollutants into the receiving environment.[95]

To be more specific about reaching its "long-term" goal, the ministry has set a specific goal of reducing the amount of hazardous waste generated in B.C. by **50%** by the end of the decade.[96] Presumably, this 50% reduction goal will also be reflected in the revised Pollution Control Objectives.

B.C.'s adoption of the zero discharge goal follows the lead of the federal government of Canada. The recently adopted *Green Plan* states that:

Canada's goal is the virtual elimination of discharges of persistent toxic substances into the environment.[97]

The federal government explains the rationale for this major step forward:

The process of regulating [persistent toxic substances] has begun on such chemicals as mercury, mirex and polychlorinated biphenyls [PCBs]. But our scientific understanding of the environment and health effects of many of these substances is not sufficient to establish appropriate discharge and ambient concentration levels for each substance, let alone for the complex mixtures that are now found in the environment.[98]

The *Green Plan's*commitment to virtual elimination stems from Canada's commitment to "virtually eliminate the discharge of persistent toxics" under the *Great Lakes Water Quality Agreement* between Canada and the U.S.[99] That Agreement also states that,

The philosophy adopted for control of inputs of persistent toxic substances shall be **zero discharge**. [emphasis added][100]

Support for zero discharge also comes from a wide range of organizations including environmental groups,[101] municipalities[102] and some industrial corporations. Du Pont's Chief Executive Officer Edgar Woolard has made zero pollution the company's goal.[103] The Monsanto chemical corporation has taken a similar approach:

In 1988, Monsanto said that its goal is to reduce toxic air emissions by 90 percent by the end of 1992. In more general terms, Monsanto ... has said, 'Our goals should be zero spills. Zero released. Zero incidents. And Zero excuses. That goes for us, our suppliers, our contractors and our shipping firms.'[104]

In the Great Lakes region, a "Program for Zero Discharge", a joint project of the US National Wildlife Federation and the Canadian Institute For Environmental Law and Policy, calls for a two-pronged strategy:

Stop all future discharges of the most harmful pollutants through a zero discharge program and substantially reduce the discharge of all of the chemicals; and

Clean up those contaminants that have been released into the Great Lakes.[105]

In addition, 51 American and 25 Canadian communities and organizations have endorsed a "zero discharge statement of principles," as of March 1991.[106] Toronto City Council adopted the statement in June 1991. The preamble to the statement notes the importance of the Great Lakes ecosystem, the poisoning of that ecosystem by persistent toxic chemicals, the failure of current regulations to protect the environment and human

health, and the 1978 Great Lakes Water Quality agreement signed by Canada and the United States, referred to above. The statement defines zero discharge as follows:

Zero discharge means ending the use, the production and, thus, the disposal of persistent and/or bioaccumulative toxic substances.

It continues:

For us 'zero' means zero. Pollution must be prevented before it is generated. Production processes (including agriculture) must be reformulated so that these toxic substances are not used, produced or discharged. 'Zero' does not mean reducing discharge beneath some arbitrary level or beneath the level of detection. Zero means none.

The use of the term 'discharge' is not limited to a single environmental medium. It applies to all toxic discharges into water, air, landfill, product, etc. Nor can persistent toxics be eliminated by shifting them from one medium to another or by attempting to recycle them after they have been produced.

The Zero Discharge goal applies to more than a small list of the most notorious toxic substances. Unless some strong contrary evidence is presented, it applies in all cases where there is good reason to believe the substance itself is a persistent and/or bioaccumulative toxin or when persistent toxins are generated during its production use or disposal.

In our view, at stake is the future health, and survivability of the wildlife, humans and other life in the ecosystem.

The Toronto council also resolved to "endeavour to implement zero discharge in all of its programs and services impacting on the environment."[107]

We are satisfied that for persistent toxic contaminants the goal should be elimination. But for pollutants that are not persistent toxics, there are situations in which complete elimination of non-toxic pollutants, such as small quantities of food waste going into well-flushed parts of the ocean, is not a high priority. There are other situations in which complete elimination of non-toxic pollutants is impossible, such as elimination of human sewage. Thus, strictly speaking, the stated B.C. goal of 'zero pollution' is somewhat overbroad. Therefore, we follow the federal approach by deliberately limiting the goal to the elimination of persistent toxic contaminants, in an effort to make the goal more attainable.

In addition, it is clear that elimination of the discharge of persistent toxic contaminants will not occur immediately. The focus of much of the

regulatory attention will be on creating and implementing appropriate timetables for reducing discharges to zero. The basic principle should be that for persistent toxic contaminants, elimination should proceed according to timetables that are both urgent and realistic. This phrasing is intended to capture both the need for technology-forcing regulatory changes, as well as the need to recognize that even high priority changes will take time to implement.

The Need For Legislative Direction

At present, the only legislative statement regarding the goal of pollution control activities by the provincial government is a very broadly worded clause in the *Ministry of Environment Act* stating that the purposes and functions of the ministry are, among other things, "to encourage and maintain an optimum quality environment."[108] The *Waste Management Act*[109] does not specify the purpose of the pollution controls which the Act authorizes to be imposed. The Ministry of Environment announced recently[110] that it plans to introduce legislation substantially revising the *Waste Management Act*. These changes should include specifying that a central purpose of the Act is to eliminate the discharge of persistent toxic pollutants according to urgent and realistic timetables.

Recommendation 3. The Province of British Columbia should amend the *Waste Management Act* (or include a provision in legislation replacing that Act) to specify that a central purpose of the legislation is to eliminate the discharge of persistent toxic pollutants according to urgent and realistic timetables.

Sunsetting the Worst Substances

The primary focus of the system for regulating pollution in B.C. -- as in most other jurisdictions -- is on preventing the **discharge** of pollution. This is done by imposing limits on the quantity and quality of allowable pollution discharges and by requiring certain practices regarding handling[111] and storing[112] potential pollutants.

However, a secondary focus of the pollution regulation system in B.C. -- again, as in most other jurisdictions -- is on banning or restricting the **use**, **production** or **import** of particular substances. The federal government uses this approach to regulate pesticides,[113] food additives and drugs,[114] and radioactive substances.[115] It has also taken the use-based approach to regulate certain high-priority substances such as PCBs[116] and (ozone-destroying) CFCs.[117]

Calls for a new approach

Lately, a variety of commentators have highlighted this use-based approach. They call for banning -- or '**sunsetting**' -- the use of particular chemicals and expanding the approach to apply also to **industrial processes** that create high-priority pollutants.[118]

The Virtual Elimination Task Force of the Canada-U.S. International Joint Commission, for example, proposes law reform in both countries to provide:

... development of a comprehensive and systematic process to ban chemicals, processes or products that use, generate or release the most egregious persistent toxic substances.[119]

The Canadian Institute of Environmental Law and Policy and the (U.S.) National Wildlife Federation recently set out a detailed proposal for **"sunsetting**" toxic chemicals in the Great Lakes Basin.[120] They define sunsetting as:

... a process for banning chemicals already in use and for preventing new dangerous chemicals from being put into use.[121]

The main rationale offered for the sunsetting approach is that it is the only approach that really works. Regarding the American situation, Barry Commoner states:

The data show that, with very few exceptions, the effort to reduce the emissions and environmental concentrations of pollutants has failed... Qualitative improvement of the order envisaged in the environmental legislation of the 1970s -- 70% to 90% -- has occurred only in the case of a handful of pollutants: airborne lead emissions, ... DDT and PCB concentrations in human body-fat, ... mercury concentrations in the Great Lakes sediments ... and strontium 90 concentrations in milk... Every pollutant on this very short list of successes reflects the same remedial action: production of the pollutant has been prevented. Lead has been almost entirely removed from gasoline; DDT and PCB have been banned; mercury has been removed from chloralkali production; where phosphate has been eliminated from detergents, concentrations in surface waters have declined; the atmospheric nuclear bomb tests that produced strontium 90 have been halted. In each case the production process that originally generated the pollutant has been changed.[122]

Regarding the Great Lakes area, the U.S. Council on Environmental Quality states:

It appears that the only chemicals to have declined significantly in the Great Lakes ecosystem are those whose production and use have been prohibited outright or severely restricted.[123]

Sweden

In Sweden, work on phasing out the substances which are most dangerous to health and environment is said by the government to be "entering an increasingly intensive stage."[124] This includes:

- the phase-out of ozone-depleting substances;
- the phase-out of chlorinated solvents used for de-greasing and other cleaning purposes;

- the discontinuance of certain hazardous additives in plastics, including chlorinated paraffins, flameproofing agents containing bromine, phtalic compounds and organotin compounds, and nonylphenol epoxides;
- the phase-out of mercury by 25% of 1991 use by 1995 and 75% by 2010;
- the discontinuance of the use of lead in the long term;
- a sharp reduction in the use of arsenic and chrome compounds in wood-impregnating agents; and
- an end to cadmium in batteries and as a contaminant in phosphate fertilizers, in addition to the uses that are already restricted.

The Swedish government also stresses that international coordination is an important part of these efforts[125] and has proposed that the Organization for Economic Cooperation and Development (OECD) establish a sunset chemical program on a collective basis.[126]

United States

In the United States, as in Canada, regulatory control (including banning) of the **use** of individual substances is mainly limited to pesticides, foods and drugs and radioactive substances. Otherwise, this regulatory approach is currently a minor portion of the overall regulation of pollution. But the U.S. *Toxic Substances Control Act* (TSCA) has been used to impose controls on substances such as asbestos.[127] In addition, requirements for notification of new chemicals have led to limitations on exposure of about 500 new chemicals.[128]

The U.S. Environmental Protection Agency's new Pollution Prevention Strategy does include a major **voluntary** -- not mandatory -- industrial toxics project, which focuses on specific "targeted chemicals."[129] The EPA's goal is to reduce aggregate environmental releases of these targeted chemicals to all media (air, land or water) from industrial facilities by 33% over 1987 levels by the end of 1992 and at least 50% by the end of 1995.[130] This strategy "marks a new approach by EPA to encourage voluntary action by industry that minimizes the need for intrusive federal regulation."[131] The project involves:

- identifying 15 to 20 pollutants from the U.S. Toxics Release Inventory;
- seeking voluntary commitments from industrial sources of these contaminants;
- helping companies to prepare prevention strategies for the targeted contaminants; and
- measuring progress using the Toxics Release Inventory.

Canada

As discussed above, it is the Canadian **federal** government -- not B.C. or other provinces -- which has taken the lead in regulating the **use** of specific substances. In addition to its regulation of pesticides, food additives, drugs and radioactive substances, referred to above, the federal government has banned the production and import of PCBs and is phasing out their use.[132] It has also imposed similar controls on CFCs.[133]

The federal government is currently moving to regulate additional substances on its Priority Substances List under the *Canadian Environmental Protection Act*(CEPA). However, some of the these regulations are not 'sunsetting.' They take the traditional approach of setting limits on the discharge of contaminants -- dioxins and furans from pulp mills, for example.[134] Other regulations restrict or ban the **use** of a particular chemical, such as the use of oil-based defoamers in the bleaching of pulp.[135]

In addition to its regulation of the priority substances, CEPA requires importers or manufacturers of **new** substances -- substances not on a newly-created Domestic Substances List -- to submit environmental and health information to the government. The onus then falls on the government to decide if regulation of a particular new substance is warranted.

British Columbia

Although virtually all B.C. pollution controls are of the traditional discharge-oriented variety, the B.C. government does have authority to adopt use-oriented controls on potential pollutants, under the *Waste Management Act*. For example, the province is now developing a regulation to control ozone-depleting substances.[136]

It is our view that a 'sunsetting' approach can be a useful supplement to discharge-based controls, particularly for high-priority pollutants that emanate from a variety of sources. However, 'sunsetting' should not be seen as a **substitute** for controls on pollution from particular sources. There are so many chemicals in existing use -- and so many different contaminants produced during industrial processes -- that regulating each of them separately would take too long. The 'sunsetting' approach should be used only for the highest-priority substances. Moreover, in doing so it will be important to consider the environmental and health effects of any likely **substitutes** for the sunsetted substances.[137]

Recommendation 4. The Province of British Columbia should utilize the identification-and-prioritization mechanism recommended below to phase out -- to '*sunset*' -- the use, production and import of high-priority substances that cause toxic contamination or other environmental problems.

Identifying and Prioritizing Pollution Problems

The *Waste Management Act*currently provides no mechanism for identifying and prioritizing pollution problems to be regulated. Nor has a public non-statutory mechanism for priority-setting been established. The result is that it is difficult for those outside of government to know what problems will be dealt with in what order. And it is probably fair to say that even **within** government there is no widespread understanding of, or opportunity for input into, these decisions.

One such mechanism has been established at the federal level. The *Canadian Environmental Protection Act* (CEPA) requires the federal Minister of Environment to compile and publish a Priority Substances List, following broad consultation.[138] The

Minister is required to assess the substances on the list and to recommend to the federal Cabinet that it regulate substances where appropriate.[139] Where the Minister decides not to recommend regulation of an assessed substance a person may ask the Minister to appoint a Board of Review to investigate and make recommendations.[140] The Priority Substances List has now been established,[141] following the recommendations of a multistakeholder advisory committee.[142] The federal *Green Plan* states that assessments of all 44 substances on the list will be completed by 1994.[143] So far only one group of substances -- dioxins and furans from pulp mills -- has entered the regulation-making process, and formal publication of the draft regulations has been delayed.[144]

The federal legislation provides a valuable mechanism for publicly identifying and prioritizing problems in need of regulatory action. However, the absence of a systematic B.C. mechanism to identify candidate contaminants, set priorities and develop regulations is problematic. The federal government counts on the provinces to institute controls on some sources of the substances on the federal Priority Substances List. For example, the federal government expects the provinces to regulate dioxins and furans from sources other than pulp mills, e.g., municipal incinerators not within federal areas. Yet B.C. has not done so.

What B.C. needs is a mechanism much like the priority substances mechanism under CEPA. Much of the work needed to identify candidate contaminants has already been done under the federal system. But B.C. should assign its own **priorities** to particular contaminants, since pollutants of concern in other parts of Canada may not be a problem in this province, and *vice versa*. In addition to prioritizing **substances**, B.C. should identify and prioritize **sources** of pollution for the purpose of regulatory initiatives. Following the federal example, the first step in creating a B.C. priority pollution-problems list should be the establishment of a multi-stakeholder advisory committee.

Recommendation 5. The Province of British Columbia should enact legislation to establish a mechanism including public participation to identify, prioritize, assess and regulate particular sources of pollution and particular contaminants.

Setting Minimum Standards by Regulations

The Ministry of Environment has said it plans to revise the Pollution Control Objectives (and rename them Waste Discharge Criteria).[145] As discussed above, the Objectives are used as guidelines by regional officials when setting enforceable standards in permits. Recently, however, the government chose to adopt the Anti-Sapstain Chemical Waste Control Regulation[146] and the Pulp Mill and Pulp and Paper Mill Liquid Effluent Regulation,[147] rather than amending the Pollution Control Objectives for the Forest Industry and then amending each operator's permits accordingly. This raises the important question of whether the Pollution Control Objectives should be replaced with more **guidelines**, or with enforceable **regulations**.

Advantages

The regulation approach has four primary **advantages**. First, it is more efficient to deal with complex scientific issues in one process rather than in numerous permit appeals throughout the province, in which neither the government, the industry nor the public can marshall their best evidence.

Second, the regulation approach is faster, since there is only one document to work with -- the regulation -- instead of having to deal with numerous permits.

Third, regulations can be used without permits, as an effective way to prevent pollution from sources that are too numerous to warrant issuing permits to them all. Placer mining, roadbuilding, logging, dry cleaning, photo developing, service stations and farming are examples. Such regulations are also effective for these sources because they can not only impose numerical limits on the amount or quality of waste discharged, they can require or prohibit specific operational **techniques** on an industry-wide basis.

Fourth, the regulation approach is **clearer** to all concerned. If the government intends the limits to be mandatory, it is misleading to call them guidelines but later impose them through permits.

Overcoming the Disadvantages

There are three main potential **disadvantages** of replacing the Pollution Control Objectives with regulations, each of which is easily surmountable. First, the regulation-making process does not currently provide the public with notice and an opportunity for input. We recommend in Chapter 5 that legislation be adopted to correct that problem.

Second, a regulation will not be detailed or stringent enough to apply to all site-specific situations. One of the key advantages of the Objectives/permits system is that the standards in a permit can be more stringent than the standards in the Objectives, where necessary.[148] This flexibility should be retained in a regulations/permits system by making it clear that the regulations set **minimum** standards and that a permit can -- and should where necessary -- set more stringent standards and set requirements not covered by the regulation. This should occur where:

- the receiving environment is extra sensitive or loaded with pollutants from other sources; or
- the existing standards are outdated in relation to current technologies or knowledge of environmental impacts.

Third, regulations replacing the Pollution Control Objectives must not lose the **integrated approach** used by the Objectives, that is, that they apply to water, land and air. An integrated approach is important because technical change designed to reduce or eliminate the discharge of a particular pollutant to a particular medium -- air, land or water -- may result in **increased** discharge of the same or other pollutants to a different medium. Some jurisdictions, such as Sweden,[149] have responded to this cross-media transfer problem by issuing a single operating permit to cover discharges to **all media**. In B.C., permits are issued separately for pollution discharges to air, land and

water. However, cross-media transfer can be avoided as long as the regulations cover air, land and water, and Ministry officials take an integrated approach in considering the overall value of proposed pollution control changes.

Recommendation 6. The Province of British Columbia should replace the Pollution Control Objectives with regulations covering water, air and land. These regulations should set enforceable, minimum standards and clearly specify that a pollution permit for a specific discharger should, in specified situations, set more stringent standards and other requirements not covered by the regulation.

Updating Standards Periodically

The Pollution Control Objectives still in effect in B.C. today date back to the **1970s**. There have been some minor amendments since then, but it is clear that the Objectives are quite out of date. The Objectives were based on the Best Available Control Technology -- which is inherently linked to a certain point in time. With technologies improving continuously, 1991 BACT is certainly not the same as 1970s BACT.

This obsolescence factor must be dealt with explicitly in the revised Objectives, or the regulations that replace them. There are two key points. First, the new standards should set out **timetables** for expected improvements over time (down to a specified date for elimination in the case of persistent toxic contaminants). The present Objectives did set A (desirable), B (temporarily acceptable), and C levels. But they did not set a timeframe for the movement from B level to A level, so many permits are still at B level after almost two decades.

Second, a system should be established to review and revise the standards periodically, e.g., every five years. This should apply to regulations, Objectives and permits. Periodic review would allow re-evaluation based on changes in BACT, the recommendations of environmental assessment panels, and the results of environmental effects monitoring.

Review of **permits** in a certain sector should be lagged so as to occur shortly **after** revision of the Objectives or regulations covering that sector. This would provide an opportunity to re-evaluate the need for more stringent or other requirements based on the local factors discussed above.

Recommendation 7. The Province of British Columbia should enact legislation to require that pollution regulations, guidelines and permits set out explicit timetables for expected improvements, and that these be reviewed and revised on a periodic basis, such as every five years.

Considering Pollution Prevention in Planning and Assessment

There will almost certainly be a major expansion of land use planning processes in B.C. over the next five to ten years, coinciding with the decline of the predominance of timber cutting in land use decisions.[150] With land uses in addition to timber harvesting -- such as water supply, wildlife habitat, wilderness and tourism -- gaining increased legitimacy,

land use planning in the province will have to be expanded in order to sort out the often competing objectives of the various sectors. A *Vancouver Sun* article on an internal Ministry of Forests report discusses this change:

Where once planning decisions were based on timber values, the report says now other values have come to the fore and planning must change.[151]

Pollution prevention is not a 'value' that has often been discussed in land use planning processes in the past. But that must certainly change. Currently, for example, there is virtually no consideration of the potential pollution consequences of decisions to grant Pulpwood Agreements. But allocating land to provide fibre for a pulp mill affects the longevity of existing mills and the prospects for new mills, and thereby fundamentally affects the amount of pollution discharged into the area. Since land use planning clearly affects pollution levels, steps must be taken to ensure that pollution prevention is considered during land use planning processes. This is especially important because these processes are likely to be greatly expanded.

B.C. Environment officials are currently much more active in environmental assessments[152] than they are in land use planning processes. B.C. maintains a patchwork quilt of different assessment processes for projects of different types, some with and some without a basis in a statute or regulation.[153] However, the Ministry of Environment is developing a unified environmental assessment procedure for adoption by statute. This is partly intended to allow provincial-level assessments to dovetail more conveniently with the growing number of federal-level assessments under the current federal Environmental Assessment and Review Process (EARP), soon to be replaced by the proposed *Canadian Environmental Assessment Act*.[154] The result is likely to be a dramatic increase in the number, and in some cases the complexity, of environmental impact assessment processes over the next five to ten years.

Moreover, it is likely that the Ministry of Environment will be expected to play a more active role in these assessments than it has in the past. In the report of the recent environmental assessment of the proposed ferrochromium smelter near Port Hardy on Vancouver Island, for example, the Panel expressed its concern about the failure of the Ministry of Environment to provide information the Panel considered important.[155] And, it recommended that in the future such information be made available to environmental assessment panels.[156] The Ministry's participation in these assessments should be given a clear statutory mandate.

Recommendation 8. The Province of British Columbia should enact legislation mandating the Ministry of Environment to advocate pollution prevention in land use planning processes and environmental impact assessment processes.

Enforcing Environmental Standards

[U]nless provincial and federal regulators have the political will to enforce the standards that are established by legislation and set out in the permits and licences of regulated undertakings, even the most progressive of laws will be irrelevant. Murray Rankin[157]

Until recently, there was no regular information on the extent of compliance or non-compliance with pollution standards in B.C. But the little information that was available indicated that non-compliance was widespread. In the past few years, B.C. has started to prosecute offenders more vigorously, but non-compliance is still a major problem. It seems clear that achieving compliance with environmental standards must be a high priority goal. But what changes should be made in order to meet that goal more quickly and efficiently?

History of Non-Compliance

At the federal level, the Canadian Environmental Advisory Council concluded that from 1970 to 1977 there was "a pattern of persistent, nation-wide non-compliance with federal standards for liquid effluent."[158] Pulp and paper mills are Canada's largest single source of water pollution.[159] Yet, in 1978, 86% of them did **not** meet federal standards for acute toxicity of effluent.[160] Improvements were made, but by 1985, 68% of the mills still did **not** meet these standards.[161] A federal fisheries official stated:

We have been known for charging individuals for spills of deleterious substances (often accidental and less than a few gallons) and then continually ignoring the daily discharge of millions of gallons of toxic effluent from a mill next door.[162]

At the provincial level, a senior B.C. Environment official stated:

Formal enforcement of environmental legislation [in B.C.] did not really get underway until the late 1970s.[163] In the early days of environmental enforcement the approach used was one of consultation and negotiation -- one that was often slow and often unsuccessful. Agreements too often were abrogated, and commitments were not honoured.[164]

In 1981, the B.C. Auditor General found that the environment ministry had "not developed a clear policy and appropriate responses to non-compliance."[165] It found that more than 38% of the permits it assessed were in "serious non-compliance."[166] A study of the 1967 to 1981 period found that waste dischargers along the lower Fraser River exerted "considerable and perhaps excessive sway" over the regulators.[167]

Data from 1987 show that 14.5% of air and water pollution permits in the Northern and Vancouver Island regions were classified by the Ministry of Environment as in "significant non-compliance."[168] Some Ministry officials were reported to regard the inter-ministerial committee responsible for deciding when to lay pollution charges as "an attempt to curtail prosecutions."[169]

Governments Getting Tougher

The Canadian attitude toward environmental enforcement began to shift in 1985, when Ontario became the first Canadian jurisdiction to launch a major initiative to prosecute environmental offenders.[170] In 1987, the federal government followed suit. Then-federal Environment Minister Tom McMillan stated:

We intend to deal harshly with pollution -- the worst white collar crime in the country -- and we will come down hard on individuals and corporations alike who violate the new law [the Canadian Environmental Protection Act].[171]

In June 1989, then-B.C. Environment Minister Bruce Strachan promised a tough new approach to enforcement of pollution standards.[172] In the summer of 1989, the penalties in the *Waste Management Act* were increased.[173] By November 1989, special environmental enforcement units had been established in each of the six regions.[174]

It is clear that a new enforcement approach is actually being implemented. From 1988-89 to 1990-91, the number of charges laid under the *Waste Management Act* rose from approximately 46[175] to 220.[176] Fines rose by a factor of almost 10, from $90,025 to $884,031 over the same period.[177]

Mixed Success

Interestingly enough, there is no clear trend toward lower province-wide levels of non-compliance from 1988 to 1991.[178] However, a considerable number of permits left the non-compliance list while new ones were added.[179] Given that environmental standards were generally rising over this period,[180] a likely interpretation is that technical improvements or better operating practices were allowing some companies and municipalities to leave the 'blacklist,' while rising standards and increased expectations by regulators were bringing other operations onto the list.

Much of the enhanced enforcement activity has been aimed at pulp mills. In 1990-91,[181] 61 charges were laid against ten mills for waste management permit violations and 8 mills were convicted of previous offences and fined a total of $827,000.[182]

What was the effect on non-compliance? In May 1988,[183] not a single B.C. pulp mill met all of its provincial pollution standards.[184] This situation remained the same in June 1988[185] and April 1989.[186] By May 1990, the pulp mill non-compliance situation had improved somewhat.[187] In December 1990, the government required all mills to meet tougher standards within varying periods of time,[188] and in the meantime it allowed eleven mills to meet standards that were **looser** than the previous standards they were having trouble meeting.[189] July 1991 data (for effluent only) show mixed results. Even with the relaxed interim standards for some mills, only 14 mills were in compliance. However, all except two mills were on schedule for installing (or had already installed) the required new pollution control equipment. The mills were said to be investing over $1-billion on these upgrades,[190] although that figure has been criticized as exaggerated.[191]

What Next?

In August 1991, the B.C. government released an enforcement and compliance policy which reaffirms a commitment to "an aggressive prosecution policy, especially with respect to pollution offences."[192] The government also proposes changes in seven key areas.

First, it proposes authorizing B.C. Environment to impose **administrative penalties** against violators of certain environmental offences, presumably in addition to retaining the availability of criminal sanctions.[193] This proposal should be clearly distinguished from the 'emission charges' approach discussed in Chapter 4, which applies to discharges of pollution that are **within** the allowable regulatory limits.

Compared to using the criminal courts, the administrative penalties approach is said to be simpler, cheaper, faster, more likely to be utilized, more likely to be based on **risk** than on **harm**, and more likely to produce consistent results.[194] While there are certainly examples of administrative penalty systems that do work, there is little or no empirical evidence that the administrative penalties approach would be more effective than criminal sanctions in protecting the environment.[195]

On the other hand, there **is** empirical evidence that corporations which have been prosecuted allocate significantly more of their resources to environmental protection than do corporations which have not been prosecuted.[196] Thus, we are not convinced that there should be a wholesale shift of emphasis from prosecutions to administrative penalties, certainly regarding the more serious offences. But the development of a system for imposing administrative penalties could be a useful supplement to prosecutions, especially for minor offences.

Second, the government proposes expanding the **liability of directors and officers** for the actions of their corporations. The government's policy states:

Those ultimately responsible for the actions of a company must be fully aware that they too may be held personally accountable.[197]

This approach is consistent with the 'polluter pays principle,' discussed in more detail in Chapter 4. The value of the proposal is supported by a recent empirical study of over 100 Canadian business executives that concluded that enhancing the possibility that corporate executives would face personal prosecution would cause greater corporate efforts to avoid pollution.[198]

Third, the government proposes widening the **sentencing options** available to a court in relation to an environmental offender.[199] The options proposed exist already in the *Canadian Environmental Protection Act*,[200] and were recommended for inclusion in B.C. legislation by the Sustainable Development Committee of the Canadian Bar Association.[201] The government's list omits one key sentencing option (included in CEPA[202]) that should be added to the provincial legislation. This is the power in the court to order the offender to **pay compensation** to persons who suffer damage as a result of the offence.

