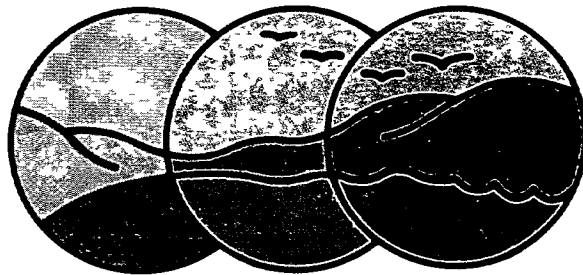

The National
Contaminated Sites
Remediation Program



1991-1992
ANNUAL REPORT

CCME

Canadian Council of Ministers
of the Environment Le Conseil canadien
des ministres de l'environnement

The Canadian Council of Ministers of the Environment (CCME) is the major intergovernmental forum in Canada for discussion and joint action on environmental issues of national, international and global concern. The 13 member governments work as partners in developing nationally consistent environmental standards, practices and legislation.

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Introduction

In October 1989, the five-year, \$250 million National Contaminated Sites Remediation Program (NCSRP) was initiated by the Canadian Council of Ministers of the Environment (CCME) to deal with properties across the country that have been polluted with hazardous materials. Such contamination may originate from abandoned landfills, byproducts of industrial activity, leaks from underground storage tanks, transportation spills and remnants of industrial plants improperly shut down. Whatever the pollution source, the NCSRP's focus is to ensure the appropriate cleanup of sites where contamination is a serious threat to human health or environmental quality.

The "Polluter Pays" Principle

The CCME has affirmed that the "polluter pays" is the program's guiding principle. Accordingly, the federal, provincial and territorial governments have begun to put in place the legal tools for applying this principle. In November 1991, the CCME Task Group on Contaminated Sites participated in a workshop focusing on effective legislation. Convened by the Canadian Institute for Environmental Law and Policy, it was an important step in resolving key legal issues as governments develop remediation laws and regulations.

Orphan Sites

When a polluter cannot be charged with the task of remediation, the program's "orphan" sites component comes into play. The federal government has entered into agreements with individual provincial and territorial governments to clean up high-risk properties for which a responsible party cannot be found, or where the owner is unable or unwilling to finance a remediation project. The costs are divided equally between Environment Canada and the respective provincial and territorial environment departments. Collectively, the governments have agreed to commit a total of \$200 million to orphan sites over the program's five-year life.

Technology Development

The primary goal of the program's Development and Demonstration of Site Remediation Technology (DESRT) component is to work with industry to develop and test new methods for assessing and cleaning up contaminated sites, and to bring them to commercial viability. This is a relatively new field in which Canadian industry has the opportunity to develop and market its expertise both domestically and internationally. The federal government and participating provinces and territories will each fund half the cost of demonstration projects from a total commitment not to exceed \$50 million for the DESRT portion of the program. Under DESRT, the financial participation of proponents is encouraged to the maximum extent possible.



Nine Bilateral Agreements Implemented

At the end of the 1991-92 fiscal year, eight provinces and one territory had signed agreements with the federal government to participate in the NCSRP. The latest to join were Newfoundland and Labrador, Prince Edward Island, and the Northwest Territories. In the program's first year, bilateral agreements were put into place between the Government of Canada and British Columbia, Alberta, Ontario, Quebec, New Brunswick and Nova Scotia. While Saskatchewan, Manitoba and the Yukon Territory had not signed bilateral agreements with the federal government as of March 31, 1992, all three jurisdictions have participated actively in other areas of the program, with a view to signing agreements in the near future.

As jointly agreed within the CCME, each province has access to a percentage of the federal contribution based on the size of its population.

