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STANDARDS DEVELOPMENT BRANCH OMOE



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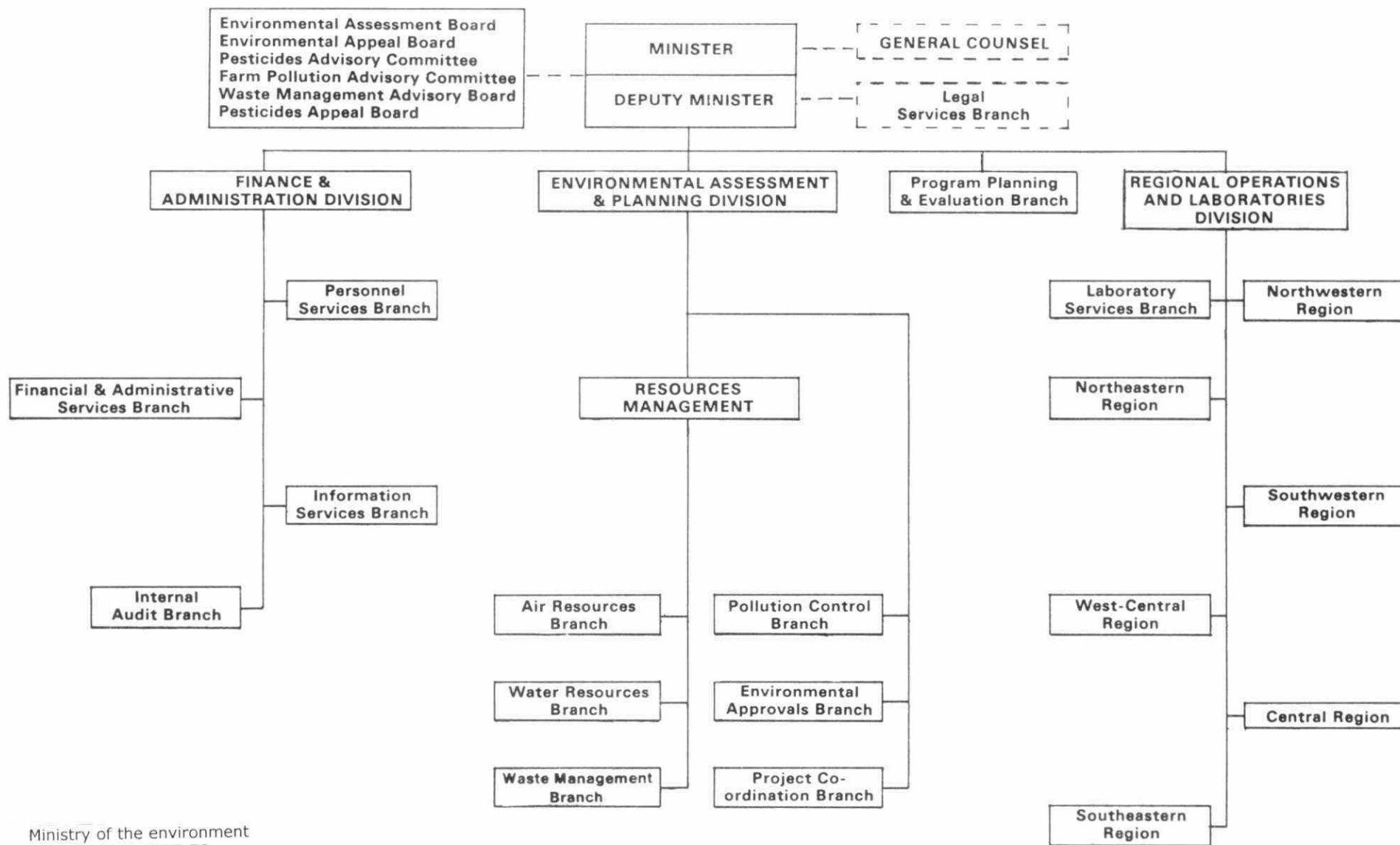
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Ministry of the Environment

Annual Report
1978-79

MINISTRY OF THE ENVIRONMENT—AUGUST 1, 1979



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HAZARDOUS CONTAMINANTS
COORDINATION BRANCH
135 ST. CLAIR AVENUE WEST
TORONTO, ONTARIO M4V 1P5



To:

The Honourable
Harry C. Parrott, D.D.S.,
Minister.

Sir,

I have the honour to submit
for your approval the annual
report of the Ministry of
the Environment for the year
1978-1979.

Respectfully submitted,

Graham W.S. Scott,
Deputy Minister



To:

Her Honour,
The Lieutenant-Governor
of the Province of Ontario.

May it Please Your Honour,

I have the privilege to present
the annual report of the
Ministry of the Environment
for the fiscal year beginning
April 1, 1978, and ending
March 31, 1979.

Respectfully submitted,

Harry C. Parrott,
Minister

The Honourable Harry C. Parrott, D.D.S., was appointed Ontario Minister of the Environment on August 18, 1978, transferring from his former portfolio as Minister of Colleges and Universities, an office he held since October 7, 1975.

The Honourable George R. McCague served as Minister of the Environment from January 21, 1978 to August 19, 1978, when he was appointed chairman of the Management Board of Cabinet.

goals and achievements, 1978-79

Ontario's pioneering commitment to environmental protection has resulted in the development of legislation, research programs, and policies which have made the Province a recognized leader in the environmental field.

The Ministry was established in 1972 to consolidate responsibility for all aspects of environmental protection, enhancement, and restoration under one agency of the Ontario Government. The operating legislation of the Ministry includes legislation which established previous agencies and now comprises:

The Ontario Water Resources Act, 1970

The Environmental Protection Act, 1971

The Pesticides Act, 1973

The Environmental Assessment Act, 1975

Goals

To provide the 8.5 million residents of the Province with effective environmental management, Environment Ontario has set four major, long-term objectives:

- to control contaminant emissions,
- to establish environmental safeguards to protect human health and the natural environment;
- to manage Ontario's water resources and to manage waste;
- to develop and maintain measures to preserve, restore, and enhance the natural environment.

Achievements

During 1978-79, the Ministry advanced toward its goals on many fronts. The activities and achievements of Ministry programs are reported by Divisions, Operating Branches and Regions, and include the following highlights of the year's progress:

Environmental Health

The Ministry continued its major co-ordinating role in the Fish Testing Contaminants Program—including responsibility for fish testing and dissemination of public information—in co-operation with the Ministry of Natural Resources and with medical advisors of the Occupational Health and Safety Division of the Ministry of Labour. During 1978-79, about 13,000 fish, weighing approximately six tons, were analyzed for trace contaminants. To date, over 43,000 fish have been analyzed. Three publications containing comprehensive guidelines on the consumption of sport fish from 625 Ontario lakes and waterways were published and made available to the public in April 1979.

The asbestos monitoring program continued testing of municipal water supplies to safeguard public health. Tests made during the year were low or at the detection limit for asbestos fibres.

Twenty-two health-related environmental research projects were approved for funding through the Provincial Lottery Trust Fund at a total cost of \$1.9 million.

The Mosquito Control Program undertaken in co-operation with the Ministry of Health contributed to successful control of mosquito populations for the third consecutive year. No human cases of encephalitis were reported during 1978-79.

Environmental Protection

In October 1978, the Minister announced a seven-point action plan to deal with the growing problem of liquid industrial waste:

- 1) Development of a plan to establish need, timing, location and provincial involvement in waste treatment facilities;
- 2) Guidelines for industry which call for an end to direct landfilling of certain liquid wastes and the disposal of wastes requiring special handling in perpetual care sites;
- 3) A review of interim storage needs for such wastes as PCBs and the possible development of secure storage sites by government;
- 4) Classification of wastes in terms of treatment and disposal requirements;
- 5) Long-term regulations specifying disposal methods for various classes of wastes, mandatory registration of wastes by producers, and establishment of a fund to provide perpetual care of special disposal sites;
- 6) Continued streamlining of the Ministry's automated way-bill system which tracks wastes from producer to disposal; and
- 7) Continuing discussion with federal, provincial and the U.S. governments to ensure free movement of wastes across provincial and national boundaries to safe disposal facilities.

Great Lakes Agreement

A new agreement re-affirming the commitment made by Canada and the U.S. in 1972 to restore and enhance Great Lakes water quality was signed in Ottawa in November, 1978. The new agreement terms included

tighter controls on the discharge of toxic substances; new phosphorus loading targets and deadlines by which municipal and industrial pollution abatement programs are to be completed; revised water quality objectives including one for radioactivity.

Review of Ministry Activities by the Standing Committee on Resources Development

On September 13, 1978, the Ontario Legislature approved a motion requiring the Standing Committee on Resources Development to "include in its consideration of the annual report of the Ministry of the Environment the following matters: "...the abatement program governing INCO in Sudbury; the pollution control measures imposed on the pulp and paper industry; and the global phenomenon known as acidified precipitation."

Consideration of the matters began on February 5, 1979 and continued through 18 sittings until February 16, 1979. The Committee heard testimony from the Minister and staff of the Ministry of the Environment, scientific experts from the federal government and Ontario universities, representatives of public interest groups and executives of the International Nickel Company.

Energy Recovery

Refuse derived fuel burning facilities at Canada Cement Lafarge, Woodstock, were completed and trial runs were carried out using RDF produced at the Ontario Centre for Resource Recovery, Downsview, in preparation for a full-scale demonstration to start early in 1979-80.

New Service Systems

During the year, the Ministry handled 249 construction contracts for sewage and water treatment systems across the Province and administered a capital expenditure of approximately \$147 million. Ten new facilities were put into operation.

The construction of 70 miles of trunk sewer and the 160 million gallon per day sewage treatment plant for the York-Durham project was on schedule for the target opening in 1980, the biggest single servicing project ever undertaken by the Ministry.

Under terms of a new agreement between the federal and provincial governments, Ontario became responsible for administering federal grants previously administered by the Central Mortgage and Housing Corporation to assist construction of water and sewage services.

Monitoring and Sampling

A new mobile laboratory, TAGA 3000, was acquired in February 1979 to improve the Ministry's capability of performing sophisticated tests for contaminants more rapidly.

Extensive air monitoring surveys were undertaken in Mississauga, Hamilton, Welland, Nanticoke, Espanola, Sault Ste. Marie, Thunder Bay, Red Rock, Marathon and Sarnia.

Wind trajectory analyses were carried out as part of the studies of acidic precipitation in Central Ontario. The data indicated that much of the problem results from the long-range transportation of acidic compounds emitted in industrial areas south of Ontario.

The Toronto and regional laboratories performed over 1.7 million tests during the year, with increasing emphasis on the testing of air, water and land samples for hazardous substances.

Water Management

Expanded and updated information on the management of surface and ground-water quality and quantity was issued in a new publication: "Water Management: Goals, Policies, Objectives and Implementation Procedures of the Ministry of the Environment".

Recreational Lakes

Acidic precipitation emerged as a major program in 1978 following the first Ministry reports on the problem in 1977. Detailed field studies were undertaken on approximately 20 lakes in the Muskoka-Haliburton area to determine the extent of the problem. In addition, a research contract was awarded to a consultant to study possible effects of acid rain on the mercury content of sport fish. This work is to be completed in 1979-80.

Environmental Assessments

During the year, environmental assessments were formally submitted for the first time by several governmental agencies. Among the 16 submissions were those dealing with highway widenings (Ministry of Transportations and Communications); the Colonel Samuel Bois Smith Waterfront in Etobicoke (Metro Toronto Regional Conservation Authority); access roads (Ministry of Natural Resources); the Highway 89 extension from highway 400 east to Highway 12 (Ministry of Transportation and Communications); major transmission lines, transformer stations, and new communication towers (Ontario Hydro); expansion of the Welland Water Treatment Plant (Ministry of the Environment); solid waste disposal (Ministry of Natural Resources); the Haldimand-Norfolk regional water supply scheme (Ministry of the Environment).

Environmental Studies

Major environmental studies continued at Nanticoke, Sudbury, Elliot Lake, Port Granby and elsewhere. The Nanticoke Environmental Management Program (NEMP) was established as a joint undertaking of the Ministry with Ontario Hydro, Environment Canada, Texaco, and the Steel Company of Canada to ensure maximum environmental safeguards when the huge industrial, chemical, and hydro complex becomes fully operational. The site will be one of the most thoroughly and intensively monitored areas in the world to ensure a clean environment.

Environmental engineering reviews and approvals were continued on major Ontario Hydro projects, and submissions presented to the Royal commission on electric Power Planning, including Ministry views on significant environment policy matters related to nuclear plants.

Contaminants Research

The Ministry's Hazardous Contaminants Program was expanded, and significant findings obtained through research and surveys conducted by the Hazardous Substances Committee's four working groups: Source Inventory, Organics, Inorganics, and Radioactivity. The Committee is inventoring industrial establishments in the Province to determine the use and handling of a selected number of chemicals which could have a hazardous reaction on health or the natural environment, and is working in close liaison with Environment Canada.

Pulp and Paper Industry

A major review was completed for the 31 pulp and paper mills which discharge directly into Ontario watercourses. Of these, ten had completed pollution abatement programs to

satisfy current Ministry requirements; three were working on schedule on voluntary control programs and the balance were under compulsory control orders.

New policies were adopted to shorten the time frame for completion of abatement programs—including new financial grants and more rigorous enforcement programs.

The Ministry also served notice on Reed Ltd., of a new control order to be issued for their Dryden Mill.

Appointments

Graham W. S. Scott, formerly Associate Secretary of the Cabinet and Secretary of the Policies and Priorities Board of Cabinet, assumed responsibility as the new Deputy Minister of the Environment in February 1979. Mr. Scott is a lawyer whose former positions include being Executive Assistant to the Leader of the Opposition, Ottawa.

Organization

The Waste Management Branch was established on August 1, 1978 in order to bring all head office functions related to the management of solid, liquid and hazardous wastes within one organizational structure. Elements of the Pollution Control Branch and the Resource Recovery Branch were re-grouped to achieve this goal.

In Appreciation

In February 1979, K. H. Sharpe, Deputy Minister of the Environment since April 1977 was appointed Chairman-designate of the Environmental Assessment Board, to succeed David S. Caverly (who remains a member of the Board) on June 1, 1979.

Mr. Sharpe originally entered the public service in 1947 with the Department of Health and served in a number of positions in the Ministry of the Environment and its predecessor, the Ontario Water Resources Commission.

Mr. Alan J. Harris, director of Air Resources Branch since 1974, retired in November, 1978. His career spanned 28 years with the Ministry and its predecessor agencies, the Dept. of Health and the Ontario Water Resources Commission.

The Ministry wishes to thank Mr. Sharpe and Mr. Harris for their many valuable contributions to environmental progress in the Province.

environmental assessment and planning division

Assistant Deputy Minister: J. W. Giles

Executive Director: W. B. Drowley

This Division has three major responsibilities which provide a scientific base for many of the Ministry's policies and activities:

To serve as the central approval and co-ordinating agency for applications involving the design, construction and operation of water, sewage, solid waste reclamation and recycling plants and waste disposal sites required under Ontario legislation.

To conduct scientific and technical research, assessment and pollution control programs involving the use of water, land and air resources, the environmental implications of realty development and the control of all forms of pollutants.

And, to provide technical and supervisory services required in the planning, construction and operation of water and sewage treatment plants, solid waste and resource recovery facilities.

air resources branch

Director: T. W. Cross

The Air Resources Branch supplies base information for the development of air quality management strategies and Ministry policies directed at achieving and maintaining desirable air quality in Ontario. The information consists of comprehensive air contaminant measurements, detailed knowledge of new technology, and recommendations concerning air quality criteria and standards.

Air Quality and Meteorology

The Air Quality and Meteorology Section maintains the Ontario air monitoring network, which included over 1400 air quality and meteorology instruments in 1978-79 and operated in approximately 100 areas. The network produced approximately three million data points that were computer processed and interpreted in published reports. The following pollutants were routinely monitored: sulphur dioxide, nitrogen oxides, carbon monoxide, total reduced sulphur, hydrocarbons, ozone, suspended particulate matter, dustfall, sulphates, nitrates, lead and other trace metals. Sulphation and fluoridation rates were also routinely measured.

The Air Pollution Index, the basis of Ontario's Alert System, continued to be publicized daily for Windsor, Sarnia, Hamilton, Niagara Falls, Toronto, Sudbury, and Coniston.

Air quality modelling of the Sarnia-Port Huron area was conducted to develop a new

regulation limiting the emissions of sulphur dioxide from power and petrochemical plants south of Sarnia.

Wind trajectory analyses carried out for acidity in precipitation occurring in Central Ontario showed much of the acidity to result from the long-range transport of acidic compounds emitted in industrialized areas south of Ontario.

Studies were conducted to characterize the long-range transport of ozone into and across Southern Ontario during 1976, 1977 and 1978. Ozone episodes — i.e., widespread high concentrations of ozone of approximately twice Ontario's criteria — were primarily associated with warm, moist, south-southwest airflows advecting the pollutant from the United States into Ontario. Ontario's sources of nitrogen oxides and hydrocarbons add to the photochemical production of ozone downwind of major urban centres, thereby increasing levels above Ontario objectives.

Criteria Development and Program Planning

The Criteria Development and Program Planning Section established guidelines for ten new air contaminants and prepared detailed reports on three environmental assessments and two land-use changes. Section members also worked on four federally-organized task forces to produce federal regulations and guidelines for various industries.

Using the formal procedure developed previously for Ministry participation in the administration of federal regulations and guidelines in Ontario, the Section made recommendations regarding Ontario's course of action with respect to federal guidelines dealing with the cement industry.

The Section organized and presented a two-day seminar and workshop on air pollution for Ministry personnel.

At year-end, the Section, Southwestern Region, and related industry, were finalizing a new regulation for SO₂ emissions in the Sarnia area. During the year, the Section completed a detailed study of SO₂ emissions from the Texaco Port Credit refinery. Also provided was an air quality correlation investigation in support of the Sudbury environmental study.

Phytotoxicology

The Phytotoxicology Section conducted soil and vegetation assessment studies near 93 industrial and other sources in southern Ontario in 1978-79. Investigation reports were provided to regional managers for use in environmental management programs. The Section also investigated 178 vegetation complainants from the public of which 46 per cent were confirmed as being caused by pollutants. Investigation reports were provided to the complainants, the alleged offending sources, regional managers, and the Board of Negotiation.

The Section investigated the effects of fluorides emitted by industries manufacturing hydrofluoric acid, fertilizers, steel, aluminum, uranium hexafluoride, brick, ceramic, frit, and glass. The Section also investigated the effects of sulphur dioxide, lead, boron, ethylene, nickel, cobalt, and mercury emitted by various industries in southern Ontario. In the City of Toronto, soil, which had been replaced on residential properties adjoining several industries, was retested for lead content.

Biological monitors consisting of fluoride sensitive gladiolus plants were established in the vicinity of six industries to monitor at-

mospheric fluorides. Indicator plots consisting of plants selected to differentiate between effects caused by photochemical oxidants, sulphur dioxide, and ethylene were established. Networks of sphagnum moss bags were established in the vicinity of several industries to determine the degree and extent of heavy metal deposition.

During the 1978 crop-growing season, the Section conducted extensive field assessment surveys to determine the degree of photochemical oxidant (ozone and/or peroxyacetyl nitrate) injury on white bean, tomato, and potato crops. Oxidant injury to crops was less severe in 1978 than in 1977.

At Nanticoke, the Section continued studies where major operations by Ontario Hydro, Stelco, and Texaco are planned. No fluoride or sulphur dioxide injury has been observed on vegetation in the study area to date, but ozone injury has occurred annually on established indicator plants.

The Section collected 8,057 vegetation and soil samples for laboratory examination (chemical analysis, herbarium, pathology, and histology). Phytotoxicology guidelines for excessive levels of contaminants in soil and vegetation have been developed for 19 contaminants. The section conducted a number of research studies both in the field and in controlled-environment greenhouse and growth chamber facilities. Some studies involved differential diagnosis of contaminants and crop injury protection.

A Phytotoxicology display on the effects of various contaminants on vegetation was shown at the Ontario Science Center in March 1979.

During 1978, five Phytotoxicology papers were published in scientific journals; twelve papers were presented to technical conferences; 21 extra-ministerial activities were undertaken by Phytotoxicology staff in con-

junction with provincial, national, and international committees and task forces.

Technology Development and Appraisal

The five units of the Technology development and Appraisal Section conducted a wide range of investigations in support of Air Management Branch activities in 1978-79.

The **New Technology Unit** keeps the Branch informed of technological developments in the process industries and in pollution control methods. In 1978-79, particular emphasis was placed upon the control of asbestos emissions and silicon carbide manufacturing processes. The unit also monitored and reviewed energy-related problems such as coal desulphurization and gasification; general control methods, including ways of reducing emissions of oxides, nitrogen, and sulphur dioxide; and methods of collecting suspended particulate emissions.

The Unit assisted other Branches and the Regions in assessing control equipment, resolving problems of ferrous foundries, and evaluating odour control problems. Responsible for comprehensive inventories of hazardous substances, the Unit initiated in-house inventories of 16 substances and completed the work involved for twelve of them.

A contract was awarded to Acres Consulting Ltd. in 1978-79 for the inventorying of 15 organic chemicals. By year-end, the first phase had been completed and a selection made for materials to be examined in greater depth. Work was also started on the design of a data handling system intended to produce reports summarizing inventory information for other Branches.

The **Monitoring and Instrumentation Development Unit** conducted extensive air monitoring surveys in Mississauga, Hamilton,

Welland, Nanticoke, Espanola, Sault Ste. Marie, Thunder Bay, Red Rock, Marathon, and Sarnia. In addition, spot surveys were conducted in Guelph, Kitchener, and Oakville. The unit acquired a TAGA 3000 mobile laboratory in February 1979 that will greatly enhance its capabilities. Extensive development was carried out on the Hewlett Packard 5830A gas chromatograph to meet an increasing demand for monitoring organic contaminants in ambient air.

The **Special Studies Unit** is responsible for the co-ordination of activities under the Nanticoke Environmental Management Program (NEMP) and the Sudbury Environmental Study.

Routine particulate, gaseous pollutant, and precipitation monitoring was started in the Nanticoke area with the selection of monitoring sites, instrument installation, and the contracting of network operations. A data base was set up for storage of NEMP network data, and data reporting procedures were finalized.

Mathematical modelling of short-and long-range Nanticoke air quality impacts advanced significantly with completion of a summertime fumigation model for the area. At year-end, the model was being interfaced with a real-time, data acquisition and processing system (DAPS) for possible use in a supplementary control system. A contract for setting up DAPS was awarded to Radian Corporation. The Unit conducted several intensive field studies in the Nanticoke area, including an investigation of lakeshore plume dispersion and airborne particulate composition.

The Unit continued the Sudbury Environmental Study (SES) meteorological measurements program with balloon soundings, solar radiation measurements, and smelter plume photography studies. The high-volume

sampler and monthly precipitation chemistry networks were expanded, and an event precipitation chemistry network was started. A dispersion study involving INCO's 391-meter stack was carried out in June 1978 under conditions when fumigation due to loosing occurs. Particle-sizing and chemical composition measurements were performed, both on the ground and in the plume of the Falconbridge smelter.

The Unit continued development of long-term, short- and long-range mathematical models for assessing smelter emission impacts on the Sudbury area and farther afield.

