ANNUAL REPORT 1982-1983

Canada

Energy, Mines and Resources Canada
Énergie, Mines et Ressources Canada

LETTER FROM THE MINISTER

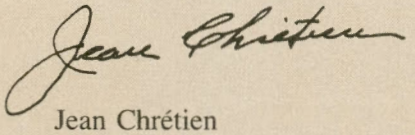
To Her Excellency the Right Honourable Jeanne Sauvé, Governor General of Canada:

MAY IT PLEASE YOUR EXCELLENCY:

I have the honour to present to Your Excellency the Annual Report of the Department of Energy, Mines and Resources for the fiscal year ended March 31, 1983.

This report outlines departmental objectives and highlights for the 1982-83 fiscal year as well as providing a detailed review of operations for the department's three programs – Energy, Minerals and Earth Sciences and Administration.

Respectfully submitted,



Jean Chrétien
Minister of Energy, Mines
and Resources

DEPARTMENTAL PROFILE

The Department of Energy, Mines and Resources explores Canada's landmass and offshore regions in order to understand their evolution, geology and configuration, and to search for, investigate and map mineral and energy resources. More than 5000 employees – scientists, engineers, economists, technicians, and administrative and support staff – work throughout the country to develop and implement policies and programs based on research and data collection in the earth, mineral and metal sciences, and on social and economic analyses.

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Cat. No. M 1-5/1983

ISBN 0-662-53070-5

HIGHLIGHTS

Energy Program

- Parliament approved eight energy Bills implementing new policies and programs.
- EMR had discussions with industry on the proposed Norman Wells development, tar sands projects, the Venture offshore gas project and several heavy oil upgrading projects; and with Newfoundland on revenue sharing and offshore management.
- The report *National Energy Program – Update 1982*, which introduced new fiscal and pricing measures, was issued.
- Two new incentive programs, the Natural Gas Vehicle Program and the Natural Gas Fueling Stations Contribution Program, were announced.
- In support of its conservation and substitution activities, EMR launched the Building Energy Technology Transfer Program to facilitate the adoption of energy-saving equipment, materials and techniques.
- As a pilot project, EMR cooperated with the Housing and Urban Development Association of Canada in funding the construction of 30 energy-efficient homes, and planned to build another 272 energy-efficient homes by the end of 1983-84.
- The Remote Community Demonstration Program was initiated in 1982-83 to provide financial assistance for alternative approaches to energy supply and conservation in remote communities.
- 1982-83 marked the first year of operation for the Petroleum Incentives Administration and the programs it administers: the Petroleum Incentives Program and the Canadian Ownership and Control Determination Program.
- Five new CANDU nuclear reactors began operation, the most to start in any year.

Minerals and Earth Sciences Program

- The Mineral Policy Sector and the Mining Association of Canada analyzed factors underlying international mineral market trends and released an assessment of the Canadian industry's competitive position and its employment and investment potential.
- In early 1983, the Short Term Assistance in Research and Technology Program was approved, increasing research and development assistance to the Canadian mining industry.
- The Canada Centre for Remote Sensing completed the concept, design and economic assessment for a Canadian remote sensing satellite, RADARSAT.
- The Geological Survey of Canada and provincial government agencies in Newfoundland, Nova Scotia and Manitoba developed geoscientific programs to stimulate mineral resource exploration.
- The GSC developed a new multidisciplinary approach in some research areas.
- The Polar Continental Shelf Project provided logistics support for 167 research parties, including the Canadian Expedition to Study the Alpha Ridge (CESAR '83), in the Arctic.

Administration Program

- The Office of Equal Opportunities developed a policy regarding women on selection boards, established a resource information centre and held a Handicapped Awareness Week and a Native Awareness Session.
- The Program Evaluation Branch examined the Geological Survey of Canada and approved an implementation plan complying with its recommendations.
- The department's scientific quarterly *GEOS* won awards for design, articles and journalistic excellence.

REVIEW OF OPERATIONS

INTRODUCTION

The Department of Energy, Mines and Resources consists of three major programs: one covers the field of energy; another deals with matters relating to minerals and earth sciences; the third, administration, provides common services to the department.

Energy Program

In working toward the goal of self-sufficiency, the Energy Program divides its work into three sectors: Energy Policy Analysis, Petroleum, and Conservation and Non-Petroleum. This program recommends, coordinates and implements energy policies and programs covering the development, production, transportation and processing of resources, and their conservation and use. Subobjectives of the Energy Program include:

- establishing federal energy policies, strategies and activities with regard to their impact on Canadians and to Canada's international energy relations;
- ensuring that sources of petroleum are developed;
- administering programs which implement the policy of a single national oil price;
- planning policies and programs for distributing energy supplies equitably in a national emergency;
- ensuring that sources of non-petroleum energy are developed;
- maintaining effective policies and programs to use and conserve energy effectively;
- monitoring and analyzing developments affecting the petroleum industry;
- contributing to increased Canadian ownership and control of the petroleum industry;
- ensuring that the Canadian public obtains maximum benefit from mineral, oil and gas rights, and that Canada has the research capabilities to support energy strategies;
- increasing public awareness and understanding of federal energy policies and programs and their social and economic effects.