A related CEPA provision[203] that should be added to B.C. legislation allows a person to **sue civilly** for damages caused by conduct that is contrary to the Act or regulations, whether or not there has been a conviction. There is a similar provision in the federal *Fisheries Act*[204] that allows a commercial fisher to recover damages due to the closure of

fishing grounds because of pollution. The section imposes absolute liability. Lack of negligence is not a defence.[205]

Such 'civil suit' provisions should be an integral part of the array of available enforcement remedies. Governments cannot be counted on to seek compensation on behalf of citizens injured by pollution. And if citizens are to obtain actual compensation, rather than being put off by the formidable, expensive legal hurdles posed by the common law,[206] they need the assistance of a statutory cause of action. Such provisions are consistent with the 'polluter pays principle.'[207]

The Ministry's fourth proposal is to encourage more **public participation** in discovering and investigating environmental incidents that may be violations.[208] This will be welcomed by concerned citizens frustrated with what they see as illegal pollution going unchecked. But there is no reason for this initiative to be restricted to the investigation stage of the enforcement process. It should also include citizen involvement in seeking **remedies** -- criminal and civil -- in cases of non-compliance. Regarding civil remedies, the government should provide the absolute liability 'civil suits' discussed above.

Regarding criminal remedies, it is vital that the government restore the right of a citizen to conduct private prosecutions regarding environmental offences.[209] This right may have been abolished by recent legislation[210] and policy[211] aimed at controlling private prosecutions against politicians. Private prosecutions have been a powerful tool in citizens' efforts to protect the environment. For example, the Union of B.C. Indian Chiefs successfully conducted a private prosecution against the Greater Vancouver Regional District for illegal discharges from the Iona Island sewage treatment plant. This led to a cleanup of that plant.[212] Another cleanup resulted when two private citizens successfully prosecuted the Municipality of North Vancouver for improperly operating its landfill.[213]

Fifth, the government proposes **decentralizing** to regional officials the powers to issue environmental protection, cleanup and emergency orders that are now exclusively the prerogative of the Minister of Environment or, in some cases, senior officials.[214] This proposal is long overdue. It should also include the power to suspend or cancel a permit or approval for failure to carry out obligations.[215]

Sixth, the government proposes authorizing officials to enter into **agreements** with alleged offenders as an alternative to going to court.[216] The agreements would stipulate remedial actions, preventative measures and financial compensation payments. New legislation would provide that it is an offence to violate the agreement. While this proposal has definite merits, a variety of issues need to be resolved before it could be implemented. Would an alleged offender have to admit responsibility for the offence before being eligible to enter an agreement, as in 'diversion' programs in the criminal process? How would concerned members of the public be assured of an opportunity to participate in forming the agreement? Would an agreement be a bar to prosecution on the original offence? A similar offence? How would government officials be able to

bargain hard on an agreement without being accused of extortion (threatening to lay charges unless the alleged offender enters the proposed agreement)?

The seventh proposal, to enact legislation to require companies to conduct **environmental audits** and report them to the government, also needs some reshaping. Environmental audits are more and more frequently used by companies, and they should be encouraged. However, most environmental audits address not only compliance with regulatory standards but also any other measures the company could take to improve its operations from an environmental perspective. It would seem that companies would be unlikely to pursue this latter purpose if the audit was to be reported to the government. In addition, there is a question as to whether it would be contrary to the Charter of Rights and Freedoms to use an environmental audit as evidence against a person where the person was required by statute to conduct the audit. This issue has already been raised in relation to mandatory reporting of spills, where the social value of the requirement is much more compelling.[217]

Recommendation 9. The Province of British Columbia should pursue vigorous enforcement to achieve compliance with environmental standards. It should also buttress the present enforcement mechanisms by:

(1) expanding the liability of directors and officers of corporations;

(2) introducing innovative sentencing options;

(3) enacting statutory 'civil suit' provisions, to impose absolute liability for damages caused by illegal pollution;

(4) clearly reinstating private prosecutions for environmental offences; and

(5) decentralizing enforcement powers to the regional level.

Dealing with Contaminated Sites

One legacy of British Columbia's past reliance on hazardous substances is widespread contamination of land.[218] Twenty-eight contaminated sites are listed as "pollution concerns" to the Ministry of Environment as of July 1991.[219] Neither B.C. nor federal legislation is aimed specifically at dealing with contaminated land, although the Province has the power to order a person to conduct a clean-up under the *Waste Management Act*.[220] This power was recently amended to make it abundantly clear that it includes the power to order a clean-up by a person who caused the contamination in the past, even prior to the enactment of modern pollution control legislation.[221]

At the same time, the B.C. government indicated its intention to introduce more-comprehensive legislation respecting contaminated sites. A key factor motivating the government to adopt legislation in this area is that the B.C. and federal governments have signed an agreement[222] for partial federal funding of clean-ups of "orphaned" contaminated sites in B.C. This agreement is contingent on B.C. having legislation --

which has not yet been enacted -- implementing the "polluter pays principle." Exactly what such legislation would entail is not spelled out in the agreement.

In January 1991, the provincial government released a discussion paper called "New Directions for Regulating Contaminated Sites."[223] It states:

The past focus of pollution control legislation in British Columbia was on 'end-of-pipe' discharges. The provincial Waste Management Act, for instance was primarily designed to regulate discharges from current activities.

The orientation to current activities has resulted in a lack of legislation addressing contamination left by historic activities. Waste disposal practices going back decades, if not the past century, have left a legacy of contaminated land, groundwater, and sediments in British Columbia. Many of these sites are now recognized as posing environmental hazards and human health risks. These hazards and risks are not adequately addressed by current legislation. For example, there is an inadequate legislative basis for identifying and assessing suspect sites, making it difficult for the Ministry of the Environment to establish rational clean-up priorities. Nor are there effective legislative or common law rules of liability to compel clean-ups. Indeed, there is widespread uncertainly over who is liable to pay for cleaning up contaminated sites. There clearly is a need for law reform.[224]

The need for law reform in this area has also been acknowledged by the Sustainable Development Committee of the Canadian Bar Association, B.C. Branch[225] and the West Coast Environmental Law Research Foundation. The Research Foundation published a draft B.C. statute on the prevention and clean-up of pollution,[226] which proposes that new legislation regarding contaminated sites:

(1) assign absolute, joint and several liability for clean-up costs on a wide range of parties who caused or profited from an activity that caused contamination of a site;

(2) require responsible persons to initiate or help pay for a clean-up without the need for an initiative by government;

(3) impose strict liability on responsible persons for damages caused by contamination;

(4) establish a method for identifying and assessing contaminated sites and a registry for information regarding contaminated sites and clean-ups;

(5) set rules to ensure that clean-ups are conducted safely and monitored afterward;

(6) ensure that the public has notice of, and an opportunity to participate in, decision-making regarding clean-ups of contaminated sites; and

(7) establish mechanisms to encourage responsible parties to agree among themselves regarding their respective liability and roles in relation to clean-up and damages.

What is missing now is a specific legislative proposal by the government. This will be complex legislation affecting a wide variety of parties, so it is important that there be an opportunity for public discussion before the legislation is finally adopted.

Recommendation 10. Following a reasonable opportunity for public input, the Province of British Columbia should enact comprehensive legislation to govern the identification and clean-up of contaminated sites in the province.

Keeping Pollutants Out of Landfills and Sewers

Municipal sewers, landfills and incinerators are major sources of pollution in B.C. Nine municipal landfills and sewer systems are in significant non-compliance with their waste discharge permits and 9 others are listed as being a "pollution concern" to the Ministry of Environment.[227] The provincial government's regulatory focus is on the discharge of pollutants as they **leave** municipal waste systems. A chronic weakness has been the failure or inability of municipalities to control the **entry** of pollutants into municipal systems. Households, commercial establishments and light industrial operations contribute contaminants such as heavy metals, pesticides, and solvents to municipal landfills, incinerators and sewers.

Municipal landfills, incinerators, sewage outfalls and biomedical waste are regulated under the *Waste Management Act*. The operators of these facilities must obtain a waste discharge **permit** under the Act for each of these operations. Alternatively, one or more municipalities may obtain approval by the Minister of Environment of a **waste management plan**, which takes the place of a permit. The standards contained in a permit or, presumably, an approved waste management plan, are determined in accordance with the Pollution Control Objectives for municipal waste,[228] which have not been updated since 1975.[229]

In 1989, the Act was amended[230] to **require** regional districts and municipalities not within a regional district to submit a waste management plan for **biomedical waste** by the end of 1992 and for **solid waste** by the end of 1995. The Ministry of Environment has published *Requirements*[231] for solid waste management plans and a *Guide*[232] to their preparation. The *Requirements* and the *Guide* obligate regional districts to follow the '5 Rs' (reduction, reuse, recycling, recovery and residual management) and to incorporate the provincial goal of a 50% reduction in solid waste by weight by 2000 over 1990 levels.[233] In the development of the plan, information must be gathered on the hazardous waste component of the waste stream.[234] The *Requirements* specify that management strategies shall address **household** hazardous waste,[235] but for some reason commercial and industrial sources of toxic pollutants are not mentioned in the same context.[236]

The *Waste Management Act*[237] does allow the B.C. Cabinet to designate an area as a **sewage control area**, which authorizes the relevant municipality to prohibit or regulate pollutants entering a sewage system. It also allows regional districts and the Greater Vancouver Sewerage and Drainage District (GVSDD) to make bylaws controlling the direct or indirect discharge of sewage into sewers. The GVSDD has recently adopted a modern sewer use bylaw[238] and other regional districts are following

suit, often in conjunction with preparing waste management plans for liquid waste. But the inadequacy of mechanisms for controlling the **entry** of pollutants into municipal waste systems remains a major problem in B.C.

Recommendation 11. The Province of British Columbia should take additional steps to curtail the entry of pollutants, especially persistent toxic contaminants, into municipal waste systems by:

(1) requiring regional districts and municipalities not in a regional district to submit waste management plans for sewage;

(2) specifying that municipal waste management plans must include rigorous controls against the entry of pollutants, especially persistent toxic contaminants, into municipal solid and liquid waste systems; and

(3) considering the adoption of province-wide regulations to phase out the entry of persistent toxic pollutants into municipal waste systems.

Reducing Nonpoint Sources

Regulating large point-sources of pollution such as smokestacks and effluent discharge pipes is relatively easy compared to the difficulties of regulating a multitude of smaller, more diffuse sources. These hard-to-regulate sources are often called **nonpoint sources**.[239] Key examples in B.C. include:[240]

- vehicle emissions, which cause smog and disperse pollutants to the ground;
- urban stormwater runoff, which collects pollutants from vehicles and other sources and carries it to bodies of water;
- agricultural fertilizers and pesticides, which leach into groundwater and surface water;
- dredging, which can disturb previously buried contaminated sediments;
- woodstoves and fireplaces, which emit particulate, toxics and 'greenhouse' gases;
- logging and roadbuilding, which can damage streams by siltation, temperature change (loss of shade) and altered timing of flow (faster melting of snow pack);[241] and
- contaminated lands.

Many of these nonpoint sources of pollution, such as urban stormwater runoff, agricultural fertilizers and pesticides, dredging and woodstoves, are not usually subject to environmental standards.[242] Theoretically, the general anti-pollution provisions of the federal *Fisheries Act* and the B.C. *Waste Management Act* apply to many of these pollution sources. But these statutes are rarely effective in eliminating nonpoint releases of pollution, because the sources are usually too numerous and too small to warrant the devotion of scarce enforcement resources.

Yet the cumulative impact of nonpoint sources can be quite significant. For example, stormwater runoff has been linked to the severe pollution problems in Burrard Inlet,[243]

and large quantities of agricultural and forestry pesticides[244] impact the BC environment annually. Washington State has ranked nonpoint sources as amongst its top priorities for state environmental policy needs.[245]

Motor vehicle emissions are currently the most closely regulated of all the types of nonpoint sources of pollution, but they are still a major problem. Emission standards for **new** motor vehicles are set by the federal government.[246] These standards need to be tightened. The federal government should follow the lead of California, which recently announced auto emission standards that will require cars to be 50-85% less polluting than today's strictest requirements within twelve years, and will also require that 10% of new cars have zero emissions.[247]

Emissions from **in-use** vehicles are regulated by the Province.[248] The B.C. government has announced plans to require vehicle and emissions **testing**, following the closure of provincial motor vehicle testing stations in the early 1980s. But, the new testing requirements and facilities are not yet fully implemented. This should be considered a major priority.

In addition, the Province should develop a comprehensive plan to reduce significantly the **amount** of vehicle use, including measures to:

- restore the power of regional districts to prepare regional plans, to promote regional growth that minimizes automobile use;[249]
- substantially improve public transit ridership;
- encourage carpooling;
- promote walking and bicycling;
- encourage employees to work at home; and
- add taxes on gasoline or parking.

Because of the rapid increase in the number of motor vehicles in the Province, actions such as these must be taken very soon. If not, it may become necessary to take more severe measures such as requiring car commuters to buy a monthly bus pass, with the revenue used to improve transit, as is done in Stockholm, banning cars in the downtown core, as is done in Milan, Florence and other cities, or allowing an individual to drive downtown only on alternate days, as is done in a number of cities.

Like vehicle emissions, dealing with pollution from **pesticides** should involve a broad range of techniques both to **discourage** inappropriate pesticide use and to **encourage** alternatives to chemical pesticides. The province should:

- expand research into alternative pest control methods;
- reorient agricultural and silvicultural support programs to promote alternatives to chemical pesticides;
- consider laws prohibiting the use of pesticides unless non-pesticide pest controls have been shown to be infeasible; and
- implement economic incentives and disincentives to the use of chemical pesticides.[250]

In addition to reducing toxic contamination, these measures will bring other benefits such as reducing soil depletion caused by excessive use of fertilizers and pesticides.[251]

Controlling other types of nonpoint source pollution could also require innovative controls. For example, Washington State proposed a Nonpoint Pollution Control Fee, which would assess a fee on operations that contribute to certain types of nonpoint pollution -- and rebate the fee if certain preventive measures are taken.[252] This approach could be used, for example, to encourage service stations to take proper steps to control polluted stormwater runoff.

Watershed Management Approach

B.C. currently takes an *ad hoc* approach to regulating nonpoint sources of pollution, tackling problems one by one. In contrast, the Puget Sound Water Quality Authority has established a concerted program to address nonpoint sources of pollution.[253] Under the program, watershed management committees led by local governments prioritize watersheds and prepare watershed action plans for high-ranked watersheds. The plans describe voluntary, educational or regulatory methods to encourage or require polluters to meet stated goals, and objectives for preventing and controlling nonpoint pollution throughout the watersheds.

Recent proposed changes to the program would broaden the membership of watershed management committees to include representatives of local governments, tribal governments, the public and other affected parties.[254] The changes would also allow the development of control strategies either by **source** category or by each **pollutant** across a range of sources.

There are six categories of sources: farms, stormwater systems, on-site sewage systems, forestry operations, marinas and boats, and others (pesticide users, landfills, mines, sand and gravel pits, etc.) Each sector may be dealt with differently. However, each plan must outline, "specifically worded statements, such as model ordinances, recommended government policy statements, interagency agreements, proposed legislative changes, and proposed amendments to local comprehensive plans." In addition, each plan must have specific time frames for achieving objectives and estimated implementation costs. Water quality will be monitored and the plans reviewed annually. After the plans are drafted, they are submitted to the Department of Ecology for approval.[255]

We recommend below that B.C. give serious consideration to following this watershed-based approach. Similarly, an airshed-based approach should be considered for nonpoint sources of air pollution.

Recommendation 12. The Province of British Columbia should adopt a concerted program to prevent and control nonpoint sources of pollution in B.C., giving serious consideration to a watershed- and airshed-based approach.

ENDNOTES

92. "We recommend a series of measures to correct the incentives which are aimed at protecting the environment; and, in general, we propose strengthening the regulatory framework." [Source: *Royal Commission on the Economic Union and Development Prospects for Canada Report*, vol. 2 (Ottawa: Ministry of Supply and Services, 1985) p. 530.]

93. B.C. Environment, Environment 2001: Strategic Directions for British Columbia, (Victoria: the Ministry, 1991) p.11.

94. The following objectives have been established: Pollution Control Objectives for the Chemical and Petroleum Industries, Pollution Control Objectives for the Food-Processing, Agriculturally-Oriented and Other Miscellaneous Industries, Pollution Control Objectives for the Forest Products Industry, Pollution Control Objectives for the Mining, Smelting and Related Industries, Pollution Control Objectives for Municipal Type Waste Discharges, Minimum Requirements for Disposal of Municipal and Domestic Wastewaters to Surface Waters, Minimum Requirement for Refuse Disposal to Land.

95. Supra, note 93, at p.19.

96. *Ibid*. at p. 17.

97. Government of Canada, Canada's Green Plan for a Healthy Environment (Ottawa: Minister of Supply and Services, 1990) p. 43.

98. Ibid. at p. 44.

99. *1978 Great Lakes Water Quality Agreement*.

100. Ibid., Annex 12.

101. For example, the Canadian Institute of Environmental Law and Policy and the (U.S.) National Wildlife Federation.

102. "Zero Discharge Statement of Principles," City of Toronto, Clause 9, Report No.7 of the Board of Health amended and adopted by City Council, 18 June 1991.

103. D. Kirkpatrick, "Environmentalism: The New Crusade," (12 February 1990) *Fortune* p. 24 at p. 28.

104. J. Hirschorn and K. Oldenburg, Prosperity Without Pollution: The Prevention Strategy for Industry and Consumers (New York: Van Nostrand Reinhold, 1991) p. 93. See also A. Iveroth report in Cleaner Production p.3.

105. National Wildlife Federation and Canadian Institute for Environmental Law and Policy, A Prescription for Healthy Great Lakes: A Report of the Program for Zero Discharge (Toronto: the Federation and the Institute, 1991) p. 13.

106. Zero Discharge campaign brochure attached to letter dated 6 May 1991 from J. Palter of Greenpeace to Toronto Councillor J. Layton, attached as materials considered by the Board of Health for the City of Toronto Health Unit at its meeting on 22 May 1991.

107. *Supra*, note 102.

108. SBC 1980, c.30, s.4.

109. The *Waste Management Act*, SBC 1982, c.41, is the central pollution control statute in B.C. It was adopted in 1982, replacing the former *Pollution Control Act*, RSBC 1979, c.332. The change in names was intended to signify that the *Waste Management Act* places more emphasis on managing waste **before** it becomes a pollutant. This is reflected mainly in provisions (Part 3) regarding municipal waste management which authorize and in some cases require municipalities to prepare waste management plans. Apart from that, the *Waste Management Act* is mainly a straightforward pollution control-type statute. It prohibits people from putting pollutants into the environment unless they are authorized to do so by a permit, approval, order or regulations (Section 3). It also prohibits handling or storing "special" (hazardous) waste except in accordance with regulations (Section 3.1). Generally speaking, the *Waste Management Act* and other legislation such as the *Environment Management Act*, SBC 1981, c.14, give the Minister of Environment (headed by a Minister, under the *Ministry of Environment Act*, SBC 1980, c.30) and the B.C. Cabinet (composed of the Premier and approximately twenty-five or thirty ministers) ample authority to control pollution.

110. *Supra*, note 93.

111. For example, the *Transport of Dangerous Goods Act*, SBC 1985, c.17.

112. For example, the Special Waste Regulation, BC Reg 63/88, under the *Waste Management Act*, SBC 1982, c.41.

113. *Pest Control Products Act*, RSC 1985, c.P-9.

114. *Food and Drugs Act*, RSC. 1985, c. F-27.

115. *Atomic Energy Control Act*, RSC. 1985, c.A-16.

116. Polybrominated Biphenyls Regulations, 1989 SOR/90-129.

117. These regulations were imposed under the former *Environmental Contaminants Act*, SC 1974-75-76, c.72, which was replaced by the *Canadian Environmental Protection Act*, SC 1988, c.22.

118. *Supra*, note 105, at pp. 21-23.

119. Virtual Elimination Task Force, IJC p. 14.

120. *Supra*, note 105.

121. Ibid. at p.21.

122. B. Commoner, "Address before the EPA/IACT International Conference on Pollution Prevention, Washington, D.C. 1990," Appendix 2 of "Creating the Future" A Strategic Plan for the Environment Industry of B.C. (Burnaby: The Environment & Waste Management Committee of the Science Council of British Columbia, 1991) p. 4.

123. U.S. Council on Environmental Quality, Executive Office of the President, "Environmental Quality: Twentieth Annual Report" (1990) p. 363, cited in supra, note 105, at p. 21.

124. 8 Riksdagen 1990/91. 1 saml. Nr 90. Main proposals, p. 101, excerpt provided by the Swedish National Environmental Protection Board, Solna, Sweden.

125. *Ibid*. at p.103.

126. P. Muldoon, "Sunset Chemicals" *Probe Post* (Spring 1990) p.13.

127. N. Haigh & F. Irwin, eds, *Integrated Pollution Control in Europe and North America* (The Conservation Foundation, Washington, D.C., and Institute for European Environmental Policy, Bonn, undated) p. 17.

128. *Ibid*.

129. U.S. Environmental Protection Agency, *Pollution Prevention Strategy* (Washington, D.C.: the Agency, 1991) pp. 33-44.

130. *Ibid*. at pp. 33&35.

131. *Ibid*. at p. 35.

132. Chlorobiphenyls Regulations, SOR/91-152, and PCB Waste Export Regulations, SOR/90-453. Less extensive versions of these regulations were first adopted under the former *Environmental Contaminants Act*, SC 1974-75-76, c.72, which was replaced by the *Canadian Environmental Protection Act*, SC 1988, c.22.

133. Ozone-depleting Substances Regulations No.1 (Chlorofluorocarbon) SOR/89-351, No.2 (Bromofluorocardons) SOR/90-583, No.3 (Products) SOR/90-584, under the *Canadian Environmental Protection Act*, SC 1988, c.22.

134. Draft Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations, Public Information Version, January 1991.

135. Draft Pulp and Paper Mill Defoamer and Wood Chips Regulations, Public Information Version, January 1991.

136. Ozone Layer Protection Regulation, Draft 5, 12 June 1991, LC4/ac, B.C.

137. For example, K. Wolfe, A. Yazdani & P. Yates, "Chlorinated Solvents: Will the Alternatives be Safer?" 41:8 *Journal of the Air & Waste Management Association*, p. 1055.

138. *Canadian Environmental Protection Act*, SC 1988, c.22, s.12. The consultation is with with the provinces, labour, industry and "associations or person concerned with environmental and health matters."

139. *Ibid*.

140. *Ibid*.

141. *Canada Gazette* Part I, February 11, 1989.

142. R. Hall, Chair, *Report of the Ministers' Priority Substances Advisory Panel: Under the Canadian Environmental Protection Act* (Ottawa: Environment Canada, 1988).

143. *Supra*, note 97, at p.46.

144. The regulations were to have been published in the *Canada Gazette* Part I in June or July of 1990, according to federal officials at a national workshop on the federal regulatory package of proposed pollution regulations for the pulp and paper industry, in Hull, Quebec, May 1990. The latest estimate is that they will be published in September, 1991. [Source: Government of Canada, *News Release* 1991-39 (9 August 1991) p. 2.

145. "Draft Procedure Manual Chapter, Waste Discharge Criteria Based on (BACT) Best Available Control Technology," enclosed with a letter dated 15 January 1991, from J. O'Riordan, Assistant Deputy Minister, B.C. Ministry of Environment, to W. Andrews, West Coast Environmental Law Association.

146. BC Reg 300/90.

147. BC Reg 470/90.

148. The government has vacillated recently regarding utilizing this approach. In 1990, the rebuilt Port Mellon pulp mill, for example, received amended waste discharge permits based on the existing Pollution Control Objectives (for the conventional pollutants: suspended solids, biochemical oxygen demand and acute toxicity), even though the mill argued during the assessment process that it could do much better than those standards. But in July 1991, the proposed rebuild of the Celgar pulp mill in Castlegar, on the other hand, received amended waste discharge permits that are more stringent than the Objectives, following the proponent's claim that it, like the Port Mellon mill, could exceed the Objectives. Most recently, however, the government issued an amended air emissions permit for the Skookumchuk pulp mill that was only slightly more stringent than level A standards, and was not as stringent as the standards

that had been on imposed on the Celgar mill. The East Kootenay Environmental Society has appealed this amendment to the Director of Waste Management.

149. *Supra*, note 127, at pp. 4 & 24.

150. The Forest Resources Commission, for example, calls for much-expanded land use planning in the province. [Source: A. Peel, Chair, *The Future of Our Forests* (Victoria: Forest Resources Commission, 1991) p. 94.]

151. B. Parfitt, "Province's top foresters fear forests being overcut" Vancouver Sun (11 September 1991) p. D3.

152. "Environmental assessment" at the present time in B.C. refers to the review of proposed new projects or, in some cases, substantial expansions of existing operations.

153. Assessment processes with a legislative basis include: the Energy Project Review Process under the *Utilities Commission Act*, SBC 1980, c.60, the Mine Development Review Process under the *Mine Development Assessment Act*, SBC 1990, c.55, the Guidelines for Heritage Resource Impact Assessment under the *Heritage Conservation Act*, RSBC 1979, c.165, and the Guidelines for Linear Development and the Cowichan and Fraser River Estuary Environmental Assessment Procedures under the *Environment and Land Use Act*, RSBC 1979, c.110. Assessment processes without a legislative basis include: the Major Project Review Process, the B.C. Aquaculture Review Process, the Coastal Log Hauling Application Guidelines, and the Land Disposition Referral Procedure.

154. SC 1988, c.22.

155. B. Williams, P. West & G. Davies, *Report of the Port Hardy Ferrochromium Review Panel* (Vancouver: the Panel, 1991) p. 59.

156. *Ibid*. at p. 60.

157. M. Rankin, "Economic Incentives for Environmental Protection: Some Canadian Approaches" (1991) 1:3 Journal of Environmental Law and Practice, pp. 241-258, at p. 242.

158. L. Giroux, "A Statement by the Canadian Environmental Advisory Council on Enforcement Practices of Environment Canada" (Ottawa: the Council, 1985) p. 1.

159. W. Sinclair, *Controlling Pollution From Canadian Pulp and Paper Manufacturers: A Federal Perspective* (Ottawa: Minister of Supply and Services, 1990) p. 34.

160. *Ibid*. at p. 161. For B.C., the figures are 4.5% in 1978 and 43.4% in 1985. These figures are subject to two caveats. First, "Non-compliance suggests that a mill operated in excess of federal standards sometime during the year in which the information gathered, but this might not be considered a violation under the law."[p.161.] Second,

"Toxicity requirements in British Columbia are provincial criteria."[p.161.] For coastal pulp mills these standards are less stringent than the federal standards.

161. *Ibid.* at p.161.

162. Memo dated 15 November 1989 from O. Langer, Head, Habitat Management Unit, Fraser River, Northern B.C. and Yukon Division, Department of Fisheries and Oceans, to F. Fraser, Area Manager, Fraser River, Northern B.C. and Yukon Division, Department of Fisheries and Oceans. An often-delayed package of improvements to the federal standards governing pollution from pulp and paper mills is scheduled to be officially published for public comment in September 1991. Previous drafts of the package require mills to meet new, tougher standards by 1993, with provisions for delays in some cases. [Source: Draft Pulp and Paper Effluent Regulations, Public Information Version, January 1991.]

163. "[A] vigorous enforcement program" was initiated in 1972, but it "did not survive." [Source: L. Kolankiewicz, "Compliance with Pollution Control Permits in the Lower Fraser Valley, 1967-1981" (Winter 1986-87) 72 B.C. Studies p. 28 at p. 47.]