The bilateral agreements that have been signed to date commit the following amounts to orphan sites remediation and technology demonstration over the life of the program:

| | |
|---------------------------|------------------|
| Prince Edward Island | \$ 1.25 million |
| Newfoundland and Labrador | \$ 5.50 million |
| Northwest Territories | \$ 50 million |
| British Columbia | \$ 29.25 million |
| Alberta | \$ 23.25 million |
| Ontario | \$ 91.25 million |
| Quebec | \$ 63.75 million |
| New Brunswick | \$ 6.75 million |
| Nova Scotia | \$ 8.50 million |
| Total | \$230.00 million |

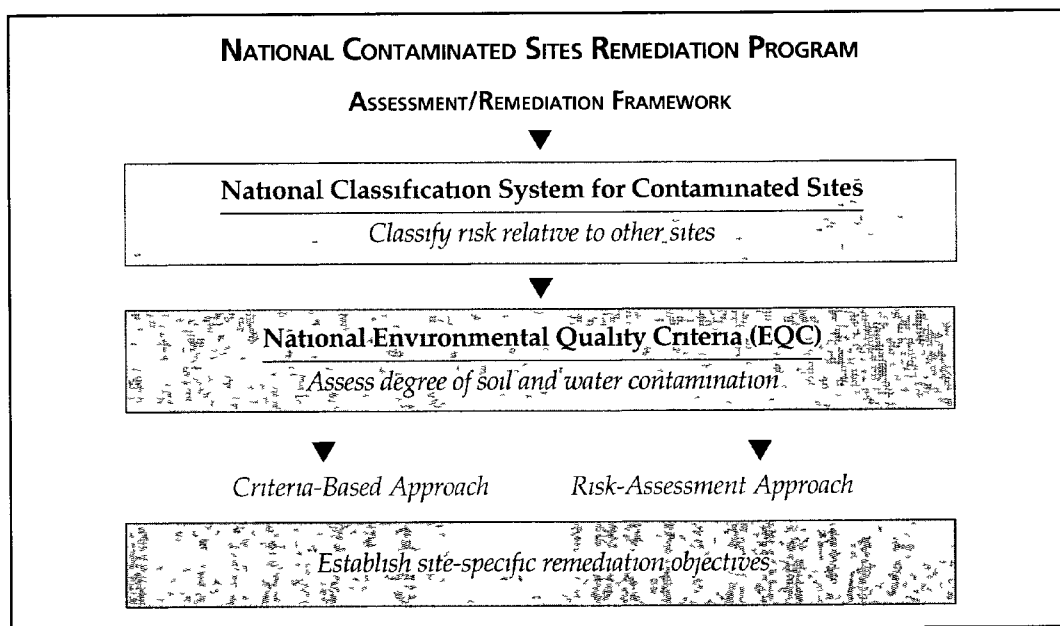
A National Approach

Progress continues to be made toward developing a consistent, national approach to the remediation of Canada's contaminated sites. In March 1992, the CCME released a National Classification System for Contaminated Sites, a culmination of the extensive work done in the program's first year of operation. Its purpose is to serve as a screening tool for evaluating contaminated sites according to the threat they pose to human health or the environment. To facilitate the efficient storage, retrieval and updating of site classification information, the National Classification System has also been made available as a stand-alone computer data base program.

At the same time, work continues on the establishment of National Environmental Quality Criteria. The criteria, expressed as concentrations of individual contaminants, serve as benchmarks for measuring the degree of soil and water contamination at specific sites. They also form the basis for determining the state to which the environment must be restored so that it is safe for its intended use—whether that use is agricultural, residential, parkland, commercial or industrial.

Considerable progress has also been made toward developing technical guidance for the establishment of site-specific remediation objectives. Two complementary but distinct approaches are being pursued in this regard: a "criteria-based approach," which involves the direct application of the Canadian Environmental Quality Criteria, and a "risk-assessment approach," which involves characterizing potential hazards posed by the contaminants at a particular site.

In March 1992, an international workshop of experts was convened under the auspices of the NCSRP to discuss a draft risk assessment framework that reflects one of the overall objectives of the program, to give equal consideration to human health and ecological risk when dealing with contaminated sites. The CCME will issue a final risk-assessment guidance document in late 1992.