The **Hazardous Contaminants and Research Planning Unit** is responsible for co-ordinating activities under the hazardous substances and the research grants programs. In 1978-79, the Unit completed documents on PAHs, aromatic and chlorinated hydrocarbons, and environmental radioactivity. The Unit also conducted surveys in Hamilton, Mississauga, and Sarnia to measure levels of aromatic and chlorinated hydrocarbons in ambient air. Approximately \$280,000 was distributed to 19 different groups under the Research Grants Program; a monitoring system was established to ensure maximum benefit to the Ministry from the program.

The **Source Assessment Unit** is responsible for co-ordination of source testing surveys, maintenance of high technical standards during source tests, writing of new source testing methods, updating of the Source Testing Code, and initiation of research on measurement methods. In 1978-79, the Unit continued emission surveys in the Sudbury basin, at coke ovens in Hamilton, and at automotive paint-baking ovens in Southern Ontario; the surveys are expected to be completed in 1979-80. In addition, the Unit co-ordinated sampling programs in 40 companies, evaluated 30

emission-testing reports, completed the revised Source Testing Code and source-testing methods for alcohols and methyl chloride, conducted a seminar on witnessing source tests for inspectors from the two Northern Regions, and completed a research contract on the method for measuring sulphuric acid in metallurgical sources.

Vehicle Emissions

The Vehicle Emissions Section again spot-checked for emission controls and exhaust emissions in 1978-79—6433 cars in twelve Metropolitan Toronto locations and 1959 cars in ten other municipalities. Of this number, 52 per cent failed to meet Ontario emission guidelines, and 3.9 per cent were found with pollution control equipment missing, disconnected, or inoperative. Seventeen charges were laid against vehicle owners. Owners in seven cases were found guilty and fined; five cases were dismissed; five cases were still pending at year-end.

Section inspectors visited 468 used-car dealerships in Southern Ontario and inspected 2264 cars under Section 23 of the Environmental Protection Act. As a result, 142 Violation Notices were issued, and one dealer was charged and convicted. Compared to 1977-78, 125 per cent more dealerships were visited, and 56 per cent fewer Violation Notices were issued.

The Section's two diesel inspectors conducted highway patrols in co-operation with the Ontario Provincial Police (OPP). Altogether, 505 trucks were stopped or reported for excessive smoke emissions — 391 in Metro, 114 in the Kitchener and Burlington areas. The OPP laid 405 charges under the Highway Traffic Act, Section 49(2), and issued 100 warnings. Charges resulted in 350 truck owners being fined, 19 cases being dismissed, and 36 cases still pending at year-end.

Section inspectors made 21 visits to eight community colleges to explain provisions of the Environmental Protection Act and emissions/performance/fuel economy relations to 1613 student mechanics in 56 classes. Exhaust sampling and emission analysis equipment was supplied and installed in Downsview as the first part of a co-operative research program into fuel economy versus emissions with the Ministry of Transportation and Communications.

water resources branch

Director: G. H. Mills

The Water Resources Branch provides information on water quality and available surface and ground water resources throughout the province. Its scientific investigations lead to improved understanding of processes and practices affecting water quality and quantity. In 1978-79, extensive reviews of water management needs and water quality criteria resulted in the publication of updated information on water management goals, policies, and objectives. Continued emphasis was given to increasing information about trace contaminants and the prevention of pollution in lakes, streams, and ground water.

Great Lakes

Some improvement in water quality in the St. Marys River was observed, although Algoma Steel Corp. continued to experience problems in bringing its new coke oven by-product recovery facilities on line. Further monitoring was being planned for 1979-80 when commissioning problems should be resolved.

Continued monitoring of nutrient enrichment problems in Penetang Harbour showed slow response to phosphorus controls because of restricted exchange with the high quality waters of Georgian Bay. The solution to similar problems at Collingwood will be aided by the town's plan to undertake secondary treatment of its wastes.

The results of field work commenced in 1977 have shown significant improvements in the biological communities of the St. Clair River sediments since 1968. This finding reflects progress in abating pollution from industrial sources. Phenol levels declined over the same period.

Bacterial contamination persisted in the Detroit River in the Windsor and Amherstburg areas. Improvements are expected upon completion of sewer separation and the elimination of faulty septic tank systems in Windsor and the completion of remedial measures at the Amherstburg sewage treatment facility. A detailed analysis of total phosphorus loading since 1970 revealed that lower flows, as well as detergent reformulation and sewage treatment improvements, have contributed significantly to a downward trend in the phosphorus load reaching Lake Erie in recent years.

The first year of a two-year, international study of Lake Erie quality was completed in 1978. A final report, to be presented to the International Joint Commission in 1981, will outline the lake's response to remedial measures implemented since the signing of the Canada/US Water Quality Agreement in 1972. Early results indicate that the impact of the Grand River on the coastal zone of eastern Lake Erie, during and after snowmelt events, may extend as far east as Fort Erie. Total phosphorus levels in the eastern basin have remained relatively constant since the initiation of phosphorus input controls in

1970. Total phosphorus concentrations in the western end of the lake remained below the high levels of the early 1970s; however, there was an increase in the amount of algae in 1978.

Since 1969, water quality and currents in the nearshore area of Lake Erie at Nanticoke have been under surveillance to provide a baseline for determining the effects of industrialization. Only minor long-term changes have been detected to date. The water quality is uniform throughout the area but varies with the season. The currents parallel the shore, a west-to-east direction predominating. A study conducted in 1978 in Wheatley Harbour showed conditions to be similar to those observed in 1973 — low dissolved oxygen levels and high bacterial levels. Although remedial measures at Omstead Foods Limited were completed in 1977, operational problems have resulted in failure to meet the expected effluent loading reductions. No contamination was observed in Lake Erie waters adjacent to the harbour outlet. Studies carried out in the western Lake Erie basin indicated a downward trend in total DDT concentrations in young-of-the-year fish since 1975.

The Lake Ontario annual spring surveillance program continued in 1978 on a grid extending from the Niagara River to Kingston. Time-trend analyses of 1972–1978 data have revealed a continuing decline in phosphorus levels along most of the nearshore zone. Decreases in phosphorus levels are attributed largely to detergent reformulation and phosphorus removal at sewage treatment plants.

In order to improve the precision of time-trend analysis, a weekly monitoring program was instituted in 1978 at a site east of Toronto. Frequent sampling was believed to be essential in accounting for the great variability

in water quality imposed by the dynamic nature of the nearshore zone. Preliminary analyses of the 1978 data have confirmed the use of the approach which will be applied to two locations (east and west of Toronto) in 1979 to monitor changes in areas experiencing rapid growth and development.

The Ministry continued its participation in an inter-agency monitoring program set up to assess trophic status changes in the Bay of Quinte. A dramatic decline in total phosphorus and chlorophyll *a* levels was experienced in the 1979–1978 period. This decline has been attributed in part to phosphorus removal programs on line at all sewage treatment plants discharging into the Bay and to lower precipitation levels experienced in 1978. Despite documented phytoplankton reductions, dissolved oxygen levels continued to be depressed in the deeper sections of the Bay during the summer of 1978.

An intensive, three-year Ministry study of Toronto Harbour came to a close in 1978. Detailed reports under preparation at year-end delineate zones of influence associated with major points of discharge, review water quality trends over the last 10 years, and outline actions necessary for the enhancement and protection of the harbour. Substantial reductions in 1978 bacterial levels along waterfront beaches were confirmed through daily sampling of the harbour. This improvement was likely due to remedial measures instituted by Metropolitan Toronto and to unusually dry weather conditions in 1978. Harbour sediments were found to contain elevated levels of heavy metals such as mercury, lead, zinc, and chromium; higher levels were associated with inner harbour slips and sewer overflows. A similar pattern was observed with PCBs and other trace organic compounds. Recording current and water

chemistry meters were operated in the harbour concurrently with intensive sampling of storm sewer outfalls and the harbour itself to study, in detail, the effects of severe rainfall on water quality. A two-dimensional model was used to simulate the effects of storm-water runoff.

Installation and maintenance difficulties reduced the efficiency of re-aeration through artificial mixing in Hamilton Harbour. Dissolved oxygen concentrations declined rapidly during the spring, and deeper parts of the harbour became anoxic at the end of June. Oxygen levels increased temporarily in July and August, but near anoxic conditions persisted into October. Total phosphorus concentrations in the spring were 25 per cent to 30 per cent higher than in 1977; chlorophyll *a* levels were the highest ever observed in the harbour. Development of predictive models for the harbour continued, and work on the two-dimensional depth integrated model was completed. Work was continuing at year-end to determine the compounds and processes that affect oxygen levels most and to decide what further action can be taken to improve oxygen concentrations.

A new agreement reaffirming the commitment made by Canada and the United States in 1972 to restore and enhance Great Lakes water quality was signed in Ottawa in November 1978. As pollution control in Canada is primarily a provincial responsibility, the Ministry will play a major role in implementing the requirements of the new agreement. A review of the existing Canada/Ontario Agreement Respecting Great Lakes Water Quality was underway at year-end with a view to incorporating changes in shared responsibilities and funding necessitated by the international agreement.

Among the major changes to the 1972 agreement are the following:

- (1) provisions to largely eliminate discharges of toxic substances into the Great Lakes and to establish warning systems to prevent future toxic substances causing problems;
- (2) new interim phosphorus loading targets for each lake, these provisional targets to be finalized and their apportionment between the two countries negotiated within 18 months of the signing of the agreement;
- (3) new final deadlines by which municipal (December 31, 1982) and industrial (December 31, 1983) pollution control programs are to be completed and operating;
- (4) new and revised water quality objectives, including one for radioactivity;
- (5) provisions for dealing with pollution from land-use activities and for examining the problem of airborne pollutants;
- (6) revised monitoring and surveillance requirements for better assessment of the effectiveness of control programs plus provision for a public inventory of discharges and progress in meeting pollution control requirements.

Because of its considerable expertise and experience in the design and implementation of monitoring and surveillance activities for the assessment of water quality problems in the nearshore waters of the Great Lakes, the Ministry continued to be principal advisor on these programs to the International Joint Commission. Baseline plans for each of the Great Lakes, which will guide the surveillance activities of governmental agencies in both Canada and the United States under the 1978 Water Quality Agreement, were nearing completion at year-end and were to be

presented to the International Joint Commission in the summer of 1979.

Significant advances in the understanding of the influence of waste sources, water movement, and thermal effects on water quality of harbours and the nearshore zone were made during the year. The successful implementation of a computerized analysis technique for delineating areas of differing water quality and the incorporation of a variety of computer graphics and mapping techniques contributed to this progress. The Branch also undertook development of field equipment and computer analysis for plume tracking, using the Metro Toronto main sewage treatment plant outfall as a test location. The tests were successful and the methodology will be enhanced further to provide in-situ assessment of limited-use zones under the 1978 Great Lakes Water Quality Agreement and to assess potential water-use conflicts of discharge plumes with recreational areas and water intakes on the Great Lakes.

Increasing awareness of the Ministry's monitoring activities in the Great Lakes has generated a growing number of requests for advice and information on the suitability of Great Lakes waters for municipal and industrial water supply, recreation, and sport fishing. The Ministry received more than 200 inquiries from the general public, industry, consultants, and other governmental agencies in 1978-79.

The Branch participated in the work of the International Great Lakes Diversions and Consumptive Uses Study Board (IJC). (The Study Board is charged with the task of determining effects on Great Lakes Water levels of diversions into and out of the Great Lakes basin, and of increased withdrawals and consumptive uses of water in the basin to the year 2035.) Major input was made to

an inventory of existing withdrawal and consumptive water uses in Ontario, and their projection to the year 2035. The Branch is continuing to contribute to the preparation of the final report of the Study Board, which is to be presented to the IJC in early 1981.

Pollution From Land Use Activities Reference Group

The findings of the Pollution from Land Use Activities Reference Group (PLUARG) were submitted to the International Joint Commission in July 1978. They are summarized in the report "Environmental Management Strategy for the Great Lakes". The report calls for continuing reductions of phosphorous loadings to the Great Lakes and indicates that reductions are feasible for sewage treatment plant effluents, urban runoff, and agricultural activities related to manure spreading and erosion control. The report recommends control of toxic substances at their source where possible and expanded efforts to assess the possible effects of environmental contaminants. Recommendations are given for developing and implementing management plans, stressing site-specific approaches for agricultural and urban areas. The Branch completed reports dealing with pollution from urban, rural, transportation, extractive, and undisturbed land uses in the Grand and Saugeen watersheds; they were published in the PLUARG technical report series.

Inland Lakes

The Branch continued intensive biological and chemical monitoring of highly acidic Clearwater Lake for the sixth consecutive year. It also monitored three other Sudbury lakes neutralized from 1973 to 75. The pH of these lakes has decreased from 6.2 to 5.0 since the cessation of lime treatments, and

phytoplankton communities now resemble pre-neutralization ones. Continued low-level nutrient additions were made to this group of lakes and a control, non-acidic lake in order to better understand and separate nutrient-acid effects. Results indicate that productivity of all these lakes is controlled by nutrients, particularly by phosphorus. The Branch made complete surveys of the surficial and bedrock geology of five Sudbury-area lakes. Intensive monitoring was carried out on these lakes, including the collection of hydrological data and many chemical inputs in precipitation and streams. This information will be used to determine application rates and durations of liming treatments required to counteract acidity.

Acidic precipitation emerged as a major program in 1978 following the first Ministry reports on the problem in 1977. The directions from which acidic materials came were identified, and it was shown that at least 80 per cent of the acidic materials impacting on the Muskoka-Haliburton area come from the south and southwest. Emissions from smelting operations at Sudbury were shown to have low impact in the Muskoka-Haliburton area. At year-end, detailed studies were underway on approximately 20 lakes. Many other lakes were also being studied, but less intensively. No lakes in Muskoka-Haliburton have been shown to be acidic; however, many lakes are being stressed by shock loads of acidic material from snow-melt in the spring and by metals such as aluminum being leached from the watersheds. A research contract was awarded to a consultant to study possible effects of acid rain on the mercury content of fish. The work is to be completed in 1979-80.

The Branch collected yearling yellow perch from ten lakes in the Muskoka and Haliburton area affected by acidification to varying

degrees. Fish were analyzed for mercury and PCBs. Data correlations indicated increased mercury accumulation in fish in lakes with increased acidity. The Branch also collected yearling yellow perch at five sites on the Wabigoon-English River System between Dryden and the Clay Lake outlet. Analysis indicated that mercury uptake by fish in the system was similar throughout the collection area; off-system fish from tributaries had considerably lower mercury levels.

Continuing evaluation of freshwater clams as biomonitoring organisms included placing caged clams along the Muskoka River where fish samples had indicated mercury accumulation in previous studies. The caged-clam data did not support the fish sampling data while natural populations did, an indication that caged clams are poor short-term integrators of this contaminant. Clams have been shown in previous studies to be excellent indicators of organic-chemical contamination.

The Lakeshore Capacity Study is a multi-ministry co-operative project to develop predictive models concerning the effects of human development on lakes and their watersheds, particularly the capacity to accept recreational development. Compilation of results and preparation of reports was initiated during 1978-79. Results indicate that a significant portion of the phosphorous in precipitation is available to promote the growth of aquatic plants and algae.

The phosphorous removal program at Gravenhurst Bay produced similar, excellent results with respect to the bay's quality in 1978 as in 1977. The destratification project on Heart Lake was monitored routinely; in a similar project on Thompson Lake the fish population was removed in order to prepare the lake for a new bass-stocking program. Two smaller, newly constructed urban lakes

in the City of Mississauga, Aquitaine and Wabukayne, were also monitored. In Aquitaine, which is equipped with a sedimentation pond, water clarity remained high, and aquatic plants began to colonize the pond.

The Branch supervised aquatic plant harvesting over a total area of 880 acres in the Kawartha Lakes. Investigations were continued into the aquatic weed problems caused by Eurasian water milfoil and into factors leading to a decline of milfoil in the Kawarthas. The Branch initiated a field survey to identify aquatic plant communities in 12 acid-sensitive lakes. Monthly detailed plant biomass determinations were made in one acid lake, Clearwater Lake, and two acid-sensitive lakes. The Branch began a project to assess the potential of natural and artificial marshes for further improving the quality of sewage effluent.

Water Management

The Water Resources Branch issued expanded and updated information on the management of surface and ground water quality and quantity in the publication "Water Management: Goals, Policies, Objectives and Implementation Procedures of the Ministry of the Environment." The Branch also coordinated a project to help implement revised goals, policies, and objectives. An implementation committee and five subordinate working groups have the following objectives: the establishment of systematic procedures for policy implementation; regular review and update of the Provincial Water Quality Objectives; review of implementation to ensure fairness and consistency in application.

The Ministry distributes information widely on trace contaminants such as mercury, PCBs, Mirex, and DDT. During 1978-79, the Ministry issued six environmental health bulletins containing new or updated infor-

mation on contaminants in fish for over 300 watercourses. In April 1978, it published a series of bilingual booklets under the general title "Guide to Eating Ontario Sport Fish" for Northern Ontario, Southern Ontario and the Great Lakes. The booklets contain information on 31,000 fish taken from 440 waterbodies; more than 100,000 copies were distributed free of charge. A fourth booklet, "Health Implications of Contaminants in Fish," was also published for sale through the Provincial Bookstore in Toronto. This booklet contains all fish contaminant information, a more complete discussion of the contaminants of concern, and the medical rationale for fish consumption guidelines.

The fish contaminant information program is a co-operative undertaking of the Ministries of Natural Resources, Environment, and Labour. The Ministry of Natural Resources collects the fish. The Laboratory Services Branch of the Ministry of the Environment carries out chemical analyses. The Ministry of the Labour provides medical advice for the consumption guidelines. The Water Resources Branch co-ordinates the program and prepares the information for the environmental health bulletins and yearly booklets. The 1979 versions of "Guide to Eating Ontario Sport Fish" were to be published in April 1979 and include information on 43,000 fish from 625 lakes and rivers.

A report entitled "Mercury in the Lake Simcoe Aquatic Environment" was issued late in 1978. This report outlines the results of an 18-month investigation of mercury in water, sediment, and fish from the Lake Simcoe Basin. The study concludes that Lake Simcoe is not seriously contaminated by mercury. Low levels of pollution associated with human activity has resulted in some mercury enrichment in sediments near urban areas. In general, the level of mercury in fish is low,

but long-term bio-accumulation has resulted in elevated concentrations in some of the larger and older predatory fish such as walleye, largemouth and smallmouth bass, and lake trout.

The Water Resources Branch participated in and co-chaired the Urban Drainage Policy Committee which produced "Proposed Model Policies for Urban Drainage Management" for the Urban Drainage Sub-Committee of the Canada-Ontario Agreement on Great Lakes Water Quality. The report recommends that new approaches be incorporated into the planning and design of urban drainage systems, including master drainage planning and development of pollution control strategies by municipalities, use of the 'major-minor' drainage concept in storm sewer designs, better sediment and erosion control measures, and assessment of the effects of any new development on the water resources of an area. The Branch also helped to complete the "Urban Drainage Manual of Practice". At the request of Southeastern Region, the Branch developed detailed terms of reference for a stormwater management study for the Rideau River in the Regional Municipality of Ottawa-Carlton. The study is to be funded partially by the Provincial Lottery Trust Fund. Participants include the Regional Municipality, the City of Ottawa, the City of Nepean, Gloucester Township, and the Environmental Protection Service of Environment Canada. Purpose of the study is to resolve existing and potential pollution problems in the river in order to maintain it as a unique recreational resource and to evaluate pollution control measures for urban drainage.

The Branch continued development of mathematical modelling techniques to describe effluent mixing zones in rivers. The use of these techniques to evaluate the

mixing and decay of residual chlorine toxicity and free ammonia toxicity in shallow rivers was presented in a report. The Branch also continued improvement of direct measurement techniques for estimating stream reaction rates. Improvement of the Ministry's dynamic water quality model was undertaken as part of the Grand River Basin Study. This technique is a powerful tool for simulating a river system with natural processes and man-made inputs. Major improvements included consideration of urban runoff inputs and aquatic plant effects. The Branch continued surveillance of the water-well drilling industry, issuing 496 licenses to drilling and boring contractors during 1978-79 (38 to contractors being licensed for the first time). One driller was prosecuted; three licenses were placed in temporary suspension for infractions under Section 40 of The Ontario Water Resources Act. Staff participated in six regional meetings sponsored by the Ontario Well Association to upgrade the water-well construction industry.

In concert with the General Counsel and the Legislative Counsel, amendments to Section 39 and 40 of The Ontario Water Resources Act were drafted. The amendments were required to allow for upgrading of the water-well industry with respect to driller licensing, technician certification and training, and well-construction techniques.

Work continued toward reducing incidents of ground-water contamination in the areas of solid waste disposal, salt contamination, and underground petroleum storage. Staff provided advice in developing the Ministry's position on disposal sites in Cobourg, Huntsville, Orillia, Tillsonburg, and a site proposed for Maple. Problems with landfill gas were examined in London, St. Catharines, Oshawa, and Norwood. Assistance was provided to the Regional offices and the Legal Services

Branch for Hearings into the Elliot Lake mine expansion and the Appeal on the proposed industrial-waste disposal plant at Nanticoke. Consultation continued on various Ministry committees and groups including the Landfill Gas Committee, MTC-MOE Contamination Committee, and the Ad Hoc Committee on Gasoline Contamination. Assistance was provided to the Regions and the Ministry of Transportation and Communications in resolving difficult ground-water problems, many associated with the use of salt for deicing.

The Branch continued collecting continuous data on dissolved oxygen and temperature at eight sites in the Grand River Basin. The data are used primarily to verify a continuous simulation, water-quality model. Additional water-quality information on nutrients, sediment, chloride, lead, zinc, and BOD₅ was collected at seven special study sites. Studies of the extent and source of some organic contaminants and the chemical and physical characterization of fluvial suspended sediment were also undertaken.

Information was assembled on water quality, aquatic plants and algae, hydrology, and land use practices for extensive areas of the basin. It will be used in evaluating water resource conditions and predicting the effects of development and various water management options through the use of hydrologic, biological, water quality, and economic systems models. The Branch and participating groups in the Ministry of Natural Resources and the Grand River Conservation Authority are applying the models to evaluate water management plans to meet needs for flood damage reduction, water quality, and water supply in the Grand River Basin. The biological model being developed by Branch staff will predict changes in oxygen levels in the rivers caused by the growth of aquatic plants and algae.

The Branch continued the ground-water resources inventory started in 1977. The study is divided into two major sections: one concerning a basin-wide inventory of ground-water resources; the other, the potential for future supplies for all municipalities in the basin that presently have or are contemplating municipal ground-water systems. The study is also to be used to define ground-water quality throughout the basin and to determine the susceptibility of ground water to contamination from surface sources.

Staff contributed actively to a public consultation program to inform municipal representatives and officials and the public about water management conditions and practices in the basin. The Grand River Implementation Committee directed the study. The Committee consisted of representatives from seven ministries (Agriculture and Food, Environment, Housing, Industry and Tourism, Intergovernmental Affairs, Natural Resources, Treasury and Economics) and the Grand River Conservation Authority.

The first major review of the Permit-to-Take-Water Program was completed with implementation of changes in program administration to be effected in 1980. The automated storage and retrieval systems related to the Permit Program were expanded to include data from five of the Ministry's six Regions.