Minerals and Earth Sciences Program

The Minerals and Earth Sciences Program develops mineral policies and strategies, assesses the structure and properties of Canada's landmass and is involved in surveying and mapping. The program is divided into three sectors: Mineral Policy, Earth Sciences, and Research and Technology. Subobjectives of this program include:

- establishing policies and strategies to ensure that the minerals and metals sector contributes a maximum to the economy of Canada;
- ensuring that adequate technology is available to extract, process, use and conserve energy and mineral resources;
- contributing to the scientific investigation of Canada's Polar Continental Shelf;
- improving technologies of remote sensing;
- ensuring that technology, expertise and geophysical data are available on the geology of Canada, and the configuration and evolution of the solid earth;
- ensuring the availability of geodetic, topographic and selected geographic information;
- increasing public awareness and understanding of federal mineral and earth science programs.

Administration Program

The Administration Program includes two sectors – Personnel and Management Practices, and Finance and Administration. The Administration Program ensures that departmental programs are effectively managed and accounted for and it maintains a central support service. Subobjectives in the Administration Program include:

- ensuring that the department makes the best use of its allocated resources;
- providing advice and support in personnel management, general administration and electronic data processing;
- advising on departmental plans to achieve equality of opportunity for women, natives and handicapped persons.

The Communications Branch, which reports directly to the Deputy Minister, provides broad communications and public relations support to all sectors. Its subobjectives include:

- analyzing public information requirements;
- providing marketing services to departmental programs;
- publishing material for program support, education and public relations, and scientific reports and books;
- supplying information to the media;
- arranging exhibitions.

ENERGY PROGRAM

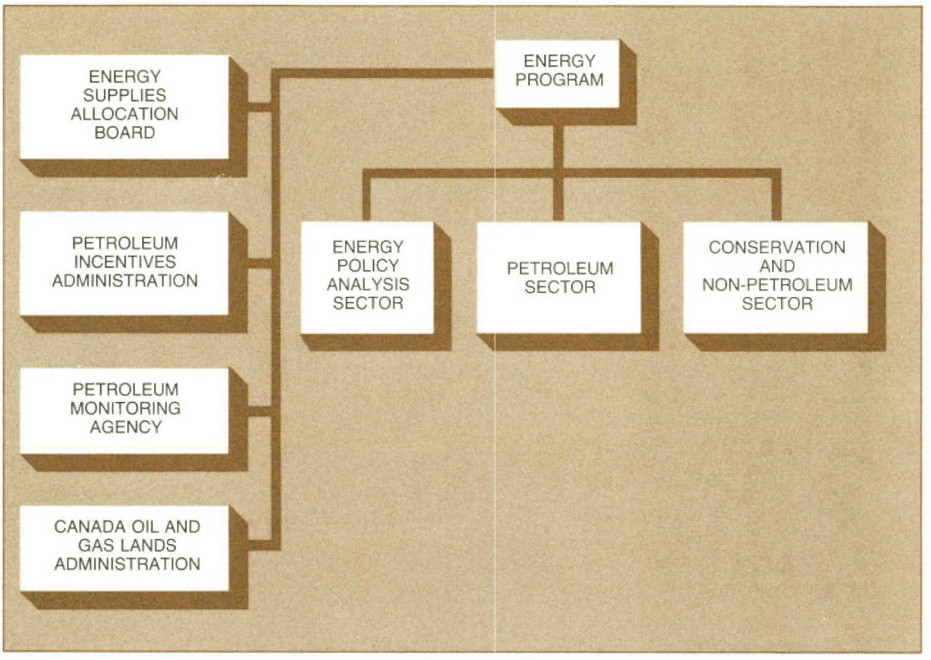
Energy Policy Analysis Sector

ENERGY STRATEGY BRANCH

In 1982-83 the Energy Strategy Branch published the *National Energy Program – Update 1982*, which introduced new fiscal and pricing measures. Consultations between the Government of Canada and provincial governments on implementing federal-provincial energy agreements continued. *Update 1982* focused on the effect of declining world oil prices on these agreements.

To ensure consistent and sound policy development, the branch maintains computer models simulating the economic impacts of various policy options and forecasting energy developments. It also maintains an extensive data base of statistical information on energy supply, demand and pricing, and is developing on-line computer access to the data. This information is published in the *Energy Statistics Handbook*.

The branch provides analyses and recommendations, and monitors and coordinates federal-provincial and federal-territorial energy relations. It is also concerned with other policy issues, including energy exports and domestic fuel substitution.



FINANCIAL AND FISCAL ANALYSIS BRANCH

The Financial and Fiscal Analysis Branch analyzes and makes recommendations on energy sector policies concerning revenue sharing, industry investment and rates of return, project evaluations, and energy taxation and incentives. It also maintains an information system on provincial fiscal regimes and energy corporations.

In 1982-83 the branch had discussions with the sponsors of the proposed Norman Wells development in the Northwest Territories; the Wolf Lake, Cold Lake and Alsands tar sands projects in Alberta; the Venture offshore gas project off the coast of Nova Scotia and several heavy oil upgrading projects; and with Newfoundland on offshore management and revenue sharing.

The branch played a key role in developing fiscal measures contained in the *National Energy Program – Update 1982*, as well as energy fiscal initiatives announced in the federal budget of April 1983, and it produced a background paper, "Do Governments Take Too Much? – An Examination of Pre- and Post-NEP Fiscal Regimes".

CORPORATE DEVELOPMENT AND ECONOMIC ANALYSIS BRANCH

The Canadianization Division of the Corporate Development and Economic Analysis Branch develops and coordinates policies to strengthen Canadian participation in the petroleum sector. The division advises the Foreign Investment Review Agency on energy-related foreign investment policy. During 1982-83 it provided

advice on the proposed Dome Petroleum financial restructuring; assisted in establishing Co-Enerco, an oil and gas company joint venture between the Government of Canada and an association of cooperative financial and marketing institutions; and evaluated policy options related to private and public ownership of the Canadian petroleum industry.