Site-Specific Activities

In FY 1991-92, the NCSRP's second year, 20 site remediation projects and 14 technology development demonstration projects were under way across the country, representing close to \$33 million in expenditures in the program's first two years. Three additional technology demonstration projects were approved for funding late in the year and will start in FY 1992-93.

British Columbia

Development and Demonstration of Site Remediation Technology (DESRT) Projects

The province of British Columbia is focusing considerable effort on the identification of appropriate technologies for the rehabilitation of Pacific Place, an 85-hectare former

industrial waterfront area in Vancouver that served as the site for EXPO '86. Over the past 100 years, the soil and groundwater have become polluted by a variety of industrial activities, including railway maintenance facilities and coal gasification plants.

Under the NCSRP, the province and the federal government are conducting soil treatability studies to determine the effectiveness of various treatment technologies proposed by environmental remediation firms to deal with contamination at the Pacific Place site. Evaluation of technologies by six vendors were completed in the 1991-92 fiscal year, which focused on stabilization/solidification, bioremediation and thermal extraction.

Alberta

Orphan Site Remediation Projects

Work on two orphan sites initiated in the program's first year continued in 1991-92. Projects at Canada Creosote in Calgary, and Peerless Wood Preservers in Cayley, both involve the cleanup of soil and groundwater contaminated by wood preservatives.

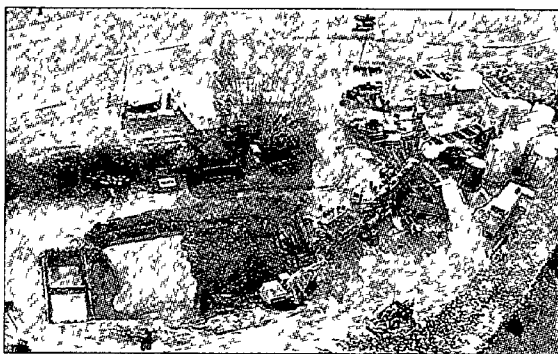
Canada Creosote, Calgary

Creosote waste from the property has seeped into the soil, contaminating the groundwater and nearby Bow River. Under the program, a berm has been built to control the migration of contaminants from the site to the river. Several studies have also been completed evaluating the feasibility of alternative remedial options, using either on-site bioremediation or constructing a subsurface barrier to contain the contamination.

Peerless Wood Preservers, Cayley

Soil at the Peerless site is highly contaminated with wood preservative waste, specifically pentachlorophenol (PCP). Groundwater beneath the site also has elevated levels of PCP, but there is no immediate risk to local drinking water. To date, contaminated sludge from the lagoon has been removed and securely stored on the site until a field scale bioremediation project is completed in FY 1992-93.

Development and Demonstration of Site Remediation Technology (DESRT) Projects



Canada Creosote Site

Canada Creosote, Calgary

An on-site pilot test of technology for washing contaminated river-bed gravel was successfully completed in 1991 by the Alberta Research Council and Acres International.

Peerless Wood Preservers, Cayley

The Alberta Research Council successfully used naturally occurring bacteria to treat contaminated soil in

bench scale laboratory tests. The Alberta Research Council also studied the feasibility of using hydraulic methods to prevent chemical migration in the groundwater aquifer.