Water Resources Inventories

The water resources study of the Holland and Black River basins was completed, and a draft report was prepared. The study outlines surface and ground-water resources in the Oak Ridges Moraine area north of Toronto and provides a valuable data base for the Regional Municipality of York's official plan. Plans were prepared for undertaking a similar inventory study in 1979-80 in the Humber and Don River basins.

The results of water-resources inventory studies in the five large river basins of the Moose, Albany, Attawapiskat, Winisk, and Severn Rivers in Northern Ontario were published in three separate reports:

- (1) MOE Water Resources Report 11a: General characteristics and Frequency Analyses of Streamflows;
- (2) MOE Water Resources Report 11b: Ground-Water Resources;
- (3) MOE Water Resources Report 11c: The Water Quality of Selected Lakes in the Arctic Watershed of Ontario.

The three reports summarize field studies undertaken by the Ministry in Northern Ontario during which an extensive hydrometric network was established and maintained; water quality samples of both surface and ground waters were taken; and extensive hydrogeologic field work was carried out.

The Branch provided conceptual and technical supervision to a hydrogeologist hired on a contract basis by the Niagara Escarpment Commission (NEC) to carry out an inventory of ground-water resources within an 800-square mile planning area. The sensitivity of ground-water resources to contamination from possible surface sources in the area was subsequently established and used in developing official plan policies consistent with conservation objectives of the NEC.

The Branch continued the ground-water probability mapping program in 1978-79, and the map for the Regional Municipality of Haldimand-Norfolk was published. The ground-water probability map for the Regional Municipality of Peel was being printed at year-end. Mapping was completed for the southern portion of the County of Simcoe, while mapping of the northern portion was initiated. The program of delineation

of major aquifers was terminated with the publication of maps of the "Oak Ridges Aquifer Complex" and the "Guelph-Amabel and Guelph-Lockport Aquifer Complex."

Three publications—"Water Well Records for Ontario", Bulletins 2-21, 2-22, and 2-23—were released, showing ground-water and geologic data for three regional municipalities and two counties in Southern Ontario. Bulletins 2-102 and 2-103, "Data for Observation Wells in Ontario", containing data on ground-water levels for 1975 and 1976, were released.

The Branch divided information on total phosphorus loads to the International Joint Commission (IJC) for all significant tributaries to the Great Lakes for the 1977-78 water year. Detroit River tributary loads for 1977-78 were provided to the Michigan Department of Natural Resources as input to the Surveillance Subcommittee Report on the Detroit River.

Regional liaison meetings concerning all surface and groundwater networks resulted in the following benefits and improvements:

- (1) All stations in the provincial streamflow network were reviewed with respect to programs of the Ministry and classified according to program needs. Some stations were identified as surplus and dropped from the network.
- (2) Base maps were prepared as a rational planning basis for the observation well network, and each well was assessed within the new framework. Several observation wells were eliminated, and new wells were established. A pilot study was initiated to investigate the variability of ground-water quality with time.
- (3) The water quality network was modified to meet changing environmental needs and fiscal restraints. The resultant reduction of

20 stations and a saving of 10,000 lab determinations lowered costs while maintaining adequate information for management purposes.

"The Trent River Basin: an Interpretation of Selected Data Collected Under the Routine Water Quality Monitoring Program" was published. Three other publications providing basic information on the province's stream-flows and inland water quality were released: "Selected Streamflow Data, Ontario, Bulletin 3-12, 1977"; "Water Quality Data for Ontario Lakes and Streams, Volume X, 1976"; "Streamflow Data for IHD Representative Basins, 1965-1978".

Cartography and Drafting Services

In servicing the cartographic, drafting, graphic artwork, and reproduction needs of Ministry programs, Branch staff completed 342 multi-colour and monocolour maps and prepared 1,270 drawings, figures, and illustrations.

Engineering, Scientific and Technical Services

Geophysical surveys involving seismic, resistivity, gravity, well-logging, and VLF methods were utilized in ground-water contamination problems at Emsdale, Georgina Township, and various sites in Northwestern Ontario, and for ground-water development projects at Frankford, Callander, and Platts-ville. Specialized assistance was also provided to the University of Waterloo and to the Grand River Study in mapping borehole stratigraphy and bedrock topography. The soils laboratory continued to conduct a variety of analyses on soil samples submitted from various sources within the Ministry.

The Branch assisted Regional staff in conducting intensive surveys to define the effect

of pulp and paper mill effluent discharges on stream water quality and in applying water quality models to set-waste loading guidelines for mills on Junction Creek, the Kapuskasing River, the Abitibi River, and the Sturgeon River in Northeastern Region. Similar tasks were undertaken in West-Central Region in defining discharge guidelines for sewage treatment plant facilities on Canagagique Creek in the Grand River Basin.

The Branch provided technical support and consulting services to the Environmental Approvals Branch and Regional offices in applying Ministry guidelines and proposed policies for stormwater management in existing and proposed new urban development areas. Technical assistance was also provided to the Environmental Approvals Branch in preparing the Ministry's review of the hearings into uranium mining in Elliot Lake.

In co-operation with the Central Region, the Third Annual Water Resources Seminar was held with regional staff to discuss mutual concerns in surface-water quality management.

Bio-assay tests were completed on waste effluents for the three major steel companies—Dofasco, Stelco, Algoma—to determine overall effluent quality from various processes. Information from the program is to be used in development of federal industrial effluent regulations.

In co-operation with Environment Canada, the analysis of hexachlorobenzene (HCB) in fish, *Daphnia*, water, and sediments was conducted to determine the mobility of this compound through the eco-system. HCB is commonly associated with the chemical manufacturing sector. Preliminary toxicity data were available at year-end but bio-accumulation and transport processes needed further examination.

Agreed methodology for fish tainting was used to evaluate fish exposed to industrial effluents from the St. Clair River for flavour impairment. Chemical analysis of fish samples was incomplete at year-end. Tainting data indicate that effluents containing organic compounds can impair fish flavour; evaluations of this type can be used in the regulation of effluent quality. Bio-assay tests were run routinely on industrial effluents with rainbow trout. These tests meet the requirements of federal effluent guidelines. Standard methods were developed to include the water flea, *Daphnia Magna*, in the bio-assay testing program. Work was continuing at year-end to incorporate computer control of continuous flow bio-assay testing. The continuous flow test provides a more stringent evaluation of effluent quality and is more complex to run than the static test.

The Branch identified microscopic organisms (plankton) in samples from lakes and streams across Ontario for many projects, including those connected with Great Lakes water quality monitoring, acid rain effects, and effects of Ontario's phosphorus control program on the plankton of lakes.

The Branch also examined samples collected by cottagers or lakeside residents and answered questions related to algae growth and drinking water supplies. Experiments were under way at year-end to examine the effects of heavy metals on the plankton of lakes and how the toxic effects of metals are influenced by nutrient enrichment lake acidification.

Significant findings included the discovery of numerous new species of organisms in Ontario's lakes. Many of these new species are common in the slightly acidic lakes of the Precambrian Shield; however, their significance in terms of continued lake acidification and the health of the food web

is not yet fully understood. The plankton studies also demonstrated that the joint U.S./Canadian phosphorus removal programs have been effective in controlling algae growth in several Ontario waters, including Lake Erie's western basin.

pollution control branch

Director: K. C. Symons

The Pollution Control Branch is primarily responsible for the planning of environmental control programs and development of associated legislation, regulations, and guidelines to control the emission of contaminants. Supplementary functions include applied research, technology transfer, technical advisory service, and delivery to certain aspects of the pesticides and noise control programs.

Municipal and Private

The Municipal and Private Section is responsible for policy development and program audit in connection with municipal water supply, pollution control, and private sewage systems.

The **Private Sewage Unit** obtained approval for amendments to O.Reg. 229/74, one of which offered manufacturers of prefabricated septic and holding tanks a choice of methods in obtaining acceptance of their products. Notices were forwarded to Regional Municipalities, Health Units, and Ministry Regional and District offices concerning program matters. The most significant of these notices related to policy concerning the inspection of subdivisions, severances,

and undeveloped lots with regard to private sewage disposal, and to the acceptance of proprietary systems.

The Advisory Committee on Private Sewage Disposal Systems held seven meetings and initiated a review of O.Reg. 229/74, especially as it pertains to leaching beds in heavy soil areas. In addition, a sub-committee completed the production of a training film and slide program on septic tank systems. Summary reports of program activity were prepared for the private sewage program and the boating and marina inspection programs. Meetings were held to outline boating and marina program requirements for 1979-80.

The **Municipal Sewage Unit** completed revision of draft guidelines for the inspection of digester gas systems in existing sewage treatment plants to ensure their safe operation. Recommendations regarding the review and approval of new digester gas systems were also drafted.

The Operating Summaries for 1977, covering Ministry-operated water and sewage facilities, were published. A complete listing of all water and sewage works in Ontario for 1977 was issued and will be updated annually. Policies and guidelines for energy conservation in sewage treatment, land application of sewage plant effluents, disinfection of wastewater, and wastewater treatment plant sampling procedures were being prepared at year-end.

Under the Municipal Infrastructure Agreement between Central Mortgage and Housing Corporation (CMHC) and the Ministry of the Environment, CMHC financing for sewage and water works construction in Ontario for 1978 was as follows: \$85.0 million in loans, \$20.4 million in grants, \$7.6 million in high-cost construction grants. This Agreement terminated on December 31, 1978.

Under the terms of a new agreement between the federal and provincial governments, Ontario became responsible for administering federal grants to assist construction of municipal water and sewage services under the Community Services Contribution Program. This program was developed to replace the Municipal Infrastructure Program (previously administered by CMHC) and is intended to be more readily adaptable to changing municipal and provincial priorities. It should also reduce duplication of administrative effort and related inefficiencies between federal and provincial governments. In total \$31 million of grants were to be made available for facilities built in 1979. Eligibility criteria for grants under the new program are to be initially the same as those utilized under the CMHC program.

The **Municipal Sewage Unit** implemented the phosphorus removal program under the Canada-Ontario Agreement on Great Lakes Water Quality. Monitoring and evaluation of the program were under way at year-end. In 1978-79, 214 wastewater treatment plants throughout Ontario were controlling phosphorus inputs to lakes and rivers; approximately 500 tons of phosphorus are removed yearly from sanitary wastes.

The Municipal Sewage Unit is responsible for identifying and quantifying waste from municipal sources discharging into the Great Lakes. All waste loadings, as well as the status of existing and intended remedial programs, are reported yearly through the IJC Water Quality Board Annual Report.

The Unit concentrated considerable efforts on urban drainage management and sewage sludge utilization on agricultural lands. A draft policy and guidelines package on urban drainage management was completed, and policy implementation procedures were under development at year-end. Guidelines

for the utilization of sewage sludge on agricultural lands were completed and, at year-end, awaited final approval prior to implementation.

The Unit co-ordinates the development and operation of a management information system. In conjunction with regional representatives from the Utility Operations Section, work was completed on a performance data collection system for ministry-operated water and wastewater utilities. At year-end all ministry-operated works were reporting to the system. Output reports on the annual and monthly operating data, as well as summary reports on plant capabilities, efficiencies, and loadings, were made available to the Regions on a quarterly basis. Work was begun on determining data collection procedures for municipally-operated utilities, which will make utilities performance reports available for the entire province.

The **Municipal Water Unit** worked on the development of a cross-connection control manual for Ontario in 1978-79. The manual is to deal with both legal and technical aspects; at year-end, the technical aspects were under review by the Canadian Standards Association.

The Unit continues to serve on the MOE/Ministry of Health Committee on household water treatment devices. Guidelines for ultraviolet disinfection and iodine disinfection devices were prepared. Manufacturers and distributors have asked the Canadian Standards Association to canvass opinion on the need for standards for various household water treatment devices. The Committee has indicated its support for such standards.

Quality control in the manufacture and transportation of water chemicals was under review at year-end. Chemicals were being sampled and information gathered to deter-

mine whether or not additional controls are required.

The Unit represented Ontario on the Federal/Provincial Working Group on Drinking water, which was established to complete a major review of the Canadian Drinking Water Standards. This task was essentially completed by September 1978 when a draft document was submitted to the Advisory Committee on Occupational and Environmental Health. One item, the radio-activity objective, was still under discussion at year-end.

Noise Pollution Control

The Noise Pollution Control Section received 448 new noise complaints in 1978-79. Complaints of excessive noise from industry resulted in 165 investigations, and permission was granted to prosecute one persistent offender. The Section also investigated 95 complaints of air conditioner noise, 73 complaints of blasting concussion noise, and 115 complaints of miscellaneous noise activities. Provincial officers were called upon to provide expert testimony in 12 actions launched by various municipal and private parties.

The final report of the Model Municipal Noise Control By-law was published in August 1978. Twenty municipalities, accounting for more than 20 per cent of Ontario's urban population, have adopted noise control by-laws under Section 95a of the Environmental Protection Act. At year-end, 20 additional by-laws were being prepared for submission to the Minister of the Environment for his approval.

The fourth year of the Environmental Acoustics Technology training program sponsored by the Ministry was successfully completed. An external contract has been awarded to provide a draft Acoustics IV training manual, the final text in the planned series of training materials.

The Noise Pollution Control Section has provided technical comment on more than 2000 new land-use proposals and industrial projects in the four years since the noise impact assessment program was formalized. Increasing attention has been given to assessing class environmental impact statements, inter-government studies on transportation noise problems, and use of lands subject to Ministerial zoning orders.

The Section sponsored and guided the following major research projects: a study of the effects of transportation noise (funded by the Provincial Lottery Trust Fund); an investigation of noise emissions from a railway marshalling yard (funded by the Transportation Development Agency of Transport Canada); a study of community response to railway noise (funded by Experience '78). The United States Environmental Protection Agency used data from the last study in preparing U.S. Railroad Noise Rules. Two other noise-related projects were funded under the Ministry Experience '78 program. Both were external study projects on transportation noise and were awarded to two Ontario universities.

Pesticides Control

The Pesticides Control Section promotes a balance between pesticide use and environmental protection. The Section classifies pesticide products, licenses exterminators and vendors, issues permits for pesticide use, educates the public with publications, and provides training courses, fact sheets, and study guidelines for industrial and commercial education programs. The Section carries out its programs under The Pesticides Act, 1973 and Ontario Regulation 618/74.

The summer of 1978 was the third consecutive one in which municipalities south of a line drawn between Sarnia and Toronto

were urged to participate in mosquito abatement programs. This area was designated by the Ministry of Health as a high-risk area after 67 cases of St. Louis encephalitis were reported during the fall of 1975. Due mainly to dry weather in the late summer, mosquito populations remained relatively low, and no human cases of encephalitis were reported. Accordingly, spraying activity was reduced.

The termite control program is directed towards providing technical and financial assistance to municipalities experiencing problems with this insect. Public education is a large part of the program. At year-end, surveys were being carried out in all Metropolitan Toronto boroughs and in 15 other communities. The Section conducted a termite survey using wooden bait blocks. In all, 9,400 blocks were examined, and various degrees of activity were found. In addition, a research centre program was initiated in Guelph involving the planting of 12,000 blocks.

The following is a list of grants approved for chemical treatments and structural alterations required for the control of termites:

Municipalities	Chemical	Structural
Town of Kincardine	21,348.00	9,837.44
Town of Leamington	2,280.00	2,549.15
Village of Elora	3,142.92	2,145.80
City of Guelph	2,005.80	2,751.00
Borough of East York	11,403.00	3,959.92
Borough of Scarborough	6,965.40	6,097.00
City of Toronto	65,916.96	98,646.33
Borough of Etobicoke	840.00	640.42
Town of Fergus	1,446.00	399.00
Township of Nicol	216.00	
	\$115,564.08	\$127,026.06
TOTAL	\$242,590.14	

Altogether, 445 treatments were successfully completed, and grants totalling \$175,000.00 were paid to homeowners.

During 1978-79, the Pesticides Control Section gave 2,158 examinations and issued approximately 6,043 exterminator, 917 operator, and 3,572 vendor licences. The Section also issued 103 permits for the use of restricted products on land, 402 permits for the application of pesticides to water, and 225 permits for structural extermination.

Research continued to be conducted at selected water sites throughout the province to determine the efficacy of a number of unregistered aquatic herbicides for a variety of plant problems.

Research and Development

The Co-ordination and Technology Section is primarily responsible for internal and external co-ordination and liaison in matters related to research, and for administration of the research facility.

The Supervisor is Chairman of the Ministry's Research Advisory Committee and maintains liaison with other research groups in the Ontario government through the Research Administrators' Committee and with the federal government through the Canada-Ontario Agreement. During the year, contact was maintained with the United States Environmental Protection Agency, particularly their drinking and wastewater research groups in Cincinnati, Ohio. Through membership on the Research Committee of the American Water Works Association, the Section participated in the Association's research program selection.

The Section administers the Provincial Lottery Program initiated in 1977. Twenty-two health-related environmental projects were funded at a cost of \$1.919 million in

1979-80. Project subjects included viruses, toxic organics, carcinogens, noise, acid rain, PCBs, ozone, mercury in fish, and air quality effects on human health. Funding was to continue with a modest increase in 1979-80.

Applied Sciences

The Applied Sciences Section carries out investigations and reports on innovative concepts relating to environmental protection and enhancement. Nine studies were under way at year-end, primarily in the fields of alternative private waste systems and improved construction techniques for municipal utilities in cold regions. Six reports and two papers were prepared during 1978-79.

Wastewater Treatment

The Wastewater Treatment Section advances the quality of wastewater treatment in Ontario by maintaining and upgrading the level of expertise in wastewater treatment technology through developmental research and by providing expert advice and assistance to planning, control, and operational staff of the Ministry, municipalities, and industry. The Section maintains an analytical laboratory and the Ontario Experimental Facility, a 5.0 MIGD activated sludge plant for use in developmental research work and operator training.

At year-end, the Section was involved in seven research projects dealing with effluent disinfection, ammonia removal, hydrogen sulfide stripping, aerated lagoon design, and stormwater treatment. During the year, seven final reports, six interim reports and twelve technical bulletins were prepared. Ten

technical papers were presented at conferences, workshops, and seminars.

In an advisory capacity, Section staff made 115 site visits to municipalities and operating treatment facilities and prepared 75 follow-up memoranda and reports. Section staff assisted in the preparation and/or review of design proposals for approximately 22 facilities.

Section staff participated in the Activated Sludge Workshop, the Basic Sewage Treatment Course, the Chlorination Workshop, the Digester and Primary Treatment Course, and the Sampling and Monitoring Course within the Ministry's training program.

Water Technology

The Water Technology Section conducted research concerning ozone, trace organics (including haloforms), iron and manganese treatment, asbestos, effect of treatment processes on treated quality, distribution systems, and micro/macro-biological water quality.

Trace organic work involved a revised province-wide sampling survey to add new locations and resample locations with yearly averages over 30 ppm. Under Provincial Lottery funding, investigations were under way at year-end into alternate disinfection procedures at Belleville and the use of granular activated carbon to reduce haloforms in treated water at Brantford.

Ozone pilot work was carried out at the Hawkesbury waste treatment plant to examine the potential of ozonation for water treatment and colour removal. A Lottery project was proposed, funded, and contracted for the study of ozonation water treatment and by-product formation.

The asbestos monitoring program covers

all municipal water supplies; levels in 1978-79 were low or at the detection limit for asbestos fibres. Technical advisory work was carried out concerning new water plant commissioning, plant up-rating, and plant operational and technical problems.

Contingency Planning

The Contingency Planning Section revised and updated the Province of Ontario Contingency Plan for Spills of Oil and Other Hazardous Materials and two publications supplementing this manual. The contingency plan is intended to organize the activities of the various governmental agencies which may be involved in a spill incident of major proportions. The Ministry of Labour co-signed the provincial plan, thereby bringing the total number of participating agencies to nine.

The Section continued to assist in the development of several contingency plans for municipalities and major corporations. The Section also continued to assist in the development of the Detroit-St. Clair River Supplement and the St. Lawrence River Supplement—detailed response mechanisms under the Joint Canada-U.S. Marine Contingency Plan which would come into force in spill incidents crossing the international boundary.

Section staff participated in the preparation and delivery of several spill response training exercises, seminars, and workshops. Included were "hands-on" oil spill exercises at Parry Sound (co-ordinated by Shell Canada Limited) and Nanticoke (co-ordinated by the Hamilton Spill Control Group) and a mock exercise at Jordan Harbour (co-ordinated by the Sun Oil Company). A workshop for governmental and oil company on-scene co-ordinators, ar-

ranged by PACE and held in Toronto, was also very successful.

During 1978-79, the Section received spill reports on 490 incidents. Of these, 338 involved the loss of oil; 82 the loss of liquid or solid hazardous materials; 14, gaseous materials; 56 other contaminants.

The Section participated in the preparation of amendments to The Environmental Protection Act, 1971, as introduced in Bill 209 and, subsequently, Bill 24. These amendments will increase notification requirements, create clean-up and restoration duties for the owner and person in charge of spilled contaminants, define liabilities, create an incentive for preventative programs, establish a legal basis for municipal response, and provide authority for the Minister to order that action be taken or to initiate action through employees or agents.

environmental approvals branch

Director: D. P. Caplice

The Environmental Approvals Branch provides an approvals function for companies, individuals, and governmental agencies requiring approvals for their projects under The Environmental Assessment Act and sections of The Ontario Water Resources Act.

Environmental Assessment

The Environmental Assessment Section is responsible for managing the implementation

of The Environmental Assessment Act and co-ordinating the review of projects coming under the Act. The Environmental Assessment Act is a decision-making tool in which the proponents of major projects show in a public environmental assessment document how and why the project is needed in its preferred form and how detrimental environmental effects caused by the project during its construction, operation, and retirement will be lessened or eliminated. At year-end, the Section was in the process of completing the application of the Environmental Protection Act to provincial ministries and agencies, finalizing details involving implementation of the Act to the municipal sector, and conducting studies as to how the Act will be applied to private sector undertakings.

The Section continued to develop Ministry policy and submissions on environmentally significant matters concerning the nuclear power industry in 1978-79. The Section co-ordinated the Ministry's submissions to the Royal commission on Electric Power Planning; co-ordinated the Ontario Government's review of environmental impact documents submitted by Eldorado Nuclear Limited to the federal environmental Assessment and Review Panel for the planned development of a uranium hexa-fluoride processing plant at Port Granby; participated in hearings by the Environmental Assessment Board concerning uranium mining expansion plans by Denison Mines and Rio Algom Mines at Elliot Lake.

Concerning projects under the Environmental Assessment Act, section staff continued to prepare environmental assessment document guidelines, consult with proponents on the form and content of environmental assessments, review draft environmental assessments, and prepare formal reviews of environmental assessment documents.

During the year, environmental assessments were formally submitted for the first time by several governmental agencies. Among the 16 submissions were those dealing with highway widenings (Ministry of Transportation and Communications); the Colonel Samuel Bois Smith Waterfront in Etobicoke (Metro Toronto Regional Conservation Authority); access roads (Ministry of Natural Resources); the Highway 89 extension from Highway 400 east to Highway 12 (Ministry of Transportation and Communications); major transmission lines, transformer stations, and new communication towers (Ontario Hydro); expansion of the Welland Water Treatment Plant (Ministry of the Environment); solid waste disposal (Ministry of Natural Resources); the Haldimand-Norfolk regional water supply scheme (Ministry of the Environment).