The Energy Envelope and Crown Corporations Division reviewed the financial and strategic implications of Petro-Canada's 1983 capital budget. It coordinated matters relating to the energy envelope, and analyzed natural gas policy issues in depth.

The Energy Initiatives Division analyzed the economic and financial viability of technologies for upgrading fuels; began an economic and policy analysis of the Canadian solar industry; and continued to advise on processing and marketing for the petroleum industry.

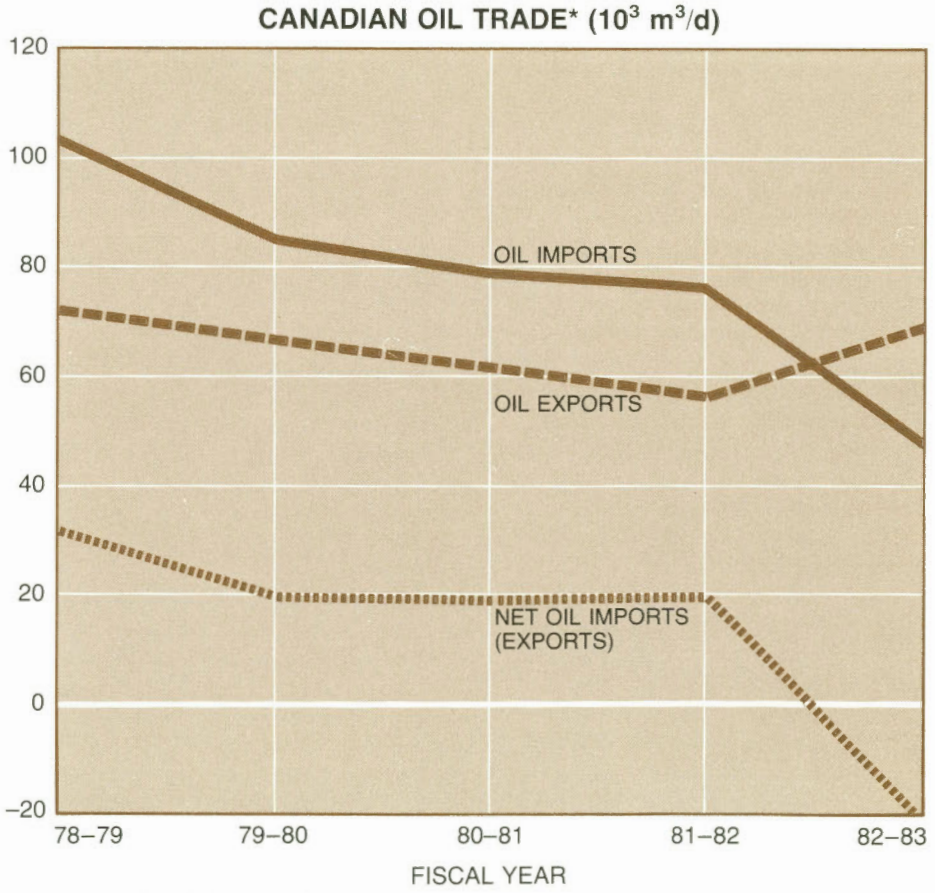
The Electrical and Nuclear Division assessed market prospects and possible contracts for electrical energy exports and analyzed the costs of concessional financing for reactor exports. It also examined the economic outlook for the Canadian nuclear reactor industry.

The Macroeconomics Division studied the effect of changing world oil prices on the Canadian economy. It developed proposals to moderate the economic impact of sudden changes in energy prices, and studied the interaction between the energy and mineral sectors and the Canadian economy.

INTERNATIONAL ENERGY RELATIONS BRANCH

The International Energy Relations Branch participates in multilateral organizations dealing with energy matters and maintains contacts with other countries. It analyzes international energy markets and foreign energy policies. In 1982-83 Canada attended a ministerial meeting of the International Energy Agency in Paris and contributed to a study by western countries on energy security to the year 2000. The branch coordinated departmental participation in renewed bilateral energy consultations with the United States, and consulted regularly with Japan and Germany on energy matters. There were ministerial visits between Canada and Indonesia, the Philippines, Egypt, France, Denmark, the United Kingdom, Germany and the United States.

The branch provided policy advice to Petro-Canada International Assistance Corporation, the Crown corporation established to help developing countries reduce their dependence on imported oil



*Includes Liquefied Petroleum Gases

by exploring and developing domestic hydrocarbon resources. PCIAC assisted projects in Jamaica, Barbados, Tanzania and Senegal in 1982.

ENERGY POLICY COORDINATION BRANCH

The Energy Policy Coordination Branch provides documentation for parliamentary debates and committees, and plans and evaluates programs in the context of the fluctuating domestic and international energy economies. It completed a survey of all federal energy programs, on a provincial and territorial basis, to assist in program review and evaluation. Parliament approved eight energy Bills implementing new policies and programs.

Petroleum Sector

The Petroleum Sector's principal concern in 1982-83 was adapting to changing national and international oil and gas markets. The weakness of international oil markets was reflected in spot prices through most of 1982-83. Toward the end of the year prices for most export crude oil dropped significantly for the first time in the past quarter century.

Because of economic factors, substitution and conservation efforts, demand for Canadian oil continued to decline, large quantities of western oil were shut in at times, and incentive for development faltered. Energy, Mines and Resources was challenged with maintaining oil-producing capacity at high levels.