Ontario

Orphan Site Remediation Projects

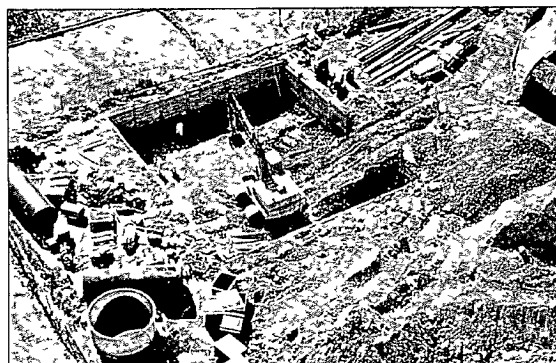
During FY 1991-92, clean-up activities under the Canada/Ontario bilateral agreement continued at the Tyre King Fire site in Hagersville, and the Canadian Waste Management Ltd PCB spill site in Smithville. As well, work began at two new sites located in Rednersville and Deloro. The status of these projects is as follows:

Tyre King Fire Site, Hagersville

A former tire storage compound at Hagersville was the site of an immense fire in 1990 which consumed an estimated 14 million tires. It left behind debris, oil and other chemical byproducts of burning rubber that contaminated the soil, surface water and groundwater. Initially tackled in the program's first year, contaminated soil and other debris was excavated and placed in a landfill cell on the site. Oily wastes were sent for recycling. Contaminated surface water and groundwater was placed in a specially constructed lagoon, and rendered suitable for discharge by biological treatment. Last year, the treatment of the contaminated surface and groundwater continued, and final site grading and seeding was completed.

Canadian Waste Management Ltd PCB Spill Site, Smithville

At Smithville, a former waste oil transfer station, the soil and groundwater have been contaminated with polychlorinated biphenyls (PCBs). Under the program, PCB-contaminated solids and liquids are being destroyed on site using a mobile incinerator. Migration of the contaminated groundwater is being controlled by a purge well system until a groundwater remediation plan is implemented.



Canadian Waste Management Ltd PCB Spill Site

Blackbird Holdings Site, Rednersville

The Blackbird Holdings site had been illegally used for the disposal of drummed solvents and other hazardous wastes, which subsequently contaminated the underlying soil and groundwater. Last year, contaminated soil and wastes were excavated and disposed of at a hazardous waste landfill in Sarnia. Groundwater monitoring is being carried out but no decision has been made on the need for further groundwater remediation.

Deloro Mine Site, Deloro

Deloro was the site of a gold mining and mineral processing operation for more than 100 years. Ontario's Ministry of the Environment took over the arsenic-contaminated property in 1980 to minimize the pollution to groundwater and the nearby Moira River.

Since 1983, the province has been operating a groundwater treatment plant, and groundwater treatment activities continued under the program in 1991-92

Development and Demonstration of Site Remediation Technology (DESRT) Projects

Four technology development and demonstration projects were approved under the Canada-Ontario agreement in FY 1991-92. One project is nearing completion, the remaining three are scheduled to begin in FY 1992-93.

Dearborn Environmental, Trenton

This project involves demonstrating the use of native bacteria to speed up the degradation of soil contaminated with wood preservatives (PCP) at Domtar Inc's wood treatment facility. Work on the site began in September 1991 and will be completed in the fall of 1992.

Eco-Logic, Bay City, Michigan

Scheduled to begin in FY 1992-93, this will be a joint effort with the United States' Environmental Protection Agency to demonstrate the treatment of PCB-contaminated sediments at Bay City, Michigan, using a patented thermo-chemical reduction process developed by a Canadian firm, Ecologic International Inc.

Beak Consultants, Toronto

Approved for funding and scheduled to begin in FY 1992-93, Beak's work will demonstrate, at a former chemical transfer facility, the on-site use of anaerobic bacteria to break down chlorinated organic chemicals (tetrachloroethylene compounds) into innocuous byproducts.

Tallon Metal Technologies Inc., Toronto

This project will involve the use of a potential absorbent process, "Virokele ®," to remove heavy metal contaminants from lake sediments taken from the Toronto harbour.

Quebec

Orphan Site Remediation Projects

In FY 1991-92, five new remediation projects were initiated in Quebec under the program. As well, cleanup of the contaminated Saint-Amable site was completed.