Section staff consulted on the Upper Thames Conservation Authority, Glengowan flood control dam; the Orillia Water, Light and Power Company Go-Home Bay hydro-electric power dam; the INCO hydro-electric power dam on the Spanish River; the Onakawana Development Limited lignite mine on the Ontario Northland Railway line south of Moosonee. They also reviewed 100 Ministry water and sewer projects conditionally exempted under Section 30 of The Environmental Assessment Act in October 1977 when the Act came into effect. Exemption was granted because the projects were too far advanced to be properly assessed under the Act or too small to be of major environmental significance.

Section staff addressed or otherwise participated in 74 illustrated lectures on The Environmental Assessment Act as well as at numerous conferences and seminars. They also supervised 13 Experience '78 projects.

Industrial Approvals

During 1978-79, the Industrial Approvals Section continued to provide technical expertise in the field of industrial pollution control and to process applications for Certificates of Approval.

More applications were received and processed in 1978-79 than in 1977-78, largely because of an 18 per cent increase in waste disposal applications. Industrial air pollution control applications dropped significantly in number as a result of a continuing slowdown in the construction of large industrial sources that started in 1977-78. Fifteen per cent more industrial waste water applications were received, as many existing waste water control facilities underwent improvements and long overdue expansions.

Waste disposal applications received more in-depth technical appraisal in 1978-79. This thoroughness of review gave rise to a number of administrative problems mainly

caused by incomplete and incorrect information being supplied by proponents in support of their applications. Most of these problems were resolved; applications dealing with hauled liquid industrial waste of a hazardous nature required the most attention.

Section staff gave increased time and technical assistance to the Legal Services Branch in 1978-79 through testimony as expert witnesses at legal prosecutions, attendance and assistance at hearings, technical appraisal of control orders, and the introduction of charges under Section 8 of The Environmental Protection Act governing accidental spills.

Major projects requiring staff input included Ontario Hydro installations at Bruce, Pickering, and Wesleyville; the proposed Eldorado Nuclear Limited plant on Lake Ontario; a \$250-million expansion by Dofasco at Hamilton; grain handling and drying systems; a PCB storage depot at Smithville; new auto production facilities for aluminum engines to

be built by Ford Motor Co. at Windsor. The project to treat saline waste waters was abandoned by Dow Chemical Co.

Municipal and Private Approvals

The Municipal and Private Approvals Section processes approval applications made by municipal and private agencies for water supply and distribution systems, wastewater collection and treatment facilities, and sites and systems associated with waste management programs. The Section also licenses septic tank installers and waste haulers and provides technical approval to applications made under Central Mortgage and Housing Corporation's subsidy programs and the Ministry of Environment's regional subsidy program.

In 1978-79, the Section processed approximately 3,000 applications and approved over \$700 million worth of water and sewage works for construction. The processing function was aided by the Ministry's transfer program in which selected municipalities assist with the technical review of applications. Additional municipalities were brought into the program during the year, and it is intended to extend this program further. The program was supported by draft design guidelines that were finalized during the year and are to be made available throughout the province.

Considerable public interest was expressed concerning waste management disposal programs for which stricter requirements were adopted. The trend to larger regional sites being proposed to replace smaller, inadequate facilities continued. In 1978-79, the Section received 242 waste disposal site applications of which 220 were approved. The applications resulted in ten hearings before the Environmental Assessment Board, four appeals, and various court

Applications received and processed in 1978-79 are summarized below:

APPLICATIONS PROCESSED* APRIL 1, 1978 — MARCH 31, 1979

	Received	Approved	Cancelled	Denied
Air	680	619	71	9
Water	100	87	10	1
Waste	121	98	4	1
TOTAL	901	804	85	2

*Does not include 250 applications processed by the Technical Support Section of Central Region and forwarded to the Industrial Approvals Section for checking and approval.

actions. At year-end, there were 1,570 certified waste disposal sites in Ontario.

The Hughes Enquiry into the affairs of Waste Management Incorporated was completed, and both the staff of the Ministry of the Environment and the other ministries identified were exonerated of any wrongdoing.

Waste disposal site applications for extensive landfilling in Maple by Crawford Allied Industries and Superior Sand, Gravel and Supplies Limited were turned down by the Director of the Environmental Approvals Branch on the recommendation of the Environmental Assessment Board. The Director's decision was promptly appealed to the Environmental Appeal Board where the matter was being heard at year-end.

Additional applications for licenses from septic tank installers and waste haulers were received during the year; 3,600 licenses have been issued to date. Three licenses were successfully revoked without appeals.

Land Use Co-ordination and Special Studies

The Land Use Co-ordination and Special Studies Section advises other governmental agencies at all levels and the private sector on environmental matters related to land use planning and economics. It co-ordinates the Ministry's responses to regional development strategies, regional municipality official plans, and other proposed land uses to ensure that all environmental aspects are considered. It initiates or carries out studies on environmental matters affecting land use as well as on economic matters as related to the environment in controlling pollution.

In 1978-79, the Section represented the Ministry on various interministerial or inter-governmental committees concerning the

Agricultural Code of Practice, clean-up of low-level radioactive waste, the Canada-Ontario Agreement on the Flood Damage Reduction Program, the Niagara Escarpment Commission Planning Area, Ontario Base Mapping, the Parkway Belt, implementation of the development strategy for Simcoe County, cottage land policies, statistics on environmental data, studies under the auspices of the International Joint Commission, air quality standards setting, water quality objectives, the Grand River Basin, the West Patricia Land Use Plan, urban drainage, and the special task force on the Ontario pulp and paper industry.

The Section provided technical back-up to the Ministry's representative on the Land Use committee of the Resources Development Policy Field and reviewed 16 documents submitted under The Environmental Assessment Act, 1975. Economic studies and financial analyses of several companies and industries were also carried out to assess the economic impact of pollution abatement. At year-end, studies were under way on methods and procedures for setting industrial pollution abatement priorities on the basis of environmental effects.

The Section reviewed the Commissioners' Reports on reviews of the regional governments for the Regional Municipality of Waterloo and the regional municipality of Niagara. It also reviewed and provided comments on the Official Plans for Haldimand-Norfolk, Metropolitan Toronto (Metroplan), York Region, and projects leading to major amendments to the Official Plan for Ottawa-Carleton.

The Section started a major revision of the Land Use Planning Review Handbook, which is used by Ministry field staff in reviewing development proposals.

During 1978-79, Section staff gave 12 invited speeches to conferences and seminars, seven lectures to universities, polytechnical institutes, and community colleges, and presented testimony before the Environmental Assessment Board and the Legislature's Standing Committee on Resources Development. Staff also supervised ten Experience '78 projects.

project co-ordination branch

Director: J. C. F. Macdonald

The Project Co-ordination Branch has prime responsibility for managing, co-ordinating, and reviewing all Ministry capital sewage and water projects from inception to the completion of construction. During 1978-79, the Branch handled 249 construction contracts and administered a capital expenditure of approximately \$147 million. Of this amount, 34.6 per cent was paid out as subsidies under the Ministry's construction program for municipalities. (See Table I). In addition, the Branch was assigned the responsibility for administration and budgeting of the Direct Grants as part of a new policy that became effective on April 1, 1978. This policy broadened the availability of grants to assist the construction of municipally-owned water and sewage facilities.

Effective March 1979, following the signing of an agreement between the governments of Ontario and Canada, the Branch commenced administration and budgeting for the new Federal Community Services Contributions.

Program (CSCP) which replaced the former Central Mortgage and Housing Corporation (CMHC) infrastructure assistance program.

The Branch started construction on a number of new water and sewage works projects for municipalities having no communal facilities and extended existing facilities in many other municipalities. It also continued major sewage and water projects in South Peel Region and the York-Durham Area and undertook major extensions to water treatment facilities in Haldimand-Norfolk Region to permit the development of new housing. Completion of commitments, based on a 1974 5-year agreement with Niagara Region, was achieved; the Regional Municipality will develop and construct new projects, beginning in 1979-80.

In Northern Ontario, generous provincial government subsidy, combined with CMHC grants for high-cost projects, enabled the Ministry to continue with the provision of communal sewage and water facilities that will allow for growth and expansion of industry and housing. Additional funding provided through the Ministry of Treasury and Economics under DREE (Federal Department of Regional Economic Expansion) and RPB (Ontario Regional Priority Budget) schemes, enabled water and sewage works to continue under this Branch's direction in Geraldton, Nakina, and Longlac. A similar program for the City of Timmins is proceeding under the City's administration.

In addition to the regularly subsidized sewage and water projects, the Ministry also administered a number of other projects financed either solely by the Ministry of Northern Affairs or jointly by the Ministry of Northern Affairs and the Department of Regional Economic Expansion. Projects financed by the Ministry of Northern Affairs included sewage and water works for Kenora,

Ear Falls, Red Lake, Blind River, White River, Atikokan, Gore Bay, and Schreiber. Jointly-funded projects included works for Longlac, Geraldton, and Nakina. All of these works were well advanced at year-end; completion was scheduled for late 1979. Total estimated cost of these works: \$30,000,000.

Wasaga Beach sewage and water works projects were commenced in 1978-79. Funded through the Ministry of Natural Resources and administered by this Ministry, the projects were valued at approximately \$16 million and scheduled for completion over the following three years.

The Management-by-Results (MBR) system continued to be applied to all new applications for grants considered.

MBR grant eligibility evaluation for 1978-79 was as follows:

	No.	Estimated Cost
New grant requests accepted	87	\$ 87.805 M
New grant requests rejected	27	8.465 M
Total Evaluated	114	\$ 96.270 M

The Branch continued to administer the grants program for the construction of regional or area sewage and water treatment facilities in regional and specially restructured municipalities. These grants amounted to \$13.731 million in 1978-79. Effective April 1, 1978, grants for regional and restructured municipalities were amalgamated with the Direct Grant Program, and these municipalities became subject to the same MBR assessment as all new direct grant projects. Graphs I through IV for fiscal years 1973-74 to 1978-79 show:

- (1) annual total expenditures for sewage projects and for water projects;
- (2) annual total expenditures for provincial projects and for municipal projects;

- (3) number and value of contracts tendered;
- (4) construction activity by number of contracts.

(See Graphs—I-IV, pages 53 to 54)

The Branch's Groundwater Development Section supervised eight test-drilling contracts and four well-construction contracts with a total value of \$355,000. The Branch also undertook eight groundwater surveys and 16 special investigations involving well testing and analysis of well and aquifer performance for Ministry projects.

The Branch monitored innovative techniques for the construction of communal facilities in northern areas. Construction was completed on a low-pressure, shallow-buried sewer system for the old Townsite of Temagami.

During 1978-79, the Branch continued to administer the concrete sewer pipe plant pre-qualification program. Thirteen concrete sewer pipe plants had prequalified status in 1978-79.

The MEA-MOE Construction Inspectors' Courses (Nos. 1 and 2) were held again during the year. Approximately 50 candidates from municipalities and consulting engineering companies attended the one-week courses.

The Special Activities Unit performed approximately 104 field inspections of Ministry sewer and water projects, both at times of substantial completion and at expiry of contract guarantee periods.

Considerable work was performed in the review and drafting of standards, specifications, and Ministry policy for construction and materials, and in the evaluation of new products proposed for incorporation into capital works undertaken by the Ministry.

During 1978-79, the Branch's Claims and Contracts Section handled nine claims of a

contractual nature. At year-end, nine claims were either in the course of or had been referred to arbitration, and eight claims were in litigation. One claim under The Public Works Creditors Payment Act was outstanding at year-end. Approximately 95 claims amounting to \$2,384,605 were received pursuant to The Mechanics' Lien Act. The Section also dealt with several insurance-related claims.

The number of contracts tendered and executed during 1978-79 were as follows:

<u>Contracts Tendered</u>
101
<u>Contracts Executed</u>
102
<u>\$ Value of Contracts Executed</u>
111,880,475

TABLE I PROJECT CO-ORDINATION BRANCH Volume of activity under Capital Construction Program during 1978-79	
1) Capital Expenditure	147,325,000
Sewage Works	96,659,000
Water Works	50,666,000
Provincial Projects	142,961,000
Municipal Projects	4,364,000
Provincial Subsidy	50,914,000
% of total expenditure	34.6
2) Construction	
Contracts Tendered - No.	101
- \$ Value	118,100,000
Contracts Started - No.	109
- \$ Value	105,904,000
Contracts Completed - No.	115
- \$ Value	140,935,000
Contracts Under Construction During the Year	249
Average Number of Contracts Under Construction in each month	136
3) Grants to Regional and Restructured Municipalities	
No. of Municipalities Participating	14
Value of Grants Paid	13,731,000

waste management branch

Director: L. F. Pitura

The Waste Management Branch was formed on August 1, 1978 by incorporating elements of the Pollution Control Branch and the Resource Recovery Branch. This re-grouping brought all head-office functions related to the management of solid, liquid, and hazardous wastes within one organizational structure.

Experimental Plant for Resource Recovery

The Experimental Plant for Resource Recovery was officially opened by the Premier of Ontario on August 1, 1978. The transfer station section of the plant continued its successful operation at 50 per cent higher-than-design capacity. All processing systems were put into operation, and a 12-month program was initiated for gradual build-up to full design capacity. Market development programs continued and were expanded to include materials being recovered from processing operations at the plant.

A significant hazard associated with processing plants is the potential for shredder explosions due to flammable liquids or explosives. Following two such explosions at the Experimental Plant, an intensive investigation was launched to determine means of reducing the incidence, extent, and damage resulting from such accidents. The potential for fires, which is also a significant hazard, was successfully resolved by the combina-

tion of a selective suppression system and the development of detailed operator training procedures.

Material/Energy Recovery

Engineering design work continued on the Region of Peel material/energy recovery project in accordance with the agreement between the Region, the Ministry, and Reed Limited. Concerning the Watts from Waste projects, the Ministry, Metropolitan Toronto, and Ontario Hydro agreed that a technical and economic review of the project should be carried out before proceeding with construction because of escalating equipment costs and technical problems being experienced at similar plants in the United States.

The construction and commissioning of facilities at the Canada Cement Lafarge plant at Woodstock were completed; trial runs were carried out using RDF produced at the Experimental Plant in preparation for the full-scale demonstration project due to commence early in 1979-80.

Subsequent to an extensive joint review by the Ministries of the Environment and Energy, a program for the encouragement of energy-from-waste projects was developed and approved.

Source Separation

Four major pilot projects on residential source separation were initiated in co-operation with the municipalities of Etobicoke, the City of Toronto, Aurora, and Georgetown.

The success of the desk-top separation of fine office paper at the Ministry's head office building led to the decision to extend the program to 13 other government buildings in Metropolitan Toronto in early 1979-80.

Solid Waste Management

Under Project REMOVE, the Solid Waste Unit developed 30 contracts with municipal agencies at a cost of \$225,000. A total of 57 sites have been established to date; it is planned to withdraw further financial support after 1979-80.

The Unit initiated a gas migration study to investigate changes in gas migration patterns caused by natural or manmade restrictions. Remedial measures will be evaluated and guidelines developed in order to facilitate recommendations regarding the use of land that may be affected by gas production at old sites.

New guidelines were developed for landfill site establishment and operation, and proposed amendments to Regulation 824 were finalized. These changes will provide greater flexibility to the Regions and ensure further protection of the environment.

The Pathological Waste Task Force submitted a report to senior management outlining a strategy to control pathological waste from generation to final disposal. The report was under consideration at year-end.

The Waste Management Improvement Program included 80 contracts worth \$210,000 and involved many aspects of site improvement and up-grading.

Disposal of Liquid Industrial Wastes

In October 1978, the Minister of the Environment introduced a seven-point program to the Standing Committee on Resource Development for the disposal of liquid industrial wastes. The Waste Management Branch has initiated a number of activities to implement the program, including the automation of the way-bill monitoring system; submission of a report by M. M. Dillon Limited on the storage and handling of

PCBs; retaining of James F. MacLaren Limited for the reporting on requirements for a variety of waste treatment facilities; funding of engineering costs for the conversion of the Duffin No. 2 WPCP to an industrial liquid waste treatment facility; development of various guidelines and regulations; establishment of a task force to develop a "perpetual-care" program for waste disposal sites.

Transfers of Liquid Industrial Wastes

Automated equipment to process data from way-bill forms was put into operation during October, 1978. Major revisions to the form were introduced in January, 1979 in conjunction with the introduction of guidelines for the treatment and disposal of hauled liquid industrial wastes. Program results were generally encouraging during the year; there was a significant decrease in the percentage of unreported transactions by waste receivers.

Proposed Liquid Industrial Waste Treatment Facility

A study by Simcoe Engineering indicated that the conversion of the Duffin No. 2 WPCP in Ajax to treat liquid wastes in Durham and other municipalities was technically and economically feasible. The Ministry indicated its intent to fund the engineering costs up to \$170,000 and possibly the capital costs with a pay-back system. The necessary agreements and engineering works were proceeding at year-end.

PCB Handling and Disposal

A guideline relating to the management of PCBs and the prevention of PCB pollution was issued in 1978, thereby providing much needed guidance for both government and industry personnel. A need for control of the

movement of contaminated electrical equipment became apparent, and work on a regulation under The Environmental Protection Act was begun.

The acceptability of the cement kiln for PCB destruction at St. Lawrence Cement was the subject of a hearing before the Environmental Assessment Board at year-end. A report by the Director of the Waste Management Branch advocating use of this process was presented to the Board in December 1978, and the formal hearing process commenced in February 1979. The hearing was expected to continue through much of 1979.

Various organizations were investigating alternative methods of PCB destruction or removal, including the treatment of material and wastes containing low levels of PCB as well as the destruction of more concentrated materials. The Wetox process was being investigated at the Ontario Research Foundation; the Plasma Arc approach was being considered at the Royal Military College in Kingston. While these two processes have merit for specialized applications, considerable development would still be needed, and early utilization appears unlikely. Research at the University of Waterloo holds some promise for the removal of low levels of PCBs from transformer oils by chemical methods.

Until disposal can be arranged for PCBs, interim storage of wastes and contaminated equipment is needed. M. M. Dillon Limited, consulting engineers, was retained in December 1978 to review the needs for PCB storage in Ontario, develop a conceptual design for an interim storage facility, and locate suitable sites. The consultant's draft report was to be submitted to the Ministry in April 1979.

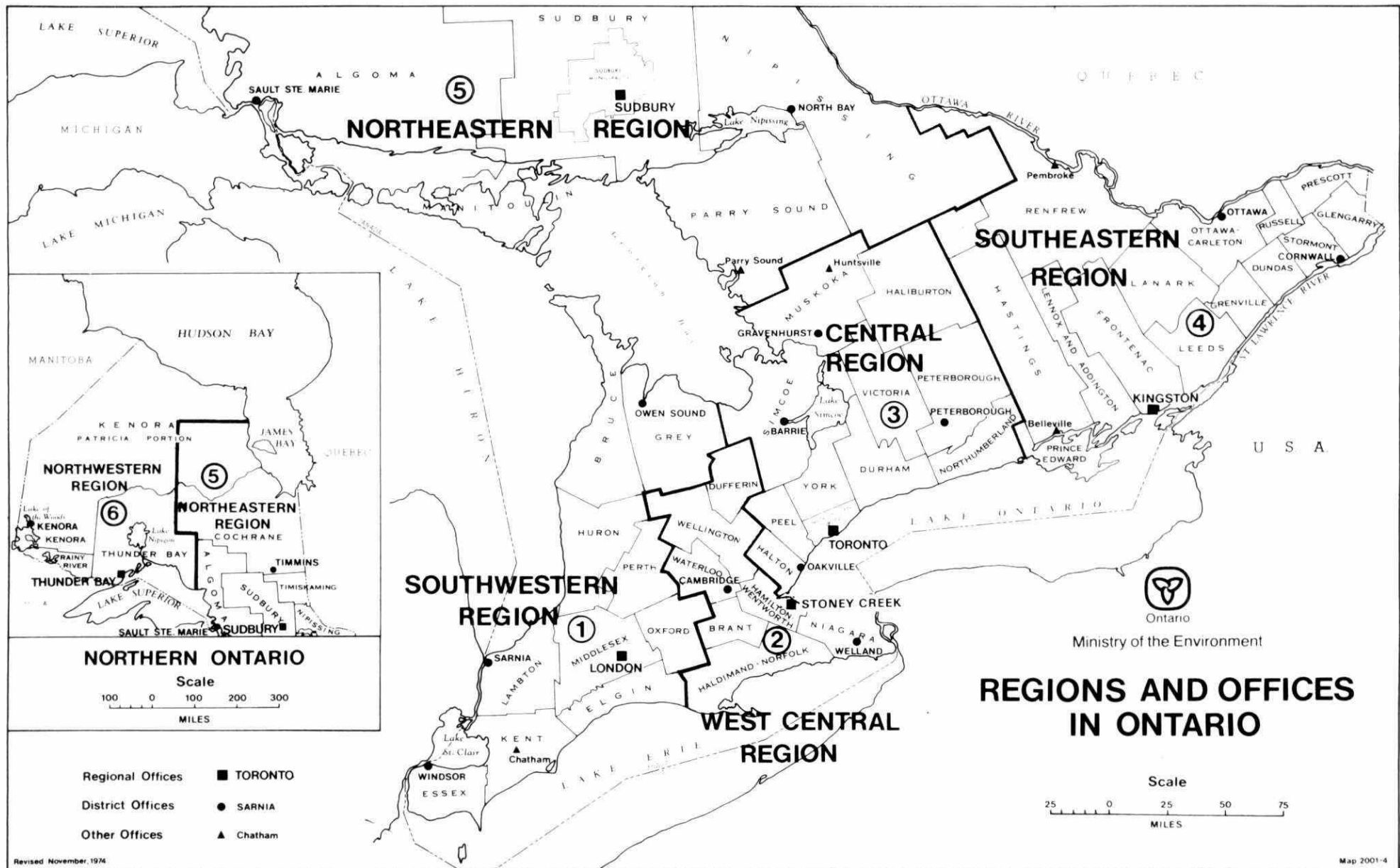
Used Oil Program

During 1978-79, 150 samples of waste oil were analyzed, and widespread PCB contamination was found. However, 96 per cent of the samples contained less than 100 ppm, and 90 per cent contained less than 25 ppm. These results indicated that most of the oil was acceptable for road oiling or as fuel in cement kilns consistent with waste oil guidelines.

A study of the environmental acceptability of used oil for dust suppression was extended through 1978-79 after the first phase of the study in 1977-78 produced inconclusive results. Second phase results appeared to be more definitive. On receipt of the consultant's report, the inter-ministerial committee on used oil recycling was to issue recommendations regarding the continued use of used oil for dust suppression on rural roads as well as for other uses.

Pulp and Paper Industry Investigation

During the fall of 1978, Ministry staff provided environmental and industrial expertise for Ontario's Task Force on the Pulp and Paper Industry. In January 1979, the Treasurer accepted the Task Force's recommendations and announced an incentive program for this industry. To receive a grant, a company must meet environmental and long-term mill viability requirements. Ministry staff are a part of the Advisory Group that reviews all grant requests. By year-end, nine companies had made submissions covering 20 mills.



regional operations and laboratories division

northwestern region

Regional Director: R. M. Gotts

Industrial Abatement

Industrial abatement activities in 1978-79 were primarily centred around extensive abatement programs required by Control Orders, Requirements and Directions, and Program Approvals issued to the Region's pulp and paper mills. Abatement programs were completed at three mills: by American Can of Canada Ltd. in Marathon (air), by Boise Cascade Canada Ltd. in Fort Frances (water), and by Domtar Packaging Ltd. in Red Rock (water). Additional abatement programs for these mills were being considered at year-end.