NATURAL GAS BRANCH

The Natural Gas Branch continued to encourage substitution for oil from Canada's abundant natural gas supplies. Under the Distribution Systems Expansion Program, $37 million was approved for more than 375 oil-displacement projects in British Columbia, Saskatchewan, Ontario and Quebec.

Two additional programs were put in place. The Natural Gas Laterals Program contributes funds to Gaz Inter-Cité Québec to construct natural gas lateral pipelines in Quebec. The Gas Marketing Assistance Program lessens the contracting risks faced by Quebec distributors in promoting the rapid expansion of gas sales.

The Government of Canada received about $22.6 million in Gas Market Development Incentive payments from the Government of Alberta to fund part of the gas expansion initiatives in provinces east of Alberta.

In consultation with the producing provinces and industry, a natural gas export pricing strategy was developed to respond to the rapidly changing U.S. market. Additional pricing flexibility is intended to stabilize Canada's export revenues and preserve its market share while natural gas is in surplus. This is important because the National Energy Board has authorized an additional 12.2 exajoules of natural gas for existing and new markets in the United States and for a new market in Japan.

OIL SUPPLY BRANCH

At the beginning of 1982-83 shut-in western Canadian crude oil caused acute problems for revenues and economic activity in Canada.

In April 1982 the Action Program was announced to attract export markets by maintaining competitive prices and providing for export licences for up to one year. The program concentrated on expanding markets for light crude oil in eastern Canada by displacing imports. This included new procedures for setting oil import compensation rates, penalties for unauthorized imports of spot market oil displacing Canadian crude, and compensation to suppliers to transport western oil to Quebec City or Atlantic refineries.

The branch noted a decrease of imports and increase of exports. In 1982-83, for the first time since 1975, Canada became a net exporter of crude oil and oil products, including liquefied petroleum gases.

PETROLEUM RESOURCES BRANCH

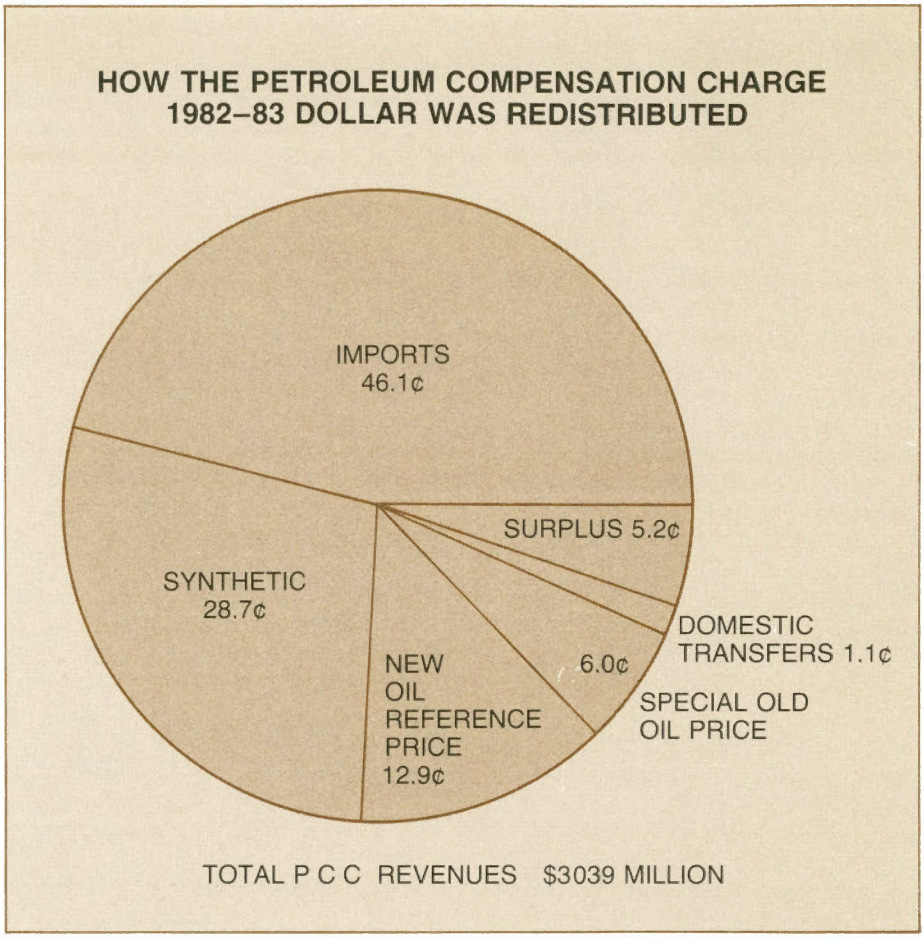
The Petroleum Resources Branch supplies information, analysis and advice on all aspects of the upstream oil industry from land tenure, geology, geophysics, exploration and development drilling to reserves and production of oil and gas. Major activities during the year included resource assessments, and engineering and supply costing of potential and producing oil and gas pools in conventional and frontier areas of Canada.

PETROLEUM UTILIZATION BRANCH

The petroleum industry in Canada was forced to reduce refining capacity and improve its performance because demand for petroleum products continued to drop. The Petroleum Utilization Branch monitored this situation carefully and concluded that supplies are not endangered.

OIL PRICING AND COMPENSATION BRANCH

Programs managed by the Oil Pricing and Compensation Branch are central to the Government's made-in-Canada oil price policy: oil importers are compensated for the difference between their production costs and the price of Canadian crude oil; supplements up to international price levels are provided to domestic producers of new conventional and synthetic crude oil; in Atlantic Canada, refiners are compensated for the cost of transporting domestic crude oil from Montreal. These programs are financed by the Petroleum Compensation Charge, which is applied to all petroleum consumed in Canada. The application of these funds is illustrated in the accompanying chart.