164. S. Wynn, "Notes for an Address, Environmental Legislation and Enforcement" (22 November 1989) [unpublished] p. 3.

165. Auditor General, *Report of the Auditor General for the year ended 31 March 1981* (Victoria: the Office, 1982) p. 130.

166. *Ibid.* "Serious non-compliance" was defined as, "when one or more permit conditions were exceeded for more than four consecutive months during the year, and where the concentration of contaminants in the discharge averaged more than 50% above the permit limit set by the Ministry [of Environment]" p. 130.

167. L. Kolankiewicz, "Compliance with Pollution Control Permits in the Lower Fraser Valley, 1967-1981" (Winter 1986-87) 72 *B.C. Studies* p. 28 at p. 47.

168. R. Brown & M. Rankin, "Persuasion, Penalties, and Prosecution: Administrative v. Criminal Sanctions" in M. Friedland, ed., *Securing Compliance: Seven Case Studies* (Toronto: University of Toronto Press, 1990.) p. 334.

169. *Ibid.* at p. 339. The authors noted that: "[T]here was no tough enforcement rhetoric emanating from politicians or senior civil servants." [p. 339.]

170. D. Saxe, *Environmental Offences: Corporate Responsibility and Executive Liability* (Aurora: Canada Law Book, 1990).

171. Government of Canada, Press Release (26 June 1987). See also Environment Canada, Enforcement and Compliance Policy, Canadian Environmental Protection Act (Ottawa: Minister of Environment, 1988). It states that: "Compliance with the Act and its regulations is mandatory." [p. 9.] The policy provides that for each violation a charge

will be laid, **except** where a formal warning, a ticket or a Ministerial order is considered more appropriate. [p. 50.] There have been significantly more prosecutions under CEPA than there were under the federal statutes that preceeded it. Because there are as yet so few regulations under CEPA, however, the full impact of the CEPA Enforcement and Compliance Policy has not yet been felt. In contrast, the federal Fisheries Act, RSC 1985, c.F-14, and regulations exert far more influence on daily activities than does CEPA. But an enforcement and compliance policy for the Fisheries Act still has not been released even in draft form, despite the fact that one has been in almost continuous preparation since **prior** to the development of the CEPA policy in 1987.

172. B.C. Ministry of Environment, *News Release* 1989:76 (7 June 1989).

173. *Waste Management Amendment Act, 1989*, SBC 1989, c.62.

174. *Supra*, note 165, at p. 10.

175. B.C. Ministry of Environment, "Ministry of Environment, Conservation Offenses Information System, Statistical Report Sorted by Region & Programme (Entry Date)" (2 May 1990) [unpublished] p. 9. This figure may include one or two informations laid under the *Litter Act*, RSBC 1979, c.239.

176. B.C. Ministry of Environment, "Ministry of Environment, Conservation Offenses Information System, Statistical Report Sorted by Region & Programme (Entry Date)" (20 September 1991) [unpublished] p. 17. The Ministry states that the 1990-91 figures may be subject to revision. [Source: *Pers. comm.* with A. Powell, B.C. Ministry of Environment, 20 September 1991.]

177. *Ibid*. Figures for 1988-89 include prosecutions under the *Litter Act*. These were mostly tickets, likely totalling less than $10,000 in fines.

178. B.C. Ministry of Environment figures show that the numbers of permits in "significant non-compliance" was 115, 48, 33 and 72 in October 1989, July 1990, December 1990 and July 1991, respectively. [Sources: B.C. Environment, "Compliance, October 15, 1989" [unpublished], B.C. Ministry of Environment, "Report of Significant Non-Compliance Evaluation of Waste Management Permits" (12 July 1990) [unpublished], B.C. Ministry of Environment, "Report of Significant Non-Compliance Evaluation of Waste Management Permits" (10 December 1990) [unpublished], B.C. Ministry of Environment, "Report of Significant Noncompliance Evaluation of Waste Management Permits" (16 July 1991) [unpublished]. Unfortunately, the October 1989 figure may have been calculated on a different basis than the later figures, making comparison unreliable. The July 1991 figure includes 9 out-of-compliance pulp mill effluent permits, which were listed separately from the main non-compliance report. This failure to follow consistent methodology or to set out the methodology followed in the reports makes evaluation over time difficult.

179. Of the 41 permits on the July 1990 list of permits in "significant non-compliance" ("Part 1"), nine moved off the lists in December 1990, ten moved to the list of "pollution concerns" ("Part 2"), and 26 stayed on the list. Of the 33 permits on the December 1990 list, 14 moved off the lists in July 1991, and 19 stayed on the Part 1 list. Of the 63 permits on the July 1991 Part 1 list, in addition to the 19 from the previous Part 1 list, 13 had been on the previous Part 2 list and 31 were new. [Sources: B.C. Environment, "Report of Significant Non-Compliance Evaluation of Waste Management Permits" (12 July 1990), B.C. Environment, "Report of Significant Non-Compliance Evaluation of Waste Management Permits" (10 December 1990), B.C. Environment, "Report of Significant Noncompliance Evaluation of Waste Management Permits" (16 July 1991).]

180. Some standards were lowered and waivers were granted for some pulp and paper mills in December 1990 for interim periods of up to approximately three years while new secondary treatment and other facilities are installed. [Source: Pulp Mill and Pulp and Paper Mill Liquid Effluent Control Regulation, BC Reg 470/90.]

181. From April 1990 to March 1991.

182. B.C. Environment, *News Release* 1991:114 (17 July 1991) p. 3.

183. W. Andrews, "We need a B.C. Access to Information Act" (Address to the Environmental Education Provincial Specialist Association, 7 May 1988) [unpublished].

184. Without the benefit of a variance order.

185. B.C. Ministry of Environment and Parks, Waste Management Program, "Pulpmill Compliance Summary" (20 June 1988). Three mills had variance orders.

186. B.C. Ministry of Environment and Parks, Waste Management Program, "Pulpmill Compliance Summary" (April 1989). One mill had a variance order. One mill was in compliance with its air emissions permit and discharges its effluent through the discharge pipe of an adjacent mill whose effluent permit was out of compliance.

187. B.C. Ministry of Environment, "Pulp Mills, Environmental Impact & Compliance" (7 May 1990). Nine out of 22 pulp mills were in compliance with all of their air, water or refuse (land) pollution permits. The report does not indicate how many of the pulp mills were in compliance because of a variance order. Moreover, of the nine mills in compliance, eight were nevertheless classified as causing "significant environmental impact" regarding effluent and seven were in the same classification for air emissions.

188. The schedules are designed to allow for technical changes, including the installation of secondary wastewater treatment systems by the coastal mills (the Interior mills already had such systems).

189. BC Reg 470/90.

190. B.C. Environment, *News Release* 1991:114 (17 July 1991) p. 1.

191. W. Sinclair & A. Colodey, *An Economic, Technical and Biological Review of the British Columbia Council of Forest Industries (COFI) Report: Sustainable Development and the B.C. Pulp and Paper Industry (March 1990)* Regional Review Report 90-1 (North Vancouver: Environment Canada, Conservation and Protection, Pacific and Yukon Region, June 1990, as amended February 1991) pp. 9-11. For COFI's rebuttal, *see* COFI *News Release* (24 July 1991) and letter dated 6 February 1991 from B. McCloy, Council of Forest Industries of British Columbia, to W. Sinclair & A. Colodey, Environment Canada.

192. Enforcement Branch, B.C. Environment, *Ensuring Effective Enforcement, British Columbia's Environment, Planning for the Future* (Victoria: the Ministry, 1991) p. 4.

193. *Ibid*. at p.16. Utilizing **both** the administrative penalty approach and criminal sanctions is recommended in R. Brown & M. Rankin, *supra*, note 169, at pp. 325-353, and M. Rankin, *supra*, note 157, at p. 241.

194. *Supra*, note 157, at p. 241, and *supra*, note 169, at p. 348.

195. *Supra,* note 169, found that the administrative penalties approach used by the B.C. Workers Compensation Board resulted in more frequent fines than did the court-enforcement approach taken by the Waste Management Branch. But, at the time of the study, the Branch was not following a vigorous prosecution policy. And the purpose of the study was not to examine actual levels of occupational safety or environmental protection.

196. D. Saxe, "The Impact of Prosecution," 20 *Hazardous Materials Management*, p. 20 at p. 34. The author concludes that, "This survey provides empirical evidence to support the decision of environmental regulators to give greater emphasis to prosecution, both of corporations and of their officers and directors." [*Ibid*.] For a thorough discussion of the `pros and cons' of prosecution as a method of achieving compliance with environmental standards, *see supra,* note 170, at pp.26-31.

197. Supra, note 192, at p.17.

198. D. Saxe, "The Impact of Prosecution," *supra,* note 105.

199. *Supra,* note 192, at p. 17. The proposals include powers to order the offender to refrain from continuing or repeating the offence, to restore the environment, to avoid potential harm, to notify those adversely affected by the offence, to publish the facts of the offence, to perform community service, to compensate the government for preventive or corrective measures (including clean-up) necessitated by the violation, and to contribute to the cost of research regarding the subject matter of the violation. [p. 17.]

200. *Supra*, note 138, s.130.

201. W. Andrews, *"Waste Management Act*: Recommendations to Improve Enforcement," in C. Sandborn, ed., *Law Reform for Sustainable Development in British Columbia* (Vancouver: Sustainable Development Committee, B.C. Branch, Canadian Bar Association, 1990) p. 218.

202. *Supra*, note 138, s. 131.

203. *Supra*, note 138, s. 136.

204. *Fisheries Act*, RSC 1985, c.F-14, s.42(3).

205. Only an act of war, a natural disaster or an act of deliberate vandalism is a defence. *Ibid.,* s.42(4).

206. In *Gagnier* v. *Canadian Forest Products* (11 September 1991), Vancouver C894108 (S.C.) a crab fisher and his company sued two pulp mills in Howe Sound for damages caused by the closure of the shellfish fishery due to dioxins and furans. The case took some **52 days** in court. Moreover, none of the many legal issues argued in the case were resolved for future plaintiffs and defendants because the case was decided by the court on a credibility issue and none of the environmental legal questions were addressed.

207. *See* Chapter 4 for additional discussion of the `polluter pays principle' and the desirability of increasing the civil liability of polluters.

208. *Supra*, note 192, at pp. 17-18.

209. *See* L. Duncan, *Enforcing Environmnetal Law: A Guide To Private Prosecution* (Edmonton: Environmental Law Centre, 1989). At common law, a citizen has a right to initiate and conduct a private prosecution, subject to the Attorney General's perogative to step in and `stay' a private prosecution, effectively stopping it.

210. *Crown Counsel Act*, SBC 1991, c.10, s.2(a) gives the Criminal Justice Branch the function and responsibility of approving and conducting on behalf of the Crown all prosecutions of offences in the Province.

211. Letter of 27 March 1991 from R. Fraser, B.C. Attorney General, to R. Edwards, Deputy Attorney General. The letter states that, "The Criminal Justice Branch will intervene in all private prosecutions of either indictable or summary conviction offences to ensure a single standard of charge approval and the exercise of prosecutorial power in the public interest in all cases." [p.4.]

212. *R.* v. *Greater Vancouver Regional District and Greater Vancouver Sewerage and Drainage District*, (1981) 3 *Fisheries Prosecutions Reports* 134 (Prov. Ct.).

213. *R.* v. *Corporation of the District of North Vancouver, Harry McBride and John Bremner*, (1982) unreported (Prov. Ct.).

214. *Supra,* note 192, at p. 18.

215. This would allow a regional official -- in addition to the Minister of Environment -- to respond to practical problems such as the non-payment of a fine under the *Waste Management Act*. This was recommended in *supra,* note 202.

216. *Supra,* note 192, at p. 18.

217. How else would the government learn of the spill?

218. W. Andrews, W. Braul, J. Russell & C. Sandborn, "Contaminated Land," in C. Sandborn, ed., *supra,* note 110, at p.26.

219. B.C. Ministry of Environment, *Report of Significant Non-Compliance Evaluation of Waste Management Permits* (Victoria: the Ministry, 1990), and B.C. Ministry of Environment, *Report 2 -- Waste Discharges, Special Waste Sites and Contaminated Sites Not in Report 1 But That Are A Pollution Concern to the Ministry* (Victoria: the Ministry, 16 July 1991). The figure includes mine tailings, groundwater contamination and hazardous waste storage.

220. SBC 1982, c.41. s.22.

221. *Waste Management Amendment Act*, SBC 1990, c.74.

222. *Agreement Between the Government of Canada and the Government of British Columbia Regarding the Implementation of Remedial Measures at Orphan High Risk Contaminated Sites and the Development and Demonstration of Contaminated site Remedial Technologies*, 30 November 1990.

223. W. Braul, *New Directions for Regulating Contaminated Sites: A Discussion Paper* (Victoria: B.C. Ministry of Environment, 1991).

224. Ibid.

225. W. Andrews, W. Braul, J. Russell & C. Sandborn, "Contaminated Land", in Sandborn ed., *supra,* note 202, at p. 26.

226. J. Russell & W. Andrews, *Toxic Real Estate In British Columbia: Draft Statute for Discussion* (Vancouver: West Coast Environmental Law Research Foundation, 1990).

227. B.C. Ministry of Environment, *Report of Significant Non-Compliance Evaluation of Waste Management Permits* (Victoria: the Ministry, 1991), and B.C. Ministry of Environment, *Report 2 -- Waste Discharges, Special Waste Sites and Contaminated Sites Not in Report I But That Are A Pollution Concern to the Ministry* (Victoria: the Ministry, 1991).

228. Department of Lands, Forests, and Water Resources, *Report on Pollution Control Objectives for Municipal Type Waste Discharges in British Columbia, as a Result of a Public Inquiry Held by the Director of Pollution Control* (Victoria: the Department, 1979). Despite the date of publication, the Objectives were established in 1975.

229. *Pers. comm.* with D. Wetter, B.C. Ministery of Environment, 24 September 1991.

230. *Waste Management Amendment Act*, SBC 1989, c.62.

231. B.C. Ministry of Environment, *Requirements for Regional Solid Waste Management Plans* (Victoria: the Ministry, 1990).

232. B.C. Ministry of Environment, *Guide to the Preparation of Solid Waste Management Plans by Regional Districts* (Victoria: the Ministry, 1990). This has been supplemented very recently by B.C. Environment, *Applicants' Guide to Municipal Solid Waste Management Financial Assistance Programs* (Victoria, the Ministry, 1991).

233. *Supra,* note 231, at p. 1.

234. *Supra,* note 232, at p. 17.

235. Supra, note 231, at pp. 1 & 3.

236. A draft Regional District Solid Waste Management Plan Regulation (18 June 1991) addresses this problem by defining "household hazardous wastes" to include waste from "residential, commercial, institutional or industrial sources." [s.1.] Unfortunately, this definition conflicts with the plain meaning of the term "household hazardous waste." A much more apt term would be "municipal hazardous waste."

237. SBC 1982, c.41.

238. Greater Vancouver Sewerage and Drainage District, *Sewer Use By-law No. 164*, 27 June 1990.

239. Nonpoint sources are pollution sources other than industrial or municipal waste pipes or chimneys.

240. Parts of this section are from W. Andrews, W. Braul, J. Russell & C. Sandborn, *supra*, note 225.

241. Logging and roadbuilding are sometimes covered by environmental standards [usually as conditions of a permit] or guidelines. The B.C. Ministry of Forests and Lands, *Coastal Fisheries Forestry Guidelines*, 2d ed. (Victoria: the Ministry, 1988), set out logging practices intended to protect fish habitat. These can be effective, but they are not applicable in all instances and compliance is not universal. The Forest Resources Commission noted that: "Unfortunately, secondary roads, spur roads, and other temporary roads have sometimes been poorly constructed, poorly located, poorly

drained with inadequate culverts, poorly maintained, and poorly `put to bed' for the period of several decades between their use for silvaculture or other management activities." [Source: *supra*, note 151.]

242. The application of most pesticides on Crown land is covered by the B.C. *Pesticide Control Act*, RSBC 1979, c.322. The pesticides themselves are registered for use under the federal *Pest Control Products Act*, RSC 1985, c.P-9.

243. Stormwater runoff was one of the chief sources of carcinogenic PAHs, which have been linked to the high incidence of precancerous lesions in Burrard Inlet fish. [Source: D. Goyette & J. Boyd, *Distribution and Environmental Impact of Selected Benthic Contaminants in Vancouver Harbour, British Columbia, 1985 to 1987* (Vancouver: Environment Canada Regional Program Report, 1989) p. xii.]

244. In 1987, 2,220,642 kg of pesticides (active ingredients) were sold in B.C. [Source: *Agriculture Canada/Environment Canada Pesticide Registrant Survey, 1988 Report* [incomplete citation], cited in a memo dated 25 June 1991, from R. Kobylnyk, Director, Pesticide Management Branch, B.C. Ministry of Environment, to Regional Managers and others.

245. 1 *Shellfish Quarterly* (Washington State Department of Ecology, March 1990).

246. Motor Vehicle Safety Regulations, CRC 1978, c.1038, as amended by SOR 89-279, under the federal *Motor Vehicle Safety Act*, RSC 1985, c.M-10.

247. *See* C. Sandborn, "A Breath of Fresher Air" *Vancouver Sun* (16 July 1991).

248. Div.29, Air Pollution Controls on Motor Vehicles, of Motor Vehicle Regulations, BC Reg 229/70, as amended by B.C. Reg. 343/77, under the *Motor Vehicle Act*, RSBC 1979, c.288.

249. *Municipal Amendment Act, 1983*, SBC 1983, c.22, ss.3-7, took away such planning powers.

250. *See* M. Kansky, "The Pesticide Regulatory Process", in C. Sandborn, ed., *supra,* note 202, at 146. *See also*, Chapter 5, for a discussion of how pesticide taxes have been used in other jurisdictions to provide funding for research into sustainable agriculture.

251. *See* Senate Standing Committee on Agriculture, Fisheries, and Forestry, *Soil at Risk: Canada's Eroding Future*, (Ottawa: the Committee, 1984).

252. 1 *Shellfish Quarterly* (Washington State Department of Ecology, March 1990). The proposal was not accepted due to budget constraints.

253. WAC 400-12-410, Washington State Register 91-15-090.

254. WAC 400-12-410, Washington State Register 91-15-090.

255. WAC 400-12-535(1).

CHAPTER 3 SPREADING THE WORD: "POLLUTION PREVENTION PAYS"

Fortuitously, reduction of the generation of pollutants is frequently highly profitable for companies that undertake it. Hundreds of companies have discovered that they can

dramatically reduce generation of pollutants -- and at the same time make more money -- if they systematically:

- recover and reuse wastes such as waste solvents, plastics, metals, oils, paper, etc.;
- redesign production processes to reduce waste production, discharge and escape;
- make more efficient use of new materials and energy; and
- substitute less toxic materials for material inputs.

In this chapter we will discuss what the provincial government can do to encourage industry to prevent pollution and at the same time become more efficient and profitable. Among other things, we will recommend that the provincial government:

- establish a British Columbia Pollution Prevention Centre to provide information, education, training and technical assistance to assist individual firms in implementing pollution prevention at their worksites;
- fund pollution prevention demonstration projects in high-priority polluting industries;
- provide financial assistance to firms that are developing innovative clean technology, and to needy firms that are cleaning up operations; and
- require generators of toxic materials to prepare comprehensive toxics use reduction plans.

Prevention Works

The multinational 3M Corporation of Minnesota has pioneered the pollution prevention approach. 3M's "Pollution Prevention Pays" (PPP) program was implemented in 1975, applying the strategies listed above. Today 3M's PPP program prevents the annual production of 126,000 tons of air pollutants, 16,600 tons of water pollutants (sludge), 6,600,000 litres of wastewater and 409,000 tons of solid and hazardous wastes. The program saves the company the energy equivalent of 210,000 barrels of oil annually. Although the company has reduced total releases by 50%, company officials believe they will be able to reduce wastes and emissions to air and water by an additional 30%. Most startling of all, 3M estimates the PPP program has saved the firm U.S. $506-million since the program began.[256]

The *Toronto Star* installed an ink recycling machine in 1978. As a result, the *Star* has dramatically reduced the amount of ink it dumps into landfills. The environment has profited. And so has the *Star*. The ink recycling machine paid for itself in less than a year.[257]

Eco-Tec Ltd. of Toronto has developed systems for recapturing waste metals in electroplating operations. Such systems reduce the amount of nickel, cadmium and chromium that goes into the environment. They also pay for themselves in a period of a year or two.[258]

In 1984, Dow Chemical adopted a "Waste Reduction Always Pays" program. Since that time, Dow's overall air emissions have decreased 44% and total hazardous waste generation is down 25%. This occurred while volume of production was increasing significantly.[259] The implementation of one project alone in the Gulf of Mexico Region --

reuse of the by-product hydrochloric acid -- saves the company U.S. $20-million annually in that region.[260]

Such stories are the rule, not the exception. Allister Brown, a Vancouver industrial consultant, states:

Most businesses that create hazardous wastes will improve their bottom line by adopting a Pollution Prevention program.[261]

Profit from Pollution Prevention, a book published by Pollution Probe, documents the success stories of hundreds of firms that have turned waste products into financial assets.[262] A wide variety of firms -- from drycleaning firms to breweries, from paint manufacturers to textile firms, from oil companies to tanneries, from photo finishers to auto repair shops -- have discovered that pollution itself can be a valuable resource. Smart companies cannot afford to let this valuable resource escape.

The U.S. Congress Office of Technology Assessment has gone so far as to state that the majority of waste reduction projects provide a payback of capital cost in less than one year.[263]

The PRISMA project, which involved waste reduction demonstration projects in a cross-section of Dutch industries, achieved up to 80% pollution reductions -- and saved the companies money.[264] The PRISMA team concluded that -- **without additional cost to industry or with actual savings to industry** -- a substantial number of pollution prevention opportunities existed in Dutch industry, with reduction percentages of 50% or more achievable.[265]

The Massachusetts Office of Safe Waste Management has estimated that numerous hazardous waste streams could be reduced by an average of 48% with an aggressive pollution prevention program. The U.S. Congress Office of Technology Assessment estimates that such a program could reduce U.S. hazardous waste streams by 50% in a five-year period.[266] A study of industrial managers in Ventura County, California, estimated that waste reductions of 30-40% could be achieved by their firms.[267]

The Need for Government Action

Although it is clear that many firms could reduce their pollution discharges -- often at a profit, or at no cost -- most firms are not fully exploiting the numerous opportunities they have to cut pollution at source.[268]

Ever-tightening regulations, increasing waste management costs and liabilities, and difficulties in siting disposal sites provide firms with additional economic incentives to reduce wastes at source. However, these incentives can be too indirect, leading simply to changes in waste **control** technology, illegal dumping, manoeuvres to avoid or delay compliance, or the closing of plants.[269] Many experts have concluded that firms are not responding with pollution prevention programs because of:

- information barriers;
- attitude barriers; and
- corporate organization barriers.

For example, an Office of Technology Assessment survey of U.S. companies elicited the following reasons why the companies did not respond to regulatory programs by reducing hazardous waste:

- Managers are more familiar with waste management and pollution control.
- Managers hold an incorrect belief that waste recycling and treatment can be made safe enough to minimize liabilities as well as waste reduction does.
- Many managers hold a mistaken belief that no waste reduction opportunities remain.
- Companies have a lack of technical information on how to pursue waste reduction.
- Companies feel that they are unable to simultaneously devote resources to regulatory compliance and to voluntary waste reduction.
- Companies lack accounting systems that allocate environmental costs to specific production operations, in order to provide an economic motivation to assess waste reduction.[270]

Commentators have noted that information barriers often exist within the company itself. Employees with environmental responsibilities frequently work in relative isolation from employees that make production decisions. Yet most waste reduction decisions must be implemented by production people, not by those with 'pollution control' responsibilities. Thus, non-optimal **production** decisions can be made that create unnecessary pollution problems.

Sanford Lewis and Marco Kaltofen of the U.S. National Toxics Campaign Fund have summed up the problem:

Analysts have concluded that companies are failing to adopt waste reduction methods because of a lack of awareness of alternatives, a focus on very short-term profits, organizational adherence to certain ways to doing business, and a failure to consider hidden benefits of waste reduction to the firm. The challenge, as the Congressional Office of Technology Assessment (OTA) stated in 1986, "is to persuade most American waste generators to do what a few companies have already discovered is in their own economic self-interest."[271]

A number of jurisdictions have recently taken action to reduce the information barriers, attitude barriers and corporate organization barriers that prevent companies from achieving a 'win-win' situation -- that prevent them from achieving a reduction of pollution, accompanied frequently by an increase in profits.

Pollution Prevention Centres

Other Jurisdictions

Governments in the U.S., Canada and Europe have begun to attack the irrational institutional barriers to pollution prevention by establishing pollution prevention centres. Typically, these centres:

- conduct research on pollution prevention technologies and methods;
- serve as a central clearinghouse for dispensing pollution prevention information -- information that is rapidly being developed worldwide;
- develop training programs for key personnel in industries that produce pollution; and
- provide pollution prevention educational materials, including training manuals and videos.

The United States Environmental Protection Agency established an Office of Pollution Prevention in 1989. The EPA now performs extensive pollution prevention research, information clearinghouse functions, education, technology transfer and assistance, demonstration projects, etc.[272]

The Canadian federal government recently established the Great Lakes Centre for Pollution Prevention. The Centre's purpose is to develop prevention strategies in the Great Lakes basin, assist industries installing clean technology, and educate people about pollution prevention.

Over twenty U.S. states are promoting waste minimization programs, through such means as technical assistance programs, research programs, and distribution of manuals that tell local industry how they can reduce pollution generation. State technical assistance programs are provided through environment departments (Oregon, Washington, Virginia); commerce departments (Mississippi); natural resource departments (Massachusetts); or independent commissions (Connecticut). Kentucky, Tennessee, Georgia, Iowa and Minnesota have sited their technical assistance programs at universities.[273] New Jersey, New York, Connecticut, North Carolina and Pennsylvania have sited their programs in a combination of agencies.[274]

In the Netherlands, the government has established 18 regional innovation centres that guide Dutch companies to sources of innovative expertise in various fields, including energy and environmental protection.[275] Centres that fulfill many of the functions of a pollution prevention centre have been established at various universities in Europe, including the Erasmus University Centre for Environmental Studies in the Netherlands and the University of Lund in Sweden.

British Columbia

The Government of British Columbia needs to establish a pollution prevention centre, in order to break down the information and attitude barriers that are preventing B.C. industry from implementing win-win pollution prevention programs. Since the British Columbia Hazardous Waste Management Corporation has a mandate to provide education, assist in technology transfer and develop a British Columbia hazardous waste management system, the corporation would be a logical place to locate a pollution prevention centre.[276] Alternatively, the centre could be located in the Ministry of

Environment. Wherever located, the centre should work closely with provincial business-oriented ministries,[277] and with universities and technical institutes (discussed below).

The British Columbia Pollution Prevention Centre should perform eight functions:

1. Provide a central clearinghouse for dispensing the rapidly developing body of world-wide information on pollution prevention.

The B.C. Centre could become the B.C. distribution centre for the massive amount of pollution prevention information that is being developed internationally. For example, the U.S. EPA has established a Pollution Prevention Information Clearinghouse to transfer technical, policy, program, legislative and financial information on pollution prevention. In Europe, the Network for Environmental Technology Transfer serves a similar function. The United Nations Environment Program's Cleaner Production Network produces a pollution prevention newsletter, *Cleaner Production*, and operates an international data base, the International Cleaner Production Information Clearinghouse.