A new Control Order was issued for the Kenora mill of Boise Cascade Canada Ltd. for a major air and water pollution program to be completed by June 30, 1982. A Notice of Intent was served on Reed Ltd. for its Dryden mill for a Control Order to cover extensive abatement facilities required for an existing program. An Amended Requirement and Direction was issued to Great Lakes Forest Products Limited to allow additional time to resolve technical difficulties with the innovative closed-cycle effluent system in its new kraft mill.

A Control Order was issued to Steep Rock Iron Mines Ltd. for a monitoring and security program to ensure that PCBs from contaminated soil are contained in an existing, closed, environmentally secure, dedicated solid waste disposal site. At year-end, a Notice of Intent to issue a Control Order was

Assistant Deputy Minister: W. B. Bidell

The Regional Operations and Laboratories Division provides a wide range of services including: environmental protection, abatement programs and complaint investigations; environmental assessment; and the operation and management by Ministry staff of water and sewage works systems constructed by the Ministry.

In addition, the Division provides analytical and research support to the Ministry through the operation of provincial and regional environmental laboratories.

awaiting approval prior to being served on Industrial Grain Products Ltd. for a major abatement program to resolve air emission problems and excessive BOD₅ loadings in wastewater from its Thunder Bay starch plant. Progress continued with extensive air pollution abatement programs at the terminal grain elevators in Thunder Bay. By September 1979, it is anticipated that emissions from these elevators will have been reduced to approximately five per cent of pre-abatement levels.

Municipal and Private Abatement

Regional staff routinely inspected all communal water and sewage treatment facilities. They also conducted special surveys and studies, including bacteriological and chemical studies of water quality in municipal distribution systems, loading studies at sewage treatment plants, and water pollution surveys at a number of communities.

Major construction of water and sewage projects continued at various municipalities. Construction activity is expected to decline, as most municipalities have, or shortly will have, acceptable water and sewage treatment facilities. Construction projects of water and/or sewage treatment plants were completed or being completed at Kenora, Rainy River, Beardmore, Longlac, Nakina, Thunder Bay, and Geraldton.

Inspections were completed of all municipal and provincially-operated waste disposal sites in the Region. Funds from the Waste Management Improvement Program were used to upgrade facilities as required. Municipalities continued to participate in Project Remove, which has been essentially effected throughout the Region. In 1978-79, programs were carried out in the areas of Pickle Lake, Marathon, and Terrace Bay.

The Cottage Pollution Control Program was carried out along the north shore of Lake Superior. The Boating and Marina Inspection program was also continued, with particular emphasis on ensuring the adequacy of shore-based pumpout facilities.

More licences were issued under the Pesticides Control Program for brush and weed control programs, utility corridor maintenance programs, and forestry programs. General interest in pesticide use increased, as indicated by a public controversy over the use of 2,4-D in the forestry program in the Sioux Lookout area.

Air Quality

The Air Quality Assessment Unit continued major monitoring surveys in seven urban centres and issued reports for these areas for the year 1977. Special investigations utilizing vegetation, soil, and snow sampling techniques and direct air monitoring were also conducted near several forestry, mining, and grain elevator operations. The regional network of 130 instruments measured particulate pollutants, sulphation rate, sulphur dioxide, hydrogen sulphide, wind direction, and wind speed.

Water Quality

The Water Resources Assessment Unit operated a 47-station water quality monitoring network for lakes and streams in the Region (notably those affected by industrial and municipal wastes or urban run-off) and conducted regular sampling at 11 sites in support of the tributary monitoring program of the International Joint Commission for streams entering Lake Superior. Other major survey activities included participation in a joint federal/provincial study of mercury pollution of the Wabigoon/English River

systems; a pre-operational survey of the Mission Bay dredged-spoil disposal site in Thunder Bay; analysis of samples from wells in the Thunder Bay area for chemical quality; completion of surveys in the Red Lake and Sturgeon Lake areas to assess the impact of mining activities on surface water quality and biota; assessment on lakes in the Kenora area affected by the development of residences and summer cottages.

Environmental Planning

The Approvals and Planning Unit continued to co-ordinate regional responses to environmental impact statements and to review municipal subdivision proposals. In co-operation with the assessment units the use of magnetic tape data files was continued to improve Regional capability to retrieve, analyze, and interpret information collected at water and air quality monitoring stations.

Laboratory Operations

The analytical workload of the Thunder Bay Regional Laboratory was substantially increased by the added requirement in 1978-79 that soil and vegetation samples submitted from regional phytotoxicology surveys undergo chemical analysis. Analytical capabilities were extended significantly in order to accommodate this new area of chemical service.

Utility Operations

The Utility Operations Section operated 11 water treatment and 12 sewage treatment plants. Three new projects were commissioned during the year, and the transfer of operating responsibility of Kenora water and sewage treatment facilities to the Town of Kenora was initiated. Three additional projects

are to be commissioned and two new projects constructed in 1979-80.

northeastern region

Director: C. E. McIntyre

Industrial Abatement

Nine Control Orders, two Amending Control Orders, one Requirement and Direction, and two Provincial Officers Requirements were issued in 1978-79. The International Nickel Company of Canada Limited received three of these documents concerning their Sudbury operations: a Control Order, a Requirement and Direction, a Provincial Officers Requirement. As a result of earlier Control Orders, consultants completed assimilation studies on the Abitibi and Sturgeon Rivers. The studies were subsequently reviewed and abatement procedures agreed to by the companies concerned and the Ministry.

A Ministry-engaged consultant provided alternative solutions to the problem of PCB soil contamination in the Dowling area of Onaping Falls. At a public meeting, the Minister of the Environment announced that the situation would be remedied by means of hydrodynamic containment. Regional staff investigated 1507 complaints during 1978-79; of these, approximately 1400 were satisfactorily resolved.

Municipal and Private Abatement

The Region completed 62 lake and municipal surveys and visited 1683 cottages and residences to check waste supply and

sewage disposal systems—nearly a 50 per cent increase in such activity over 1977-78 due to the introduction of private services grants to municipalities. In total, 304 spills were reported and investigated; appropriate clean-up action was taken in each instance.

Under Project Remove, 19 municipalities helped to collect 3289 derelict motor vehicles. Nine municipalities participated in a program to improve their solid waste management operations. The Environmental Assessment Board hearings, held in Elliot Lake concerning proposed mining expansions, were finally concluded after nearly 30 months of public involvement.

Air Quality

A total of 200 instruments and recorders monitored air quality throughout the Region. In addition, special studies for particulate were conducted in Matheson, Parry Sound, Agnew Lake, Sault Ste. Marie, and Timmins. The suspended particulate and dust fall surveys in Elliot Lake were also continued to provide radiological data for use at Environmental Assessment Board hearings.

The Plant Pathology Unit collected over 1300 vegetation and soil samples throughout the Region and investigated 35 complaints of injury to vegetation. It was determined that 23 of the vegetation injuries were directly related to air pollution. The special white birch and white pine study, involving remote satellite-sensing and low-level photography, was continued to study the effects of air pollutants on vegetation in the Wawa area. The leaf litter decomposition study was continued in the Timmins area to determine the effects of zinc in the litter layers.

Water Quality

Water Resources staff completed a significant number of water quality projects, in-

cluding 12 groundwater interference/contamination investigations, 25 groundwater assessment studies, 40 water quality assessment studies, and 25 lake classification evaluations. In addition, 165 routine water quality monitoring stations and five routine water quantity monitoring stations were maintained.

Staff also provided reviews and assessments on 85 separate matters concerning official plans and amendments, lake management plans, the Public Lands Act, and zoning orders and processed 149 applications pertaining to pits and quarries under the Navigable Waters Protection Act and the Beach Protection Act.

Many groundwater interference and contamination complaints continued to be received. Major investigations were concerned with salt contamination of wells in Emsdale, gasoline contamination of wells in Port Loring, and water interference problems arising from a fish hatchery operation in Earleton. Staff verified 1200 water-well records, visited 110 well drillers, and issued 65 permits to take water.

Utility Operations

The Region operated 22 water treatment and 47 sewage treatment facilities, two of which were put into operation during the year.

The Region completed construction of the sludge dewatering system it had designed for the North Bay sewage treatment plant. The Region will operate the plant and use rented trucks for hauling sludge rather than rely upon a contractor. This arrangement should result in the City of North Bay saving more than \$6,000 in sludge disposal costs yearly. A sludge thickening tank was put into operation at the Sudbury sewage treatment plant that should save approximately \$22,000

a year in sludge disposal costs.

In co-operation with the Township of Black River-Matheson, the Region designed and constructed a new pumping station for the Community of Ramore. It was estimated that the use of governmental rather than private engineering and construction services for this project resulted in a cost saving of approximately \$30,000.

The Region initiated a study to determine the least expensive method to reduce the corrosive effects of water coming from the Wanapitei water treatment plant, which serves parts of the City of Sudbury and the Town of Nickel Centre. The study was undertaken after lead levels above provincial standards were found in water supply samples taken from older homes in the area with lead service connections.

southwestern region

Director: D. A. McTavish

Industrial Abatement

Work continued through 1978-79 towards establishment of a new regulation for control of sulphur dioxide levels in the Sarnia area. It appears possible to achieve air quality objectives for sulphur dioxide by curtailing sulphur oxide emission rates from certain industries during weather conditions that contribute to elevated sulphur dioxide levels in the area.

Regional staff are required to respond in the event of radioactivity-release incident at the Bruce Nuclear Power Development, which might have off-site effects. In mid-

March 1979, a two-day seminar was held at the site to familiarize staff with the facility, its surroundings, and their responsibilities for environmental monitoring in the area. Municipal representatives and the Medical Officer of Health for Bruce County attended the seminar.

Residents in rural areas surrounding the Tricil waste disposal site in Moore Township expressed concern about waste disposal activities at this site, especially following shut-down of the Mississauga incinerator. Extensive monitoring in 1978 included air sampling for both gaseous and particulate matter and measurements for soil and vegetation contamination. These studies showed that Tricil is not contributing to environmental contamination around the site to a detectable degree.

Work continued under the Transboundary Memorandum of Understanding by which air pollution control programs along the Detroit and St. Clair Rivers are integrated to the mutual advantage of both Ontario and Michigan. During 1978-79, procedures were established for companies to inform the appropriate municipal authorities in either country should a large quantity of toxic gas be accidentally released and appear likely to cross the international boundary.

There was a continuing increase in the number of applications for Certificates of Compliance for new and expanding livestock facilities. Many municipalities expressed an interest in receiving more information on the treatment of individual applications, and procedures were altered to provide this information. Some municipalities began participating in the program by providing the services of building inspectors; more are expected to follow suit.

The Region continued to receive complaints of dust emissions from grain-drying

facilities. At year-end, four grain dryers in the area were slated to be equipped with supplementary control equipment in 1979-80. During 1978-79 all drilling rigs in the lime industry were equipped to control dust emissions from quarry operations. At year-end, similar controls were being planned for quarry operations in the cement industry.

Municipal and Private Abatement

The Region participated in negotiations with the Ministry of Housing, a developer, and the Kent County Health Unit that led to the adoption of a development proposal for the entire western tip of the Eriean Peninsula, which had previously been owned by the C&O Railway in the United States and used for several decades as a coal depot. As a result of the proposal's adoption, existing residents of the area gained the opportunity to purchase lands they had occupied previously under 30-day lease arrangements with the Railway.

Discussions involving the Ministry, the public, and Lambton County health officials took place concerning difficulties being encountered in obtaining approval for the construction of septic tank systems in Lambton County. Regional staff, it was finally decided, would take over the approval and inspection of septic tank systems from the Lambton County Health Unit on April 1, 1979.

The Environmental Assessment Board approved an application by the City of Owen Sound to use a farm situated in the Township of Sydenham for the landfilling of domestic and commercial wastes.

Following discussions with the Town of Blenheim concerning odour problems arising from high-strength canning plant wastes being discharged into its sewage lagoon system, the Ministry indicated it would provide a design and \$100,000 for the construc-

tion of facilities capable of treating such wastes. At year-end, it was anticipated that the new facilities would be in operation prior to the 1979 canning season.

Air Quality Assessment

During 1978-79, the Air Quality Assessment Unit maintained 90 monitoring sites collecting pollutants over 30-day periods, 35 instruments collecting suspended particulates every sixth day for 24-hour periods and 68 continuous air monitoring instruments. The goal of achieving 90 per cent valid data was surpassed, based on the collection of 560,000 measurements. The Ontario Air Pollution Index was provided for Sarnia and Windsor.

Air quality monitoring was increased in the vicinity of the Bruce Nuclear Power Development site with the addition of an ozone monitor and suspended particulate monitoring for radiation. The main monitoring station in Sarnia was relocated to Centennial Park. A special study was initiated to determine the source and impact of particulates in the Beachville area.

The Unit documented the adverse effects on air quality of particulate emissions from Canron Limited in St. Thomas using correlations between levels of suspended particulates and meteorological parameters.

Approvals and Planning

The Approvals and Planning Unit reviewed 135 official plans, amendments, and zoning orders and forwarded comments on 110 of them to the Ministry of Housing. The Unit coordinated and provided regional input on 18 reports relating to sewage works and five reports concerning water supply and distribution systems. Fifteen applications were processed for Certificates of Approval to ensure compliance with air quality requirements.

Ninety-one water-taking permits were issued or renewed, and ten were cancelled. Regional input was provided on 11 environmental assessments (five formal), and appraisals were made of 71 development or land use proposals having environmental implications. The Unit also provided input on eight documents relating to land use planning and development guidelines, circulation and review procedures, agricultural practices, and the Niagara Escarpment Preliminary Plan.

Water Resources Assessment

By year-end, the Water Resources Assessment Unit had completed or was in the process of completing 21 reports outlining water quality assessments or establishing waste control requirements for surface waters throughout the Region. Surveys were conducted on ten watercourses or lakes to assess waste assimilation capacities, involving a complete range of water quality parameters and encompassing present concerns for hydrogen sulphide, ammonia, chlorine residuals, and heavy metal concentrations. Specialized efforts included assessments of marsh-type sewage lagoons at Harrow, investigations of the impact of fish hatchery effluents, sampling for Mirex on Kettle Creek, PCB sampling at Walkerton, and industrial lagoon sampling at Borden Company Ltd.

The water quality monitoring network was sustained, based on the collection of monthly water samples at 130 stations—seven of them involving continuous dissolved oxygen monitoring equipment. Streamflow measurements were taken regularly at 20 stations. Staff investigated 30 fish kills and assessed 12 surface water interference complaints. Continued progress was made to develop an experimental marsh treatment

facility at Listowel and apply soil renovation-type treatment approaches at Markdale and Flesherton. Specialized monitoring efforts involved bi-monthly sampling (December to May) at ten selected waste treatment lagoons to evaluate treatment efficiency.

Groundwater activities were again focussed on water quality and quantity complaints. Staff investigated 68 water-supply contamination complaints and 46 water-quantity interference complaints, the latter involving 274 residences. All complaints involved extensive field investigation and follow-up; several required letters to MPPs and the Ontario Ombudsman.

The Unit helped the Industrial Abatement Section assess the impact of 15 liquid manure holding facilities, locate waste disposal facilities at four sites, and evaluate the impact of two existing facilities. The Unit also provided advice on deep well disposal and maintained a monitoring program involving 30 observation wells in the vicinity of past deep-well disposal operations. Water-level fluctuations throughout the region were assessed by an observation well-network that included 38 wells equipped with automatic recorders and 16 wells where manual measurements were taken.

The Unit inspected 2,262 wells under the Water Well Program and reviewed and corrected an equivalent number of water well records prior to plotting on permanent map records. Thirty-seven per cent of the wells inspected were deficient in one or more respects. The Unit investigated 27 complaints of improper well construction and pump installations. Well-plugging guidelines were developed and distributed for review, and special assistance was provided to the Ministry of Transportation and Communications to ensure the plugging of numerous abandoned wells.

Water resources staff were involved in a total of 325 reviews of marine construction proposals, official plans and amendments, subdivision proposals, Permits To Take Water, pump tests, and various development proposals.

Laboratory Services

The London Regional Laboratory performed 150,364 chemistry tests on 16,436 samples and 41,658 microbiological tests on 15,386 samples.

A program to store and analyze quality control data on the mini-computer was finalized, involving transmission of data every six months to the Quality Assurance Officer for evaluation. The API multi-test bacterial identification system was put into use enabling more positive identification of bacteria at the genus and species levels. Total Dustfall and Carbon were added to the analysis program.

The microbiologist assisted the Municipal and Private Abatement Section and officials of the Ministry of Health in organizing and implementing a contingency plan to prevent the spread of polio virus in the environment. Efforts were focussed on disinfection of digested sludge and wastewater at activated sludge sewage plants in the area of a simulated polio outbreak.

Utility Operations

Two small waterworks systems and three small sewage treatment and collection systems commenced operations in 1978-79, thereby increasing the total population provided with water or sewage service by the Ministry from approximately 740,000 to 750,000. Two provincially-operated municipal plants were expanded by the municipalities concerned. Measures were initiated to expand eight sewage lagoon facilities that

failed to meet the Ministry's criteria for effluent concentrations because of overloading.

Negotiations for transferring operating responsibility for the Chatham Pollution Control Plant progressed satisfactorily; similar discussions with another municipality were also under way at year-end. Resolutions were received from four municipal councils repeating previous refusals to accept operating responsibilities for pollution control plants.

The Regional Utility Operations Section operated 57 sewage treatment plants and lagoons and 21 water treatment plants and well facilities in 1978-79. Its complement was increased by four full-time staff and two part-time staff. The Regional Safety Committee, comprising management and bargaining unit staff from all disciplines within the Region, continued to function satisfactorily.

west central region

Director: C. J. Macfarlane

Industrial Abatement

Dofasco and Stelco made a number of significant advances in their respective pollution control programs in 1978-79. Dofasco controlled charging emissions in a melt shop and completed the construction of a new coke oven equipped with the most modern pollution control devices in North America. The company also completed the exhaust air emission control of two blast furnace buildings. After much research and development work, Stelco installed an air cleaner of advanced design at its sinter plant; start-up problems, however, were not fully resolved at

year-end. Stelco also installed additional air pollution control devices at its coke ovens in Hamilton and completed the recirculating water system for the blast furnaces at its Hilton Works.

The new Texaco oil refinery at Nanticoke was in production at year-end. The most modern refinery in Canada, it was equipped with the latest pollution control devices.

Municipal and Private Abatement

The year was marked by major advances in the provision of water pollution control construction in the Grand River Basin. Completed expansion of the Kitchener Sewage Treatment Plant increased its nominal capacity from 13.5 million gallons to 27 million gallons per day. Expansion of the Waterloo plant (almost complete by year-end) increased its nominal capacity from 6 million gallons to 10 million gallons per day. The City of Brantford's plant was undergoing expansion at year-end from a nominal capacity of 12.5 million gallons to 18.5 million gallons per day. The City of Guelph undertook an advanced tertiary waste water treatment system intended to improve the quality of the effluent discharged to the Speed River and to permit development of the city. Plans were being made to expand and to improve present waste water treatment systems at Ayr, St. George, Elmira, Salem, Elora, and Shelburne.

Expansion of Hamilton's secondary waste water treatment plant from a nominal 60 million gallons to a nominal 90 million gallons per day was nearing completion at year-end. Expansions of treatment plants at Fort Erie (river plant), Simcoe, and Dundas were substantially complete; expansion of the treatment plant at Niagara Falls was well advanced.

Allegations of irregularities in industrial liquid waste disposal in the Hamilton area led to the laying of more than 100 charges by the Ministry against individuals and companies in the waste management field. The charges followed an examination of disposal practices in the Regional Municipality of Hamilton-Wentworth.

Public resistance to the establishment of sanitary landfill sites was evident at the Ontario Municipal Board (OMB) hearing into the proposed establishment of a disposal site in Glanbrook Township in the Regional Municipality of Hamilton-Wentworth. The OMB found in favour of the site being established. The Environmental Assessment Board hearing into the environmental aspects of the site was to commence in April 1979.

Air Quality

Air quality in the Nanticoke area was being monitored at year-end under a co-operative measurement program conducted by Ontario Hydro, Stelco, Texaco, Environment Canada, and the Ontario Ministry of the Environment. The intention is to provide detailed meteorological information for well-founded air quality management, especially within a range of approximately 80 kilometers. Air quality in this area has been affected for many years by sources of air pollution in the United States. It is important that air quality not be permitted to alter to an unacceptable degree or to cause unwarranted effects because of the presence of the new industrial development at Nanticoke.

Water Quality

During the year, there was a great upsurge of public interest in the disposal of industrial and municipal wastes. The revelation that large quantities of industrial wastes had

been stored at the Love Canal, Bloody Run Creek, and other sites along the Niagara Frontier in the United States led to disquiet about river water quality and the effect of contaminated Niagara River sediments on fish. Surveys of water quality at Ontario communities, including Niagara-on-the-Lake, Niagara Falls, and Fort Erie, did not reveal the presence of unusual levels of toxic chemicals; however, the conditions of the river sediments were far from acceptable.

central region

Director: P. G. Cockburn

Significant activities included environmental planning, an air quality improvement program in the core area along Lake Ontario, environmental control activities in recreational areas, and the control of phosphorus inputs to waterways.

Industrial Abatement

The disposal of difficult-to-treat liquid industrial wastes continued to be a problem during the year. With the closure of the Beare Road landfill site in April 1978 and the Tricil incineration facility in Mississauga in July 1978, no overall disposal outlet remained in the Region. At year-end, much of the waste being generated by industry was being stored on-premise; a portion was being shipped to outlets outside the Region.

Surveillance and monitoring of lead industries continued during the year. Emission levels were largely satisfactory. Elevated emissions occurred around the Canada Metal

Plant in late 1978 and early 1979; by year-end, the company had initiated further control activity.

Responses to spills and emergencies continued to be time-consuming. A warehouse fire, involving stored pesticides, occurred in April 1978 at Oakville Storage and Forwarders Limited in Oakville and required much liaison with other agencies and this Ministry to effect a satisfactory environmental response. Spills of contaminants, such as gasoline and fuel oil, required immediate and positive action to prevent significant environmental damage.

Progress continued to be made in abating liquid and gaseous emissions to the environment. Union Carbide in Lindsay eliminated their liquid effluent problem by re-diverting wastes from Sinister Creek to an augmented municipal treatment facility. Eldorado Nuclear Limited in Port Hope installed leachate collection and treatment facilities at the Welcome disposal site. Chemical Developments of Canada Limited in the Township of Rama installed a wastewater treatment system to treat liquid wastes. Gulf Oil Canada Limited in Mississauga completed the requirements of a Control Order.

Municipal and Private Abatement

Recreational lakes surveys were undertaken in the Honey Harbour area of the Township of Georgian Bay and along the Severn River in the District Municipality of Muskoka and the County of Simcoe. In the Peterborough area, surveys were undertaken on Crystal, Pencil, Four Mile, White, Fortesque, and Salmon Lakes. A total of 2,350 cottages were inspected to insure that sewage treatment facilities were adequate for the purpose of protecting the quality of recreational waters. During the year, increased emphasis was placed on the upgrading of

existing waste management sites and the development of new sites where existing facilities were proving to be inadequate. The number of inspections in this area increased from 1,656 in 1977-78 to 1,817 in 1978-79.