ENERGY EMERGENCY PLANNING GROUP

The Energy Emergency Planning Group coordinated the development of a National Emergency Agency for Energy during 1982-83. This work concentrated on identifying potential emergency situations and on developing a concept of operations.

ENERGY SUPPLIES ALLOCATION BOARD

In 1982-83 the Energy Supplies Allocation Board (ESAB) tested the support systems in the Allocation Program. The ESAB Allocation Systems Test – 82 evaluated Canada's petroleum allocation programs to test the information exchange and data processing systems and the mechanism for allocating crude oil to refineries in response to product demand, and to determine how effective communications are between government and industry in simulated emergencies. The test's scenario assumed that Middle East crude oil had not been available for some time, that an oil-sharing plan was operating, and that a state of emergency was in effect for most oil products. Participants included the Petroleum Industry Advisory Committee, comprising all major refining, marketing and crude oil pipeline companies, leading petroleum wholesalers and the energy departments of the oil-producing provinces.

ESAB helped to plan the International Energy Agency's Allocation Systems Test No. 4 (AST-4), which will take place during 1983-84. It will measure Canada's ability to integrate effectively into the International Energy Agency's sharing program.

The board completed a survey of industry on petroleum transportation capabilities for the logistics program, discussed the distribution of emergency ration coupons and participated in the Interprovincial Advisory Committee on Energy (Sub-Committee on Demand Restraint).

Conservation and Non-Petroleum Sector

ENERGY CONSERVATION AND OIL SUBSTITUTION BRANCH

Two of the most familiar programs within the Conservation and Non-Petroleum Sector are the Canadian Home Insulation Program (CHIP) and the Canada Oil Substitution Program (COSP), which help Canadian homeowners to reduce heating costs by insulating and by switching from oil to alternative fuels.

CHIP began in September 1977. It was amended during the past year to include homes built before 1971. New terms and conditions were introduced to improve the quality of contracted work and to increase the applicant's share of the costs. Participants in this program have reduced energy consumption by about 3.5 million litres of oil a day. This program has expended $700 million.

COSP contributes up to $800, or half the cost of converting from oil to other fuel, to participating homeowners. Program expenditures of $200 million during 1982-83 assisted 225 000 homeowners in converting to gas, electricity, wood and other fuels. Since 1981, 500 000 conversions have reduced annual oil consumption by 1.5 billion litres.

The branch assists Canadian industries in converting from oil fuels and in undertaking conservation activities. The Canadian Industry Program for Energy Conservation is a network of 17 voluntary energy management task forces representing approximately 750 reporting companies, which account for 80 per cent of Canadian industrial energy use. In 1982 more than 6.5 billion litres of oil equivalent were saved. Energy conservation task forces have also been formed for health care facilities, hotels, restaurants, office buildings, agriculture, postsecondary education institutions and the service industry.

The National Energy Audit Program provides energy audits, consulting assistance and grants, and conducts seminars. The Atlantic Energy Conservation Investment Program provides contributions in the four Atlantic provinces. The Industrial Conversion Assistance Program assists conversion from heavy fuel oil to pipeline natural gas. The Accelerated Capital Cost Allowance (Class 34) provides a fast tax write-off for energy conservation and renewable energy equipment.

As a result of oil conversion projects, more than 22 million litres of oil were displaced during the year in federal buildings. More than 200 major conservation projects were undertaken under the Federal Internal Retrofit Program. The projects generally pay for themselves within 10 years. The federal government added about 1400 propane-powered vehicles to its fleet.

EMR and the Housing and Urban Development Association of Canada funded the construction of 30 energy-efficient homes incorporating standards of airtightness and insulation that can reduce energy consumption by 75 per cent. Under Phase II of the program, another 272 energy-efficient homes will be built by the end of fiscal year 1983-84. EMR is coordinating the development of better housing standards for remote and northern areas, which should be in place by 1985. The Building Energy Technology Transfer Program was launched during the year to support EMR conservation and substitution activities.

ELECTRICAL ENERGY BRANCH

The general decrease in economic activity affected the demand for electricity this fiscal year, as in 1981. It is difficult to project future electricity demand accurately but growth in demand is expected to increase at an average annual rate of 3.5 per cent between 1982 and 2000.

Electricity production decreased by 1.2 per cent to 375 449 gigawatt hours: 68 per cent from hydro, 10 per cent from nuclear and 22 per cent from other thermal sources. This decline reflects the 0.2 per cent decrease in domestic consumption as well as a 7.4 per cent decrease in net exports to the United States. Installed generating capacity increased by 1.8 per cent from 1981 to an estimated 84 777 megawatts.

Two of the three phases of a study funded by the department, to consider the conversion of New Brunswick Power's Coleson Cove generating station from oil to coal, were completed in 1982.

The branch publishes annual reviews of electrical energy entitled *Electric Power in Canada* and *Electric Power in Canada – Update*, based on data provided by provincial electrical utilities, Statistics Canada and the National Energy Board.

URANIUM AND NUCLEAR ENERGY BRANCH

The Uranium and Nuclear Energy Branch coordinates the activities of the Uranium Resource Appraisal Group (URAG), which examined how rising production costs and low prices affected the way uranium deposits in Canada's established producing areas should be handled. This new method included establishing a higher price category to provide an inventory of uranium resources that may not be of economic interest before uranium prices recover. As a result of URAG's activities, which emphasized maintaining exploration and development efforts on government-owned property, significant new uranium resources have been proven to exist. Production of uranium increased by almost 5 per cent over 1981 to 8075 tonnes and new export contracts totaling 7509 tonnes were reviewed and accepted by the Government of Canada.