2. Provide pollution prevention educational materials, including training manuals, videos, etc.

For example, the Ontario Waste Management Corporation has produced a manual that explains how to do a waste audit (to determine what types and amounts of contaminants a company is dealing with), and where to find resources for pollution prevention techniques.[278] The United States Environmental Protection Agency has published a similar manual, along with an annual report on pollution prevention training opportunities.[279] The EPA manual describes detailed procedures on how a business can identify and reduce hazardous waste generation in a broad variety of industrial facilities.[280] The United States Environmental Protection Agency lists 15 such manuals that have been developed in various jurisdictions.[281] British Columbia should produce a manual targeted at B.C. industry, and B.C. pollution problems.

3. Develop training programs for key personnel in industries that produce pollution, including technical seminars, workshops and conferences geared to specific industries.

Seminars can provide an effective forum for exchanging information about pollution prevention techniques that are useful to a particular industry. In the U.S., the leaders of such seminars not only bring in outside expertise to business people, but also encourage business people to talk to their peers about techniques that have worked for them. Reportedly, this approach has been very effective.[282] The EPA's Pollution Prevention Training Opportunities manual lists hundreds of such seminars, workshops and conferences.[283]

4. Focus its resources on small businesses that might not otherwise have the resources to fully analyze pollution prevention opportunities.

Pollution prevention technology assistance policies are particularly well suited to clean up small, currently unregulated point sources of pollution. These sources can be significant contributors to environmental contamination. For example, only a small fraction of the chlorinated organics released in the U.S. come from large firms. The rest come from dry cleaners, paint stripping operations, degreasing operations and other relatively small facilities that typically discharge into sewer systems. From sewers, the contaminants can move to the air or water.[284] For example, the U.S. EPA found that a Philadelphia sewage treatment plant was the largest single source of air toxics in the metropolitan Philadelphia area, greater than such large single industrial facilities as refineries and chemical plants. Prevention policies can encourage such small unregulated facilities to use alternative substances (e.g., water-based solvents) that can eliminate much of the problem.[285]

According to a National Governors' Association study, many industries which include numerous small firms -- such as auto servicing, film processing, electroplating and metal finishing, and printing -- are amongst the industries that most readily benefit from inexpensive pollution prevention changes.[286]

To transfer technologies to small business the EPA's Pollution Prevention Program provides technical assistance, in cooperation with the American Institute of Pollution Prevention and the University of Cincinnati. The highly successful Minnesota source reduction program has delivered technology assistance through the state's Small Business Development Centers.[287]

5. Provide on-site assistance and consultations with industry.

The U.S. National Environmental Law Centre has pointed out that pollution prevention assistance is most effective when tailored to particular needs of a firm, because there are so many differences between facilities, even in the same industry.[288] Many U.S. states, including Oregon, Washington, California, Massachusetts, Illinois and Minnesota, provide on-site technical assistance.[289] The Ontario and Manitoba Waste Management Corporations also provide on-site technical assistance.[290] B.C. Hydro's Power Smart program for industry spends a significant amount of time and resources on providing on-site technical assistance.[291] (See below for a discussion of the similarities between Power Smart and pollution prevention programs.)

6. Coordinate its efforts with industrial associations.

For example, a team of Centre experts could work extensively with the provincial associations of dry cleaners, photo finishers, metal finishers, etc., in order to maximize the effect of their work. The associations could serve as a vital communications contact point between the Centre and widely dispersed small businesses. The Manitoba Hazardous Waste Management Corporation is currently working with dry-cleaning and metal-plating industry groups to investigate collective means of dealing with waste.[292]

7. Carefully coordinate its work with the B.C. Institute of Technology and B.C. universities, particularly with the engineering and environmental sciences faculties.

It is critical that B.C. engineering faculties actively promote **production process designing** that optimizes waste reduction. Researchers at the Massachusetts Institute of Technology found that U.S. engineering schools and firms, unlike their European and Japanese counterparts, pay little attention to process engineering. The U.S. engineers tended to focus more on innovative end products, rather than on processes. Consequently they understand little about ways to modify production processes to eliminate waste and pollution. The researchers observed:

... [T]he design of manufacturing processes and production operations [has] acquired a reputation as lowbrow activities and [has] largely disappeared from the curriculum.[293]

This unwarranted de-emphasis of process design should be reversed -- and the pollution prevention centre can encourage engineering faculties to do that. In addition, the pollution prevention centre should work closely with B.C. Research, which has already conducted research on a number of waste recycling, reuse and reduction projects.[294]

8. Focus its resources on users whose processes' toxicity, widespread use, or potential for improvement merit priority.

An Ounce of Toxic Pollution Prevention, published by the National Environmental Law Center, provides an excellent discussion of the rationale for this approach.[295]

The Pacific Northwest Research Center

The Pacific Northwest Pollution Prevention Research Center, located in Seattle, could play a critical role in conducting research into pollution prevention opportunities that may be available in British Columbia. Funded by Idaho, Washington, Oregon, and Alaska, the U.S. EPA and the Province of British Columbia, the Center has a mandate to bring together governments, industry, educational institutions and environmental, civic, and labour organizations to:

(1) identify important pollution prevention research gaps;

(2) set priorities based on identification of research needs;

(3) support, sponsor, and/or conduct pollution prevention research; and

(4) disseminate the results of pollution prevention research, and foster ways to evaluate the effectiveness of pollution prevention efforts.[296]

Active British Columbia involvement with this Center would help B.C. tap into the growing body of international information on pollution prevention. In addition, the Center could research pollution problems that are unique to B.C. and the Pacific

Northwest. Unfortunately, the Center is currently underfunded and is not accomplishing its full potential.[297] The provincial government should help to rectify this situation.

Funding for the proposed B.C. Pollution Prevention Centre and increased funding for the Pacific Northwest Pollution Prevention Research Center should be derived from the pollution taxes and charges outlined in Chapter 4.

Recommendation 13. The Province of British Columbia should establish a B.C. Pollution Prevention Centre. The Government should also dramatically increase its support for, and involvement with, the Pacific Northwest Pollution Prevention Research Center. Funding for these initiatives should come from the pollution taxes and charges outlined in Chapter 4.

Demonstration Projects

The Europeans have had great success in establishing pollution prevention **demonstration projects** as a means of encouraging pollution prevention technology transfer.

For example, the PRISMA demonstration project in the Netherlands involved ten companies in the fields of food products, electroplating, metalworking, transport, and chemicals, and ranging in size from the giant Nestle corporation to a small metalworking firm. The government invested approximately $1.2-million (two-million Dutch guilders (NLG)) in the project.[298] After two years of research and planning, 45 pollution prevention options were undertaken by the companies, resulting in dramatic pollution reductions. Certain 'good housekeeping' changes reduced chemical usage by 25-30%. In a number of companies, technological changes led to reduction of waste and emissions by 30-80%. The use of alternative input materials caused a total elimination of emissions of substances such as cyanide from electroplating companies and of solvents from garages and metal companies.[299]

Of the 45 implemented PRISMA options, 20 have been cost-saving and 19 have been neutral in terms of cost. At one company an investment of approximately $1500[300] is now saving the company $144,000[301] **annually**. At another company an investment of $480,000,[302] is now saving the firm approximately $600,000[303] **annually**.[304] Several of the companies are now conducting their own research efforts to continue to bring down their waste outputs.

The Landskrona demonstration project in Sweden involved six companies in the metal finishing, printing and chemical fields. The project was coordinated by pollution prevention experts at the University of Lund. After three and a half years of work, each of the companies has reduced its emissions so substantially that the Swedish government has now set aside approximately $9-million (50-million Swedish KRN) for further projects. Just as important, the companies themselves are continuing research on their own.[305]

The Ostfoldforskning project in Norway involved government-industry funding of a cleanup at a paper mill and a metal painting company. The paper company cut pollution discharges by implementing process and housekeeping changes that cost approximately $500,000 (KRN 3-million). However, the payback period for this investment was less than one year, because of reduced energy costs. Process changes at the metal painting company resulted in savings of $1.7-million (KRN 10-million) over the cost of end-of-pipe controls, and a net reduction in operating costs. Both companies have substantially reduced pollution discharges.[306]

The PREPARE (Preventative Environmental Protection Approaches in Europe) project is a pan-European project based on the success of PRISMA. PREPARE programs are now being established in Austria, Belgium, Finland and Norway,[307] and are also being initiated in the United Kingdom, Denmark and Germany.[308] PREPARE's goals are to:

- initiate new prevention projects, including demonstration projects;
- enhance information exchange about existing and on-going prevention projects;
- develop and formulate guidelines for an effective preventative environmental protection policy;
- develop standard guidelines for environmental preventative strategies within industry;
- disseminate the PREPARE results to other European countries; and
- identify possible new projects.

Each demonstration project within the overall project will cost approximately $400,000 to $1,300,000 (300,000 to 1,000,000 European Currency Units) per year for up to two years.[309] Currently, efforts are underway to get several European governments to cover these costs.

Recommendation 14. The Province of British Columbia should fund pollution prevention demonstration projects in high-priority polluting industries, with an emphasis on industries that might not otherwise have sufficient capital funds to undertake such projects. Funding for such projects should be derived from the pollution taxes and charges discussed in Chapter 4.

Financial Assistance

In spite of the fact that pollution prevention will often pay for itself, some firms will have difficulty paying for initial capital costs. In addition, firms that are breaking new technological ground may incur costs that government should consider sharing, because of the broad benefits that will accrue to society because of such research. For these reasons, a number of jurisdictions have made financial assistance available to industries that are cleaning up.

European governments have mainly focused their pollution prevention efforts on financial assistance for research, along with tax incentives and disincentives to encourage clean technology.[310] Germany, the Netherlands, France and the Commission of the European Community have all developed financial assistance programs designed to encourage waste reduction.[311] The French and the Dutch have promoted development

of clean technologies primarily to enhance the international competitiveness of their industries.[312]

In 1987 Denmark launched a massive industrial subsidy program, called the Clean Technology Development Program, to encourage the development and installation of clean technologies throughout the country. From 1987 to 1990, approximately $30-million (DKK 50-million) was made available to companies in the wood, iron and food industries to develop and install clean technologies that would reduce emissions of heavy metals, solvents and organic sewage. An evaluation done by the Technical University of Denmark found that many of the projects were very successful in reducing pollution levels -- so successful, in fact, that a new program will increase the number of sectors eligible for funding and the amount of funds available to approximately $140-million (DKK 229-million) from 1990 to 1992.[313]

The Ontario Ministry of Environment will fund up to 50% of the capital cost of hazardous waste reduction projects proposed by private firms, and will fund up to 100% of the cost of research/demonstration projects in waste reduction.[314]

The federal government already provides tax breaks to industries that install pollution control equipment.[315]

However, there can be problems of both practice and principle involved in providing financial assistance to polluters. As a matter of **practice**, subsidies have sometimes led to inefficient solutions to environmental problems. For example, high subsidies in the U.S. wastewater plant construction program induced plant operators to overbuild facilities.[316] As a matter of fundamental **principles**, financial assistance to polluters violates the widely accepted polluter pays principle, now accepted by most Western countries.

However, while recognizing the fundamental importance of the polluter pays principle, the Organization for Economic Cooperation and Development has at the same time concluded that government financial assistance can be important in speeding up old plant renewal, assisting in the introduction of new technologies, and solving economic problems created by new environmental policies. The OECD has taken the position that environmental subsidies should be considered to be consistent with the polluter pays principle where such aid is limited to:

- target groups, where severe difficulties would occur otherwise;
- well-defined transition periods; and
- situations where international trade and investments are not distorted significantly.

In particular, the OECD does not consider government support for the development of **new** clean technology as incompatible with the polluter pays principle.[317] In our opinion, these OECD conditions are reasonable. Therefore, we recommend below that the Province of British Columbia focus its financial assistance on aid that meets the OECD guidelines.

All funds that are made available for pollution prevention financial assistance should come from the pollution taxes and charges discussed in Chapter 4. Thus, in a larger sense, B.C. polluters will be paying for the cost of this clean-up initiative.

Recommendation 15. The Province of British Columbia should provide financial assistance to selected firms that implement pollution prevention programs. Such assistance should focus on:

(1) target groups, where severe difficulties would occur otherwise;

(2) well-defined transition periods for particular industries; and

(3) the development of new clean technology.

Reduction Plans

Government-sponsored education and technical and financial assistance will encourage industry to find innovative ways to reduce pollution. But there will still be those firms that fail to take advantage of the pollution prevention opportunities open to them -- even though taking action would frequently be in their own best interest. Some mechanism is required to get such firms to step back from day to day operations and take a holistic view of their operations in order to determine how they can cut toxic pollution. In the United States, more than a dozen state laws have been passed to encourage firms to do just that. These laws require firms to develop individualized plans for how they will reduce the use and generation of toxic or hazardous substances.

Massachusetts Toxics Use Reduction Act

The *Massachusetts Toxics Use Reduction Act*[318] is probably the most comprehensive of these new state laws, and has been widely praised by pollution experts.[319] The law requires generators of toxic substances to analyze their operations and produce a comprehensive plan on how the firm can reduce toxics use. Each plan must be certified by a licenced toxics use reduction planner.[320]

The plans must focus on reduction in the **use** of toxic materials, not just reduction in ultimate pollution discharges or generation of hazardous waste. The principle involved is that reduction of **use** will better protect workers and consumers, as well as more reliably reduce pollution and hazardous waste problems.[321]

The Act defines **toxics use reduction** as:

... in-plant changes in production processes or raw materials that reduce, avoid, or eliminate the use of toxic or hazardous substances or generation of hazardous byproducts per unit of product, so as to reduce risks to the health of workers, consumers, or the environment, without shifting risks between workers, consumers, or parts of the environment.[322]

Under the Massachusetts Act, treatment of toxics and out-of-plant recycling is not considered toxics use reduction.[323] Instead, reduction is to be achieved through:

- **Substitution of material inputs.** Toxic materials can be replaced by less toxic ones. Replacing oil-based inks with vegetable-based inks and replacing chlorinated solvents with water-based cleaning agents are examples.
- **Product reformulation or redesign.** Redesigning the final product can eliminate the need for toxic chemical inputs. For example, if 'natural color' paper is the desired end product, there is no need for chlorine bleaching, which creates toxic problems.
- **Modifying or modernizing the production line.** Production equipment, technologies and practices can be changed to reduce toxic chemical use. For example, using air blasting pellets and "no-clean" processes can reduce the use of acids and solvents in paint stripping and metal finishing. Spraying lumber with anti-sapstain chemicals **after** trimming the lumber -- rather than before -- can reduce the use of chemicals, and can also reduce contaminated chips and end pieces.
- **Improved operation and maintenance.** Simple changes in housekeeping, storage, handling, repair and spill prevention can substantially reduce toxic chemical use.
- **Integrated recycling, reuse or extended use of toxics.** Closed-loop recycling within the plan can dramatically reduce the amount of feedstock chemicals used.[324]

Massachusetts firms must meet five main obligations in developing a toxic use reduction plan:

First, the plan must include a **statement of management policy** regarding toxics use reduction and the scope and objectives of the plan. This provision is designed to involve top management in pollution prevention.[325]

Second, the plan must include the preparation of mass, energy and water **balances**. Surprisingly, many businesses do not know what all their toxic inputs and outputs are. W. Beck, of E.I. du Pont de Nemours & Co., has pointed out that, "People don't really know their wastes."[326] The preparation of balances forces companies to review just what materials and energy they use -- and lose.

Third, the plan must include a comprehensive economic and technical **evaluation of appropriate technologies**, leading to an identification of each technology, procedure or training program to be implemented for the purposes of achieving toxics use reduction. This requirement forces companies to look widely for cleaner technologies and demand that their suppliers do the same.

Fourth, the plan must include an identification of the **economic impacts** of the use of each toxic or hazardous substance and the costs of implementing the new technologies. Researchers at Pollution Probe in Toronto have pointed out that low-cost options can often reduce a great deal of pollution, and should be investigated before a company spends a lot of money on capital-intensive production changes.[327]

And fifth, the plan must include a **schedule for implementation**, with two- and five-year goals that match the state-wide goal of reducing toxic waste generation by 50% by 1997. This requirement provides a means for evaluating the progress of the program.

Firms must report annually on their success at meeting the plans. The plans have to be **updated** every two years. There is no specific penalty if a firm does not live up to its plan's goals,[328] since the main aim of the planning requirement is educational.

Citizen Review

The U.S. National Environmental Law Center has summarized the rationale for worker and citizen involvement in toxics use reduction planning:

Workers at a facility and community residents living nearby play an important role in promoting toxics use reduction because they are potentially affected by toxics used at the facility. From these peoples' perspective they have a right to know what efforts are being made by a facility to practice toxics use reduction and to participate in those efforts. From the perspective of state and local agencies with scarce resources, workers and community residents are an important resource who can augment the agencies' efforts to monitor facilities. And from the perspective of the facility, workers and community residents can provide innovative ideas on how toxics use reduction might be achieved.

One important way to facilitate this is to allow workers, concerned neighbors and local emergency planning committees to review the plans of facilities which affect them and participate in helping to prepare those plans. The Massachusetts' law allows ten or more residents within ten miles of a facility to petition the state agency to review the facility's plan to evaluate the adequacy of its reduction efforts. Minnesota's law also includes such a 'citizen trigger' provision for concerned neighbours.[329]

The Massachusetts Act gives citizens the right not only to review reduction plan summaries, but also to review a firm's annual toxic substances report, which describes how much of each toxic substance a firm uses. The *Act*provides for protection against disclosure of trade secrets.[330]

British Columbia

We recommend below that the Province of British Columbia enact legislation requiring polluters to prepare toxics use reduction plans. The legislation should be modeled after the Massachusetts *Toxics Use Reduction Act*. A key requirement of the plans should be that they contain goals that will meet or exceed the enforceable pollution standards set through regulations or permits.

Toxics use reduction planning should be instituted by incorporating it into the permitting process under the *Waste Management Act*. New facilities should be required to formulate and submit toxics reduction plans as part of the process of getting waste permits. Established facilities should be required to prepare and submit a plan as part of the process of renewing existing permits[331] . The legislation should also require that plans be prepared by facilities that are not required to have provincial waste discharge permits, but that discharge substantial amounts of toxics to municipal sewage or solid waste systems. Updated reduction plans should be required of all operators of facilities

that are found to be in substantial non-compliance with their waste permits.[332] The legislation should also specify that citizens have the right to review any firm's reduction plan, with reasonable protection against disclosure of trade secrets.

Energy Issues

In view of the fact that much energy generation contributes to pollution and to the grave problem of global warming, the government may wish to incorporate an energy efficiency component in toxics use reduction plans.

The issues of pollution prevention and energy conservation are closely intertwined. The Danish government has pointed out that a comprehensive pollution prevention strategy must emphasize reduction of energy consumption, because energy generation frequently produces pollution.[333] The Netherlands PRISMA project team concluded that energy audits "will be essential in [waste] prevention efforts."[334]

Frequently it makes sense for a firm that is modernizing to prevent pollution to simultaneously modernize for energy efficiency. Such energy savings will often be a natural consequence of the prevention modernization. As mentioned above, 3M's Pollution Prevention Pays program saves the equivalent of 210,000 barrels of oil annually.[335] A French study on waste reduction found that 51% of firms implementing waste reduction saved on energy costs.[336] However, such energy efficiency gains should be maximized. Conversely, when a firm is renovating to enhance energy efficiency, it should be aware that such renovations often create opportunities to cut pollution at the same time.

The requirement that energy efficiency be considered in toxics use reduction plans could complement B.C. Hydro's current Power Smart Program. The proposed Pollution Prevention Centre could routinely provide energy efficiency information to firms that initiate pollution prevention programs. In return, the Power Smart organization could provide pollution prevention information to Hydro's electricity customers. Power Smart already has an effective organization in place that promotes electricity conservation, and it could become an important delivery vehicle for pollution prevention information.

Recommendation 16. The Province of British Columbia should enact legislation requiring polluters to prepare toxics use reduction plans that contain goals that will meet or exceed enforceable pollution standards set through regulations and permits.

ENDNOTES

256. D. Huisingh, "Concepts and Results of Using the Preventative Approach Within Industrial Contexts", in *Papers to present at the 2nd European Conference on Technology Assessment, "People and Technology", Workshop 2* (Milan: the Conference, 1990) pp.11-13.

257. M. Campbell & W. Glenn, *Profit from Pollution Prevention* (Toronto: Pollution Probe Foundation, 1982) p.213. Readers should note that Pollution Probe has written a sequel to this highly popular book.

258. *Ibid.* at pp.56-58.

259. *Supra,* note 256.

260. *Dow Today* (Midland, Michigan, 1989) p.1.

261. C. Sandborn, "Pollution Potentially Profitable", Vancouver Sun (2 November 1989) p.A19.

262. *Supra,* note 257.

263. U.S. Office of Technology Assessment, *From Pollution to Prevention: A Progress Report on Waste Reduction* (Washington, D.C.: U.S. Department of Commerce, 1987) p.29.

264. S. de Hoo et al., "PRISMA: Industrial Success with Pollution Prevention", in *Papers to Present at the 2nd European Conference on Technology Assessment, "People and Technology", Workshop 2* (Milan: the Conference, 1990) p.47. In one case, the pollution reduction was actually 100%.

265. *Ibid.* at p.50. For more information on the Prisma project see below.

266. S. Lewis & M. Kaltofen, *From Poison to Prevention: A White Paper on Replacing Hazardous Waste Facility Siting with Toxics Reduction* (Boston: National Toxics Campaign Fund, 1989) p.34.

267. *Supra,* note 256.

268. *Supra,* note 263, at pp.18-19. Illinois figures indicate that 50% of large quantity generators of hazardous wastes have made no serious progress in waste reduction, and that the percentage is even higher for small quantity generators.

269. *Ibid.* at pp.13&26.

270. *Ibid.* at pp.27-29. See Chapter 4 for a discussion of the need to alter accounting systems to provide incentives to reduce pollution.

271. Supra, note 266, at p.vii.

272. M. Morse, "U.S. EPA Shifts Its Priorities to Pollution Prevention" in UNEP, *Industry and Environment* (Geneva: UNEP, Spring 1989) pp.30-33.

273. In addition, an important pollution prevention institute has been established at the University of Lowell in Massachusetts, under the *Massachusetts Toxic Use Reduction Act*, St. 1989, c. 265 p.3. *See* the Discussion of the Massachusetts statutory scheme below.

274. C. Stenberg & R. Brown, *State Actions for Reducing Hazardous Waste* (Council of State Governments: Centre for Environment and Natural Resources, 1989) pp.5-6.

275. "Innovation Centers" (1991-92) *Environmental News from the Netherlands*, p.10.

276. *Hazardous Waste Management Corporation Act*, SBC 1990, c. 19, s. 3.

277. e.g., the Ministry of Development, Trade and Tourism, the Small Business Development Branch thereof, the Office of the Provincial Secretary, the Ministry of Finance and Corporate Relations.

278. J. Richmond, ed., *Industrial Waste Audit and Reduction Manual* (Toronto: Ontario Waste Management Corporation, 1987).

279. U. S. Environmental Protection Agency, *Waste Minimization Opportunity Assessment Manual* (Cincinnati: Center for Environmental Research Information, 1982); U.S. Environmental Protection Agency, *Pollution Prevention Training Opportunities in 1991* (Washington, D.C.: Office of Environmental Engineering and Technology Demonstration, 1991).

280. D. Stephan & J. Atcheson, EPA officials, "The EPA's Approach to Pollution Prevention", *Chemical Engineering Progress* (June 1989) p.57.

281. U.S. Environmental Protection Agency, *Pollution Prevention Training Opportunities in 1991* (Washington, D.C.: Office of Environmental Engineering and Technology Demonstration, 1991).

282. Interview with Robert Burmark, Environmental Engineer for the Department of Ecology, Washington State, 31 May, 1991.

283. *Supra,* note 281, at p.25.

284. U.S. Environmental Protection Agency, *Pollution Prevention Strategy* (Washington, D.C.: the Agency, 1991) p.4 & 5.

285. U.S. Office of Technology Assessment, *Serious Reduction of Hazardous Waste for Pollution and Industrial Efficiency* (Washington: U.S. Congress, 1986) p.18.

286. K. Weisman, *Taming the Toxic Threat: Strategies to Reduce Hazardous Waste Generation in the Northwest* (Seattle: Northwest Policy Center, University of Washington, 1990) p.35.

287. *Ibid.* at p.89.

288. W. Ryan & R. Schrader, *An Ounce of Toxic Pollution Prevention* (Boston: National Environmental Law Center, 1991) p.20. The Ontario and Manitoba Waste Management Corporations provide on-site technical assistance also. *See* Ontario Waste Management Corporation, *Waste Reduction Program* (Toronto, undated), and *Fourth Annual Report, Manitoba Hazardous Waste Management Corporation* (Winnipeg: MHWMC, 1990) p.8.

B.C. Hydro's Power Smart program for industry spends a significant amount of time and resources on providing on-site technical assistance. [Source: Personal communication with Jeff Lam, B.C. Hydro, 11 September 1991.]

289. W. Ryan & R. Schrader, *ibid.* at pp.C-22-C-26.

290. *See* Ontario Waste Management Corporation, *supra,* note 288, and *Fourth Annual Report, Manitoba Hazardous Waste Management Corporation supra,* note 288, at p.8.

291. Personal communication with Jeff Lam, B.C. Hydro, 11 September 1991.

292. *Fourth Annual Report, Manitoba Hazardous Waste Management Corporation supra,* note 288, at p.9.

293. M. Dertouzos et al., Made in America: Regaining the Productive Edge (Cambridge: MIT Press, 1990) p.78.

294. Personal communication with R. Hunter, B.C. Research, 5 September 1991.

295. W. Ryan & R. Schrader, *supra,* note 288, at p.20.

296. B.C. Environment, *News Release* # 387-5202, "Cross-Border Meeting on Environmental Concern" (29 May 1991); Pacific Northeast Pollution Prevention Research Center, *Information Document* (Seattle, 1991) p.2 [unpublished]; Interview with M. Grulich, Director of the Pacific Northwest Pollution Prevention Research Center, 11 June 1991.

297. The Center's funding for the present year is $610,000, about $100,000 short of its anticipated funding. British Columbia has only provided $5,000 of its promised $50,000 for the year. Personal communication, M. Grulich, Director of the Pacific Northwest Pollution Prevention Research Centre, 23 August 1991.

298. Interview with Dr. F. Reijenga, Researcher Waste Prevention, University of Amsterdam, June 18, 1991. *See also* University of Amsterdam, *Prevention is the Winning Option: Final Report of PRISMA* (Amsterdam: University of Amsterdam, 1991) p.217.

299. University of Amsterdam, *ibid.* at p.215-217.

300. NLG 2,500.

301. NLG 240,000.

302. NLG 800,000.

303. NLG 1,000,000.

304. University of Amsterdam, *supra,* note 43*,* at p.215-217; Dr. F. Reijenga, "Waste Prevention in the Netherlands: Results and Experiences of the PRISMA Project" (Address to the Air & Waste Management Association 84th Annual Meeting and Exhibition, 16 June 1991) [unpublished].

305. Interview with L. Silijebratt of the University of Lund, Sweden, 20 April 1991.

306. O. Hanssen, "Cleaner Production Experience in Norway" in *Papers to Present at the 2nd European Conference on Technology Assessment "People and Technology", Workshop 2* (Milan: the Conference, 1990) pp.17-19.

307. *Cleaner Production* (March 1991) p.3.

308. Personal communication from D. Huisingh to B. Wylynko, August 1991.

309. M. Crul et al., *Preventative Environmental Protection Approaches in Europe (PREPARE) Program Definition* (Amsterdam: University of Amsterdam, 1991) [unpublished].

310. *Supra,* note 285, at p.240 summarizes some of the economic assistance measures taken by Austria, Denmark, France, the Netherlands, Norway and Sweden. *See also* the discussion in Chapter 4 for examples of the European tax incentives and disincentives.