Tire Fire Site, Saint-Amable

Because of a fire at this tire storage facility, both soil and surface water at this site were contaminated by oils and heavy metals. Remediation work has involved excavating the burnt tires and contaminated soil and placing it in secure storage, with soil treatment to begin in 1992. The property has been fully landscaped and revegetated. Groundwater monitoring at the site indicates minimal contamination of the underlying aquifer.

Le Vidangeur de Montreal Ltee, Montreal

This 70-hectare site has been contaminated by petroleum byproducts and hazardous industrial wastes dating from the 50s, 60s and 70s.



An assessment of remedial options has been completed, with clean-up work scheduled to start in FY 1993-94

Ruisseaux Bouchard et Bertrand, Dorval

The Bouchard and Bertrand rivers in Montreal have been polluted by heavy metals, oil and grease of an unknown origin. An assessment study carried out under the program in FY 1991-92 has determined that the site does not present an elevated risk to human health or the environment. As a result, no further action at the site is planned.

Hazardous Waste Disposal Site, Ville Mercier

Waste oils and solvents were dumped into lagoons on this property located in Ville Mercier in the late 1960s. The province continues to operate a groundwater pump and treatment system which was installed at the site several years ago to control the migration of contaminants. Meanwhile, new efforts are being directed to identifying appropriate remedial techniques for some 260,000 cubic metres of contaminated soil that remains below the bottom of the lagoons.

Weedon Mine, Fontainebleau

Mine wastes from an old copper mine cover about 11 hectares at this site. Contaminants include acid water and heavy metals that are leaching towards neighbouring private property and threatening the nearby river. An assessment of remedial options has been completed, with clean-up work scheduled to start in FY 1992-93.

Industrial Waste Disposal Site, Sainte-Marie Salome

This site has been used for the disposal of refinery and other industrial wastes for some years. Polluted groundwater is slowly moving toward the Vacher River located adjacent to the property. Alternative remedial measures are currently under study, with a final assessment expected in FY 1992-93.

Development and Demonstration of Site Remediation Technology (DESRT) Projects

Four technology development and demonstration projects were approved under the Canada-Quebec agreement in FY 1991-92. Work carried out to date has been primarily at the laboratory stage, with full-scale demonstration scheduled for the next two fiscal years.

Biogenie Inc

This project, which is being carried out in association with Hydro Quebec and Canadian National Railways, will evaluate the use of enhanced bioremediation in a 500-tonne demonstration "soil pile" to treat a variety of excavated soils contaminated by such materials as petroleum refinery wastes and transformer oils.

Shell Canada Ltd

In collaboration with ADS Associates Ltd and the Institut Armand Frappier, Shell Canada will evaluate the use of enhanced on-site bioremediation to clean up petroleum hydrocarbon contamination at an abandoned gravel pit operation.

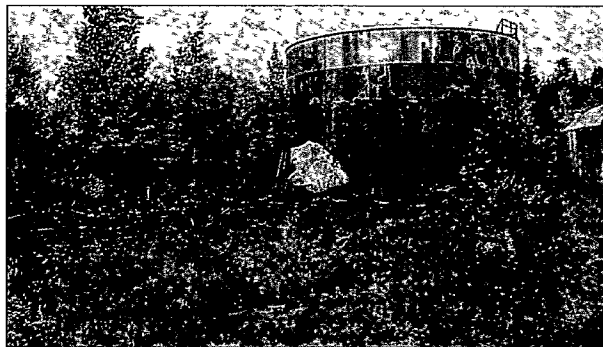
University of Laval

Two technology demonstration projects are being carried out by the University of Laval. The first project, at the Vidangeur de Montreal Ltee contaminated site in Montreal, will evaluate the effectiveness of a vacuum pyrolysis technology known as PYROVAC to treat petroleum hydrocarbon contaminated soils, as well as soils polluted by chlorinated organic wastes. Laval is carrying out the second project at the Ville Mercier contaminated site. It involves using surfactants to increase the solubility of hydrocarbon and chlorinated organic wastes in a contaminated groundwater aquifer, thereby allowing quicker cleanup of the aquifer.