In September the branch announced details of a five-year research program for speeding the development of technology to minimize the environmental impact of wastes from uranium mining and milling. This $9.5 million program will be administered by the National Tailings Program Office in the Canada Centre for Mineral and Energy Technology (CANMET). Atomic Energy of Canada Limited (AECL) set up a Low-Level Radioactive Waste Management Office to take over federal responsibilities for cleaning up historical wastes and to carry out research on a collection, treatment and disposal service.

A new CANDU reactor started up in Korea, another in Argentina, and three in Canada: at Gentilly, Que., at Point Lepreau, N.B., and at Pickering, Ont., giving Canada nearly 7000 MWe of installed nuclear electrical generating capacity. EMR officials coordinated a federal approach to a second CANDU at Point Lepreau where output would be largely devoted to U.S. markets. At year's end, operational responsibility for the project was transferred to AECL, in cooperation with the New Brunswick Electric Power Commission.

The *Nuclear Industry Review*, examining prospects for the industry to the year 2000, noted that although construction of reactors would bring Canada's total nuclear capacity to almost 15 000 megawatts by the early 1990s, the industry lacked reactor orders from other countries.

COAL AND ALTERNATIVE ENERGY BRANCH

Coal Division

In 1982-83 the Canadian coal industry set a production record of 42.8 million tonnes. Electrical generation consumed 81 per cent and the steel industry 14 per cent. In western Canada and in Nova Scotia, new mines continued to be developed, and in British Columbia two new mines that will provide about 8 million tonnes of coal to Japan were under development.

In 1980 the Government of Canada introduced the Coal Utilization Program, which the department administers by supporting demonstration projects to encourage the use of coal in modern technologies. One of these projects is the new twin-boiler heating plant in Prince Edward Island, the first Canadian installation using fluidized bed coal combustion technology. An agreement was reached with the Nova Scotia Power Corporation to construct a special materials testing facility at an oil-fired generating station at Point Tupper. A pilot facility to produce coal/water fuels, a project also supported under the Coal Utilization Program, was being built at the Victoria Junction coal cleaning plant of the Cape Breton Development Corporation. This will provide several thousand tonnes of the new liquid fuel for extensive combustion trials.

In Cape Breton the Scotia Coal Synfuels Project continued to study the potential of liquefied coal as an automotive fuel, with support from the Canada/Nova Scotia Agreement on Oil Substitution and Conservation.

The division studied the control of sulphur and other emissions which lead to the formation of acid rain.

Transportation Energy Division

The Motor Vehicle Fuel Consumption Standards Act received Royal Assent in July 1982, empowering the Governor in Council, acting on the recommendation of the Ministers of Transport and Energy, Mines and Resources, to prescribe mandatory standards for fuel consumption in new vehicles. The Act has not yet been proclaimed, as the ministers have opted to continue the voluntary program of improved fuel consumption.

A government-industry motor vehicle committee has been established to consider cold-weather vehicle technology, diesel fuel quality and establishment of data bases to monitor and forecast fuel consumption. It will provide an opportunity to deal with issues related to alternative transportation fuels such as propane, natural gas and methanol.

Vanpooling has been encouraged as another energy conservation measure. A ridesharing centre has been established in Montreal, and a film and a series of guidebooks and brochures have been released.

The Propane Vehicle Program has paid $7.9 million toward the conversion or purchase of 19 800 propane-powered vehicles, resulting in the displacement of about 160 million litres of gasoline a year. This represents a saving on imported oil of more than $30 million a year. The Natural Gas Vehicle Program and the Natural Gas Fueling Station Contribution Program were initiated to help establish a viable natural gas vehicle fuel industry in Canada.

To help determine methanol's potential as a vehicle fuel, vehicles in Manitoba, Ontario and Quebec are being run on methanol alone and on blends of methanol with gasoline.

Renewable Energy Division

In 1982-83, the Forest Industry Renewable Energy Program, which provides financial incentives for the installation of biomass systems, approved $10.4 million for projects ranging from wood and municipal waste burning, to biofuel preparation. Since the program began in 1978, EMR has contributed $57 million and industry has invested more than $350 million in these projects, which could displace more than one billion litres of oil a year.

The Solar Water Heating Demonstration Program provides financial incentives to eligible homeowners to buy a solar water heating system. In 1981 more than 800 systems were installed across Canada, and in Phase II, which ran in 1982-83 in cooperation with Public Works Canada, more than 1000 new systems were installed at significantly reduced prices.

EMR headed an interdepartmental committee which reviewed federally sponsored solar activities and recommended alternative directions for federal solar policies and programs.

Under the federal-provincial Conservation and Renewable Energy Demonstration Agreements, which began in 1980, EMR has contributed $31.8 million to 300 demonstrations. In 1982-83 EMR contributed $14 million to 120 projects.

The Remote Community Demonstration Program was initiated in 1982-83 to provide financial assistance for alternative approaches to energy supply and conservation in remote and northern communities.

Petroleum Incentives Administration

The Petroleum Incentives Administration (PIA), established to administer the Petroleum Incentives Program (PIP) and the Canadian Ownership and Control Determination Program (COCD), began operations in June 1982. Previously, PIP and COCD operated on a provisional basis pending passage of enabling legislation and were under the administration of the Petroleum Monitoring Agency and the Petroleum Prices and Compensation Branch. PIA sought to make the programs fully operational quickly, and to be as responsive as possible to the needs of applicants.