311. A. Williams, "A Study of Hazardous Waste Minimization in Europe", 14 [1987] 165 *Environmental Affairs*, p.201.

312. *Supra,* note 285, at p.239 . An OECD report has concluded that waste reduction is the only environmental protection tactic that directly benefits industry by enhancing industrial efficiency and technological change. A French study on waste reduction found that 51% of firms implementing waste reduction saved on energy costs, 47% saved on raw materials, and 40% experienced improved working conditions. [Source: *supra,* note 8*,* at p.12].

313. In addition, a new Danish *Environmental Protection Act* will require all companies renewing their discharge permits to examine alternative clean technologies as a way to meet the permit conditions. [Source: Interview with N. Busch of RENDAN A/S, Copenhagen, 9 April 1991; National Agency of Environmental Protection, *Cleaner Technology Action Plan 1990-1992* (Copenhagen: Ministry of the Environment, 1990).]

314. Ontario Ministry of Environment, *Industrial Waste Diversion Program, Program Information Fact Sheet* (Toronto: the Ministry, 1991).

315. Manitoba Ministry of Environment, *Harnessing Market Forces to Support the Environment* (Winnipeg: the Ministry, 1990) p.16.

316. J. Opschoor & H. Vos, *Economic Instruments for Environmental Protection* (Paris: Organization for Economic Cooperation and Development, 1989) p.117.

317. *Ibid*. at pp.76&117.

318. *Massachusetts Toxics Use Reduction Act* [New], Chapter 21I of the General Laws of Massachusetts, added by St. 1989, c. 265.

319. For example, the National Environmental Law Center and the Center for Policy Alternatives conducted a review of ten of these new state toxic use and waste reduction laws, and rated the Massachusetts as by far the best law [Source: *supra,* note 288, at p.iii.]

320. These planners will be trained at the Toxic Use Reduction Institute established by the law at the University of Lowell.

321. A study by the National Environmental Law Center and the Center for Policy Alternatives which compared toxics use reduction laws of ten U.S. states recommended that a model law should focus on **use** as well as reduction of generation of waste. The study noted that otherwise toxics may be displaced into product, may continue to threaten workers, or may cross environmental media [Source: *supra,* note 288.]

"The objective of toxics use reduction is the reduction or elimination of toxic chemicals in production, whether the chemicals appear as wastes, by-products, intermediaries, feed-stocks, or constituents of finished consumer products." [Source: K. Geiser, "Toxics Use Reduction and Pollution Prevention" (Spring 1990) *New Solutions*, p.4.]

By reducing the amount of toxics in consumer products, society can begin to deal with the problem of household hazardous waste. In the U.S., it has been estimated that the average household contributes 30 pounds of hazardous waste annually to the general hazardous waste problem [Source: J. Hirschhorn & K. Oldenburg, *Prosperity Without Pollution: The Prevention Strategy for Industry and Consumers* (New York: Van Nostrand Reinhold, 1991) p.53.] D. Huisingh, in, "Cleaner Technologies Through Process Modifications, Material Substitutions and Ecologically Based Ethical Values" (1989) 12:1 Industry and Environment, p.7 discusses how governments need to develop product design criteria to ensure industry manufactures products that reduce toxic risks throughout the entire life cycle of future products.

322. Toxics Use Reduction Act [New], Chapter 21I of the General Laws of Massachusetts, added by St. 1989, c. 265, s. 3.

323. The U.S. federal *Pollution Prevention Act of 1990*, 42 USCS § 13103 nt., s. 5(A). has similarly rejected treatment of waste and recycling as being "source reduction". The U.S. Office of Technology Assessment has also limited definition of true waste reduction to in-plant reduction processes [Source: *supra,* note 283*,* at p.10.]

324. *See* the definition of "toxics use reduction" in the Act, and K. Geiser, *Beyond Auditing, Toxics Use Reduction in the United States* (Lowell: University of Lowell, undated) [unpublished] p.6.

325. D. Benforade, head of 3M's pollution prevention program, has recognized this as critical to the success of the program [Source: D. Benforado & A. Aspengren, "Pollution Prevention: The 3M Program and the 3M Experience Internationally" (Address to the Air & Waste Management Association 84th Annual Meeting and Exhibition, 16 June 1991) p.6 [unpublished].]

326. W. Beck, "Cost and Resource Limitations in Waste Reduction: A Matter of Perspective" (Address to the Air & Waste Management Association 84th Annual Meeting and Exhibition, 16 June 1991) p.3 [unpublished].

327. G. Munroe et al., *Profit from Pollution Prevention*, 2nd. ed. (Toronto: Pollution Probe Foundation, 1990) p.25.

328. Although an industry that generally fails to reduce toxics use may be subject to new, tighter regulations.

329. W. Ryan & R. Schrader, supra, note 288, at p.19.

330. *Toxics Use Reduction Act* [New], Chapter 21I of the General Laws of Massachusetts, added by St. 1989, c. 265, ss. 18&20.

331. Note the recommendation in Chapter 2 that all waste permits be renewed periodically.

332. *See supra,* note 263, at pp.26-27 for a discussion of how pollution prevention strategies can be incorporated into new permits.

333. Denmark Ministry of Environment, *Cleaner Technology Action Plan, 1990-1992* (Copenhagen: the Ministry, 1990) p.4.

334. *Supra,* note 264, at p.47.

335. *Supra,* note 256, at pp.11-13.

336. *Supra,* note 263, at p.12. In addition, 47% of the firms saved on raw materials, and 40% experienced improved working conditions.

CHAPTER 4 HARNESSING THE MARKETPLACE TO CUT POLLUTION

As the last chapter demonstrated, pollution prevention frequently leads to higher profits. This fact in itself -- when information about it becomes more well-known to the business community -- will cause many firms to implement pollution prevention programs.

However, some firms will find that it is still more profitable for their firm to pollute than to clean up. Other firms will be daunted by high capital costs of reducing or eliminating their pollution.[337] Still other firms will exhaust the cheap and easy pollution prevention techniques and will reduce their pollution -- but will find that getting to the level of **zero release** would cost them more than they will save.

The incentive for all of these firms to clean up their operations would be dramatically increased if firms had to pay for the real environmental costs[338] of their activities. In this chapter we will propose methods that can be used to ensure that firms begin to pay for the costs they are imposing upon our government and on our land, air and water. By implementing these proposals, the government can begin to harness the immense powers of the marketplace to reduce toxic pollution in British Columbia.

The Polluter Pays Principle

People tend to waste things that are underpriced. So it is not surprising that producers of toxic pollution -- and consumers of products that generate toxic pollution -- have overused and wasted the free air, water, and land that society has made available to them as receptacles for such pollution. Toxic contaminants inflict a major cost upon the environment -- they contaminate fish and wildlife, they taint the air, and they poison the land. Yet Canadian law has traditionally handed over our common air and water to polluters -- and hasn't bothered to charge them for it. Industries have to pay a bill for machinery, they have to pay invoices for construction costs, they have to pay for the labour they employ, they have to pay for pollution control equipment -- yet they have never been systematically invoiced for the use they make of our rivers, lakes, oceans and air. Moreover, they have never been billed for anything close to the amount that taxpayers spend to administer pollution control activities by government.

As a result, it is often more profitable[339] for a company to foul our air and water than it would be to clean up its act. Given a choice between spending money on cleaner technology or continuing to pollute air and water for free, many rational firms will choose the 'free' option of polluting. It is this economic equation that must be changed if we are to make substantial progress in reducing pollution.

In recognition of this problem, most Western countries have now adopted the 'polluter pays principle.'[340] The federal government's *Canada's Green Plan for a Healthy Environment* states this principle succinctly:

To encourage efficient use of resources, we must adopt the rule that the polluter or user pays. Whoever causes environmental degradation or resource depletion should bear the full cost.[341]

Although this principle has been widely accepted by Canadian governments, in practice polluters are still not paying for the true cost that their pollution imposes on society. For example, polluting companies in B.C. are paying for only 15% of the government's cost of operating its waste permit system -- a system necessitated by the polluting activities

of those companies. Eighty-five per cent of the cost of this program is subsidized by general taxpayers.[342]

Quite apart from this administrative cost, polluters are seldom invoiced for the actual environmental costs that their activities inflict. Instead, they externalize the cost of their pollution and let outsiders pay the bill -- outsiders like fishers, who lose their livelihood when fisheries are condemned; like asthmatics, who go to hospital when air pollution levels rise; native Indians, who lose traditional sources of food; recreational users of places like Howe Sound and Cowichan Bay; neighbours who have to put up with degradation of their air and water; and, of course, the plants and animals that share our increasingly contaminated biosphere. Under present B.C. laws, polluters very seldom pay fully for such costs. Nor do consumers pay the true cost of the goods produced by polluting companies.

Even criminal prosecutions -- which have been the ultimate sanction used by the B.C. government to enforce compliance with waste permits -- have not been a reliable tool for ensuring that the 'polluter pays,' as discussed in Chapter 2. As recently as the 1986 reporting year, total fines for all provincial pollution offences were a mere $4,900. Prosecutions and fines are now up dramatically -- to over $800,000 in 1990-91.[343] However, even today's higher fines are still so small that polluters may still realize a direct profit from lawbreaking activity. Polluters continue to break the law on a wholesale basis.[344]

Perhaps even more important than the **size** of fines is the fact that most offenders will probably not be charged and convicted at all. By its very nature the criminal court system is an unreliable and unwieldy instrument for dealing with polluters and ensuring that the 'polluter pays.' Extraordinary amounts of government resources (scientists, analysts, enforcement officers, lawyers, judges, etc.) must be mobilized to bring a single polluter to court. The government simply doesn't have the resources to bring every environmental wrongdoer to court.

Furthermore, rules in the criminal courts make it impossible to consistently convict polluters. The Crown must prove guilt **beyond a reasonable doubt**, and it may lose its case because of legal and scientific technicalities. Criminal rules of evidence may prevent the court from being told about previous convictions of the polluter.[345] In general, the Crown is handicapped by court rules predicated on the criminal law principle that, 'It is better that nine guilty persons go free than that one innocent be convicted.'[346]

The 'polluter pays principle' has not been applied to companies that **obey** their permits either. Basically, a company pays a minimal administrative fee for a waste discharge permit, and is then allowed to pollute up to the permit levels, with no further charge. As long as the company is polluting within the limits allowed by its permit, it is immune from prosecution.[347] If the company's permit allows 100 units of pollution, and the company discharges 99 units, there is no economic incentive to invest in technology to totally eliminate or drastically reduce discharge. Because the polluter is not paying for

the environmental cost of the 99 units, the polluter will likely not eliminate that waste stream.

Nor has the 'polluter pays principle' been applied to manufacturers, distributors, and retailers of products that become toxic waste problems during use or disposal of the product. Businesses that profit from such products -- and consumers that use them -- have essentially left it to society as a whole to pay for the disposal of such toxics as lead and cadmium batteries, used oil, and solvents.

Often the present situation, where the polluter does not pay its own way, actually **encourages** companies to remain 'dirty.' It can give polluters a real or perceived competitive advantage over environmentally responsible companies -- over companies that bear their own environmental costs and clean up their operations. The products of 'dirty' companies may actually be cheaper to produce, and may have a tendency to displace 'clean' products from the market place. Just as damaging, many firms that might actually increase profits by instituting a pollution prevention program will not be sufficiently motivated to change the *status quo*. Because of the free ride they are getting, courtesy of our common land, air and water, they will not be motivated to look for new, cleaner -- and possibly more profitable -- ways of doing business.

British Columbia should move now to fully implement the 'polluter pays principle.' British Columbians need to make fundamental legal and economic changes to ensure 'full cost accounting' -- to ensure that environmental costs are taken into account and paid for. We need to ensure that every company routinely and without exception pays an appropriately high price for any environmental cost it imposes -- and just as routinely profits from its efforts and innovations to clean up operations. We need to devise a system that ensures that variations in environmental performance are directly reflected on a company's daily ledger sheet. We need to devise a system that provides sustained economic pressure to clean up, and richly rewards companies that develop innovative technology to totally eliminate pollution discharges. We need a system that will reward consumers, as well as industry, for making appropriate environmental choices. Such a system would harness the immense powers of the marketplace -- the profit incentive that has led to innovations ranging from the Model T car to the 747 jet, from the development of nylon to the development of AZT -- to clean up the environment.

In this chapter we will discuss the following ways in which the 'polluter pays principle' could be fully implemented in British Columbia:

- an **emission charge** system for industrial emissions, based on the principle that 'the more you pollute, the more you pay';
- a system of **product taxes** to ensure that the market price of products reflects the costs that they impose on the environment, particularly during use and disposal;
- a **deposit/refund system** to ensure the return of products containing toxic materials;
- a general requirement that manufacturers, distributors and retailers take **direct responsibility** for disposal of products containing toxics;

- a significant expansion of the **civil liability** of toxic polluters;
- mandatory **insurance** and/or **security** requirements for polluters, sufficient to compensate for potential "worst-case scenario" pollution damages;
- a **government purchasing policy** that gives routine preference to products produced with clean technology, over products associated with toxic pollution; and
- a review of all **government subsidy programs**, and elimination of non-environmental subsidies for industries that create toxic pollution.

The purpose of these economic measures is to:

- discourage the production and discharge of toxic pollutants;
- encourage the establishment of clean industry in British Columbia;
- encourage B.C. consumers to make choices that will not poison their environment; and
- provide funding to implement the regulatory measures discussed in Chapter 2, the pollution prevention activities discussed in Chapter 3, and the improvements to the environmental information system discussed in Chapter 5.

Emission Charges

Under an emission[348] charge system, a price would be set on each unit of pollutant discharged, and the polluter would pay to government an amount equal to the quantity of pollutant times the unit price. The 'unit price' for different pollutants would vary according to toxicity. The basic rule would be that the more harmful pollutants discharged, the more a company would pay. The less discharged, the less payable.

Companies would still be prohibited from exceeding the pollution levels allowed under their waste permits, as at present. However, under the emission charge system they would actually have to pay for the authorized pollutants discharged.

The advantage of the system is simple -- as a company reduces or eliminates its pollutants, the company reduces or eliminates a substantial cost of doing business. This system financially rewards innovative companies that totally eliminate pollution discharges -- and changes the current situation where a company that is meeting its discharge limits has no real incentive to eliminate pollution discharges.

An example of an emission charge system that seems to have worked very effectively is the system established in the Netherlands to govern the discharge of effluent containing oxygen-consuming matter and heavy metals. Although the system's primary function was cost-recovery,[349] many reviewers have credited the substantial level of the fees (e.g., $300-million in 1980) with having a substantial incentive effect on polluters. This has been a critical factor in reducing discharges of oxygen-consuming discharges by a forecast 89% over a 15-year period. The Chief Inspector, Public Health and Environmental Protection in the Netherlands has stated:

As to the industrial waste water production, a remarkable decrease since 1965 can be observed and a further decrease is expected. A small portion of this reduction, some 10-20% , is attributable to end-of-pipe treatment. The main part, however, is due to internal measurements, improved technology and "good housekeeping". Industry is forced to take these types of actions by the permits issued by the water quality authorities, but the pressure of a steadily increasing taxation level is a far more effective means, as experience has shown.[350]

Similarly, a West German effluent discharge fee system has been credited by one-third of surveyed municipalities as being the main reason for expanding waste treatment measures.[351]

Japan has established an emission tax based on the sulphur content of fuels consumed by an industry, less any abatement measures taken. The funds collected help finance compensation for victims of pollution.[352] Other countries have also taxed fuels that contain sulfur, or that have the potential to generate carbon dioxide.[353]

California's South Coast Air Quality Management District has established substantial emission charges on a wide variety of pollutants. The fees are different for different types of pollutants, providing an incentive for polluters to reduce emissions of the more harmful pollutants first. The District's 1990/91 budget calls for receipt of almost $40-million in emission fees, on top of approximately $45-million in other administrative fees -- which pays for the District's entire budget.[354]

The emission charge principle is not new to Canada. For instance, 38% of Ontario municipalities have sewer bylaws that provide for a surcharge for "extra-strength sewage."[355] However, these charges are generally **less** than the cost of effluent pre-treatment systems[356] -- and would not, by themselves, cause a company to clean up. The ideal charge should make it more expensive for the company to pollute than to clean up.

A recent report funded by Environment Canada and the Ontario Ministry of Environment has recommended that the government of Ontario should:

Require that water and waste-water utilities introduce universal metering and volumetric charges for water and wastewater services, and adopt water and wastewater rate setting practices based on economic principles.[357]

Presently British Columbia imposes a fee on waste discharge permit holders. However, these fees only recover 15% of the cost of administering the waste permit system, and the fees do not vary with the amount and toxicity of discharge. Thus, the present system provides little deterrence against polluting -- and little financial reward for cleaning up.

In its 1990 Budget, the B.C. government stated that waste discharge fees would be increased, and that the amounts charged would take into account volume and toxicity.[358] Draft proposals of such a system have apparently been prepared by the Ministry. However, this Budget promise has not yet been fulfilled.

We recommend below that the government should now implement its promised waste discharge fee system, based on the fundamental principle that 'the more you pollute, the more you pay.' The fee structure should take into account both the volume and the toxicity of pollutants discharged.

Over a short phase-in period, the new system should ensure that polluters pay for 100% of the government's cost of operating the waste permit system -- as opposed to the 15% currently recovered.[359] The emission charges[360] should then be raised to a level that reflects the actual damage done to the environment by discharges.[361] The Province should require all municipalities to establish parallel emission charge systems for all industrial effluents discharged into municipal sewage systems.

It should be recognized that the practicality of emission charges is limited when effective monitoring is expensive or technologically infeasible, and where precise information on the source of particular pollutants is not available (as is frequently true when numerous small generators of pollutants discharge into a common sewer system).[362]

For example, it may be impossible to accurately monitor all of the dry-cleaners and metal plating shops in B.C. for their exact effluent levels. Frequently they simply discharge, unmetered, into municipal sewage systems or elsewhere. However, one solution to this monitoring problem may be to establish charges for different **classes** of polluters, and provide an economic incentive by providing a rebate of the pollution charges if an individual polluter can establish that it routinely meets certain performance standards, or has installed state-of-the-art pollution reduction technology that assures high performance.[363]

A properly designed emission charge system should create a strong incentive for industry to reduce the amount of pollution it allows to escape into the environment.

Recommendation 17. The Province of British Columbia should promptly establish an emission charge system for waste discharges in the Province, based on the principle that 'the more you pollute, the more you pay.' The system should apply only to discharges that are within regulatory standards.

Product Taxes

A comprehensive, well-designed emission charge system should be the primary economic instrument for compensating society for the environmental cost imposed by polluting businesses. It will compensate society for damage done to the 'commons', and provide direct economic incentive for companies to become cleaner. It will also provide funding for provincial pollution prevention programs.

But what about environmental harm that takes place away from the industrial site?[364] What about toxics that are not emitted during processing, but far later, during the use of the product, or during its final disposal? Emission charges do not address the problems that occur later in the life-cycle of B.C. products. And they do not address the problem of products produced elsewhere that emit toxics when used or disposed of in B.C.

For example, mercury-cadmium batteries do much of their harm when the **end product** is disposed of through incineration or landfilling. The Swedish government has calculated that municipal solid waste incinerators emit about 55% of all mercury released into the Swedish environment, and incineration of batteries provides the bulk of that mercury.[365] Lead batteries, solvents, and a multitude of other products present similar difficulties.

Society can use a system of **product taxes** to ensure that products that cause toxic problems during use and disposal pay their own way. Such taxes can not only ensure that the 'polluter pays,' but also can be used to give preferable alternative products an advantage in the

marketplace -- an advantage that is deserved because they do not impose the environmental and social costs that deleterious products do.

Environmentally-based product taxes have been used extensively in other jurisdictions. Such taxes have been applied to pesticides, CFCs, lubricant oils, fuel oils, leaded gasoline, batteries and other products.[366]

One of the primary purposes of such product taxes has been to raise funds to deal with disposal problems created by the product. For example, over 20 years ago West Germany placed a tax on lubricant oil that was used to finance a highly successful system of recovering waste oils. This scheme led to a 92% reduction in the quantity of unaccounted waste oil between 1969 and 1979. As a result, the Council of European Communities adopted a directive on waste oil that was based on the West German law. A number of European and other jurisdictions have followed suit.[367]

Similarly, the B.C. government has recently established an environmental tax on tires, car batteries and disposable diapers. For example, a customer pays $3 per new tire and $5 per new battery purchased. Revenue from the tax is dedicated to environmental purposes. The government has recently announced that these tax funds will be used to pay for tire disposal, to subsidize transportation of used batteries, and to provide low-interest loans to companies that recycle tires and subsidies to companies that use products derived from used tires.[368] Tire and battery users will no longer be able to take advantage of free disposal of these items -- they are now paying for disposal in advance.[369]

The proceeds from such a tax can also be applied to the development of long-term prevention strategies, and to the development of more environmentally acceptable products and processes. For example, the state of Iowa and the government of Denmark have both established taxes on pesticides, the proceeds of which are used to research and develop alternative methods of pest control.[370] This is a particularly appropriate measure. As a leading Cornell entomologist, Dr. David Pimentel put it:

If we put as much research into pesticide alternatives as the chemical companies put into chemical pesticides, then we would be farther ahead in the fight against pests.[371]

The Danish and Iowa schemes will help to fund alternatives -- which have historically been underfunded because alternative pest controls are generally not patentable and profitable to corporations in the way that chemical pesticides are. Product taxes on pesticides could specifically fund research to reduce the use of pesticides in B.C. agriculture and forestry. In a similar fashion, other B.C. product taxes could fund the proposed B.C. pollution prevention centre and the Northwest Pollution Prevention Research Center discussed in Chapter 3.

Using product tax revenue to solve present environmental problems and prevent future problems is a laudable goal. And this approach is one method of forcing businesses to 'internalize' the true environmental cost of production. However, many product taxes have been criticized for not creating **sufficient** incentive for business to actually move toward clean production.[372] A primary goal of an environmentally-based product tax system in B.C. should be to provide such an incentive. Perhaps the most effective way to do this is to establish tax differentiation between targeted 'clean' products that can be substituted for 'dirty' ones.

Tax Differentiation

Differential taxation can create a clear price advantage for 'clean' products that compete with 'dirty' products in the marketplace. Such tax differentiation schemes may be a highly useful economic incentive mechanism. According to a study done by the Organization for Economic Cooperation and Development, tax differentiation between 'dirty' products and 'clean' products "seems to be one of the more successful economic instruments and its application ... is recommendable."[373] Differential taxes applied to consumer products may lead to consumer-driven moves away from detrimental (e.g., toxics-generating) industrial undertakings. In addition, differential taxes can be applied directly to industrial consumers.

One major advantage of tax differentiation schemes is that, because they can frequently be integrated with current tax schemes, administration of such schemes can be relatively easy.

Such schemes have been widely applied to the sale of leaded versus unleaded gasoline. Special taxes on leaded (as opposed to unleaded) gasoline have been particularly successful at encouraging the use of unleaded fuel, and dealing with the problem of drivers who previously 'misfueled' their cars with cheaper leaded gasoline.[374]

A number of jurisdictions (Norway, Sweden, Germany) have a differential tax scheme to financially advantage purchasers of relatively clean cars. An OECD report has stated:

In some countries [using the scheme] the sale of clean cars has exceeded expectations.[375]

Norway has used differential taxation to remove the non-refillable metal can from the beverage container market -- a 30% tax on non-refillable beverage containers caused the sale of beer in cans to drop from 12 million cans in 1973 to 1.4 million cans in 1975, an

88% reduction in can use. Similarly, Sweden has used a tax on non-refillable containers to drive a consumer switch away from non-refillable bottles.[376]

Sweden has implemented a tax on batteries containing mercury or cadmium, with the purpose of providing an incentive to reduce the use of mercury and cadmium in batteries. Sweden aims to reduce emissions of mercury and cadmium from batteries by 75%, partially by using this tax.[377]

Perhaps the most interesting tax differentiation system yet enacted is the "Feebate" scheme that Ontario implemented as of 1 August 1991. Under this scheme new "gas guzzler" autos are subject to a very substantial tax (up to $4,400 for a Rolls Royce), while "gas sippers" actually earn cash rebates for their purchasers.[378] And now the province of Alberta is considering imposing a gas guzzler surcharge and a gas sipper rebate on both new and **existing** vehicles, the scheme to be administered through a vehicle registration charge.[379] It is hoped that such feebate systems will have a substantial impact on the number of gas guzzlers and gas sippers sold. If such schemes are successful, the resulting reduction in gasoline consumption would mean a corresponding reduction in carbon dioxide[380] and such toxic pollutants as benzene and polynuclear aromatic hydrocarbons.

In British Columbia some very modest differential taxation is currently taking place. B.C. imposes the previously-discussed special taxes on car tires and batteries, and it has removed the standard provincial sales tax on bicycles. Biological pest control products have also been exempted from provincial sales tax, as have certain energy-saving home improvements.[381]

A potential problem with tax differentiation schemes is that, if they are not carefully designed with acceptable alternative products in mind, they may trigger ecologically undesirable "substitution effects". A non-taxed substitute product may replace the target product in the marketplace, and may not be better for the environment.[382] Study should be focused on products where clearly preferable alternative products exist, and where a tax might be effective in 'flipping the market' toward consumption of the preferable product.

We recommend below that the Province establish a system of product taxes on environmentally harmful products. Key products to consider for such taxes are products such as paints, solvents, lubricant and fuel oils, batteries, automobiles, and mercury and cadmium batteries.

In addition, we recommend that a product tax system also emphasize tax differentiation schemes where tax differentiation might be instrumental in 'flipping the market' to clearly preferable products. A gas guzzler tax/gas sipper rebate scheme should be implemented.

Recommendation 18. The Province of British Columbia should establish a system of product taxes on environmentally harmful products. The system should focus on products where clearly preferable alternative products exist, and where tax

differentiation might make the crucial difference in 'flipping the market' toward consumption of the preferable products. Tax/rebate schemes such as the gas guzzler tax/gas sipper rebate should also be established.[383]

Deposit/Refund Systems

Under deposit/refund systems, people pay a deposit when they purchase an article. The deposit is refunded when the article is returned for proper reuse, recycling, or disposal. Such systems can be particularly effective at ensuring the return and proper handling of environmentally harmful materials. People who abandon the article forfeit their deposit, and thus pay for the environmental cost of their actions. On the other hand, the refund creates a direct economic reward for those who return things for proper handling.

British Columbia was the first North American jurisdiction to legislate a deposit/refund system for beverage containers. This economic incentive program has been an enormous success in dealing with litter problems, leading to the return of over 84% of containers covered by the system. This system has been widely copied throughout North America. Similar deposit/refund systems have been instituted to ensure the proper disposal of car hulks in places like Norway and Sweden.[384]

Other jurisdictions have used deposit/refund systems to ensure that consumers return products that contain toxics. Car batteries, for example, are subject to a deposit/refund system in Rhode Island and Wisconsin. Minnesota and Washington have established a car battery tax that works in many ways like a deposit/refund system.[385] Project 88 -- a major U.S. policy study on economic incentives conducted by leaders from business, government, the environmental community and academia -- has suggested that a deposit/refund system for car batteries may be desirable.[386]

Commercial-size pesticide containers are subject to a deposit/refund system in Maine.[387] Several European countries, including Denmark, Finland, and the Netherlands, are considering implementing deposit systems on batteries containing mercury and cadmium. A deposit/refund system has been proposed for sales of refrigerator units containing chlorofluorocarbons, to ensure the proper return and disposal of such chemicals.[388] The Canadian Automobile Association has taken the position that deposits "or other means" should be used to ensure that automobile parts generally are returned and recycled.[389] West Germany has passed legislation giving the federal government a *general* power to impose deposits on products that could create problems in landfills.[390]

Key products to be considered for deposit/refund systems in B.C. are lubricating oils and products that lead to containerizable hazardous waste. Others are automobile batteries, pesticide containers, and mercury and cadmium batteries.