A total of 2,200 inspections were made of water and sewage works to ensure compliance with Provincial requirements, based on an inspection frequency of two per year for waterworks and six per year for sewage works. Sewage works inspections were concerned, in part, with the control of phosphorus inputs to the water environment. The majority of plants were able to meet the 1.0 mg/l standard of the Canada—Ontario International Joint Commission Agreement; other plants required considerable assistance in upgrading their operations. One notable success story was the correction of a pH problem at the Gravenhurst sewage treatment plant that reduced the phosphorus loading to Gravenhurst Bay and eliminated a serious algae problem.

Air Quality

Major improvements in Toronto's air quality achieved over the previous ten years were maintained during 1978-79. The sulphur dioxide level in 1978 was lower than the 1977 level and well below the annual criterion. Suspended particulate remained slightly above the annual criterion. The API (Air Pollution Index) exceeded the maximum desirable level on only two occasions but did not reach the first alert level.

Monitoring for hazardous substances was continued in 1978-79. The intensive lead monitoring program in the vicinity of five Toronto-area lead plants was maintained. Airborne asbestos was monitored at five asbestos-using plants in the Region.

During the year, 34 applications were processed and approved related to environ-

mental emissions. Evaluations involved analysis of combustion equipment, plant, and process exhausts with or without control equipment. Particular attention was given to asbestos and heavy metal emissions and other potentially hazardous substances such as TDI, MDI, PVC, and PCB.

Water Quality

Studies were carried out on a number of recreational lakes either to assess sensitivity to development or to establish a data base for long-term water quality trends. In Peterborough County, Central Region staff worked closely with municipal planners to establish the sensitivity of 16 lakes within the Seven Links Planning Area. In the District Municipality of Muskoka, a co-operative MNR-MOE lake survey program was undertaken to define the quality and sensitivity of five lakes for which these Ministries had very little data. The Region also continued its Self-Help program whereby cottagers and permanent residents on 73 lakes routinely collect their own water clarity data and take lake samples for chlorophyll analysis at the central laboratory. A review of this data suggested that, in general, the quality of most of the Pre-Cambrian lakes has remained reasonably constant over the past five years.

Considerable emphasis was placed on Lake Simcoe, the largest inland lake in Southern Ontario. Regional staff continued to monitor the lake's quality to establish long-term trends and participated on the interim ministerial Simcoe Couchiching Report Committee. During the year, the committee suggested that a basin policy be adopted for keeping Lake Simcoe quality at a constant level; at year-end, it was preparing its submission on the subject to the Cabinet Committee on Resource Development. Lake surveys were also carried out on Brydon Bay

(Lake Muskoka) and Gull Lake to check their suitability as water supply sources for Gravenhurst; both were judged to be suitable. A study was conducted on Sturgeon Lake to establish the effect of the enriched Scugog River, and a report was prepared detailing the 1977 survey on Little Lake near Barrie.

The Water Resources Assessment Unit paid increased attention to the impact of effluent discharges from sewage treatment facilities on receiving streams to determine whether the more stringent water quality objectives outlined in the new Water Management booklet were being met. Preliminary office studies were conducted for all such facilities discharging to streams in the Region, and specific field sampling runs were made on the summer and winter low-flow conditions for all plants in the southwestern part of the Region. Assessments indicated that, in many sections of streams, the ammonia and chlorine objectives were being exceeded during low-flow periods. Intensive field work at Uxbridge, Alliston, Stayner, Lakefield, and Cobourg found that the impacts of the facilities were generally acceptable.

As a result of proposed urban development in a number of municipalities, waste-loading requirements were established. Normal-to-high treatment was recommended for Cookstown, Victoria Harbour, Georgetown, Alliston, and Stouffville.

Regional staff provided assistance to the Water Resources Branch in defining the sensitivity of Muskoka-Haliburton Lakes for acid rain. The sampling of 29 lakes in early 1979 revealed that many of the Region's Pre-Cambrian Lakes have alkalinity values of less than 1 to 2 mg/l and are hence sensitive to acid precipitation.

The Muskoka Basin Mercury report, based on 1977 field-work, was prepared. It was con-

cluded that known direct inputs from human activities (i.e., sewage treatment plant discharges) could not account for the high mercury levels found in fish taken from the basin.

The Water Resources Assessment Unit investigated a number of complaints of ground-water contamination resulting from accidental spills and poor well construction and maintenance. The Unit also investigated complaints concerning lowered water tables, allegedly caused by major water withdrawals. A report on well interference in the Bolton area was released; at year-end, negotiations were under way for reimbursement of restorative costs incurred by owners of affected wells.

The construction of the York-Durham Sewage Scheme in the Boxgrove area resulted in numerous complaints about water quality and quantity problems being experienced with private wells. Regional staff helped to assess these complaints.

The hydrogeologic settings of a number of proposed and existing sanitary landfill sites were reviewed to determine their likely impacts on local ground and surface water quality through the production, movement, and attenuation of leachate. Sites investigated included Beare Road (Metro Toronto), Maple Pits (Town of Vaughan), as well as those in the Township of Seymour, the Town of Lindsay, and the Region of Halton.

Through the water well location and inspection program, 4,363 wells were located and the records submitted to the Water Resources Branch for processing. An inspection survey of 428 wells in the Region of York and the Muskoka and Haliburton areas showed about one-half of the wells to be deficient in one or more respects.

Eleven stream-flow recording stations were maintained, while periodic measurements

were made at 11 additional sites. Water quality samples were collected monthly at 189 stations with the help of the Credit Valley, Halton Region, Metropolitan Toronto and Region, and South Lake Simcoe Conservation Authorities. Radiological monitoring of surface water in the Township of Cardiff and at the Eldorado nuclear facilities in Port Hope and Port Granby was continued. Thirty continuous recording observation wells were operated in the Region to monitor fluctuations in groundwater levels.

Environmental Planning

Staff provided environmental planning expertise for the design and review of an increasing number of development proposals related to submissions under the Planning Act. Municipal liaison was increased in this area to assist the municipalities in Central Region that have assumed responsibility for the approval of such proposals from the Province. Liaison with private developers and their consultants was stepped up in order to introduce environmental factors at early stages of design. Staff assessed a number of class environmental assessment documents and assessment reports under the requirements of the Environmental Assessment Act and participated in a major environmental and feasibility study for locating a new provincial highway.

southeastern region

Director: R. E. Moore

Industrial Abatement

The Industrial Abatement Section investigated 137 spills and 195 complaints, performed 1,028 general inspections, and helped process 161 Certificates of Approval.

Several companies addressed themselves to pollution problems by installing equipment and making other modifications and improvements to their plants. The more significant actions were undertaken by

Courtaulds (Canada) Ltd. (Cornwall),
Lake Ontario Cement (Picton),
Celanese (Canada) Ltd. (Millhaven),
Canada Starch Co. (Cardinal),
Chromasco Ltd. (Haley Station),
Nestle's (Chesterville), and
Sanilit Ltd. (Alexandria).

Seventeen Orders, Requirements and Directions, reports, and prosecutions were initiated during the year.

Municipal and Private Abatement

Main staff efforts (on a percentage basis) were as follows:

- (1) inspection and assistance to operators of municipal and private waterworks (14 per cent) and sewage works (8 per cent);
- (2) inspection and assistance to operators of municipal and private waste disposal sites (14 per cent);
- (3) land use planning activities (10 per cent);
- (4) Part VII activities (12 per cent).

Increased emphasis was placed on the waste management program in 1978-79. The funding made available for the program was generally well received by Municipalities and led to several significant improvements being made. However, it is anticipated there will be increased resistance by citizens and municipalities in 1979-80 to the location of waste disposal sites in their areas.

The funding program for the correction of private systems was initiated; at year-end, reports were being prepared by consultants for 13 municipalities.

Stormwater management emerged as a major concern; at year-end, staff were negotiating a comprehensive study for the Rideau River and Ottawa-area communities. The study is to commence in 1979-80.

Water Quality

The Region's lake survey program continued with the sampling of 42 recreational lakes. Monitoring of water quality was carried out on an additional 69 lakes through the Cottagers' Self Help Program. Monitoring continued at 170 river water quality stations.

Staff investigated 27 interference and 63 contamination complaints concerning water supply and reviewed proposals for 34 new waste disposal sites and 36 municipal water supply and waste treatment facility expansions. Reports were also prepared during the year concerning water quality in the Bay of Quinte, water management on Mayhew Creek, and the enrichment status of the 69 lakes within the Cottagers' Self-Help Program.

Environmental Planning

The Region handled 1,572 requests regarding official plans and amendments, zoning by-laws, environmental assessments, certificates of compliance, ODC/DREE ap-

plications and sewage works approvals—an increase of approximately 26 per cent over 1977-78. There was also increased liaison with local municipalities, planning boards, consultants, and other agencies and ministries of government respecting this Ministry's input to urban, rural, and recreational land use planning.

Laboratory Operations

The Regional Laboratory in Kingston continued to offer key assistance to field operations. The chemistry workload on a test-performed basis increased by 10 per cent, while the microbiological test workload decreased by 10 per cent. The actual sample increase in chemistry was 20 per cent; in microbiology, five per cent. The reduced test workload was the result of an attempt to minimize redundant tasks, particularly in microbiology where the upper limit of capability is approximately 50,000 tests per annum or 15,000 tests per man-year. Seventy-five per cent of the workload in microbiology stems from municipal and private water supplies and Ministry-operated water treatment plant.

Utility Operations

Meetings with municipalities to discuss transfers of operating responsibility for Ministry water and sewage projects were notably unsuccessful. The majority of municipalities feel they cannot operate the projects at a significantly lower cost than the Ministry and maintain the same level of operating efficiency. The Region's practice of "satelliting" the operation of a number of smaller projects from a central "parent" project has, in particular, proved to a cost-effective measure.

The Utility Operations Section completed formation of a Technical Services Unit to provide improved, co-ordinated services in the

electrical instrumentation field and to the operating projects and abatement and laboratory services.

The new Hawkesbury WPCP went into service in late 1978, thereby providing treatment to what had been the last untreated municipal sewage outfall on the Ontario side of the Ottawa River.

laboratory services branch

Director: G. C. Ronan

The Laboratory Services Branch provides analytical support to the Ministry's environmental quality assessment and pollution abatement programs. Prior to 1978-79, steady growth occurred in all areas, but, as new programs were launched and the Government's constraint program continued, no further expansion of analytical work could be accommodated.

A study of laboratory operations was completed during the year. Recommendations were made to form a Laboratory User's Committee and to reduce sampling for some programs on a selective basis to accommodate newly-emerging, high-priority requirements. Consequently, regions and management groups voluntarily cut back on some areas of sampling.

Branch Organization

The Branch continued to respond to client group's needs on the basis of the type of analytical service required. The Branch consists of seven sections:

- (1) The Water Quality Section conducts routine water and wastewater quality testing.
- (2) The Air Quality Section conducts metal and anion analysis on air, water, and biological samples.
- (3) The Pesticides Section conducts routine and non-routine pesticides testing and other organic analysis on all types of environmental samples.
- (4) The Organic Trace Contaminants Section conducts routine and complex organic analysis on water, air, and biological samples.
- (5) The Physical Methods Section performs physical and chemical analysis on environmental samples by non-destructive techniques.
- (6) The Microbiology Section determines bacterial levels in waters and wastewaters, identifies microorganisms, and conducts microbiological assessment of the mutagenicity of pollutants.
- (7) The Administrative Section provides personnel, financial, and general administrative services; operates the Laboratory and Research Complex safety program; administers the Central Stores for the Ministry.

Three regional laboratories in Thunder Bay, Kingston, and London operate under the general technical direction of the Branch; they perform microbiological and chemical analyses in support of regional programs in Northwestern, Southeastern, and Southwestern Regions respectively.

During the year, the Air Quality Section was re-organized and transferred from 880 Bay Street in downtown Toronto to newly renovated facilities at the main laboratory complex on Resources Road in Etobicoke.

Tests Performed

The Toronto and regional laboratories performed 1,702,000 tests in 1978-79 as compared to 1,780,000 tests in 1977-78, a drop in number of approximately four per cent. The Toronto laboratories conducted 75 per cent of the tests; the Thunder Bay laboratories, 6 per cent; the Kingston laboratories, 8 per cent; the London laboratories, 11 per cent. Table I (page 54) provides a breakdown of test production during the year as compared to the previous year.

Programs and Laboratory Users

The Toronto laboratories performed nearly 55 per cent of their tests in support of

regional activities. The remainder were conducted for the Air Resources Branch (4 per cent), Pollution Control Branch (3 per cent), Water Resources Branch (30 per cent), other branches and governmental agencies (8 per cent). Diagram I illustrates the distribution of the workload among users.

Principal regional programs requiring laboratory tests were concerned with assessment or abatement activities (air and waste assessment, industrial abatement, water works monitoring). The majority of tests required by the Water Resources Branch were connected with its Great Lakes and river monitoring programs. Diagram II illustrates test volumes for specific programs.

Regions 55%

DIAGRAM 1: TEST WORKLOAD BY REGION/BRANCH, 1978-79

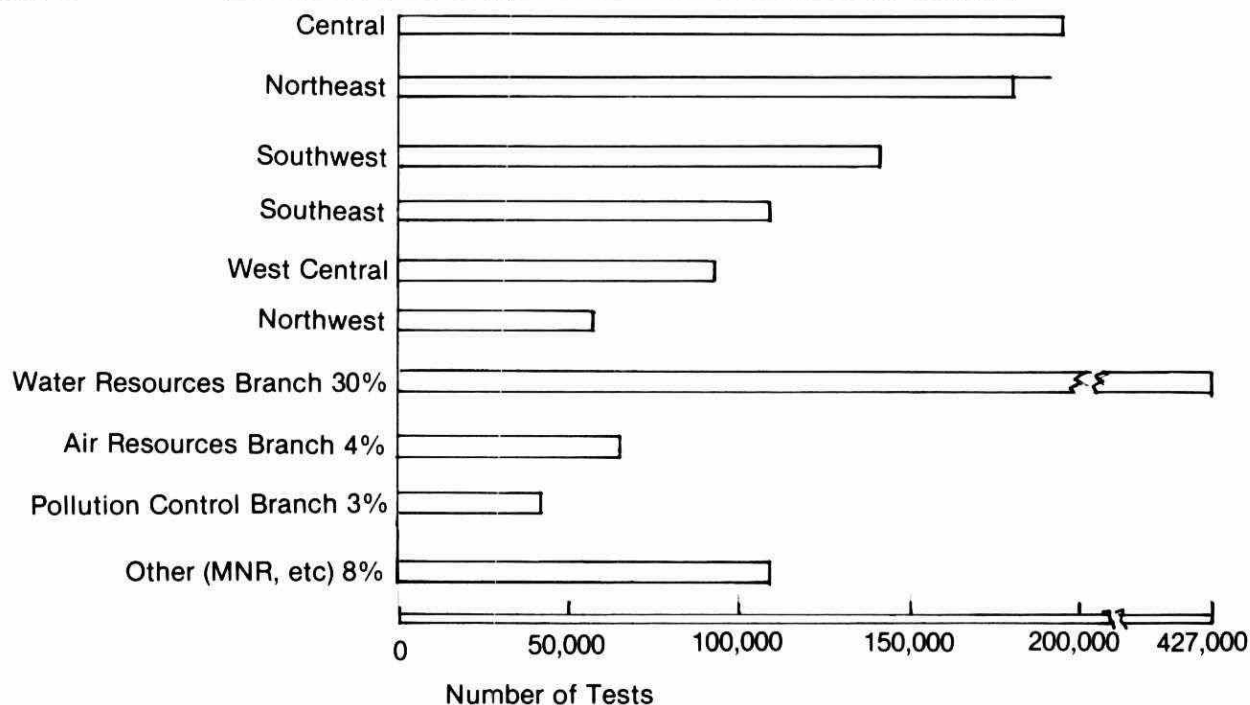
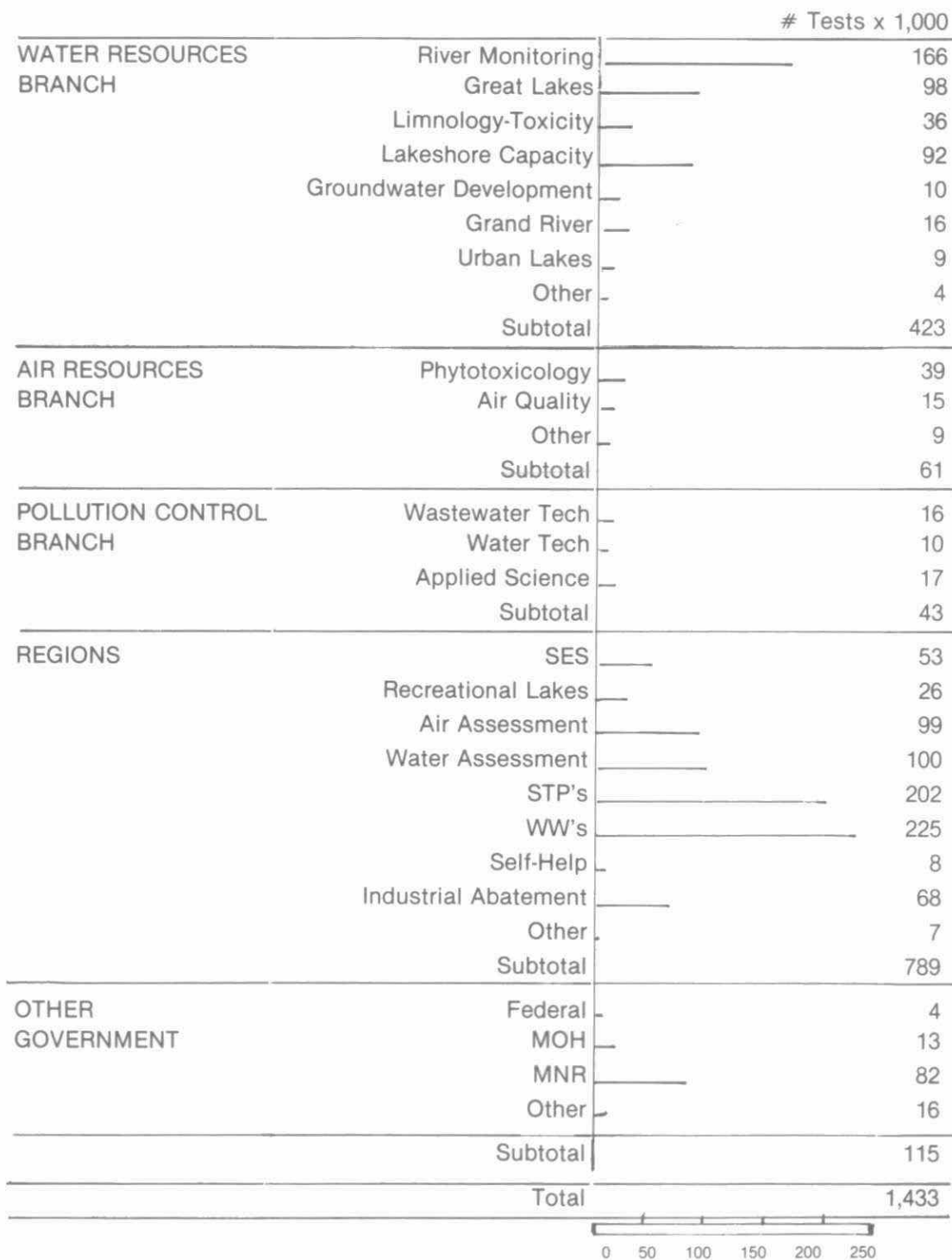


DIAGRAM II
LABORATORY USERS AND PROGRAMS (CHEMISTRY TESTS)



Major Analytical Surveys

As indicated in Diagrams I and II, numerous large-scale surveys were carried out in 1978-79. Major voluntary decreases in regional sampling requests occurred in the following areas: air assessment, waterworks monitoring, urban lakes testing, and vegetation analyses. STP and industrial abatement sampling remained at approximately the same levels as in the previous year.

There was continued high demand for air, water, and land samples to be analyzed for hazardous substances. Drinking waters from the province were analyzed for haloforms and volatile organohalides, and a wide range of organics were investigated in the second phase of the St. Clair River Study.

Fish continued to be frequently sampled indicators of water pollution. Over 4,500 fish were analyzed for PCBs; 13,000 for mercury. The "Guide to Eating Ontario Sports Fish" was based upon more than 50,000 fish analyses and provided information on 620 lakes and rivers.

Requests for the analysis of landfill materials and sites increased in 1978-79 especially with regard to leachate analysis, lysimeter studies, and possible legal actions. The PCB spill at Dowling continued to result in significant soil/sediment sample inputs.

The laboratories again received more than 15,000 testing requests apiece for lead, mercury, zinc, arsenic, copper, and cadmium. Demands for PCB analysis increased in number; demands for asbestos analysis nearly matched the output of the previous year and included an extensive survey of Ontario's raw and treated water supplies. Requests for detailed diagnostic analyses increased, placing heavy demands on sophisticated equipment systems.

Over 2,600 positive identifications of organic compounds were made using the

gas chromatography/mass spectrometry systems; nearly 4,500 tests were carried out on public complaint samples using optical scanning or transmission electron microscopy.

Automation of the x-ray fluorometer led to major increases in lead and sulfur testing. Automation of the ion chromatograph resulted in improved turnaround times for eight anions as well as sodium, potassium, ammonia, calcium, and magnesium.

The inductively coupled plasma was successfully applied as a spectral source for the emission spectrometer, thereby allowing over 130,000 multi-elemental tests to be made on sewage sludge and lake sediments.

Investigative Developments

The Microbiological Section established a virus laboratory and developed the capability for mutagen/carcinogen testing. Taxonomic identification systems were developed for a number of users, and two of the newer parameters (*Pseudomonas aeruginosa* and *Candida albicans*) were adopted for increased routine use.

The Microbiology and Organic Trace Contaminants Sections jointly initiated an intensive program for the recovery and concentration of trace organics for bacterial mutagenicity testing. The latter group also developed gas chromatographic methods for the analysis of C₁ to C₅ aliphatic hydrocarbons and aliphatic alcohols in ambient air, and ethylene in industrial emissions.

The Pesticides Section investigated:

- (1) methods of analyzing PCBs in human blood and adipose tissue;
- (2) techniques for studying airborne herbicides trapped on high-volume air samplers;

- (3) "single-peak quantitative gas chromatographic" methods for PCB analysis;
- (4) rapid extraction and cleanup methods for PCBs and pesticides in fish;
- (5) integrative techniques using Florisil adsorbents for HCB, HCBd determination in ambient air.

Other lines of investigation continued on 1) the application of capillary gas chromatographs and mass spectrometry systems for resolution of complex organic mixtures at very high sensitivity and 2) the use of group separation techniques using high pressure liquid chromatography.

The Water Quality Section developed a procedure for the rapid determination of nitrate, sulfate, and ammonia on high-volume air filters and made various time-saving changes in several of their highly automated units. The Section also developed a procedure for the analysis of trace bromide in precipitation samples. Joint projects with Applied Sciences, Water Technology, and Wastewater Treatment resulted in the development of:

- (1) a field test for nitrate determination;
- (2) preservation approaches for nitrate on sewage intended for soil amendment;
- (3) colour tests in support of ozonation studies on waters containing manganese.

