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Environment Canada



Above, Environment Canada's "oil from sludge" pilot plant in Hamilton, Ontario. Below, the National Research Council of Canada's wind tunnel.



National Research Council

In Government

As part of their mandate to promote social and economic development, Canadian government departments and their laboratories and research institutes are in the forefront of research across many scientific disciplines. For decades there has been close collaboration with scientists in the U.S.

NATIONAL RESEARCH COUNCIL

The largest of the Canadian government's research enterprises is the National Research Council of Canada (NRC). Established in 1916, NRC now operates science and engineering laboratories across Canada, in fields as diverse as building construction and plant biotechnology. NRC operates a set of national facilities which include wind tunnels, low-temperature facilities, test aircraft and simulators, and offshore and coastal wave basins, to name a few. From its inception, NRC has worked closely with the U.S. science community and the U.S. National Institute for Standards and Technology (NIST). NRC and NIST have worked out an agreement which recognizes the equivalence of Canadian and American measurement standards. The effect of the agreement will be to promote trade among firms in the two countries.

In another collaborative venture, NRC's National Aeronautical Establishment is working closely with the U.S. Federal Aviation Administration on a project designed to improve the instrument-handling quality of helicopters.

NRC's Biotechnology Research Institute will be working with a Montreal firm, IBEX Ltd., to develop a unique filtering system for cleansing blood after open-heart surgery and haemodialysis. The forerunner research to the IBEX project was conducted at the Massachusetts Institute of Technology.

THE ENVIRONMENT

Canadian government research efforts are especially strong in the area of the natural environment. Canada and the U.S. share a 5,525-mile border, and the need for joint research, standard-setting and regulation has never been greater. In partnership with their counterparts in the U.S., Canadian government scientists and engineers are tackling some of the most pressing of the shared problems, such as acid precipitation, soil degradation, hazardous wastes and global warming.

An outstanding example of Canada-U.S. public sector cooperation is the International Joint Commission (IJC), which was established in 1909. The original mandate of the IJC was to administer the Boundary Waters Treaty. The Great Lakes Water Quality Agreement, which governs the shared water resources of 40 million Canadians and Americans, was signed in 1972. Since the establishment of the IJC, over \$8 billion has been spent by Canadian and American governments — federal, provincial and state — on research and engineering aimed at improving water quality. But more work remains to be done. The IJC is currently overseeing the development of a remedial action plan for each of the areas of concern.

While the environmental and economic effects of acid precipitation on forests, fisheries and water quality are now acknowledged, concern over their effect on children's health is just surfacing. A \$6-million study being conducted by Health and Welfare Canada and Harvard University will monitor the lung capacity of children living in areas with high levels of acid rain. Fifteen thousand children in six Canadian and 18 American cities will be monitored.

A Canadian "clean technology" is attracting international attention. Environment Canada scientists have developed a technique for producing fuel oil from sewage sludge. Canada alone spends \$100 million a year disposing of sludge, a by-product of treatment processes for industrial and municipal wastes. The new process could reduce the need for ocean dumping and landfilling of sludge and thereby revolutionize the way cities around the world cope with their wastes.

Environment Canada also operates the World Ozone Data Centre, which for the past 20 years has collected data from a global network of measuring stations. Environment Canada researchers were instrumental in establishing the scientific evidence which led to the adoption of the Montreal Protocol to curb the use of chlorofluorocarbons. Canada has set as a national objective the complete elimination of ozone-destroying CFCs within ten years.

OCEANS AND THE SEABED

Understanding and managing the ocean resources is of prime importance to Canada. Canada borders on three oceans — Atlantic, Pacific and Arctic — and has the longest coastline in the world. The livelihood of many Canadians depends upon the health of the oceans.

Canada supports six ocean science centres. The largest are the Bedford Institute of Oceanography (Dartmouth, Nova Scotia) and the Institute of Ocean Sciences (Sidney, British Columbia). These institutes undertake a range of studies, with the combined help of physicists, chemists, biologists and oceanographers.

Canadian earth scientists are actively involved in the Ocean Drilling Project (ODP), in partnership with a consortium of 10 U.S. institutions. ODP probes the Earth's history by examining the composition of rocks deep below the ocean floor.

For over 40 years the Department of Energy, Mines & Resources has been conducting research on the rich resources of the polar continental shelf. One unique project makes use of a floating island 2.4 miles wide x 4.8 miles long to house a research base from which scientists study the water and floor of the polar sea. The advantage of the island — a gigantic slab of freshwater ice — is that it provides a stable platform for researchers atop an ever-shifting ocean of water and ice. The ice island will drift for decades, circling the Arctic Ocean and passing through U.S. waters.

Energy, Mines and Resources Canada



Aerial view of Canada's ice island camp.

FORESTS

The forest industry is of great economic importance to Canada. Just recently, scientists at Forestry Canada laboratories were first in the world to regenerate an entire conifer tree from a single cell. This major new application of biotechnology will provide the means to rapidly create multiple copies of elite trees for commercial forests.

Forestry Canada is working with the U.S. National Forest Service and NASA in a project that will apply expert computer systems to the prediction, detection and monitoring of forest fires. This innovative use of computers will help prevent massive forest fires such as the one that destroyed large parts of Yellowstone National Park in 1988.