Lubricating Oils

Forty-five percent of British Columbians do their own automobile oil changes. These do-it-yourselfers are major contributors to the ten million litres of used motor oil that are dumped annually into B.C. storm sewers, onto gravel roads and into landfill sites.[391] This

oil contaminates surface and ground water, increases sewage treatment costs, and dirties the air if incinerated. It also contributes to ocean pollution -- approximately 25% of the two million tons of oil reaching the world's oceans each year originates from automobile oils.[392]

A scheme that would ensure the recycling of these substances would substantially decrease the total amount of hazardous waste being created and distributed in the Province. Apparently the Ministry of Environment is considering a regulation that would require retailers to take back used oil. This is a step in the right direction, and would provide an infrastructure for proper disposal of this oil. However, it may well be necessary to provide the economic incentive of a refund system to motivate most customers to return the oil. Project 88 has suggested that a deposit/refund system on lubricating oil may be an effective way of dealing with this problem.[393]

Containerizable Hazardous Waste

According to U.S. data, 30% of industrial hazardous wastes are of types generated in small enough quantities to be containerized in drums, barrels, tanks, etc. Almost half of those wastes are potentially recyclable substances such as oils and solvents.[394] Too much of this type of waste is not recycled, and too much escapes, unmonitored, during industrial processes. For example, a single industrial plant that uses metal degreasing solvent may have thousands of tiny unmonitored pollution "sources".[395]

Project 88 has suggested that a deposit/refund system may be the best way to ensure the recycling of such wastes, and the minimization of waste escape during the industrial process. A firm would pay a deposit on each unit of oil or solvent purchased, and could then recover this deposit by returning spent solvent or oil to designated recycling facilities.

Such a system would prevent the illegal dumping that might occur if a straight emission charge or marketable permit system were applied.[396] In this sense, the deposit-refund system is self-policing and has administrative efficiency advantages. For solvents that are incorporated into products, the deposit would function as a pre-disposal fee (see "Product Taxes" above).

Further research needs to be done into the possible application in British Columbia of the deposit/refund laws and proposals discussed above. Such research should be focused on identifying those specific toxics-containing products where the establishment of a deposit/refund system would be the most effective means of ameliorating British Columbia disposal problems. Such research should consider automobile batteries[397] , commercial-size pesticide containers, mercury and cadmium batteries, lubricating oils, containerizable hazardous waste, and other products. Cabinet should then establish a deposit/refund system for the identified products.

A deposit/refund system on products containing toxics would help ensure proper return, reuse and recycling -- thus reducing the total volume of toxics in general distribution in the Province.[398]

Recommendation 19. The Province of British Columbia should enact legislation on deposit/refund systems, establishing a mechanism to identify, prioritize and implement such systems for those toxics-containing products where the establishment of a deposit/refund requirement would be the most effective way of ameliorating disposal problems. The Province should then establish a deposit/refund system for the identified products.

A Fundamental Principle

A deposit/refund system is one way to ensure that producers and distributors of hazardous products take direct responsibility for the disposal of such products. Requiring firms to take individual responsibility for their products can be a powerful tool. In Germany this principle of making industry responsible for its products has been expressed in a recent law that gives the government authority to ban sellers from selling products containing hazardous substances unless:

(1) they provide a place for the discarded products to be returned or charge a deposit on the sale; or

(2) provide proper methods for disposing of the discarded product.[399]

Apparently this law follows a highly successful Bavarian law that dramatically reduced non-refillable product packaging when it required retailers to take more specific responsibility to accept returned packaging.[400]

As mentioned, the B.C. Ministry of Environment is considering a regulation that would require sellers of lubricating oil to take back used oil.[401] This is certainly a step in the right direction of requiring that firms take full responsibility for the environmental consequences of their enterprise. Legislation based on the federal German law discussed above could very simply and directly ensure that firms 'internalize' the full cost -- including the environmental cost -- of their products.

Recommendation 20. The Province of British Columbia should develop legislation to require that manufacturers, distributors, and retailers of products containing toxics must take direct responsibility for the disposal of such products.

Marketable Pollution Permits

The B.C. Ministry of Environment is presently studying the concept of marketable pollution permits. Under this system, a total amount of allowable pollution would be calculated for a region, and permits totalling that amount would be issued to polluting industries. The permits would be tradeable, so that firms with relatively cheap clean-up costs could cut emissions, then sell their unused permits for a profit to firms that would have higher clean-up costs. Later on, the government could reduce the volume of pollution allowed under the permits. This would cause higher permit prices, and thus create sustained economic pressure to reduce pollution. The United States has had the greatest experience in implementing such a system, primarily under its *Clean Air Act*.

The new U.S. *Clean Air Act* will provide an opportunity to assess the success of this approach in dealing with North America's acid rain problem.

Perhaps this system's major advantage is that it promotes expenditures on those measures that are the most efficient, i.e., that reduce the most pollution for the least cost. For example, a program that allowed trading between agricultural sources of phosphorous and municipal-sewage sources resulted in phosphorous loading of a Colorado water reservoir being reduced at a cost of $67 (U.S.) per pound. The cheapest cost of removal using a best available technology approach under a prescribed emissions system was $824 per pound of phosphorous removed.[402] Assuming that society has a limited number of dollars to expend, as a whole, on pollution abatement, it is probably desirable that we use our abatement dollars as efficiently as possible -- because wasted dollars could better be used on further effective pollution control. The U.S. experience indicates that in some circumstances trading has indeed been successful in getting more bang for society's abatement buck. Also, emission trading has facilitated continuous economic growth in dirty areas, where new industries have, in essence, been compelled to finance the clean-up of existing industry by purchasing limited "pollution rights".[403]

Such a system may also encourage technological innovation by providing tangible cash rewards for totally eliminating pollution sources. However, this is debatable, as is the question of whether or not the U.S. experience has actually created significant environmental improvement.[404] Also, if improperly designed, such a system could encourage "pollution ghettoes" that would be tolerated because of improvements made elsewhere.

A study done for Environment Canada on ground-level ozone in Canada has concluded that emissions trading would not only reduce overall ozone control costs, but could achieve emission reduction targets with greater certainty -- and probably faster -- than if the government relied completely on emission standards.[405] The federal government's Green Plan commits Canada to study the feasibility of using emission trading to clean up the air in the Lower Mainland.

However, a recent OECD report has stated:

In general, assuming the environmental effects of trading are neutral to positive, lower pollution abatement costs indicate that emissions trading is a more efficient instrument of environmental policy than direct regulations. It induces ecological innovation. Its practicality is low, however.[406] *[emphasis added.]*

And a recent study by the C.D. Howe Institute has concluded:

With one exception -- lead emissions -- the trading of emissions credits can not be regarded as a successful demonstration of the incentive approach to pollution control.[407] *[emphasis added.]*

Emission trading may well become a part of an overall program of economic incentives and disincentives, properly dovetailed with a vigorous regulatory enforcement system.

Research on such trading should continue. However, in view of the lack of a proven track record at actually enhancing environmental quality, more experience with this approach in other jurisdictions is needed before it is adopted in British Columbia. In particular, care must be taken to ensure that such a system does not allow the creation of "pollution ghettoes".

We conclude that B.C. should not implement a marketable pollution permit system until hard evidence is developed in other jurisdictions that establishes that such a system would clearly improve environmental quality in B.C., and would not create "pollution ghettoes."

Tradeable Recycling Credits

Project 88 has suggested an intriguing "tradeable recycling credits" program to encourage the recycling of lubricating oil. A minimum figure would be set as the percentage of oil that **must** be recycled by oil companies. However, the oil companies could meet the mandatory percentage requirement (a) by reprocessing oil themselves, (b) by purchasing reprocessed oil from a reprocessor, or (c) by purchasing recycling **credits** from reprocessors or other manufacturers who exceeded the standard. Reprocessors who exceeded the required recycled oil percentage could sell credits equivalent to the amount by which they had exceeded the minimum percentage. In other words, they could convert their good works into cold cash.

This system is designed to increase the market demand for used oil. The increased demand would drive up the price of such oil, and thus encourage consumers to return oil to collectors, collectors to reprocessors, and reprocessors to new oil product manufacturers. The increased recycling, of course, would reduce the massive amounts of oil that are presently "abandoned" and released into the environment. Project 88 suggested the possibility of using a similar program to encourage recycling of lead batteries.[408]

Recommendation 21. The Province of British Columbia should consider:

(1) establishing a minimum level of recycling which must be met by manufacturers, processors and importers of oil, automobile batteries and other hazardous products; and

(2) allowing companies to meet the mandated level by recycling themselves, purchasing products containing recycled materials from reprocessors, or by purchasing recycling credits from reprocessors.

Expanding Civil Liability for Pollution Damages -- An Important Economic Incentive

Private citizens should be allowed to sue polluters for environmental damage. A number of ancient legal doctrines currently protect companies from having to fully compensate the members of the public for damage done to our common environment. Partially as a result of these doctrines, industries have not had to pay the real price of the

environmental damage they create. The traditional approach is that those who do not have a property interest in the damaged land, air and water -- or have not suffered personal injury[409] -- have no legal remedy. This approach must be changed. Fortunately, numerous jurisdictions are moving to expand the civil liability of polluters.

The U.S. *Comprehensive Environmental Response Compensation and Liability Act* (the *Superfund Act*)[410] broke new legal ground by establishing strict liability for generators of hazardous waste, transporters of waste, and owners of sites where such wastes must be cleaned up. Among other things, this law:

(1) discarded the traditional negligence rule which required fault before liability could be assessed;

(2) discarded the traditional nuisance rule that an owner of land is not responsible for a nuisance unless he or she had knowledge or means of knowledge of the nuisance; and

(3) dramatically relaxed rules of causation, so as to make it easier to establish liability.

The Superfund law has primarily aided government in suing for cleanup costs. However, its significance is broad, because it establishes the principle that those who profited from activities that created pollution should pay for the cleanup, regardless of fault.

Fifteen years ago the Canadian Parliament amended the *Fisheries Act* to abrogate the common law restriction on private citizens recovering for damage to common environmental property. The amendment established a form of absolute civil liability, requiring polluters to compensate commercial fishers for loss of income.[411] B.C. fishers who have suffered income loss as a result of pollution are currently litigating two test cases on this *Fisheries Act* provision. One case involves 876 commercial fishers suing for millions of dollars in damage.[412] The outcome of these cases may well determine how effective this *Fisheries Act* economic incentive is.

In 1980, the Ontario "Spills Act"[413] dramatically increased the civil liability of polluters to pay for clean-up costs and damages that are incurred as a result of pollution spills. Ontario polluters are now strictly liable for damages suffered by private citizens as a result of pollution spills. The Ontario act was revolutionary in four ways:

(1) It provides for absolute liability for the cost of cleaning up spills, and strict liability for loss or damage resulting from spills -- negligence is no longer a critical factor under the Act.

(2) It removes problems of standing for individuals who suffer damage as a direct result of a spill.

(3) It provides for recovery of damages in the absence of physical injury to persons or property.

(4) It provides for the recovery of damages that are the direct result of a spill, and is not limited to damages which are reasonably foreseeable[414] .

The relatively recent *Canadian Environmental Protection Act* allows individuals the right to recover for loss or damage resulting from conduct contrary to the Act or Regulations. Time will tell whether this Act becomes an effective mechanism for fairly allocating environmental costs.

Environmental harm cases are frequently difficult to prove under traditional burden of proof rules. For example, assume that a pollutant causes a 30% increase in cancer in the general population. Under present rules, that statistic would not necessarily assist plaintiff cancer patients. For each of the plaintiffs the 'balance of probabilities' could be that the pollution did not cause the cancer -- statistically 10 out of 13 would have gotten cancer anyway. Even if all cancer patients in the area sued, they might all lose under conventional rules.[415] This has led to proposals that the burden of proof be lowered or partially reversed in pollution cases.[416] The U.S. Superfund law has already relaxed the burden of proof faced by government in establishing causation.[417]

Many advocates of the 'polluter pays principle' take the position that companies should pay for damage to the **environment itself**, entirely independent of compensation payable for damage incurred by individuals or corporations as a result of environmental degradation. The Ontario Law Reform Commission has recommended that a new civil remedy be created which would allow an award of damages payable to compensate the **public** for harm done to the environment **per se**. Such awards would be payable to a government body, to be used for restoration, replacement and rehabilitation of the environment. Rules governing standing to sue would be quite liberal.[418]

It is vital that such mechanisms for civilly enforcing environmental and economic justice be expanded. In a review of the use of economic incentives to reduce hazardous waste, Robert Hahn has emphasized the importance of using private enforcement measures to deter pollution. Citing the possibility that polluters could respond to emission charges and other economic incentives by increasing illegal dumping[419] , Hahn states:

Only in the cases of increased public or private enforcement are [pollution] damages expected to decrease ... Only increased enforcement has an unambiguously positive effect on expected damages.[420]

Private civil actions, as well as private criminal prosecutions, can help provide this necessary enforcement component.[421] Of course, government will have to continue its own vigorous program of environmental enforcement and prosecution.

Recommendation 22. The Province of British Columbia should enact legislation to expand the civil liability of polluters, to ensure that they pay the full cost of their pollution. Such legislation should:

(1) allow individuals to recover for loss or damage suffered as a result of violation of the *Waste Management Act* and other environmental legislation;[422]

(2) establish absolute civil liability for the cost of cleaning up spills and other escapes of toxics, and strict liability for loss or damage resulting from spills and other escapes of toxics;[423]

(3) lower or partially reverse the burden of proof in pollution cases, if deemed appropriate, after further study; and

(4) create a new civil remedy that would allow an award of damages payable to compensate the public for harm done to the environment *per se*.[424]

Pollution Compensation Funds

An alternative to expanding the right of pollution victims to sue would be to establish a tax on relevant polluters that would fund a pollution victim compensation scheme. Such schemes have the advantage of consistently ensuring that polluters pay for certain environmental externalities. The Japanese *1973 Law for the Compensation of Pollution-Related Health Injury*establishes levies on polluters, the proceeds of which are distributed to victims of such pollution-caused diseases as Minimata disease, itai-itai disease, bronchitis, asthma, etc.[425] The U.S. *Black Lung Benefits Revenue Act of 1977* establishes a tax on coal, which is used to fund compensation for workers who develop black lung disease. Similarly, the *U.S. Surface Mining Control and Reclamation Act of 1977* levies a tax on coal to pay for restoration of the environment caused by coal mining.[426] Along the same lines, Part XX of the *Canada Shipping Act* authorized a levy on oil shipped into or out of Canada, and funds raised are available to oil pollution victims. Similarly, France has established a levy on air passenger travel, which provides funds for compensating victims of airplane noise pollution. Money is provided for soundproofing measures, or for property buy-outs.[427] In 1990 the proponent of a ferrochromium smelter at Port Hardy, B.C., proposed establishing a compensation fund for possible pollution victims, to be financed by a levy on its ferrochrome production.[428]

Since there appears to be a statistical correlation in Greater Vancouver between SO_2levels and hospital visits for respiratory distress,[429] and since any individual victim would have difficulty in suing a particular refinery or cement plant (the sources of most SO_2 in the area), perhaps such a compensation fund scheme should be considered as a possible supplement to the right of individuals to sue for damages. Such a compensation scheme might also be established to compensate the children who have suffered lead contamination from the Trail smelter, fishers and recreationists who have lost enjoyment of coastal waters due to pulp mill pollution, etc.

Recommendation 23. The Province of British Columbia should study the possibility of establishing environmental levy/victim compensation schemes. Any such scheme implemented must provide:

(1) full and fair compensation for victims;

(2) significant deterrence against polluting activities; and

(3) adequate and continuing economic incentives to eliminate or reduce pollution as much as possible.

Insurance

The effort to 'internalize' the cost of pollution within the polluting firm can be thwarted if corporations are able to pollute and then escape liability by dissolving the corporation. Imposing mandatory liability insurance requirements prior to authorizing potentially polluting activity can help ensure that the polluter -- and not outsiders like neighbours, fishers, trappers, native Indians and recreationalists -- pays the ultimate cost of pollution.

Mandatory insurance requirements provide an ongoing economic incentive for corporations to be responsible environmental citizens. Irresponsible behavior will be reflected in insurance rates -- as will exemplary behavior. Just as non-smokers and careful drivers benefit from lower insurance costs, so will clean industry. Industry that avoids producing toxic pollution, or reduces the volume or toxicity of its wastes, should profit from such moves.

Also, mandatory insurance requirements increase the likelihood that adequate risk analysis will be done before polluting behavior commences. Such risk analysis will encourage the use of benign feedstocks and processes, and the implementation of state-of-the-art technology.

Mandatory insurance requirements will also assure a higher level of pollution enforcement. While government has scarce resources for policing and enforcement activities, the insurance industry will carefully consider the activities of a polluter that it insures, and will tend to require upgrading and cleaning up of industrial plants. An insurance requirement is one way for the government to gain a valuable ally -- the insurance industry -- in the attempt to control pollution.[430] Numerous precedents exist for requiring industry to carry pollution insurance, including the U.S. and New Brunswick laws that require liability insurance for operators of underground storage tanks.[431]

A related mechanism for ensuring that companies "internalize" their environmental costs is the requirement that companies file sufficient security to pay for future pollution damage. In the past, such security deposits have been woefully inadequate -- for example, until recently the bond maximum under the B.C. *Mines Act*was only $2500 per hectare, and the Environmental Protection Program has only required a handful of pollution performance bonds.

This problem was highlighted when a Grand Forks cyanide-gold heap leaching operation led to the ministerial declaration of an environmental emergency in June of 1989.[432] The private firm involved had only filed a $5000 bond under the old provisions of the *Mines Act*. Since then, the provincial government has had to expend approximately **one million dollars** to clean up the heap leaching site.[433] A recent search of Ministry of Environment records for province-wide performance bonds being

required of industry is no more reassuring. In August 1991, the Ministry reported a province-wide performance bond total of $3,887,000. In addition, a single bond for $4-million was reported in the Surrey region. It is reported that some additional bonds may not have been reported to Victoria by regional offices.[434] However, clearly the total is insufficient to compensate for the potential damage that could be caused by all the polluters in the Province.

Therefore, we recommend below that security requirements under the *Waste Management Act* and the *Mines Act* -- or the amount of mandatory insurance -- be sufficient to adequately compensate for "worst-case scenario" pollution damages. It should be noted that the "worst-case" scenario was considered to be the appropriate amount of security by the Port Hardy Ferrochromium Plant Environmental Assessment Panel.[435]

Recommendation 24. The Province of British Columbia should establish a mandatory requirement that all companies that create, or have the potential to create, toxic pollution or hazardous waste must carry insurance or post financial security to cover pollution clean-up and damages. The amount of the insurance or security should be sufficient to adequately compensate for potential 'worst-case scenario' pollution damages.

Government Procurement as an Economic Incentive

Governments are enormously important players in the marketplace. Canada's total public sector procurement in 1979 was $73.6 billion. American government procurement expenditures for 1986 were estimated to be more than $865 billion (US).[436] Governments are beginning to realize that government purchasing policy is one of the most powerful tools available to influence the market in an environmentally positive way.

Numerous North American governments now provide purchasing preferences for environmentally preferable goods. For example, Oregon law requires the state government to purchase recycled paper if the cost of the recycled paper does not exceed other paper by more than 5%. Texas allows state agencies to pay 15% more for rubberized asphalt created from tires. Louisiana requires that 5% or more of all purchases must be recycled products, and within five years, 25% of all purchases must have recycled content.[437] Economists justify giving such price and market preferences to green products by arguing that such advantages are simply a way of quantifying, and giving weight to, the social cost differential between green products and products that harm the environment.

Preferences have already been widely applied to problem toxics such as used oil products.[438] Such preference programs should now be extended to other products that are positive alternatives to those products that generate toxic pollution in their production, use or eventual disposal. For example, governments could have enormous impact if they chose to buy only unbleached paper, because bleaching paper typically

creates dioxin problems. Governments could also help lead the marketplace toward less toxic office supplies, furniture, computer equipment, fuels, building supplies, etc.

In 1990, the U.S. EPA proposed a new federal procurement policy that would have applied pollution prevention criteria to general government purchasing policy. The EPA-proposed Executive Order nicely summarized the potential importance of government procurement policies:

WHEREAS, the Federal government can no longer view energy, transportation, agriculture, and natural resource policies as discrete from the nation's long term environmental protection objectives. These policies must become instruments to achieve the protection of human health and the sustainable development of our resources in an ecologically safe manner; and

WHEREAS, the Federal government should become a leader in the area of pollution prevention, recycling, and procurement. The Federal government should function as a proving ground for innovative pollution prevention programs and technologies, should build markets for clean products, and should incorporate pollution prevention into the basic daily choices of Federal employees; and

WHEREAS, as the single largest consumer in the Nation, the Federal government has the opportunity and the responsibility to move into the forefront of pollution prevention...

The Order went on to state that the EPA Administration shall provide guidance to procuring agencies in promoting the purchase of "clean technologies and products".[439] Unfortunately, the President never implemented this EPA initiative.

Under recent changes in B.C. government policy, British Columbia Hydro, the provincial government's hydroelectric company, can now apply an "environmental premium" to sources of electricity that solve existing environmental problems. B.C. Hydro can pay up to 15% more for electricity that comes from environmentally acceptable sources, and can give such sources priority over others. A Williams Lake project that replaced dirty beehive burners with much cleaner energy incineration technology has already been given preferential priority under this new policy.

The B.C. government has taken some other initiatives to encourage green products. The government has begun to purchase re-refined oil and recycled paper, and has barred the purchase of foam cups made with CFCs. The *Purchasing Commission Act* was recently amended to give the Commission the discretion to exempt environmentally sound supplies from the general rule that all purchases must be at competitive prices.[440]

It is now time for the government to expand such policies by ensuring that pollution prevention criteria are applied to all government purchases. The government can use criteria developed by the Canadian Environmental Choice Program and the German Blue Angel program,[441] to determine which products should be avoided because of association with pollution, and which 'clean' products should be encouraged.

Government criteria, and choice of products, should be publicized, so that private consumers and industry can make use of that information in making their private purchases.[442]

Recommendation 25. The Province of British Columbia should apply pollution prevention criteria to all government purchases. Preference should be given to products that are produced with clean technology over products that are associated with toxic pollution.

Government Subsidies

All too often government subsidies have been provided to industries that wreak environmental havoc. For example, in 1991 the Canadian federal government will spend $677.5-million on programs to support fossil fuel and nuclear energy sources, and only $34.7-million on energy efficiency. This is done in spite of the fact that energy efficiency measures can produce more energy, more cheaply, and create more jobs, than can the fossil fuel and nuclear industries. Similarly, 81% of the $1.9 billion that Ottawa will spend on agriculture will go to environmentally destructive programs that encourage farmers to get maximum production out of their land, regardless of environmental costs such as water pollution, loss of fish stocks, animal habitat and soil erosion. Less than 20% of the federal agriculture budget goes toward sustainable agriculture initiatives.[443]

Similarly, B.C. agricultural subsidies have historically been used to facilitate pesticide use, power subsidies have been used to subsidize large polluting industries, and other provincial government subsidies have been granted to polluters. Such subsidization of polluting activities should cease.

See Chapter 3 for a discussion of government financial assistance for polluters that clean up their operations.

Recommendation 26. The Province of British Columbia should review all of its subsidy programs to eliminate subsidies for industries that create toxic pollution, except where the subsidy is connected to implementation of pollution prevention measures.

Treatment And Disposal Fees

If British Columbia establishes a hazardous waste treatment and disposal facility, industry will likely lobby the provincial government to subsidize the cost of the facility. However, the government should resist this pressure. Subsidization of such costs would reduce industry's incentive to reduce production of hazardous waste at source.[444]

Many experts argue that treatment and disposal fees must be set high enough to deter the production of hazardous waste in the first place. For example, Dr. Donald Huisingh, a foremost expert on pollution prevention, has stated:

The first and foremost economic barrier to comprehensive implementation of pollution prevention is the present availability of inappropriately low cost land disposal of hazardous residuals.[445]

The German government has acted to increase treatment and disposal costs as an integral part of its government policy to promote waste reduction.[446] Although the state of Bavaria has publicly subsidized its hazardous waste treatment system -- in an attempt to eliminate illegal dumping -- it is now phasing out these subsidies.[447]

The B.C. government should avoid subsidizing the cost of treatment and disposal of hazardous waste. Otherwise, taxpayers will be subsidizing the continued generation of such materials. Illegal dumping should be deterred by enhanced enforcement activities, and increased penalties.[448]

The Government of British Columbia should not subsidize the cost of hazardous waste treatment and disposal.

Environmental Accounting

In addition to measures establishing direct economic incentives and disincentives, other economic measures should also be explored. For example, business accounting procedures should probably be changed to ensure that business accounts fully reflect present and future environmental liabilities. The rationale for this is that investors and management are more likely to make rational decisions about environmental impacts if those environmental impacts make a commensurate impact on the corporate bottom line.

As was noted in Chapter 3, a U.S. government survey found that one of the reasons why companies did not implement pollution prevention programs was that companies lack accounting systems that allocate environmental costs to specific production operations -- systems that would provide an economic motivation to assess waste reduction possibilities.[449]

A U.S. Office of Technology Assessment Report on hazardous waste has recommended that accounting measures be revised to ensure that all costs of managing hazardous wastes, including liabilities, be charged to the departments and individuals responsible for the operations that generate the waste.[450] The reasoning is that such accounting charges will motivate departments to reduce hazardous waste.

A recent Oregon law takes a similar approach by requiring companies to develop accounting systems that identify toxic use and waste management costs and factor in liability, compliance and oversight costs to the extent technically and economically practicable.[451]

Recommendation 27. The Province of British Columbia should study whether business accounting procedures should be altered to better reflect present and future environmental liabilities.

a polluter pays program

The above recommendations should be synthesized into a comprehensive Polluter Pays Program for British Columbia. The combination of measures should ensure that no firm pays more than the cost that it is inflicting upon the environment -- but no firm pays less either.

Economists tell us that such a Polluter Pays Program can, among other things:

- maximize provincial economic efficiency, and optimum production levels, by ensuring that all costs, both private and social, are accounted for in the marketplace;
- reimburse government for services and regulatory operations necessitated by polluting; and
- facilitate payment of compensation to individuals damaged by pollution.[452]

More important, though, such a Polluter Pays Program can be a critical part of a toxic pollution prevention strategy. And it can provide an irresistible economic incentive for B.C. business to eliminate the production of toxic pollution. It can ensure that clean companies prosper, and that dirty companies either clean up or go out of business. It can marshall the resources and energy of hundreds of thousands of decision-makers in the B.C. marketplace -- consumers, manufacturers, distributors, retailers -- to ensure that British Columbia remains beautiful, clean, and healthy.[453]

ENDNOTES

337. In spite of the fact that, in many cases, such high capital costs may eventually be recovered.

338. We use the term "environmental costs" to broadly encompass all damage done to the environment and society by pollution. Among other things, it includes expenditures and economic losses incurred by governments and individuals, personal injuries, physical degradation of air, land and water, as well as loss of value, use and enjoyment of our common environment. Historically many of these costs have not been calculated, let alone reimbursed.

339. Or given the widespread ignorance of the potential profits that lie in pollution prevention, it appears to be more profitable.

340. *See* the "Polluter Pays" recommendation approved by the Council of Ministers of the European Economic Community in 1975, discussed in S. Johnson & G. Corcelle, *The Environmental Policy of the European Communities* (London: Graham and Trotman Publishers, 1989) pp.265-266.

341. Government of Canada, Canada's Green Plan for a Healthy Environment (Ottawa: Ministry of Supply and Services, 1990) p.16.