PIP began with an initial appropriation of more than $1.9 billion to cover eligible exploration and development expenses dating back to January 1981. The first incentives cheque, of $8.8 million, was given to a Calgary-based, Canadian-controlled company for expenses incurred in drilling five wells in the Labrador offshore.

By March 31, 1983, PIP contributions and commitments equaled approximately $1.8 billion. More than 90 per cent of the contributions were made to Canadian-controlled entities with substantial Canadian ownership, which had explored for oil and natural gas on Crown property, now known as the Canada Lands. An amendment to the PIP Regulations was passed to allow for monthly rather than quarterly processing of applications for eligible expenses incurred on the Canada Lands. A second amendment extended the Minister's authority to assign a Canadian temporary ownership rating and control status to certain applicants to the end of 1986.

The COCD Act was passed by Parliament in September and Regulations were announced in December. By March 31, 1983 this program had received more than 4300 applications, and had issued almost 2500 ownership and control certificates.

Petroleum Monitoring Agency

The Petroleum Monitoring Agency monitors and reports on the oil and gas industry. The agency publishes semiannual surveys based on data from more than 100 petroleum companies in Canada, including those earning at least 95 per cent of the industry's revenue.

These monitoring surveys and other agency reports provide information to private and public sector decision-makers on profitability, cash flow, sources of funds, capital expenditures, dividend payments, ownership and control, revenue sharing, research and development activities and international flows of funds.

The PMA's monitoring mandate was confirmed by the Energy Monitoring Act proclaimed in February 1983. The Act eliminated reporting requirements for smaller companies by raising the threshold required for inclusion in the PMA population from $5 million to $10 million in assets.

Canada Oil and Gas Lands Administration

The Canada Oil and Gas Lands Administration manages petroleum industry oil and gas exploration, production and development in the Canada Lands. COGLA reflects the jurisdiction of the Minister of Energy, Mines and Resources in the east coast, west coast offshore and Hudson Bay – Hudson Strait regions, and the jurisdiction of the Minister of Indian Affairs and Northern Development generally north of 60 degrees.

Off the east coast, 18 wildcat and three delineation wells were drilled. In addition, the industry logged more than 85 000 km to acquire seismic data and obtained seabed survey data at 16 potential drilling stations.

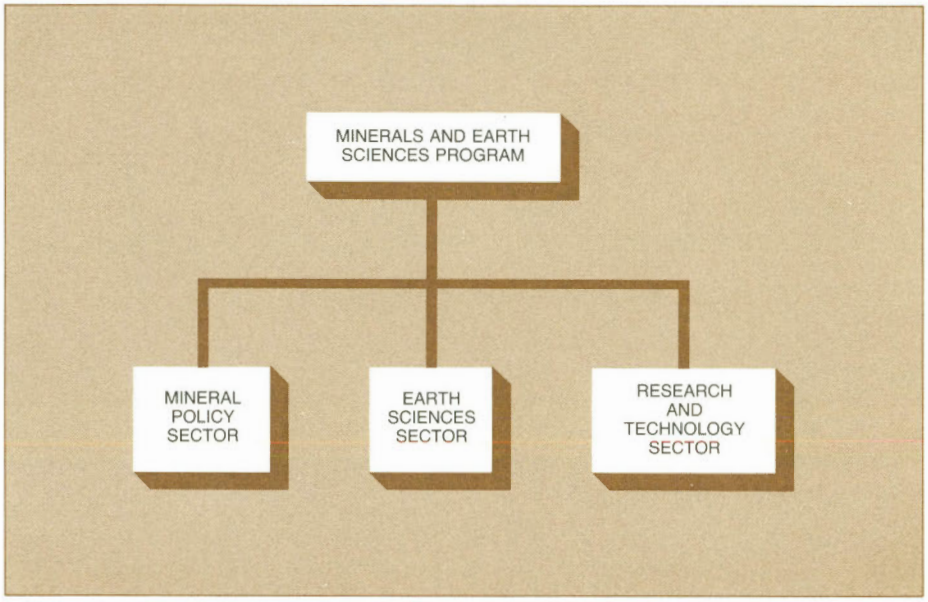
On the Scotian Shelf, Mobil Oil Canada, Ltd. completed a second delineation well, Venture B-43, at the Venture gas field. Exploratory drilling near Sable Island resulted in two discoveries by Mobil and one by Petro-Canada at Banquereau C-21. Two other wildcats were plugged and abandoned. Mobil's exploratory drilling on the Grand Banks resulted in an oil discovery at the Nautilus well, northeast of the Hibernia field.

At fiscal year end, drilling was continuing at five wildcats and one delineation well on the Scotian Shelf. On the Grand Banks, operations were temporarily suspended at one wildcat and one Hibernia delineation well because of ice cover at the well site.

MINERALS AND EARTH SCIENCES PROGRAM

Mineral Policy Sector

The economic downturn created severe problems for the Canadian minerals industry during 1982-83. The Mineral Policy Sector reacted through assistance to mining communities, job creation programs, taxation incentives for mineral exploration, market studies and proposals for commodity strategies. Industry studies revealed that problems are related not only to business cycle fluctuations but also to structural changes in world markets, requiring increasing cooperation to enhance the Canadian industry's competitiveness and market position. The sector consulted provincial governments, mining companies and labour unions on a draft policy document *Mineral Policy: A Discussion Paper*.