The Physical Method Section undertook a joint project with the Air Resources Branch to characterize pollution damage to vegetation, using x-ray mapping of elemental distributions over leaf surfaces. In other development work, methods were tested for

the use of Delbag filters as an optimum means of determining asbestos fibres in air.

In a joint project with the Air Quality Section, X-ray fluorescence was investigated as a possible tool for the analysis of metals in vegetation samples, which account for approximately 42,000 tests annually. Other methods being investigated include atomic absorption spectroscopy (AAS) and emission spectrometry (ES). ES, combined with the inductively coupled plasma, was developed as a multi-elemental direct-reading method for sewage sludge analysis and as a diagnostic technique, semi-automated with a programmable calculator.

Two new units were created in the Air Quality Section: an automated flameless AAS unit, which turned out 20,000 arsenic and selenium tests, and an autoanalyzer unit, which performed 27,000 tests on high-volume air filters and vegetation samples.

Automation of all data acquisition and analytical systems control was developed in the Mercury Unit and applied to arsenic analysis. Methods were also developed for:

- (1) cerium as a geological time indicator;
- (2) antimony in vegetation, soils, and air particulate matter;
- (3) lead by hydride generation as a sensitive water technique;
- (4) metals in precipitation and air filtering media, using graphite furnace-AAS techniques,
- (5) vanadium, boron, nickel, and other metals in biological fluids, using spectrometric techniques.

Shipping, Stores, and Safety

The Branch issued over \$600,000 worth of chemicals and glassware in support of Ministry activities. Inventory levels were in-

creased to include 1,300 stock items. Over 700,000 sample bottles and tubes were processed in the bottlewashing and sterilization area. Over 473,000 items (mainly samples) were handled by shipping and receiving.

The safety program was expanded to include:

- (1) a first-aid room equipped to meet Workmen's Compensation Board standards;
- (2) a monthly safety newsletter;
- (3) safety orientation tours for new staff,
- (4) routine monitoring of the ventilation system, fumehoods, material-handling and disposal methods, and radiation and hazardous vapour testing;
- (5) demonstrations in the use of fire-fighting equipment;
- (6) specialized surveillance for staff exposed under hazardous conditions to substances such as lead, mercury, PCBs, and suspected carcinogenic agents.

Other Activities

Quality control continued to be an important factor in all Branch operations. An estimated 80,000 additional tests were performed as part of a daily effort to validate and control analytical data being reported to clients. Numerous round-robins were initiated, or participated in, by branch staff; many standard reference materials were created or tested; interlaboratory checks were performed as part of a continuous effort to systematize and maintain data quality control.

Laboratory personnel chaired and participated in numerous technical committees as Ministry representatives or as scientific resource staff. During 1978-79, they prepared

109 reports. Of these, 14 were presented at symposia or conferences; eight were released as official MOE publications, three were published in technical journals; and 84 were made available as technical reports.

The laboratory newsletter, *Analysis*, continued to provide information on Branch developments and projects. Readership interest continued to grow; by year-end, circulation had risen to 500 copies per issue.

finance and administration division

Executive Director: G. E. Higham

This Division provides a complete range of support services and control functions to the operating Divisions required for the efficient operation of the Ministry.

financial and administrative services branch

Director: W. D. Wood

Accounting Records, Appropriation, and Control Services

The Accounting Records, Appropriation, and Control Services Section is responsible for maintaining and improvising a comprehensive financial information system for the Ministry. The Branch is also responsible for financial and budgetary control functions for all Ministry revenues and expenditures as well as cashing and cheque distribution services.

During 1978-79, in conjunction with Accounts Payable, the Section undertook efforts to integrate several computerized financial reporting systems in order to provide more timely and up-to-date information to its users and to maintain higher control standards.

Office Services

The Office Services Section maintains services to the Ministry in the following areas: the allocation of accommodation and parking, the procurement of printing, records and forms management, mail and messenger services, assets control, head office stockroom functions, the Policy and Procedures Manual, and telecommunications services. The Section also administers the Photocopier

Control Program established by Management Board in August, 1977.

Purchasing

The Purchasing Unit was restructured to facilitate the implementation of modern, progressive procurement techniques, and to create an effective and highly responsive service to clients in terms of quality, value, economy, and efficiency. During 1978-79, the Unit received 10,943 requisitions and issued 10,166 purchase orders for a total of \$39.2 million.

Systems Development

The Systems Development Section continued work on a wide variety of systems in conjunction with Ministry Branches and Regions.

A study of the Nanticoke Environmental Management Program was carried out with the Air Resources Branch to determine the feasibility of acquiring a mini-computer for on-line data acquisition and modelling purposes. Development and implementation of the system will take place in 1979-80. A Nanticoke data storage and retrieval system based on the Air Quality Information System was developed and implemented. Development of the Hazardous Contaminants Inventory System was initiated upon completion of a feasibility study. The Air Quality and Meteorological Information System was modified and extended.

In conjunction with the Water Resources Branch, the Water Quality Criteria Violation Reporting System was developed and implemented. The Sample Information System was extended to accommodate data from the Limnology Information System. At year-end the Water Quality Simulation Model, developed originally for the Thames River Basin to examine the effectiveness of various water

management alternatives, was being modified and extended for use in the Grand River Basin.

The Utility Water Pollution Monitoring System was extended to meet additional reporting needs of the Pollution Control Branch and to allow for the metrication of water and sewage plant data.

An equipment supplier for the Laboratory Information System was selected. The system, which utilizes a mini-computer to process sample submission and results data, will be developed and implemented in 1979-80. Various steps were undertaken to facilitate program and data exchange between the Regions and Head Office. The Reconciliation Module of the Liquid Waste Way-Bill System was developed with the Waste Management Branch.

In conjunction with the Financial and Administrative Services Branch, the Section developed and implemented the Provincial Billing System. The first automated billing was to be produced for the service month of April 1979. A series of additional features was added to the Utility Rate Information System in order to reduce the manual effort required to enter data into the system and to improve the editing and updating routines. A study was carried out in the Financial Services area to assess the impact of the new automated Accounts Payable System being introduced, and changes were made to the COBIS system to allow for the necessary interfaces between the two systems.

Overall, the Systems Development Section was re-organized, and new staff were brought on board. The new Systems Development Methodology adopted by the Ontario Government, Spectrum-1, was introduced and was being implemented at year-end. A project control system, PAC 11, was implemented.

Systems Operations

The Systems Operations Section accepted the limnology and toxicity module of the Sample Information System and placed it on an operational basis. The line speed of the Remote Job Entry (RJE) computer terminal was doubled by installation of Timeplexor lineplexers, thereby greatly improving the performance of RJE components, especially the tape drive. Plans were finalized to move COBIS (including the Accounts Payable subsystem) to the Downsview Computer Centre from the Queen's Park Computer Centre.

Capital Financing and Revenue

The Capital Financing and Revenue Section administers the financial aspects of the Province's investment in water and sewage works projects and cost-sharing agreements and acts as financial consultants to Ministry branches and municipalities.

In 1978-79, the Section started automation of the billing and reporting systems and conversion to the metric system. A computerized billing system for provincial water and sewage works, which will produce invoices using metric units, was completed and tested for implementation April 1, 1979. The Section conducted 90 service rate reviews, of which 89 were successfully negotiated with municipalities.

Accounts Payable

The Accounts Payable Section processes for payment all supplier accounts, grants, subsidies, and employee travel expense claims. In 1978-79, 111,772 lines of input were processed for budgetary expenditures amounting to \$73.1 million and disbursements and charges amounting to \$150.3 million.

legal services branch

Director: J. N. Mulvaney, Q.C.

Staff of Legal Services Branch are employed by the Ministry of the Attorney General and provide legal services on a solicitor and client basis to the Ministry of the Environment.

A major function of the Branch is the conduct of prosecutions under environmental legislation. The Branch screens cases being considered for prosecution, advises on the best methods of gathering and presenting evidence, and provides counsel to present these cases in court. In addition, it acts as counsel for any director whose decision under a statute is being reviewed in a hearing before the Environmental Appeal Board or other review tribunal.

During 1978-79, the highest fine assessed under Ministry legislation was \$26,500 against York Sanitation Company Limited. The company, which operates a waste disposal site at Whitchurch-Stouffville, was convicted on 11 counts of failure to comply with the conditions of a provisional certificate of approval with respect to the amount of refuse they may receive, and on 31 counts of furnishing a Provincial Officer with false information (i.e., misstating amounts of waste received for disposal purposes). A case prosecuted in Ottawa resulted in the first trial ever to be held in French under Ontario's environmental legislation.

During the year, legal staff handled 72 cases before the courts under The Environmental Protection Act, The Ontario Water Resources Act, and The Pesticides Act. Of these, 32 resulted in conviction; four, in acquittals. The remaining cases were still before the courts at year-end. Staff also

handled a number of minor offenses under the boating regulation.

Other legal services included: acting as counsel in arbitration hearings under construction contracts; advising on the appropriate application of the Ministry's powers; advising on the form of documents and orders that can be issued by directors; providing legal advice to operating branches; preparing Orders-in-Council, regulations, contracts, and orders.

personnel services branch

Director: R. E. B. Burns

The activities of the Personnel Services Branch were largely determined by the Central Agency in 1978-79 as a result of 1) the mandate that broadbanding be completed during the latter part of 1979 and 2) a change in staffing policy to accommodate surplus staff from other Ministries. New manpower policies dealing with the employee appraisal, central attendance Classified Structure Ceiling impacted on developmental activities within the Branch; Programs had to be effected with fewer staff as a result of the Government's constraint program. The Branch continued to administer management development programs with courses being held in out-of-town locations.

The appointment of a new Women's Advisor resulted in several new directions being taken in connection with the Affirmative Action Program: the institution of the Ministry Women's Advisory Council, the request for the completion of an individual Affirmative Action Program questionnaire, the holding of

regular advisory council meetings, and development of a Ministry newsletter dealing with Affirmative Action.

The Central Agency mandate for the completion of broadbanding projects resulted in the activities of personnel officers being restricted to work associated with the creation of new job descriptions and the classification of all positions within the Management Compensation Plan Modules. At year-end, projects were reasonably on schedule; however, it was clear the Central Agency request for completion by October 1, 1979 would not be met.

The impact of a new program of staff utilization within a Branch/Region (based on the Classified Structure Ceiling of a Branch/Region) resulted in considerable consultation with management as to the most effective utilization of allocated funds.

On instructions from Management Board, the Ministry changed over to a computerized attendance reporting system during the year. Personnel staff operated the system and trained other branch and regional staff in its functioning. A parallel manual system was maintained to help accommodate certain attendance-reporting peculiarities within the Ministry, but it was anticipated at year-end that it would be dropped in 1979-80.

Training and Certification

The Training and Certification Section is responsible for the Ministry's technical training program in pollution abatement and control and, in conjunction with other agencies, the certification programs for Ministry and non-Ministry personnel.

During 1978-79, the Section conducted 27 courses, workshops, and seminars. Two new workshops were included in the program. A total of 670 Ministry and 679 non-Ministry personnel were trained. Thirty-eight trainees

attended from provinces other than Ontario. Of the Ministry staff, 74 were recertified in the identification of opacities of visible emissions, while five were successful in obtaining initial certification. Fourteen trainees were certified as Noise Control Officers Class I after completing Parts I and II of the Acoustics Technology Course. Of these, seven were employees of the Ministry; five were Municipal employees; two were from industry.

The Ministry participated with the Ontario Municipal Engineers Association and other organizations in the development of a program for the voluntary certification of water and waste-water utility operators.

Development of the education centre at the Ministry's Experimental Facility, Brampton, Ontario was continued. Additional classroom, laboratory, and workshop facilities are planned; construction is to start in 1980-81.

Safety

The Safety Unit provides for the development and co-ordination of the Ministry's safety program through the production and updating of the Safety Manual and liaison with external safety agencies and organizations.

Sections on laboratory, boating, and scuba diving activities were added to the Safety Manual during the year. Training was given on entry to confined spaces, chlorine handling, and operator safety at water works and sewage treatment plants. Liaison was maintained with the AWWA on safety aspects. Work continued with the Canadian Gas Association on Bulletin 105 (Handling of Digester Gas). The new Occupational Health and Safety Act was under review at year-end with regard to the revisions to be made to the safety policy and practices of the Ministry.

General staffing activity during 1978-79 remained consistent with the previous two years. Approximately 150 competitions were held despite the deleting of many positions. A new form of interview evaluation was designed, tested, and implemented for plant operations staff during the year. A similar form was designed for all other Ministry staff.

Negotiations for the transfer of water and sewage treatment plants to municipalities continued during 1978-79.

Contract administration activities remained at a constant level; the number of grievances lodged at the first two steps of the process increased, however, as management and union staff alike become more familiar with the administrative processes involved in working with a collective agreement.

The number of Ministry employees attending courses run by the Central Agency decreased somewhat during the year; however, attendance at Ministry-sponsored courses in management development and the interview process increased. These courses are administered by the Personnel Services Branch using outside consultant services.

program planning & evaluation branch

Director: A. Castel

The Program Planning and Evaluation Branch analyses Ministry policies and co-ordinates the development of policies for environmental assessment, pollution control,

and waste management. The Branch performs operational evaluation studies to assess the effectiveness and efficiency of Ministry programs and to achieve a rational allocation of resources. The Branch also develops the multi-year plan and acts as liaison with the Policy and Priorities Board, the Cabinet Committee on Resources Development, Management Board, and other ministries.

In 1978-79, the Branch conducted major studies and projects with regard to:

- (1) the pollution control equipment manufacturing industry in Ontario;
- (2) abatement priorities in the pulp and paper industry;
- (3) increased municipal responsibility for operation of water and sewage works;
- (4) opportunities for regulatory reform;
- (5) the application and extension of Ministry program indicators, as part of the continued development of the Management-By-Results technique.

To meet the requirements of central agencies and internal priorities, the Branch became increasingly involved in evaluating the economic and financial impacts of proposed and existing environmental policies and programs.

internal audit branch

Director: E. F. Heath

During 1978-79, the Internal Audit Branch carried out a comprehensive program of financially-oriented audits throughout the Ministry to evaluate:

- (1) the accuracy of Ministry records;
- (2) staff compliance with established and approved policies, guidelines, and procedures;
- (3) the effectiveness, efficiency, and practicability of the systems of internal controls designed to protect the Ministry's assets, revenues, and expenditures.

The Branch also performed audits with regard to:

- (1) revenues, expenditures, and disbursements, including grants, bursaries, and financial transactions with other ministries and outside agencies;
- (2) regional office operations;
- (3) the attendance reporting system and records.

The Branch performed in-depth reviews in the area of recoverable and accountable advances and continued to review new systems, procedures, and proposed controls with staff of other branches.

information services branch

Director: R. J. Frewin

The Information Services Branch continued to provide a full range of communications and public information services aimed at keeping the public informed of the Ministry's policies and activities. During the year, the Branch produced and distributed 117 news releases and a wide range of publications, reports, speeches, newsletters, and printed educational materials.

Prominent among the publications were three booklets entitled "Guide to Eating Ontario Sport Fish" of which 135,000 copies were distributed to the public. The booklets resulted from the ongoing fish-testing program being carried out in co-operation with the Ministry of Natural Resources and medical advisors of the Ministry of Labour's Occupational Health and Safety Division. Updated and issued annually, the booklets contain analyses for possible contaminants in various species of fish from more than 450 Ontario water bodies. Monthly bulletins are also issued.

A major highlight of the year was "Operation Skywatch," a program involving volunteer women pilots in airborne environmental patrols to search out and report on unusual environmental conditions. The program was launched on an experimental basis in the Ministry's Central Region; on the basis of its success it was being expanded at year-end in conjunction with the "Ninety-Nines Inc." (the international organization of women pilots founded by the late Amelia Earhart) to other areas of the province where the Ninety-Nines have chapters. Approximately 85 women pilots are to be involved in the 1979-80 program, flying missions over the Ministry's four southern regions, including shoreline routes

along the Ottawa and St. Lawrence Rivers, Lake Ontario, Lake Erie, Lake Huron, Georgian Bay, Lake St. Clair, and the Detroit River.

Branch staff also continued regular aerial surveillance and photography on behalf of Legal Services and the technical branches. The photographic reports and surveys obtained were used as exhibits at hearings of the Environmental Assessment Board and as evidence in Ministry legal proceedings.

For the fourth year, Environment Ontario participated with the Ministry of Health and local officers of health in a mosquito-control information program aimed at controlling the breeding of mosquitoes. The joint program is intended to advise the public of measures that can be undertaken to prevent the breeding of mosquitoes and to provide information on viruses that can be carried by some species. More than 500,000 pamphlets, in both English and French, were distributed, and an extensive advertising and publicity campaign was conducted.

In co-operation with Environment Canada, the Branch organized public meetings in Windsor and Toronto on behalf of the Great Lakes Water Quality Board of the International Joint Commission. The meetings were held to stimulate public interest and to provide information with regard to the renewal of the 1972 Canada-United States agreement on water quality of the Lakes.

Branch staff participated as active members of the Communications Committee of the Ontario Government's Nuclear Contingency Committee. A day-long exercise, based on a simulated situation, was carried out under the direction of the Interministerial Control Group in October 1978. It was the third such exercise conducted since 1975.

The Branch co-ordinated a series of public information "open-houses" in Mississauga to provide residents with full information on a

proposal to burn PCBs at the St. Lawrence Cement plant. The open-houses provided an audio-visual documentary and published materials; Ministry scientific staff and medical experts from the Ministry of Labour responded to questions and comments from the public.

The Branch co-ordinated communications activities and arrangements for: the 25th anniversary meeting of the Industrial Waste Conference; the official opening by Premier William G. Davis of Ontario's Resource Recovery Centre and experimental plant in Downsview; the York-Durham Water and Sewage Treatment Project (the largest development of its kind in the province), which was under construction at year-end.

The documentary film, "Lake Odyssey," concerning the Ministry's experimental weed-harvesting program in the Kawartha Lakes, was shown at commercial theatres in Toronto, St. Catharines, Hamilton, Peterborough, London, and Kingston.

Two other movies intended for general public viewing were completed during the year. "River Under Ground," a documentary by four Ryerson student film-makers on the building of the York-Durham service system, shows how environmental and social responsibilities are related to major construction works. "A Matter of Common Sense" illustrates one family's approach to controlling and recycling the solid wastes generated in the home.

During the year, Ministry films were used in 690 showings to 24,231 people. In addition, four films were booked for a total of 20 showings on television where they were seen by a viewing audience estimated at 200,300. The Ministry's environmental films are available to the public from Modern Talking Pictures Services, Willowdale, Ontario. The Branch also produced a film for the training arm of

the Ministry. Entitled "Under Ground Connection," it is concerned with the proper installation and inspection of septic tanks.

A highlight of the Branch's educational program was the second Environmental Studies Workshop for Special Education Teachers held at the Bolton Outdoor Education Centre. The workshop was designed to introduce teachers who are working with handicapped children to environmental activities that can be conducted with their students. Forty teachers attended the workshop.

Two teams of four university students, trained for the summer environmental education program, conducted environmental studies with the public at 25 provincial parks, 21 summer camps, ten schools and two senior citizens' homes across Ontario. Film and talk programs about the Ministry of the Environment were also presented in the evenings at the provincial parks visited. An estimated 3,000 children and adults participated in this program during its 14-week period.

The Branch provided support to the Ministry's six Regions, including participation in 15 exhibitions and fairs and the staging of official plant openings for seven new water and/or sewage treatment facilities completed during the year.

The Ministry was also represented by exhibits featuring resource recovery, garden composting of garbage, pesticide safety, and other graphic displays and films at the Canadian National Exhibition, the Ottawa/Central Canada Exhibition, the International Plowing Match, the Western Fair in London, Dockside '78 at Ontario Place, the Royal Winter Fair, the "Do It Yourself" show in Toronto, and exhibitions at Thunder Bay and Sault Ste. Marie. The exhibits and the new "Enviro-theatre" served an estimated total audience of about 800,000.

Production of brochures and "Fact Sheets" was expanded, and 12 new titles were added to bring the number of publications distributed by the Branch to 77, plus 19 teaching aids for schools. Approximately two million pieces of literature were distributed in 1978-79.

The Library Services Section, consisting of both the main library at 135 St. Clair Ave. West in Toronto, which serves Ministry staff and the public, and the Laboratory Library on Resources Road in Etobicoke, which serves the Ministry's scientific staff, responded to 8,939 reference questions, loaned 16,238 books, and processed 50,747 photocopies of information material during the year. The libraries also acquired 4,458 technical books and documents, subscribed to 265 journals, which were widely circulated throughout the Ministry, and conducted 462 computer searches for scientific material. Using a new service from the National Technical Information Service, known as Selected Research in Microfiche, the libraries acquired 4,458 U.S. Government documents on the environment, which will help Ministry scientists keep updated in their respective fields.

boards and commissions

The Waste Management Advisory Board

Chairman: R. H. Woolvett

The Waste Management Advisory Board was established in 1975 by Order-in-Council to provide advice to the Minister of the Environment on matters relating to the management of waste in Ontario, with particular emphasis on the means of reducing waste generation and recovering valuable materials from the waste stream.

The Board, comprising 11 members of diverse backgrounds and interests, held 11 meetings totalling 19 days in 1978-79. Through a formal system of priority-grading, the Board identified new areas of concern, undertook a variety of activities, and made recommendations to the Minister on a wide range of subjects in the waste management field. These activities were carried out by staff and consultants under the guidance of six Board Committees.

Concerned with ever-increasing complexities of waste management problems, the Board conceived of the need for a strategic waste planning process and commenced work on its development. Such a process would provide the Ministry with a tool for coping with all of the implications of establishing long-term priorities, and the means for dealing with crises before they occur.

The Board maintained, and in some instances, expanded its liaison with the paper,

general packaging, milk, and soft drink industries during the year. These activities aided in the acquisition of data, broadened channels of communications, and resulted in the further dissemination of Ministry policy and intent.

With a view to improving governmental waste management practices, the Board initiated a study of current practices at the provincial level; developed and tested a new standardized cost accounting system for waste collection, recovery, and disposal at the municipal level; and participated with the Ministry of Correctional Services in an analysis of the feasibility of adopting source separation procedures in Ontario prisons. The Board feels strongly that governments should improve their own waste management practices before asking others to do so.

The Board continued its research into residential and commercial source separation, which it considers to be a valuable low-technology component of waste management. Work in this area during the year included a state-of-the-art assessment of source separations; feasibility studies on residential, institutional, and commercial composting; development of an approach, involving intermediate handling stations, to make the separate collection of source-separated materials more economical; and a study into the economics of corrugated carton recovery.

In the area of educational programs the Board undertook a project to determine the feasibility of recovering used motor oil from the "do-it-yourselfer" sector in Kitchener-Waterloo; initiated an environmental packaging design competition for students of post-secondary schools; and developed guidelines for office waste paper recovery programs.

Other Board work initiated or on-going during the year included: a study of the fiscal

and regulatory methods of reducing the environmental impacts of urban waste; an investigation of attitudes towards post-consumer products; an assessment of the Ontario waybill system for liquid industrial wastes; a survey to determine recovery rates for waste news in three communities in which separate waste news collections were being carried out; the production of an overview report on previous packaging studies; and continuous work related to carbonated soft drink containers, milk packaging, and wine and spirits packaging.