New Brunswick

Orphan Site Remediation Projects

In New Brunswick, remediation is currently under way at six orphan contaminated sites. Provincial funding is provided through the Environmental Trust Fund.



Petroleum Contaminated Site

Crude Oil Separation Site, Weldon

Soil on this property, once the location of an oil processing plant, has been contaminated with a large quantity of hydrocarbon wastes. To date, the tanks and boiler systems have been cut up and recycled as scrap metal. Petroleum wastes and contaminated soil have been transported to Chatham, N.B., where they were incinerated. About 1% of the contaminated soil on the property has yet to be excavated. It will be cleaned up in 1992-93 using thermal destruction.

Petroleum Contaminated Site, Drummond

Gasoline has leaked onto this site from an undetermined source, contaminating the soil and groundwater, and giving off vapours that have been seeping into nearby homes. Under the program, vapour extractors were installed on site to relieve the vapour problem. Groundwater collection galleries have also been installed, along with an activated carbon treatment system. The system is to begin operation in FY 1992-93. Treated groundwater will be discharged into the municipal sewer system.

Furnace Oil Spill Site, Rogersville

A fuel tank spill has contaminated subsurface soil, a significant quantity of groundwater, and at least two residential wells. Contaminated soil has been excavated and removed from the site. A groundwater pump and treatment system has been designed and will be installed in FY 1992-93.

Petroleum Contaminated Site, Haute Aboujagane

Soil, groundwater and residential wells at this location have been contaminated by an unknown quantity of petroleum products. A pump and treatment system was installed to clean the groundwater.



Petroleum Contaminated Site, Harvey Station

At this site where a gas station once stood, the soil and groundwater have been contaminated with petroleum products, as have residential wells in the vicinity. In 1991, the contaminated soil was excavated and treated on site using bioremediation. A monitoring program was established to obtain data on the petroleum degradation and microbial activity in the soil. As well, a groundwater pump and treatment system was installed with start-up scheduled for FY 1992-93.

Petroleum Contaminated Site, Trois Ruisseaux

Several residential wells have been contaminated by fuel oil, and efforts are under way to locate the source. An assessment of remedial options began in March 1992.

Development and Demonstration of Site Remediation Technology (DESRT) Project

New Brunswick Department of Transportation Site, Saint John

At a former scrapyard site contaminated with polychlorinated biphenyls (PCBs) and heavy metals, a demonstration project was carried out in FY 1991-92 involving soil remediation by washing followed by bioslurry reactor treatment. While the project did not achieve the clean-up level originally anticipated, it provided valuable information concerning the strengths and limitations of using such technologies to treat contaminated soil in the future. The final report on the project is due in the fall of 1992.

Nova Scotia

Orphan Site Remediation Project

Associated Electronics and Metal Salvage Ltd Site, Five Island Lake

At the site of this former scrapyard, the soil has been contaminated with PCBs and heavy metals. Nearby residents are being provided with bottled drinking water by the province because of groundwater pollution. Under the program, fencing has been installed to prevent access to the property, drainage ditches excavated to direct surface water runoff and a clay cap placed over the entire site to control infiltration.

Newfoundland

Orphan Site Remediation Project

Makinsons Scrapyard Site, Hodgewater Line

A scrap metal operation located in Hodgewater Line left the soil at this site contaminated with PCBs and heavy metals. An assessment of remedial options has been carried out and clean-up work is scheduled to begin in 1992-93.

Looking Ahead

Building on the considerable progress it achieved in the past two fiscal years, the CCME will enter the program's third year with the following goals

- To extend participation to include all CCME member jurisdictions,
- To forge stronger links with industry in demonstrating innovative clean-up technologies, and
- To continue to develop scientifically validated Environmental Quality Criteria and associated guidance documents, thereby providing Canadian society with the necessary tools to make informed decisions concerning the remediation of contaminated sites