342. M. Stone, *Pricing Pollution: Revising British Columbia's Waste Discharge Permit Fees* (Victoria: B.C. Ministry of Environment, 1990) p.23.

343. Ministry of Environment, *Annual Report 1986/87* (Victoria: the Ministry, 1987) p.70; and B.C. Environment, *News Release* 1991:114 (17 July 1991).

344. For example, in July 1991 the Ministry of Environment released the names of 63 operations that are in "significant non-compliance" with their permits [Source: B.C. Environment, *News Release* (22 July 1991).] This figure does not include firms that are violating their permits but are not considered to be in "significant" non-compliance -- nor does it include the hundreds of non-permitted firms that discharge into sewers. It also does not include the nine out of 23 pulp mills that are still out of compliance with their effluent permits. [Source: B.C. Environment, *News Release* 1991:114 (17 July 1991).]

345. Although previous convictions are admissible in sentencing hearings, they are not normally admissible on the main issue of guilt or innocence, except in very narrow circumstances (for example where the defendant has put his or her character in issue, or for the sole purpose of judging the **credibility** of a witness's testimony).

346. In matters of environmental safety and public health, is it really better that nine polluters escape penalty?

347. Under the *Waste Management Act*, SBC 1982, c. 41, s. 3(3).

348. "Emission" here refers to air emissions, liquid effluent and disposal to land.

349. To pay for the treatment of effluent and other water management by public authorities.

350. Supra, note 335, at p.32.

351. *Ibid.* at p.48.

352. *See* below for a discussion of this Japanese compensation scheme.

353. *Supra*, note 335, at pp.52-54 discusses the Norwegian scheme to deal with sulfur in fuel, and p.68 discusses the Netherlands scheme to deal with sulfur and lead contents in fuels, and the Netherlands recent carbon tax. At p.69, Stone discusses France's new tax on SO2, nitrous oxides and hydrochloric acid.

354. *Ibid.* at pp.63-67.

355. M. Fortin & B. Mitchell, *Water and Wastewater Charges for Ontario: The User Pay Principle* (Mississauga: Ontario Sewer and Watermain Contractors' Association, 1990) p.14.

356. Ecologistics Limited, *The Extra-Strength Sewer Surcharge to Regulate Industrial Sanitary Sewer Users* (Ontario: Ontario Ministry of Environment, 1988) p.iii.

357. Supra, note 348, at p.II.

358. Personal communication, S. Martin, B.C. Ministry of Environment, 11 April 1991. Such fees would be charged on waste discharge permitted under the *Waste Management Act*.

359. *Supra*, note 335.

360. A similar user-pay principle should be applied to pesticide use permit holders under the *Pesticide Control Act*, RSBC 1979, c. 322, generators of special waste under the *Special Waste Regulation*, BC Reg 63/88, and shippers of dangerous goods under the *Transport of Dangerous Goods Act*, RSC 1985, c. T-19.

361. *Supra,* note 335, at p.127 gives recommendations to this effect.

362. R. Hahn, "An Evaluation of Options for Reducing Hazardous Waste" (1988) 12 *Harvard Environmental Law Review*, p.213.

363. *Supra*, note 335, at pp.29-30 gives a simple example of how the Dutch government has set up classes of effluent dischargers who are not metered. The concept of offering rebates for installing technology has been applied by the Dutch in a different context. Firms in the Netherlands can earn a rebate on the tax on fuel if they install certain technologies. [Source: J. Opschoor & H. Vos, *Economic Instruments for Environmental Protection* (Paris: Organization for Economic Cooperation and Development, 1989) p.58.] Technologies eligible for the rebate should, of course, include substitution of non-toxic inputs, product reformulation or redesign to eliminate toxic-producing processes, as well as more traditional pollution control technologies.

364. The term "industrial" is used in its broadest sense here, and should be construed to include all businesses that produce toxic pollution, including small garages, photo developing studios, metal-finishing shops, as well as large industry.

365. *See* T. Rahn, *Garbage Incineration: Lessons from Europe and the United States* (Toronto: Pollution Probe Foundation, 1987) p.13; D. Reiman, "Mercury Output from Garbage Incineration" (1986) 4 *Waste Management & Research*, p.45; and, Swedish Environmental Protection Board and National Energy Administration, *Waste to Energy Report* (Stockholm, 1986) Translation of Chapter 10, p.35.

366. The U.S. imposed an excise tax on ozone-depleting chemicals effective 1 January 1990. [Source: M. Stone, *Environmental Excise Taxes: Options for British Columbia* (Victoria: B.C. Ministry of Environment, 1990) p.100.] Taxes on the other products mentioned are discussed below. We do not propose a tax on CFCs because of the severity of the threat posed by these chemicals. They should be banned, not taxed.

367. *See* M. Stone, *Environmental Excise Taxes: Options for British Columbia* (Victoria: B.C. Ministry of Environment, 1990) pp.28-37 for a review of jurisdictions that have imposed such taxes. *See also* J. Opschoor & H. Vos, *Economic Instruments for Environmental Protection* (Paris: Organization for Economic Cooperation and Development, 1989) p.56.

368. B.C. Environment, *News Release* (15 & 8 April 1991).

369. For an extensive review of the 11 North American jurisdictions that have implemented tire taxes *see* M. Stone, *supra*, note 360, at pp.21-28.

370. *See* J. Reganold, R. Papendick & J. Parr, "Sustainable Agriculture" June (1990) *Scientific American*, p.112 for information on the Iowa scheme. *See also* L. Brown et al., *State of the World, 1988: A Worldwatch Institute Report on Progress Toward a Sustainable Society* (New York: W.W.Norton & Co., 1988) p.134 for a description of the Danish pesticide tax; and C. Sandborn, *Submission to the Federal Pesticide Registration Review Public Meeting* (Vancouver, W.C.E.L.A. 1990) [unpublished].

371. Personal communication of Dr. D. Pimental with D. Regnier, West Coast Environmental Law Association, 13 September 1990.

372. J. Opschoor & H. Vos, *Economic Instruments for Environmental Protection* (Paris: Organization for Economic Cooperation and Development, 1989) p.65.

373. *Ibid*. at p.116.

374. For an extensive review of the use of special taxes on leaded gasoline, *see* M. Stone, *supra*, note 360, at pp.13-20. In Canada, these particular taxes have become moot because of the banning of leaded gasoline as of December 1990. Lead was such a grave threat to public health that banning it was the appropriate action. Economic incentive measures should not be considered as a substitute for appropriate banning measures.

375. J. Opschoor, supra, note 365, at p.116.

376. M. Stone, *supra*, note 360, at p.39.

377. *Ibid*. at p.59.

378. *See* F. Laughren, Treasurer of Ontario, Statement to the Legislature, 24 June 1991. *See also* Bill 130, *An Act to Amend the Retail Sales Tax Act*, 1st Sess., 35th Leg. Ont., 1991, cl. 2. *See also* Memorandum from A. Williams, Ministry of Revenue, Retail Sales Tax Branch, to Car Dealers and Leasing Companies, 24 July 1991.

The new feebate system was based partly on a similar scheme that was recently approved by the California state legislature, but never signed into law by the Governor. Environmentalists have criticized the new Ontario Act for not providing that all "gas guzzler" tax revenue go to purchasers of "gas sippers". Purchasers of gas sippers only get

$100 credited against their sales tax, in contrast to the far more substantial rebates advocated by environmentalists.

This scheme replaced the two-year old gas guzzler tax which simply taxed inefficient vehicles. [Source: Ontario Ministry of Revenue, *Ontario Sales Tax Guide: Gas Guzzler Tax* (Toronto, 1991); and, *Retail Sales Tax Amendment Act,* RSO 1989, c. 15, s. 2C amending the *Retail Sales Tax Act of Ontario*, c. 454. The two-year old program was similar to the gas guzzler tax created under the U.S. *Energy Tax Act of 1978*, Public Law No. 95-618, Internal Revenue Code, § 4064.

379. "Gas Guzzler Proposals Upset Some Albertans" *Vancouver Sun* (21 September 1991) p.A4.

380. CO is of concern because of its link to the global warming problem. *See* Chapter 2 for a discussion of possible strategies for dealing with automobile-generated toxic pollution.

381. G. Doern, ed., *Getting It Green: Case Studies in Canadian Environmental Regulation* (Toronto: C.D. Howe Institute, 1990) p.207. *See also* personal communication with M. Stone, B.C. Ministry of Environment, 24 July 1991.

382. "Economic Instruments in Environmental Policy" (Sept/Oct 1990) *Environmental Policy and Law*, p.141.

383. In establishing the system, the government should not restrict itself to the tax differentiation strategies discussed, but should also look at other product tax schemes that have encouraged clean production. For example, the Netherlands general fuel charge offers a direct incentive to fuel industries -- industries are granted a rebate when they apply certain abatement technologies with respect to sulphur dioxide. [Source: J. Opschoor, *supra*, note 365, at p.58.] *See also* M. Stone, *supra*, note 360, at pp.85-90 for a discussion of Norway's similar tax.

In addition, the government should consider whether, in some instances, it may be preferable to impose a feedstock tax on industrial feedstocks that pose an environmental threat throughout the product life cycle. For example, Project 88, a prestigious U.S. study group chaired by U.S. Senators T. Wirth & J. Heinz, has raised the possibility of placing a tax on mined lead. The study group stated, "If the price of virgin lead reflected its full social production and disposal costs, there would be higher recycling rates. A virgin materials charge could be used to reflect the environmental risks associated with improper disposal", Senators T. Wirth & J. Heinz, *Project 88 -- Round II, Incentives for Action: Designing Market-Based Environmental Strategies* (Washington: The Project: 1991) p.58.

There is precedent for such feedstock charges. The United States Superfund Legislation provides for taxes on petroleum and chemical feedstocks used in industrial processes. Theoretically such taxes can serve to reduce the usage of detrimental feedstocks, by raising their effective cost to the buyer. However, in practice, these U.S.

feedstock charges have not been set high enough to have a significant incentive impact. In August 1990, the B.C. government released draft regulations that would have established a tax on purchases of chlorine, CFCs, hydrocarbon and chlorinated solvents, wood preservatives and anti-sapstain chemicals -- all important industrial feedstocks in B.C. This particular feedstock proposal was dropped, reportedly because the proposed emission charge system would serve a similar purpose, and would provide more incentive to reduce chemical escape during the production process.

384. J. Opschoor, *supra*, note 365, at p.87.

385. M. Stone, *supra*, note 360, at pp.118-119.

386. Senators T. Wirth & J. Heinz, *Project 88 -- Round II, Incentives for Action: Designing Market-Based Environmental Strategies* (Washington: the Project, 1991) pp.63-64.

387. *Ibid*. at p.8.

388. P.Bohm, *Deposit-Refund Systems: Theory and Application to Environmental, Conservation, and Consumer Policy* (Baltimore: Johns Hopkins University Press, 1981) pp.129-169.

389. Canadian Automobile Association, *News Release* (26 June 1991).

390. M. Stone, *supra*, note 360, at p.119.

391. Canadian Tire, *Press Release* (5 August 1991). In the U.S. it is estimated that "do-it-yourself" mechanics are responsible for nearly 50% of the illegal dumping of lubricating oil. [Source: *Supra*, note 379, at p.64.]

392. *Supra*, note 381, at p.116.

393. *Supra*, note 379, at p.64.

394. *Ibid*. at p. 64.

395. *Ibid*.

396. Senators T. Wirth & J. Heinz, *Project 88: Harnessing Market Forces to Protect Our Environment* (Washington, 1988) pp.74-75. *See also supra*, note 379, at pp.63-65. For further discussion of such an approach, *see* C. Russell, "Economic Incentives in the Management of Hazardous Waste" (1988) 13:2 *Columbia Journal of Environmental Law*, p.257.

397. Such a study of automobile batteries would be particularly important if the new provincial program to subsidize the transportation of used batteries -- a program funded

by the new green tax on such batteries -- fails to ensure adequate levels of return of such batteries.

398. Also, where clearly preferable alternative products exist, the refund system could be used to encourage environmentally friendly purchasing. For example, a customer returning a car battery and replacing it with a recycled lead battery might receive a 100% refund of the deposit on their previous battery, compared with only 50% if the new battery was made with virgin lead. New Brunswick's new beverage container legislation has a similar type of modified deposit/refund system. The deposit on refillable and recyclable containers is the same -- but the refund on recyclable containers is only half that of the refund on the environmentally preferable refillable containers. *Beverage Containers Act*, SNB 1977, c. B-2.1.

399. *Waste Disposal Act*, 7 June 1972, Bundesgesetzblatt [BGB1.I] 1410 (W. Ger.) as amended by Act of August 27, 1986, BGB1.I 1410, discussed in A. Williams, "A Study of Hazardous Waste Minimization in Europe" (1987) 14 *Environmental Affairs*, p.197. Along the same lines, France has passed a law which authorizes the government to enact regulations to require that producers of products which are a source of hazardous waste must contribute to the management of such wastes -- Law 75-633 tit. II, art. 6 of 15 July 1975 (Framework Law) discussed in A. Williams, "A Study of Hazardous Waste Minimization in Europe" (1987) 14 *Environmental Affairs*, p.199.

400. Olaf Fiegel, German Jurist, Munich, Germany, personal communication with B. Wylynko and C. Sandborn, September 1991. Apparently, the Bavarian law led to a wholesale change from plastic and paper milk and yoghurt containers to glass containers. The federal German government is now also going to require manufacturers, distributors and retailers to take back packaging. [Source: Ordinance on the Avoidance of Packaging Waste (Packaging Ordinance - Verpackungsverordnung - VerpackVO) 8 May 1991, Non-revised translation.]

401. Personal communication, B. Grant, Senior Analyst, B.C. Ministry of Environment, 26 August 1991.

402. *Supra*, note 389, at p.51.

403. J. Opschoor, *supra*, note 365, at pp.94&99.

404. *Ibid*. at p.91.

405. A. Nichols & D. Harrison, Jr., *Using Emissions Trading to Reduce Ground-Level Ozone in Canada: A Feasibility Analysis, Report to Environment Canada* (Cambridge: National Economic Research Associates Inc., 1990) p. E-23.

406. J. Opschoor, supra, note 365, at p.100.

407. G. Doern, ed., The Environmental Imperative: Market Approaches to the Greening of Canada (Toronto: C.D. Howe Institute, 1990) p.72. See also R. Hahn, "Economic

Prescriptions for Environmental Problems: How the Patient Followed the Doctor's Orders" (Spring 1989) Journal of Economic Perspectives, p.110.

408. *Supra*, note 379, at pp.57-58.

409. Or could meet the traditional narrow qualifications for bringing a public nuisance suit, i.e., suffered a type of special damage different **in kind** from that suffered by other members of the public. However, it should be noted that in *Gagnier v. Canadian Forest Products Ltd* (1990) 51 BCLR (2d) 218, the B.C. Supreme Court stated that an individual could bring a public nuisance suit if the individual suffered a significantly greater **degree** of damage than members of the public generally -- it would not be necessary to show a different **kind** of damage than that suffered by the general public. Public nuisance suits can also be brought if the individual can convince the Attorney-General to lend his name to the suit.

410. 42 USC, § 9601-9657 (1982 and Supp. IV 1986).

411. RSC 1985, c. F-14, s. 42.

412. *Clifton Bailey et al.* v. *Fraser Surrey Docks*, Vancouver Supreme Court Registry #C896347. The other case, *Gagnier* v. *Canadian Forest Products Ltd*. (1990) 51 BCLR (2d) 218, was dismissed as this book went to press. *Gagnier* was decided on the issue of credibility, and did not deal with the Fisheries Act issues before the court.

413. *Environmental Protection Act*, RSO 1980, c. 141, Part IX.

414. Under the common law, damages were limited to those that were reasonably foreseeable.

415. Unless the specific pollutant causes a unique and characteristic type of cancer. For a further discussion of this problem, *see* P. Schuck, *Agent Orange on Trial* (Cambridge: Harvard University Press, 1986); and C. Sandborn, "Agent Orange on Trial" (1987) 21:2 *U.B.C. Law Review*, p.595.

416. sp;*See* for example, P. von Wilmowsky & G. Roller, "Civil Liability for Waste -- An Analysis of the Amended EC Draft Directive of 1991" (1991) 1 *Environmental Law Network International*, p.3.

417. For a discussion of this *see* C. Sandborn, "The Polluter Pay Principle Hits Adolescence: Statutory Trends in the Liability to Compensate" in, D. Sutherland, *Environmental Liability and Hazardous Waste Management* (Vancouver: Continuing Legal Education Society of British Columbia, 1989) p. 3.1.07.

418. Ontario Law Reform Commission, *Report on Damages for Environmental Harm* (Toronto: the Commission, 1990) pp.5-26.

419. Of course, it should be recognized that illegal dumping may be triggered by traditional command and control pollution regulation, as well as by economic measures.

420. R. Hahn, "An Evaluation of Options for Reducing Hazardous Waste" (1988) 12 Harvard Environmental Law Review, pp.218-219.

421. Unfortunately, the B.C. government has now adopted a policy of not allowing private citizens to actually conduct prosecutions, including environmental prosecutions. Citizens can still lay environmental charges, but prosecutions will actually be conducted, or stayed, by the Crown. In the past, citizens have conducted environmental prosecutions when the Crown refused to proceed. [Letter from William Stewart, Assistant Deputy Attorney General to C. Buchan, West Coast Environmental Law Association, 31 July 1991.]

422. As is provided in the *Canadian Environmental Protection Act*, SC 1988, c. 22, ss. 131 & 136.

423. As is provided in the "Spills Act", *Environmental Protection Act*, RSO 1980, c. 141, Part IX. *See also* the European Economic Community's Proposal for a Council Directive on Civil Liability for Damage Caused by Waste, COM (89) 282 final, O. J. C251/3 (1989) which proposes that producers of waste be liable for damage and injury to the environment caused by the waste, irrespective of fault. This proposed directive is discussed in J. Cameron & J. Abouchar, "The Precautionary Principle: A Fundamental Principle of Law and Policy for the Protection of the Global Environment" (1991) 14:1 *Boston College International and Comparative Law Review*, pp.12-13.

424. As recommended by the Ontario Law Reform Commission, *supra*, note 411. To avoid overpenalizing the polluter, credit might be given to the polluter for emission charges and other payments the polluter had previously made to compensate for environmental harm.

425. M. Stone, *supra*, note 335, at pp.56-60.

426. M. Stone, *supra*, note 360, at pp.96-97.

427. *Ibid*. at pp.64-65.

428. Rejecting the amount of the proposed fund as inadequate, the environmental assessment panel instead called for the proponent to post a bond or other security to "provide for any clean-up operations that can be anticipated in a `worst case scenario' and to provide compensation to parties who might be adversely effected." B. Williams, P. West & G. Davies, *Port Hardy Ferrochromium Review Panel*: *Final Report* (Vancouver: Federal Environment and Review Office, 1991) pp.106-108. The advantages of a bonding or insurance requirement are discussed below in the section on insurance.

429. City of Vancouver Task Force on Atmospheric Change, "Clouds of Change: Final Report of the City of Vancouver Task Force on Atmospheric Change", p.16 as

reproduced in, City of Vancouver, *Clouds of Change: Final Report of the City of Vancouver Task Force on Atmospheric Change*, vol. 1 (Vancouver, 1990).

430. *See* R. Brown, "Environmental Liability Insurance" (1991) 18:1 *Alternatives*, pp.18-24.

431. *Underground Storage Tanks Containing Petroleum, Financial Responsibility Requirements*, 40 CFR Parts 280-281, § i; and, *Petroleum Product Storage and Handling Regulation*, N.B. Reg. 87-97, pursuant to the *Clean Environment Act*, RSNB 1973, c. C-6, s. 32.

432. *See* B.C. Ministry of Environment, *News Release* (12 June 1989).

433. Personal Communication, D. Nichol of the B.C. Ministry of Environment with B. Wylynko, 19 September 1991.

434. Personal Communication, C. Buchan with Ministry of Environment official, August 1991.

435. Although it should be noted that the Panel was considering a plant that was, in some sense, an unproven pilot plant. *See* B. Williams, P. West & G. Davies*, Port Hardy Ferrochromium Review Panel*: *Final Report* (Vancouver: Federal Environment and Review Office, 1991) p.108. However, the Panel's basic reasoning -- that the company, not the innocent public, should bear the risk of environmental failure -- should apply to all industry.

436. S. Arrowsmith, *Government Procurement and Judicial Review* (Toronto: Carswell, 1988) p. 29; and, Office of Technology Assessment, *Facing America's Trash: What's Next for Municipal Waste?* (Washington: U.S. Congress, 1989) p. 331.

437. J. Robinson & C. Sandborn, "Government Purchasing Policy", in C. Sandborn, ed., *Law Reform for Sustainable Development in British Columbia* (Vancouver: Sustainable Development Committee, Canadian Bar Association, 1990) p. 103.

438. The B.C. government has already instituted a program of purchasing re-refined oil.

439. B. Commoner, (Address to the EPA/IACT International Conference on Pollution Prevention, 13 June 1990) reproduced in, Environment & Waste Management Committee, *SPARK Report: `Creating the Future' A Strategic Plan for the Environment Industry of B.C.* (Vancouver: Science Council of British Columbia, 1991) Appendix 2, pp. 17-18.

440. *Purchasing Commission Act*, RSBC 1979, c. 350, s. 4(2)(k).

441. As well as criteria developed by other environmental product labelling programs operating in Australia, Japan, the Nordic countries and Czechoslovakia. In addition, the U.S. Green Seal organization is developing criteria for environmentally preferable

products. *See* D. Anderson et al., "Labelling Environmental Claims" November/December (1990) *The Environmental Forum*, pp. 26-33. Also the U.S. EPA has already developed environmental criteria for use in government environmentally-conscious purchasing of some types of products. For example, the EPA has prepared criteria for lubricating oils containing re-refined oil. [Source: *Supra*, note 430, at pp. 104-105.]

442. Along the same lines, the government might also consider establishing official awards to be given to firms that excel at implementing pollution prevention technology. Such awards could be highly publicized. *See* C. Stenberg & R. Brown, *State Actions for Reducing Hazardous Waste* (Lexington: Council of State Governments, 1989) pp. 2-3, where the concept of giving Governor's Awards to firms that dramatically reduce their pollution is discussed.

443. "Ottawa Creates Pollution, Study Says" *Vancouver Sun* (23 April 1991) p. A6, citing a study of the 1991 federal budget done by Resource Futures International for Southam News.

444. *Supra*, note 435, at p. 6 discusses the pros and cons of high disposal and treatment fees.

445. D. Huisingh, "A Comprehensive Strategy for Achieving and Maintaining a Safe Clean Environment Through Emphasis Upon Pollution Prevention" (Address to the Conference on Low-Waste Technology, Tashkent, USSR, 15-19 October 1984) p. 13.

446. A. Williams, "A Study of Hazardous Waste Minimization in Europe" (1987) 165 *Environmental Affairs*, p. 219.

447. J. Linnerooth & A. Kneese, "Hazardous Waste Management: A West German Approach" *Resources* (Summer, 1989) p. 8.

448. However, it should be noted that a number of jurisdictions have encouraged preferred types of waste management by varying hazardous waste disposal fees according to the type of waste, the method of management, whether or not the waste was managed on or off the industrial site, and whether or not the waste was imported. [Source: *supra*, note 335, at pp. 106-108.] Such fee structures are probably defensible, providing that no overall subsidy is being provided to generators and users of toxic substances.

449. U.S. Office of Technology Assessment, *From Pollution to Prevention: A Progress Report on Waste Reduction* (Washington: U.S. Congress, 1987) pp. 27-29.

450. U.S. Office of Technology Assessment, *Serious Reduction of Hazardous Waste for Pollution and Industrial Efficiency* (Washington: U.S. Congress, 1986) p. 13.

451. *Reduction of use of toxic substances and hazardous waste generation*, Oregon Revised Statutes, 1989, c. 465.003, ss. 7(d).

452. For example, see the Japanese pollution-related health injury law and the U.S. coal mining taxes discussed above. *See* M. Stone, *supra*, note 335, at pp. 11 & 12, for an example of the economic arguments about the advantage of internalizing environmental costs.

453. For further discussion of using economic instruments to reduce pollution and hazardous waste, *see* W. Block, ed., *Economics and the Environment: A Reconciliation* (Vancouver: Fraser Institute, 1990); and, C. Russell, "Economic Incentives in the Management of Hazardous Wastes", D. Roe, "Barking up the Right Tree: Recent Progress in Focusing the Toxics Issue", C. Boronkay, "Source Reduction of Toxic Waste: Implications for Western Water Policy", and C. Folkerts & E. Eby, "A Federal Perspective on Waste Minimization" all in (1988) 13:2 *Columbia Journal of Environmental Law*, pp. 257-298.

CHAPTER 5 PUBLIC PARTICIPATION AND INFORMATION

In previous chapters, we discussed the regulatory, educational and economic aspects of developing a provincial strategy for preventing toxic pollution. None of these initiatives is likely to be very effective, or democratic, without two key things:

- strong public participation in pollution prevention decision-making; and
- a greatly improved system for collecting, analyzing and distributing relevant information.

Public participation and information are closely interrelated. For members of the public to contribute constructively and effectively to government decision-making they must have quick, affordable access to all the relevant environmental information. Toward this end, we discuss three important initiatives in this chapter:

- adopting legislation to enshrine the right of members of the public to have reasonable opportunities to participate in pollution prevention decision-making;
- adopting legislation to guarantee the public's right to access to information, and requiring the government to disseminate certain environmental information; and
- developing a strategy for bringing the government's environmental information system into the next century.

Opportunities for Public Participation

The World Commission on Environment and Development emphasized the importance of public participation:

In its broadest sense, the strategy for sustainable development aims to promote harmony among human beings and between humanity and nature. In the specific context of the development and environment crises of the 1980s, which current national and international political and economic institutions have not and perhaps cannot overcome, the pursuit of sustainable development requires ... a political system that secures effective citizen participation in decision making ...[454]

The right of members of the public to participate in pollution prevention decision-making is of fundamental importance for five main reasons:

- Citizens have a democratic right to participate in decision-making affecting our common environment. They are simply not satisfied that regulators and polluters have done an adequate job of protecting the environment in the past.
- Members of the public have many constructive ideas and practical knowledge to contribute toward solving pollution problems.
- Changes in personal behavior are one critical element of preventing pollution, and people will learn why and how to make these changes through participating in solving pollution problems.
- Social justice demands that if certain citizens are asked to bear the risks of measures for the benefit of society as a whole -- such as when decisions are made regarding management of residual pollutants -- then they should have a full opportunity to participate in the decision-making.
- Administrative fairness necessitates that if the polluters are to be consulted on regulatory changes, then others who consider themselves affected should be consulted as well.

The draft Economic Community of Europe (ECE) Charter on Environmental Rights and Obligations states in part:

(10) Everyone has the right to participate in the decision-making process for activities which do or could have a significant impact on the environment ...

(12) Everyone has the right to receive the information necessary to enable him [sic] to participate in a timely and effective manner in the decision-making process and to transmit comments on proposed activities to the competent authority before the formal decision is taken.[455]

In B.C., citizens currently have substantial rights to provide input to pollution control decisions which are made at the **regional** level.[456] But the present rules governing most **Victoria-based** pollution decisions provide virtually no rights for citizens to participate. For example, citizens have no right to receive notice of, or to comment on, proposed new or amended regulations[457] or Pollution Control Objectives. Yet, these are some of the most important pollution control decisions.

In practice, the B.C. Ministry of Environment has traditionally consulted with affected businesses on a confidential basis prior to making central decisions. Responding to recent pressure to extend the same courtesy to environmental interest groups, the Ministry has begun to offer a small number of organizations[458] an opportunity to comment on draft regulations on a confidential, short-notice basis.