The Board's recommendations to the Minister of the Environment during the year were concerned with the Ontario waybill system for liquid industrial wastes, paper recycling, and carbonated soft drink containers.

In October 1978, the Board underwent a review by the Standing Procedural Affairs Committee, an all-Party committee established to examine the operations of the Province's agencies, boards, and commissions. The Committee recommended that the Waste Management Advisory Board "should continue in its present form" and that "the Ministry of the Environment should consider expansion of the Board's terms of reference to include liquid wastes."

The Environmental Assessment Board

Chairman: D. S. Caverly

The Environmental Assessment Board conducts public hearings under The Environmental Assessment Act, The Ontario Water Resources Act, and The Environmental Protection Act. Hearings are also held by the Board under Orders-in-Council as directed by Cabinet.

Board membership on March 31, 1979 was comprised of seventeen persons, including two new members who were appointed to the Board during the course of the year—Mr. V. M. Seabrook, Q.C., of Toronto and Mr. K. H. Sharpe of Mississauga. The Chairman is a full-time member of the Board; other members serve on a part-time basis.

During 1978-79, the Board conducted 13 hearings under The Ontario Water Resources Act and nine hearings under The Environmental Protection Act. Reports on six additional hearings, which took place prior to 1978-79 (four under the Environmental Protection Act and two under The Ontario Water Resources Act), were also submitted to the Ministry in 1978-79.

The hearing into uranium mine expansion in the Elliot Lake Area, held under Orders-in-Council Nos. 2681/76 and 2996/76, which commenced in November, 1976, was concluded on March 1, 1979. A further hearing under Orders-in-Council Nos. 527/78, 2333/78, and 449/78 concerning the burning of polychlorinated biphenyls at the St. Lawrence Cement Company in the City of Mississauga commenced on March 6, 1979 and will extend into 1979-80.

The Pesticides Advisory Committee

Chairman: Dr. D. N. Huntley

Established under The Pesticides Act, 1970, the Pesticides Advisory Committee annually reviews the Act, its regulations, and government publications concerning pests and pesticides. The Committee also enquires into matters relating to pesticides and the control of pests as deemed necessary or as prescribed by the regulations.

In 1978-79, the Committee consisted of 16 members representing agriculture, industry,

universities, and government. The appointment of Mr. Ron Cameron, Thamesville, Ontario, and the resignation of Dr. R. Dorland, Ministry of Health, were the only membership changes.

The Committee recommended several changes to Ontario Regulation 618/74 as reflected in O. Reg. 575/78, O. Reg. 132/79, and O. Reg. 160/79; reviewed and evaluated the environmental impact, toxicity, and hazard of six new pesticide active ingredients; reassessed six previously classified compounds; evaluated 283 newly registered pesticide products and recommended for each a classification for storage, sale, and use in Ontario. Classification guidelines were updated and released to registrants in January 1979. A number of investigations were carried out relating to phenoxy herbicides and their uses in Ontario. Recommendations were submitted to the Minister.

The Committee continued a research program established in 1973 with three major objectives:

- (1) to find alternative pesticides for those deemed environmentally hazardous and those restricted in use;
- (2) to determine potential environmental hazards with pesticides currently in use;
- (3) to reduce pesticide input into the environment.

The Committee received 41 research proposals, 21 of which were funded by the Ministry through the Committee at a total of \$446,300. Two research seminars were held at which fund recipients presented progress reports. The first seminar, dealing specifically with bird studies, was held in November 1978; the second, relating to all other projects, in January 1979. The annual assessment of pesticide research projects funded through the Committee was prepared and submitted to the Ministry.

All 1978-79 publications of the Ministries of Agriculture and Food, Environment, and Natural Resources, which were concerned with pesticides, were reviewed and endorsed prior to printing and distribution.

The Environmental Appeal Board

Chairman: Lois C. DeGroot

Established under The Environmental Protection Act, 1971, the Environmental Appeal Board provides an appeal mechanism for persons affected by certain decisions made by the Ministry of the Environment or local health units. The Board consists of twelve part-time members, including the Chairman, from various occupations and parts of the province.

In 1978-79, the Board received 62 valid appeals. Sixty-five percent of the appeals concerned decisions of local health units on private sewage systems. The remaining appeals resulted from Ministry of the Environment decisions regarding waste disposal sites, sewage treatment works, waterworks, and air pollution control.

The Board held 33 days of hearings in 1978-79. It resolved 35 of the appeals received during the year as well as 13 appeals from the previous year. At year-end decisions remained to be issued, or hearings held, on 27 appeals.

The Pesticides Appeal Board

Chairman: James R. Swanborough, Q.C.

Established under The Pesticides Act, 1973, the Pesticides Appeal Board provides a mechanism of appeal for persons affected by Ministry of the Environment decisions re-

garding the licensing of pest control operators and exterminators and the use and control of pesticides. The Chairman and members serve on a part-time basis.

One appeal was received in 1977-78 and was withdrawn by the appellant after a hearing before the Board.

The Board also heard one appeal from the previous year concerning the Ministry's refusal to renew an exterminator's licenses. This appeal was allowed by the Board after hearing two days of evidence.

The Farm Pollution Advisory Committee

Chairman: O. Crone

Made up of four farmers, the Farm Pollution Advisory Committee provides objective assessments of farm environmental situations as requested by Ministry officials. The Committee visits farms to investigate complaints and makes recommendations, where deemed necessary, concerning manure storage and spreading, cultivation, yard drainage, and ventilation of livestock and poultry buildings.

The Committee visited ten farm operations in 1978-79: four hog farms, three beef ranches, two chicken farms, and one mushroom farm. The Committee recommended improvements in structure and/or operational practices with regard to six of the ten farms visited. A major problem continues to be non-agricultural development near intensive livestock and poultry operations.

The Royal Commission on the Northern Environment

Chairman: J. E. J. Fahlgren

In April 1978, the Royal Commission on the Northern Environment published an Interim Report on the activities of the Hartt Inquiries. In December 1978, the Royal Commission published an Issues Report that identified problems and opportunities related to environmental concerns both adjacent to and north of the 50th Parallel.

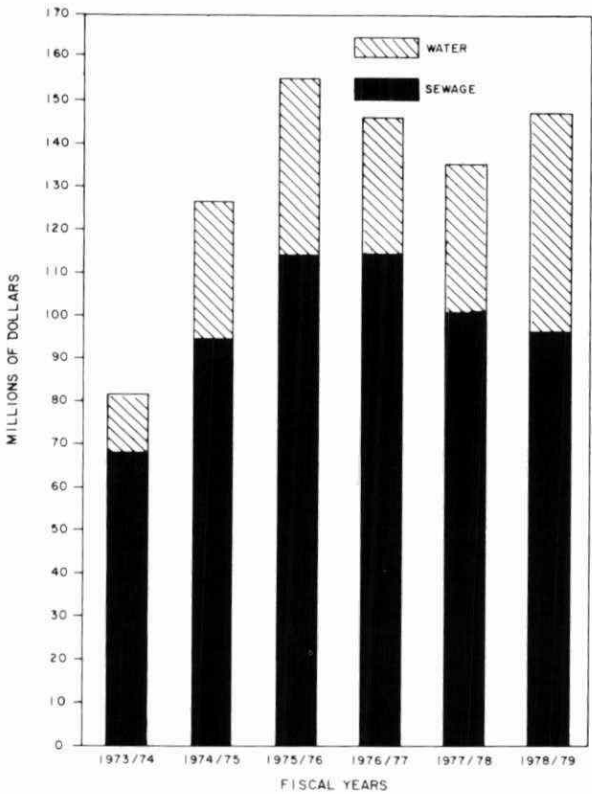
As a result of Justice Hartt's interim recommendations, the Indian Commission of Ontario was formed, and Mr. Justice Patrick Hartt was appointed its chairman. On August 2, 1978, Premier Davis appointed Mr. J. E. J. Fahlgren as Mr. Justice Hartt's successor; in October 1978, Commissioner Fahlgren publicly announced his objectives and work program. A formal organization was structured; qualified personnel were recruited; and offices were opened in Timmins and Thunder Bay in October 1978 and March 1979, respectively, to service northern communities.

November 1978, the Royal Commission implemented a public interest subsidy program aimed at public education and involvement and the preparation of submissions to the Commission. The program was concluded on March 31, 1979 by which time \$72,271 had been distributed to public interest groups and individuals.

The Commissioner and his immediate senior staff undertook a series of introductory visits to remote, northern native communities. The visits were made in seven stages and included approximately forty communities.

appendices

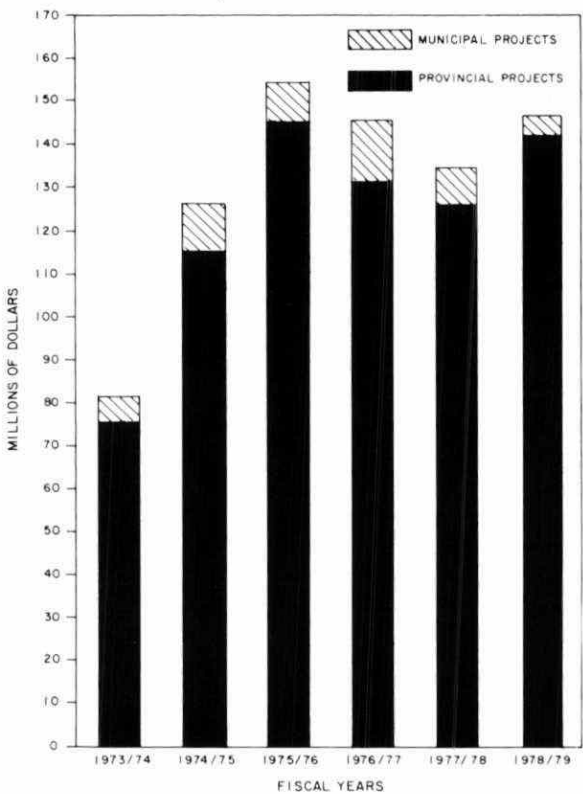
ANNUAL TOTAL EXPENDITURE
BY PROJECT TYPE



GRAPH I

F.Y.	Sewage	Water	Total
73/74	68.4	13.1	81.5
74/75	94.8	32.0	126.8
75/76	114.8	40.1	154.9
76/77	114.8	31.2	146.0
77/78	101.0	34.1	135.1
78/79	96.6	50.7	147.3

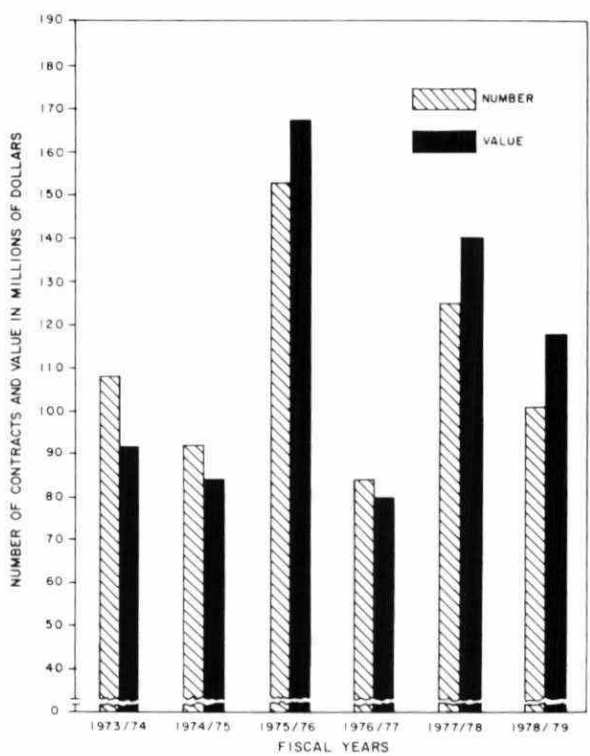
ANNUAL TOTAL EXPENDITURE BY CLASS
Capital Construction Program
(Millions of Dollars)



GRAPH II

F.Y.	Provincial Projects	Municipal Projects	Total
73/74	75.5	6.0	81.5
74/75	115.4	11.4	126.8
75/76	145.2	9.7	154.9
76/77	131.8	14.2	146.0
77/78	127.0	8.1	135.1
78/79	142.9	4.4	147.3

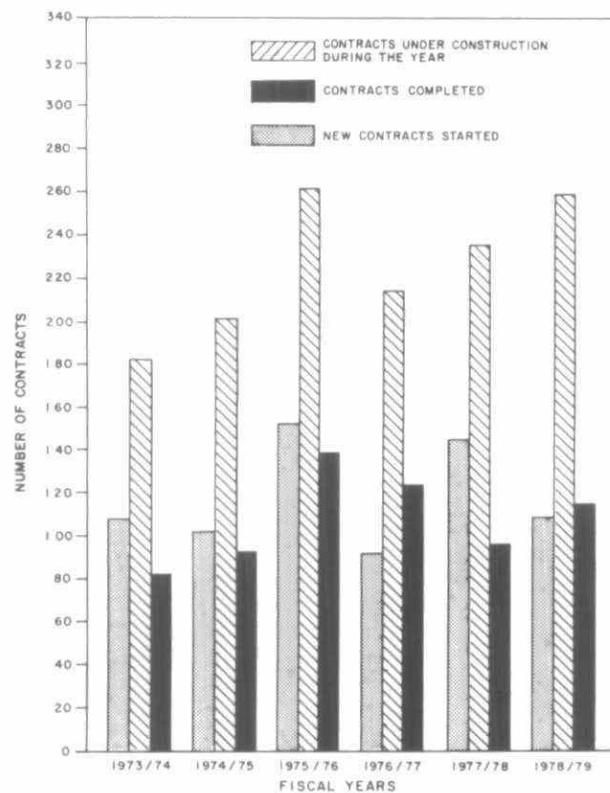
NUMBER AND VALUE OF CONTRACTS
TENDERED ANNUALLY



GRAPH III

F.Y.	Number	Value (\$ Millions)
73/74	108	91.3
74/75	92	84.1
75/76	153	167.6
76/77	84	79.6
77/78	125	140.5
78/79	101	118.1

ANNUAL VOLUME OF ACTIVITY
(Number of Contracts)



GRAPH IV

F.Y.	Started	Construction	Completed
73/74	108	182	82
74/75	102	202	93
75/76	153	262	139
76/77	92	215	124
77/78	145	236	96
78/79	109	249	115

Notes:

Number of Contracts under Construction in 77/78	236
Less: No. of Contracts Completed in 77/78	(-96)
Equals Carry-Over on to 78/79	140
Plus: No. of Contracts Started in 78/79	109
Equals Number of Contracts under Construction in 78/79	249

TABLE 1

Test Production, Central and Regional Laboratories

LABORATORY	1978-79 Tests x 1000	% Total 1978-79	1977-78 Tests x 1000	% Change
Water Quality	678	40	754	-10
Air Quality	284	17	299	- 5
Organic Trace Contaminants	48	3	49	- 2
Pesticides	84	5	103	-19 *
Physical Methods	29	2	15	+97
Microbiology	140	8	140	0
London	192	11	200	- 4
Thunder Bay	104	6	84	+24
Kingston	143	8	136	+ 5
Total	1,702	100	1,780	- 4

* While the test load was reduced, due to a decrease in the number of tests requested per sample, the actual number of samples processed rose by 18 per cent.

TABLE II
TESTS PERFORMED, 1978-79

LABORATORY	1978-79	1977-78	% of Total	
	Tests x 1000	Tests x 1000	1976-77	1977-78
Toronto Laboratory				
Water Quality	678	754		
Air Quality	284	299		
Organic Trace Cont.	48	49		
Pesticides	84	103		
Physical Methods	29	15		
Microbiology	140	140		
TOTAL TORONTO LAB.	1,263	1,360	77.1	76.4
London				
Thunder Bay	192	200		
Kingston	104	84		
	143	136		
TOTAL REGIONAL LABS.	439	420	22.9	23.6
TOTAL LAB. SERVICES BR.	1,702	1,780	100.0	100.0

TABLE III
TRAINING & CERTIFICATION SECTION
STUDENT INTAKE

JUNE, 1978 — JUNE, 1979

NO. OF COURSE	COURSE	MOE	MUN.	IND.	O/S PROV.	TOTAL
3	Acoustics Technology	16	12	3	—	31
1	Acoustics in Land Use Planning	6	2	5	1	14
4	Activated Sludge Workshop	34	47	11	3	95
7	Basic Gas Chlorination	53	86	1	24	164
4	Basic Sewage Treatment	42	37	13	—	92
3	Basic Water Treatment	36	36	6	1	79
2	Construction Inspectors	2	47	34	2	85
3	Industrial Air Abatement	6	—	—	—	6
1	Maintenance Gas Fitters	14	8	—	1	23
3	Preventive Maintenance	27	38	3	—	68
2	Primary Treatment	19	20	—	1	40
3	Pump Operations Workshop	29	36	—	2	67
1	Sewer & Watermain Design	3	33	20	—	56
1	Gas Testing	—	20	—	—	20
3	Surface Water Treatment	24	20	2	2	48
1	Visible Emissions	77	—	—	—	77
2	Monitoring Water/Wastewater	21	10	1	—	32
1	Air Pollution, Seminar	106	—	—	—	106
1	Pump Operations Seminar	60	40	—	—	100
1	Control of Industrial Waste	48	—	—	—	48
1	Nitrification Seminar	52	—	—	—	52
1	Op/Mtce. Water Distribution	2	17	—	—	19
1	Rescue & Safety	—	24	—	—	24
50	TOTAL:	—677	533	99	37	1,346

TABLE IV

ONTARIO'S AIR POLLUTION INDEX

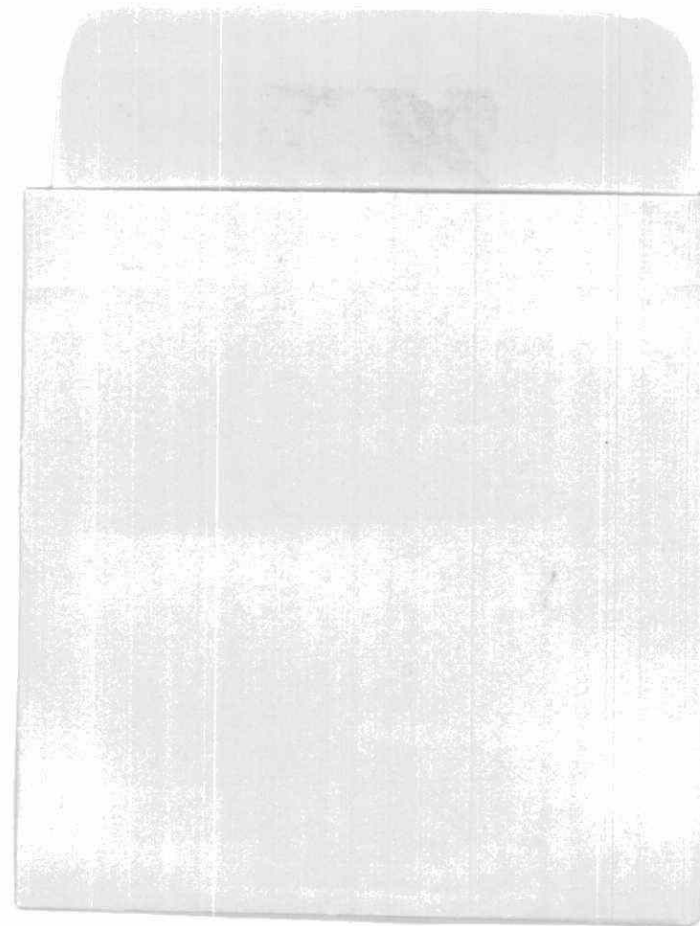
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DATE STARTED

TORONTO MARCH 23, 1970
 HAMILTON JUNE 15, 1970
 SUDBURY JANUARY 16, 1971
 WINDSOR MARCH 19, 1971
 HAPPY VALLEY MAY 13, 1971
 (CLOSED JAN. 1975)

WELLAND JAN. 1, 1974 (CLOSED OCT. 26, 1978)
 NIAGARA FALLS NOVEMBER 1, 1974
 CONISTON FEBRUARY 18, 1975
 NEW SUDBURY MARCH 1, 1976
 SARNIA (14049) DEC. 1, 1977 (CLOSED AUG. 30, 1978)
 SARNIA (14064) SEPTEMBER 1, 1978

YEAR	CITY	NUMBER OF OCCASIONS					
		10	≥ 32	30	10	≥ 50	30
1970	TORONTO	10	10	10	10	10	10
	HAMILTON	10	10	10	10	10	10
1971	TORONTO	10	10	10	10	10	10
	HAMILTON	10	10	10	10	10	10
	SUDBURY	10	10	10	10	10	10
	WINDSOR	10	10	10	10	10	10
	HAPPY VALLEY	10	10	10	10	10	10
1972	TORONTO	10	10	10	10	10	10
	HAMILTON	10	10	10	10	10	10
	SUDBURY	10	10	10	10	10	10
	WINDSOR	10	10	10	10	10	10
	HAPPY VALLEY	10	10	10	10	10	10
1973	TORONTO	10	10	10	10	10	10
	HAMILTON	10	10	10	10	10	10
	SUDBURY	10	10	10	10	10	10
	WINDSOR	10	10	10	10	10	10
	HAPPY VALLEY	10	10	10	10	10	10
1974	TORONTO	10	10	10	10	10	10
	HAMILTON	10	10	10	10	10	10
	SUDBURY	10	10	10	10	10	10
	WINDSOR	10	10	10	10	10	10
	HAPPY VALLEY	10	10	10	10	10	10
	WELLAND	10	10	10	10	10	10
	NIAGARA FALLS	10	10	10	10	10	10
1975	TORONTO	10	10	10	10	10	10
	HAMILTON	10	10	10	10	10	10
	SUDBURY	10	10	10	10	10	10
	WINDSOR	10	10	10	10	10	10
	WELLAND	10	10	10	10	10	10
	NIAGARA FALLS	10	10	10	10	10	10
	CONISTON	10	10	10	10	10	10
1976	TORONTO	10	10	10	10	10	10
	HAMILTON	10	10	10	10	10	10
	SUDBURY	10	10	10	10	10	10
	WINDSOR	10	10	10	10	10	10
	WELLAND	10	10	10	10	10	10
	NIAGARA FALLS	10	10	10	10	10	10
	CONISTON	10	10	10	10	10	10
	NEW SUDBURY	10	10	10	10	10	10
1977	TORONTO	10	10	10	10	10	10
	HAMILTON	10	10	10	10	10	10
	SUDBURY	10	10	10	10	10	10
	WINDSOR (12008)	10	10	10	10	10	10
	WELLAND	10	10	10	10	10	10
	NIAGARA FALLS	10	10	10	10	10	10
	CONISTON	10	10	10	10	10	10
	WINDSOR (12016)	10	10	10	10	10	10
	NEW SUDBURY	10	10	10	10	10	10
1978	TORONTO	10	10	10	10	10	10
	HAMILTON	10	10	10	10	10	10
	SUDBURY	10	10	10	10	10	10
	WINDSOR (12008)	10	10	10	10	10	10
	WELLAND	10	10	10	10	10	10
	NIAGARA FALLS	10	10	10	10	10	10
	CONISTON	10	10	10	10	10	10
	WINDSOR (12016)	10	10	10	10	10	10
	NEW SUDBURY	10	10	10	10	10	10
	SARNIA (14045)	10	10	10	10	10	10
	SARNIA (14064)	10	10	10	10	10	10



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