While this is a welcome step forward, it will not be workable on a long-term basis. There are a wide variety of groups and individuals[459] that are concerned and want an opportunity for input into many pollution prevention decisions. They will not accept that secret meetings with government-selected organizations are an adequate substitute for their own opportunity to have notice of, and an opportunity to comment on, key decisions.

Civil servants express the fear that broader public consultation on pollution control decisions will cause adverse media attention, take too much staff time and delay decision-making.[460] While these are valid concerns, it seems clear that there is no viable alternative to providing opportunities for public input into these decisions. The key, in our view, is to design a practical system to ensure that people who want to participate in centralized decision-making processes have an opportunity to do so, while at the same time ensuring that the process is quick and efficient. This task is particularly urgent because of the Province's recent initiatives to develop new and revised regulations and Pollution Objective Guidelines.[461]

At the federal level, the Federal Regulatory Plan[462] annually sets out the anticipated regulatory developments by all government departments, including Environment Canada and the Department of Fisheries and Oceans. The federal *Citizen's Code of Regulatory Fairness* requires regulators to provide "adequate early notice of possible regulatory initiatives" and to "encourage and facilitate an opportunity for full consultation and participation by Canadians in the federal regulatory process."[463] In practice, federal environmental regulators usually do provide this notice and opportunity for comment. In addition, federal procedures require draft regulations to be published for public comment at least 30 days prior to finalization[464] and certain statutes, such as the *Canadian Environmental Protection Act*, require 60 days for public comment.[465]

Recommendation 28. B.C. legislation should be amended to enshrine the right of members of the public to have reasonable opportunities to participate in pollution prevention decision-making, including the right to notice of, and an opportunity to comment on, proposed new or revised regulations or guidelines, such as Pollution Control Objectives.

Public Right to Information

Need for an Access to Information Act

The Ombudsman of B.C. recently set out eloquently the rationale for effective public access to information by government:

At its essence, democracy ensures that each individual is treated fairly. This can only be achieved through our meaningful participation in the affairs of government ... Unfortunately, the traditional political and judicial accountability mechanisms are not in themselves sufficient to ensure meaningful participation and individual fairness ... In order to deal effectively with potential unfairness, public administrators must be sensitized to the impact of their actions and decisions on individuals, and individuals must be empowered to participate meaningfully in the processes of government which affect themselves and their communities. **Fundamental to such sensitivity and participation is effective access to public information held by government.** [emphasis added][466]

B.C. is one of the few remaining provinces in Canada not to have legislation enshrining the right of the public to access to information held by government. In June 1991, the government introduced a "discussion Bill" called the *Access to Information and Protection of Privacy Act*. As expected, this Bill died on the Order Paper when the Legislature's session ended. Thus, although both the Government and the Opposition support the adoption of legislation on access to information and privacy, the current situation remains as it was described by the Ombudsman in March 1991:

Presently, members of the public have no absolute right to obtain information kept by provincial government agencies in British Columbia. Decisions about what information should be disclosed in the public interest are discretionary; they are often made by individual ministers and there is no consistency.[467]

We recommend below that B.C. adopt legislation on public access to information and privacy, echoing calls that have been made previously by the Canadian Bar Association, B.C. Branch,[468] the B.C. Library Association[469] and the B.C. Freedom of Information and Privacy Association. This is consistent with the provisions of the draft ECE Charter on Environmental Rights and Obligations, which states in part:

(4) Everyone has the right of access to adequate information relevant to the environment, including information on products and activities which could or do significantly affect the environment and on environmental protection measures. The information shall be provided in a clear way, be understandable to the public in general, and be without unreasonable financial burden for the applicant.

(5) Everyone has the right to receive adequate information about potential sources of accidents, including contingency planning ...[470]

Dissemination of Information

Access to information legislation and policies are traditionally oriented toward the provision of information by government on the **request** of an individual. The development of legislation and policy on access to information should not be seen as replacing the need for routine **dissemination** of certain information by the government. There are many areas in which the public is best served by routine

dissemination of information without the need for individuals to make specific, sometimes redundant, requests.

There is a trend toward requiring governments to report relevant environmental information to the public. The draft ECE Charter on Environmental Rights and Obligations states in part:

(5) Everyone has the right ... to be informed immediately when an emergency occurs ...

(8) Everyone has the right to receive at regular intervals reports prepared by competent authorities on the state of the environment at local, provincial, and national levels.

(9) Public bodies have the responsibility and accountability to report regularly on the extent to which their activities have had a significant effect on the environment ...

(13) Everyone who participates in the decision-making process has the right to be informed without delay of the reasons for the decision that is taken and in such a manner that he [sic] can identify the extent to which his suggestions and objections have been taken into account.[471]

This new European approach is partially reflected in Ontario's legislation[472] which imposes a duty on the government to disclose without request information which reveals an environmental, public health or safety hazard.

Information on environmental standards, compliance and enforcement should be considered **legal information** because it is "relevant to the public and other participants in the legal system for the determination and understanding of legal rights."[473] This wide-ranging definition of legal information was recently adopted by a Canadian Legal Information Centre working group chaired by Reg Evans, Q.C. The group includes **dissemination** of information in the following proposed principles concerning access to legal information:

(1) Public access to legal information is an essential democratic right.

(2) Those who produce and store legal information have a duty to make it available to the public.

(3) Access should be quick and convenient.

(4) Access to legal information should not be restricted because of cost.

(5) Access to legal information should be as timely, clear, accurate and comprehensive as possible.

(6) Legal information should be conveniently available, disseminated, or distributed, according to the nature of the information and the nature of the user.

(7) Legal information should be equitably accessible to all users and accommodate special needs.

(8) Legal information should be available in official languages and in other languages where warranted.

(9) Legal information should be clear. [emphasis added][474]

These principles should be followed in the design of information access and dissemination systems. Also, methods of **collecting** information should be designed to enhance implementation of the above principles.

Recommendation 29. The Province of British Columbia should move expeditiously to adopt legislation on public access to information and privacy, including provisions requiring the government to disseminate environmental information in designated circumstances.

An Information Strategy

All aspects of pollution regulation -- standards, compliance, enforcement and knowledge of environmental impacts -- are in a state of very rapid change. Yet B.C.'s system for collecting, storing, analyzing and distributing information on these critically important subjects is out of date.

Environmental Standards

The few environmental standards that are set out in federal or provincial statutes or regulations are readily available in libraries. But this is an exception. By far the greatest number of environmental standards -- and the most crucial standards -- are contained in permits, licences, leases, approvals and other documents that are specific to a particular situation.[475] The standards contained in these documents are exceedingly difficult to obtain, particularly where the object is to compare or summarize standards from more than one document.

There are two reasons for this problem. First, documents are usually stored only in the offices of the regulator and regulatee. This poses a severe problem for citizens seeking access to environmental standards of the provincial government, which utilizes a decentralized administrative structure. For instance, if a citizen wants to know what environmental standards apply to sawmills or municipal sewage systems across the Province, he or she would have to contact each of six regional offices.

The second impediment to access to these environmental standards is the series of minor and major hurdles citizens must surmount to actually obtain the desired

information. Some offices are better than others, but there are some offices where delays of months are common. Sometimes, officials will insist that an inquirer actually come in to the office, no matter how distant. Moreover, the Ministry of Environment charges an unreasonable fee of $1 per page for photocopying.

We recommend below that the Privince of B.C. establish a central registry of environmental standards in B.C. All of the documents involved are entered into computers already. They need to be put into a central database and indexed. Copies of the database could be distributed to the public library system, which is rapidly implementing the technology to make such databases available to the public. This would facilitate easy public access and would also take some of the workload off government offices.

Compliance

Closely related to the current absence of an adequate information system for environmental standards in B.C. is the rudimentary but improving state of public information on the state of compliance[476] or non-compliance with environmental standards in B.C.

In May 1988, West Coast Environmental Law Association released information obtained from the **federal** government about the widespread non-compliance by B.C. pulp mills with **provincial** pollution standards.[477] Following media coverage of this, and pressure from numerous organizations concerned about pollution from pulp mills, then-Minister of the Environment Bruce Strachan released two summaries of the compliance status of pulp mills in B.C. with respect to their air emission and water discharge permits under the *Waste Management Act*. They showed that, as of June 1988[478] and April 1989,[479] not a single pulp mill in B.C. met all of its air and water pollution standards[480] without the benefit of a variance order. Subsequently, then-Minister John Reynolds announced the government's intention to release a quarterly report on polluters who fail to comply with pollution standards or who are a pollution concern to the Ministry. A report covering March to May was released in July 1990. A June to August report was released in December 1990.[481] Then, there was a delay until a "semi-annual" report covering September 1990 to February 1991 was released in July 1991.[482]

This series of non-compliance reports issued by the B.C. government is a major step ahead. But we note two problems. First, the timing of the reports is sporadic and the period of coverage -- six months, in the most recent report -- is too long.[483] The July 1991 report covered September 1990 to February 1991. Thus, a pollution problem that occurred in September 1990 would not have been reported until ten months later. This lag could seriously interfere with citizens' ability to participate in decision-making regarding that particular problem. The public has a right to know reasonably promptly the status of polluters' compliance or non-compliance with environmental standards, and this should be enshrined in statute. It is our view that prompt **quarterly** non-compliance reports would be much more useful than **semi-annual** reports.

A second problem is that the reports include only the 'problem' permits, and information is not readily available on all the others. Periodic information on a limited number of permits is ideally suited for storage on a computerized database. Once such a system was installed it would vastly simplify and speed up the process of generating reports. And, with reasonable provisions for public access, citizens could have access to up-to-date information on the pollution permit(s) of interest to them. This management information should be linked to the computerized State of the Environment reporting system which the federal government has undertaken, and which the Province has recently promised to develop.[484]

Enforcement

It is not enough to know that a polluter is violating the legal standards -- the public should be told the status of the government's **response** to the situation. The December 1990 quarterly compliance report came with a list of environmental prosecutions from April to September 1990. This was a good start, but it would have been much more useful if it indicated the current status of the charges, e.g., set for trial, conviction, sentence, appeal filed, etc. Regular, public non-compliance reporting should include the current status of any prosecutions, as well as the current status of any non-prosecutorial response by the government.

A related issue is that there are a large number of permittees (41 in the July 1991 report[485]) listed as a "pollution concern to the Ministry" which are **not** in significant non-compliance with environmental standards.[486] In many cases, this reflects the fact that the standards are too lax or do not cover a particular problem. The government should be required to report on the steps it is taking to correct the environmental standards in these cases.

Effects Monitoring and Other Information

In addition to compliance monitoring, regulated polluters are sometimes required by the provincial government to conduct "effects monitoring" -- studies of the nature of particular pollutants and their impact on the environment. The results of these studies are normally available, at least for viewing, at regional offices. But there is no list of the studies, no index to it, and no public access at a central location. These reports should be incorporated into the State of the Environment information system.

Moreover, effects monitoring should be required by the government much more frequently and should be designed on an industry-wide basis. The proposed federal package of pulp mill pollution regulations under the *Canadian Environmental Protection Act*[487] and the *Fisheries Act*[488] does institute standardized environmental effects monitoring for that industry. The Province should follow suit. The regulations (as recommended in Chapter 2) or guidelines that replace the Pollution Control Objectives should set out standard protocols for environmental effects monitoring. This would require that the Province and the federal government coordinate their monitoring and research programs, but this should be happening anyway.

In addition to compliance and effects monitoring, the Ministry receives reports of spills,[489] registrations by generators of hazardous waste[490] and manifests of shipments of dangerous goods.[491] These sources provide the provincial government with massive amounts of data on the use and discharge of toxics in British Columbia. And apparently these reports are stored on computers. But the information is not centrally organized, it is not all routinely analyzed, and it is not readily available to the public. Like effects monitoring information, this information should be incorporated into the State of the Environment information system.

Also, the government should insist that compliance and effects monitoring data from companies -- which is virtually always prepared on a computer -- be supplied to the government in both hard copy and electronic form. This would eliminate the delays caused by rekeying (and double checking) compliance information. In the 1990s, rekeying data should be considered as anachronistic and wasteful as retyping a document instead of photocopying it.

An example of an effective system for public access to computerized toxics information is the U.S. 'SARA section 313' data base. In 1986, the *Superfund Amendments and Reauthorization Act* (SARA)[492] required companies using over 10,000 pounds per year of any chemical on a list of approximately 300 chemicals to report their use and discharge to the U.S. Environmental Protection Agency. The public was guaranteed access to the information, which is kept in a publicly accessible data bank. This information has proven to be very valuable to government, industry and members of the public in assessing the toxic contaminant situation in the United States. It has helped to make industry directly accountable to local communities for the amount of hazardous waste being generated in local neighbourhoods.

Up to this point, the B.C. Ministry of Environment's collection, storage and dissemination of pollution prevention information is developing without the benefit of an overall strategy or plan. It is our view that such a strategy has become essential. Continued *ad hoc* efforts to improve the Ministry's information systems will have only limited value. This strategy should ensure that there is regular dissemination and convenient public and government access to timely, reliable information on:

(1) pollution standards and guidelines, and the measures underway to revise them;

(2) polluters who are out of compliance with enforceable pollution standards;

(3) polluters who are in compliance but are a pollution concern to the Ministry, and the steps the Ministry is taking to revise the standards in response;

(4) the current status of prosecutions or other actions taken by the government in response to non-compliance; and

(5) the extent and impact of pollution on the environment.

In developing this strategy, the Ministry should bear in mind the principles concerning public access to legal information recently prepared for the Canadian Legal Information Centre[493] (set out above). With public participation and suitable expert assistance, an information strategy could be developed which would move this province's environmental communications into the next century.

Recommendation 30. With outside assistance, including public participation, the Province of British Columbia should prepare a strategy for consolidating and substantially upgrading its systems for collecting, storing, analyzing, disseminating and making publicly available environmental information.

ENDNOTES

454. World Commission on Environment and Development, Our Common Future (Oxford: Oxford University Press, 1987) p. 65.

455. S. Kromberg & R. Malkenes, "The Charter on Environmental Rights: Reality by 1992?" (1991) 2 ECOmmunication p. 3.

456. Under the Waste Management Regulation, BC Reg 432/82, s. 5, any "person who may be adversely affected by the granting of a permit" may file comments on an application for a permit or an amendment of a permit, and may participate in a meeting with the applicant to resolve the concerns. Under the *Waste Management Act*, SBC 1982, c. 41, s. 26, "a person who considers himself aggrieved" may appeal a regional decision to the Director of Waste Management, and may appeal a decision of the Director to the B.C. Environmental Appeal Board.

457. Pulp Mill and Pulp and Paper Mill Liquid Effluent Control Regulation, BC Reg 470/90. The regulation sets limits on the allowable level of organochlorines in effluent, requires the installation of secondary wastewater treatment facilities, and imposes the same standards for suspended solids and biochemical oxygen demand on all mills (after phase-in periods specified for certain mills).

458. Such as the West Coast Environmental Law Association.

459. Such as unions, residents' associations, native Indian organizations, environmental groups, outdoor recreation groups, tourism bodies and many more.

460. This has been expressed in various personal communications with the authors.

461. The revised Pollution Control Objectives are to be renamed Waste Discharge Criteria. [Source: "Draft Procedure Manual Chapter, Waste Discharge Criteria Based on (BACT) Best Available Control Technology," enclosed with a letter dated 15 January 1991, from J. O'Riordan, Assistant Deputy Minister, B.C. Ministry of Environment, to W. Andrews, West Coast Environmental Law Association.]

462. Office of Privatization and Regulatory Affairs, *Federal Regulatory Plan* (Ottawa: Ministry of Supply and Services, annual).

463. Office of Privatization and Regulatory Affairs, *Federal Regulatory Plan 1990* (Ottawa: Ministry of Supply and Services, 1990) p. xi.

464. Treasury Board of Canada Secretariat, *The Federal Regulatory Process: An Interim Procedures Manual for Departments and Agencies* (Ottawa: the Secretariat, 1991).

465. *Canadian Environmental Protection Act*, SC 1988, c. 22, s. 48.

466. S. Owen, Ombudsman of British Columbia, Public Report No. 26, Access to Information and Privacy (Victoria: the Office, 1991) pp. 1-2.

467. Ibid. at p. 3.

468. Since 1980, the B.C. Branch of the Canadian Bar Association has been calling on the B.C. government to adopt access to information legislation. This call was repeated most recently at its annual meeting in Vancouver 21 June 1991.

469. At its annual meeting in Vancouver in April 1991.

470. Supra, note 455, at p. 4.

471. *Ibid.*

472. *Freedom of Information and Protection of Privacy Act, 1987*, SO 1987, c. 25, s. 11.

473. Canadian Legal Information Centre, *Legal Information Access Ideals, Discussion Paper, Eighth Draft* (Toronto: the Centre, 1991) p. 4.

474. Ibid.

475. Examples include waste discharge permits, leases or licences of occupation of Crown land, e.g., for aquaculture or coastal log handling, timber cutting permits, and approvals-in-principle or certificates for mine developments, linear developments or energy projects.

476. We define "compliance" as the state of conformity with the law, and "enforcement" as the process by which governments ensure compliance. These definitions are utilized in the *Canadian Environmental Protection Act: Enforcement and Compliance Policy* (Ottawa: Minister of Environment, 1988).

477. W. Andrews, "We Need a B.C. Access to Information Act" (Address to the B.C. Environmental Education Provincial Specialist Association, Vancouver, 7 May 1988) [unpublished].

478. B.C. Ministry of Environment and Parks, Waste Management Program, "Pulpmill Compliance Summary" (20 June 1988). Three mills had variance orders.

479. B.C. Ministry of Environment and Parks, Waste Management Program, "Pulpmill Compliance Summary" (April 1989). One mill had a variance order. One mill was in compliance with its air emissions permit and discharges its effluent through the discharge pipe of an adjacent mill whose effluent permit was out of compliance.

480. For air pollution, the pollutants measured are particulate and "total reduced sulphur" (TRS). For water pollution, the pollutants measured are "total suspended solids" (TSS), "biochemical oxygen demand" (BOD) and acute toxicity (the capacity of the effluent -- or a dilute solution of it -- to kill more than 50% of test fish within 96 hours).

481. B.C. Environment, News Release 1990:121, "Second Non-Compliance/Pollution Concern List Released" (12 December 1990).

482. B.C. Environment, News Release 1991:114, "Status Report on Pulp Mill Effluents Released" (17 July 1991).

483. It should be noted that the lag in the **federal** government's compliance reporting is still measured in **years** not months.

484. B.C. Environment, *Environment 2001: Strategic Directions for British Columbia* (Victoria: the Ministry, 1991).

485. *Supra*, note 482.

486. B.C. Environment, *Report of Significant Non-Compliance Evaluation of Waste Management Permits* (Victoria: the Ministry, July 1991); and B.C. Environment, *Report 2 -- Waste Discharges, Special Waste Sites and Contaminated Sites Not in Report I But That Are A Pollution Concern to the Ministry* (Victoria: the Ministry, July 1991).

487. SC 1988, c. 22.

488. RSC 1985, c. F-14

489. Spill Reporting Regulation, BC Reg 263/90.

490. Special Waste Regulations, BC Reg 63/88.

491. *Transport of Dangerous Goods Act*, SBC 1985, c. 17.

492. *Superfund Amendments and Reauthorization Act* (SARA) 42 USC, s. 9601 (35)(A) (Supp. IV, 1986), which amended the *Comprehensive Environmental Response, Compensation and Liability Act* (CERCLA) 42 USC, ss. 9601-9657.

493. *Supra*, note 473.

CHAPTER 6 CONCLUSION

It is time for the Province of British Columbia to form a comprehensive strategy to prevent toxic pollution. The recommendations in this report are a starting point for discussion on such a strategy. We call on industry, citizens groups, municipalities and

government agencies to come forward with their own visions of what the strategy should contain. All of these groups can give the government valuable advice on initiatives that would be effective and practical.

After all affected parties have been fully consulted, the provincial government should adopt the strategy. The principles, purposes, and structures of this strategy should be enshrined in legislation. It is true that many of the specific proposals could be developed without enacting legislation. However, the imprimatur of the Legislature is necessary to ensure that our long-term pollution prevention strategy is a genuine change of direction, not just a passing political phase.

Today, the people of British Columbia demand action by the provincial government on the pressing issue of toxic pollution. Tomorrow, future generations of British Columbians will take careful note of the provincial government's response.

APPENDIX A LIST OF RECOMMENDATIONS

Chapter 1

Recommendation 1. The Province of British Columbia should adopt the precautionary principle -- taking action without waiting for conclusive proof of harm -- as the basis of its pollution policies and laws.

Recommendation 2. The Province of British Columbia should enact legislation requiring provincial authorities to promote and adhere to a waste management hierarchy that places reduction of waste generated as the most preferred option.

Chapter 2

Recommendation 3. The Province of British Columbia should amend the *Waste Management Act* (or include a provision in legislation replacing that Act) to specify that a central purpose of the legislation is to eliminate the discharge of persistent toxic pollutants according to urgent and realistic timetables.

Recommendation 4. The Province of British Columbia should utilize the identification-and-prioritization mechanism recommended below to phase out -- to '*sunset*' -- the use, production and import of high-priority substances that cause toxic contamination or other environmental problems.

Recommendation 5. The Province of British Columbia should enact legislation to establish a mechanism including public participation to identify, prioritize, assess and regulate particular sources of pollution and particular contaminants.

Recommendation 6. The Province of British Columbia should replace the Pollution Control Objectives with regulations covering water, air and land. These regulations should set enforceable, minimum standards and clearly specify that a pollution permit

for a specific discharger should, in specified situations, set more stringent standards and other requirements not covered by the regulation.

Recommendation 7. The Province of British Columbia should enact legislation to require that pollution regulations, guidelines and permits set out explicit timetables for expected improvements, and that these be reviewed and revised on a periodic basis, such as every five years.

Recommendation 8. The Province of British Columbia should enact legislation mandating the Ministry of Environment to advocate pollution prevention in land use planning processes and environmental impact assessment processes.

Recommendation 9. The Province of British Columbia should pursue vigorous enforcement to achieve compliance with environmental standards. It should also buttress the present enforcement mechanisms by:

(1) expanding the liability of directors and officers of corporations;

(2) introducing innovative sentencing options;

(3) enacting statutory 'civil suit' provisions, to impose absolute liability for damages caused by illegal pollution;

(4) clearly reinstating private prosecutions for environmental offences; and

(5) decentralizing enforcement powers to the regional level.

Recommendation 10. Following a reasonable opportunity for public input, the Province of British Columbia should enact comprehensive legislation to govern the identification and clean-up of contaminated sites in the province.

Recommendation 11. The Province of British Columbia should take additional steps to curtail the entry of pollutants, especially persistent toxic contaminants, into municipal waste systems by:

(1) requiring regional districts and municipalities not in a regional district to submit waste management plans for sewage;

(2) specifying that municipal waste management plans must include rigorous controls against the entry of pollutants, especially persistent toxic contaminants, into municipal solid and liquid waste systems; and

(3) considering the adoption of province-wide regulations to phase out the entry of persistent toxic pollutants into municipal waste systems.

Recommendation 12. The Province of British Columbia should adopt a concerted program to prevent and control nonpoint sources of pollution in B.C., giving serious consideration to a watershed- and airshed-based approach.

Chapter 3

Recommendation 13. The Province of British Columbia should establish a B.C. Pollution Prevention Centre. The Government should also dramatically increase its support for, and involvement with, the Pacific Northwest Pollution Prevention Research Center. Funding for these initiatives should come from the pollution taxes and charges outlined in Chapter 4.

Recommendation 14. The Province of British Columbia should fund pollution prevention demonstration projects in high-priority polluting industries, with an emphasis on industries that might not otherwise have sufficient capital funds to undertake such projects. Funding for such projects should be derived from the pollution taxes and charges discussed in Chapter 4.

Recommendation 15. The Province of British Columbia should provide financial assistance to selected firms that implement pollution prevention programs. Such assistance should focus on:

(1) target groups, where severe difficulties would occur otherwise;

(2) well-defined transition periods for particular industries; and

(3) the development of new clean technology.

Recommendation 16. The Province of British Columbia should enact legislation requiring polluters to prepare toxics use reduction plans that contain goals that will meet or exceed enforceable pollution standards set through regulations and permits.

Chapter 4

Recommendation 17. The Province of British Columbia should promptly establish an emission charge system for waste discharges in the Province, based on the principle that 'the more you pollute, the more you pay.' The system should apply only to discharges that are within regulatory standards.

Recommendation 18. The Province of British Columbia should establish a system of product taxes on environmentally harmful products. The system should focus on products where clearly preferable alternative products exist, and where tax differentiation might make the crucial difference in 'flipping the market' toward consumption of the preferable products. Tax/rebate schemes such as the gas guzzler tax/gas sipper rebate should also be established.

Recommendation 19. The Province of British Columbia should enact legislation on deposit/refund systems, establishing a mechanism to identify, prioritize and implement such systems for those toxics-containing products where the establishment of a deposit/refund requirement would be the most effective way of ameliorating disposal problems. The Province should then establish a deposit/refund system for the identified products.

Recommendation 20. The Province of British Columbia should develop legislation to require that manufacturers, distributors, and retailers of products containing toxics must take direct responsibility for the disposal of such products.

Recommendation 21. The Province of British Columbia should consider:

(1) establishing a minimum level of recycling which must be met by manufacturers, processors and importers of oil, automobile batteries and other hazardous products; and

(2) allowing companies to meet the mandated level by recycling themselves, purchasing products containing recycled materials from reprocessors, or by purchasing recycling credits from reprocessors.

Recommendation 22. The Province of British Columbia should enact legislation to expand the civil liability of polluters, to ensure that they pay the full cost of their pollution. Such legislation should:

(1) allow individuals to recover for loss or damage suffered as a result of violation of the *Waste Management Act* and other environmental legislation;

(2) establish absolute civil liability for the cost of cleaning up spills and other escapes of toxics, and strict liability for loss or damage resulting from spills and other escapes of toxics;

(3) lower or partially reverse the burden of proof in pollution cases, if deemed appropriate, after further study; and

(4) create a new civil remedy that would allow an award of damages payable to compensate the public for harm done to the environment *per se*.

Recommendation 23. The Province of British Columbia should study the possibility of establishing environmental levy/victim compensation schemes. Any such scheme implemented must provide:

(1) full and fair compensation for victims;

(2) significant deterrence against polluting activities; and

(3) adequate and continuing economic incentives to eliminate or reduce pollution as much as possible.

Recommendation 24. The Province of British Columbia should establish a mandatory requirement that all companies that create, or have the potential to create, toxic pollution or hazardous waste must carry insurance or post financial security to cover pollution clean-up and damages. The amount of the insurance or security should be sufficient to adequately compensate for potential 'worst-case scenario' pollution damages.

Recommendation 25. The Province of British Columbia should apply pollution prevention criteria to all government purchases. Preference should be given to products that are produced with clean technology over products that are associated with toxic pollution.

Recommendation 26. The Province of British Columbia should review all of its subsidy programs to eliminate subsidies for industries that create toxic pollution, except where the subsidy is connected to implementation of pollution prevention measures.

Recommendation 27. The Province of British Columbia should study whether business accounting procedures should be altered to better reflect present and future environmental liabilities.

CHAPTER 5

Recommendation 28. B.C. legislation should be amended to enshrine the right of members of the public to have reasonable opportunities to participate in pollution prevention decision-making, including the right to notice of, and an opportunity to comment on, proposed new or revised regulations or guidelines, such as Pollution Control Objectives.

Recommendation 29. The Province of British Columbia should move expeditiously to adopt legislation on public access to information and privacy, including provisions requiring the government to disseminate environmental information in designated circumstances.

Recommendation 30. With outside assistance, including public participation, the Province of British Columbia should prepare a strategy for consolidating and substantially upgrading its systems for collecting, storing, analyzing, disseminating and making publicly available environmental information.

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