MINERAL INDUSTRY DEVELOPMENTS

International demand for minerals continued to weaken during the first half of 1982-83, leading to production cutbacks, the brunt of which was borne by producers in capital-dominated economies such as Canada and the United States. More than three quarters of Canada's producing mines were temporarily closed and by July more than 60 000 mineral and metal sector workers had been laid off and an estimated 15 000 jobs permanently eliminated.

The sector, in cooperation with the Canadian Employment and Immigration Commission, sought to help mining employees and communities ride out the crisis. Amendments to the Unemployment Insurance Act were proposed to permit funding of job creation projects on mining property and on public lands. Projects contributing to the longer term competitiveness of the mining industry were also emphasized.

Toward the end of the year, mineral demand began to grow. To monitor industry trends and cycles and to improve liaison with the industry, the sector consulted with experts from outside the government. The Minister of State (Mines) authorized a National Mineral Outlook Conference held early in fiscal 1983-84. An intergovernmental group led by the Mineral Policy Sector evaluated incentives for junior mining companies.

INTERNATIONAL MINERALS

Discussions with industry on international mineral strategy continued. A revised EMR report, *Market Share and Market Access: The Canadian Mineral Industry in a Changing World Economy*, was produced in December 1982; and a working group was established with The Mining Association of Canada to analyze the economic, political, technical and institutional factors underlying market trends.

Canada supported Australia's proposal to establish an international nickel discussion group, and consulted with about 30 other nickel-producing or -consuming countries during the year.

The sector increased its involvement in the International Strategic Minerals Inventory Working Group, an informal body of officials from Canada, Australia, South Africa, the United

Kingdom, the United States and Germany. The ISMI will make data and analyses on major world deposits of selected commodities available to all participants.

MINERAL POLICY DEVELOPMENT

The sector reviewed possible alternatives for a regional mineral strategy for Canada, and possible alternative roles for EMR. It completed a background study on the Canadian and world iron ore industries and distributed it to provincial governments and the mining industry, and met to identify directions for the industry and appropriate actions for governments. Studies on potash and phosphate were completed and released to the public, and others were initiated to identify strategies for sulphur, chromium and asbestos.

Sector officials examined the nonferrous smelting industry in cooperation with other government departments and industry and labour representatives. This will lead to program suggestions for industry and will stimulate investment for new plant facilities while contributing to environmental protection. The sector participated in a working group investigating how the taxation of northern and isolated post allowances affects mining companies and workers in remote areas.

Earth Sciences Sector

Headquarters staff in the Earth Sciences Sector coordinated existing sector-wide programs and future plans, policies and administration, improved communications and administered the department's Research Agreements Program.

GEOLOGICAL SURVEY OF CANADA

The Geological Survey of Canada (GSC) makes available comprehensive knowledge, technology and expertise on the geology of the Canadian landmass and offshore areas, including mineral and energy resources. The GSC studies conditions affecting land and seabed use to ensure their efficient development, and estimates the mineral and energy resource base of Canada to assist in developing national policies.

During 1982-83 faltering mineral and energy resources urgently needed rejuvenating. Geoscientific programs to estimate mineral resources exploitation were developed with provincial government agencies in Newfoundland, Nova Scotia and Manitoba and programs were planned with Quebec, Ontario and British Columbia. New research initiatives were developed stressing cooperation and collaboration among various institutions, agencies and scientific disciplines.

Achievements included: studying the deep structure of the continental crust through several cooperative programs in the Canadian Shield with the Earth Physics Branch, and through projects in the Atlantic offshore area with various U.S. and Canadian academic institutions; and studying key geological structures with the Canadian Geoscience Council's Major Projects Committee through a multidisciplinary national project, Lithoprobe. A proposal was developed for a national exploration technology program at the initiative of the GSC's Resource Geophysics and Geochemistry Division. Studies on geological hazards and environmental constraints on development were expanded, particularly in the offshore areas; and the origin of mineral deposits was studied, spurred by the recent discoveries on the Juan de Fuca Ridge system off Vancouver Island.

Institute of Sedimentary and Petroleum Geology

The Institute of Sedimentary and Petroleum Geology provides the geological knowledge base for Canada's western and Arctic sedimentary basins and assesses hydrocarbons.

The ISPG's accomplishments during 1982-83 included: field studies on northern Ellesmere Island, completing geological reconnaissance of nine map areas; work in the northern Richardson Mountains and subsurface studies in the Mackenzie Delta, which defined an east to west change from terrestrial to shoreline to shelf sediments; analysis of two rock groups in the Sverdrup Basin of the Arctic Islands; and publication of four maps indicating the distribution of gas and oil pools in western Canada.

Cordilleran Geology Division

The division studies the geology of British Columbia and the Yukon Territory, and marine geology on the Pacific Continental Margin.

Chemical data gathered during the year suggest that the Mount Edziza volcanic complex in British Columbia may have geothermal energy potential. The division also demonstrated that conodont fossils are important to understanding the evolution of the Cordilleran region by identifying an unconformity in carbonate rocks of Prince Rupert, and structural repetitions in the rocks of the Cariboo Mountains in British Columbia.

Precambrian Geology Division

The division is responsible for geological information concerning the mineral-rich Canadian Shield.

Accomplishments during the year included: operation of a new solid source mass spectrometer to determine the age of rocks more accurately; linking geological, aeromagnetic and gravity data to unravel the history of the area between the Slave and Churchill structural provinces; and continuing a mapping program in the District of Keewatin, with the start of three projects near Baker Lake.

Atlantic Geoscience Centre

The Atlantic Geoscience Centre in Dartmouth, Nova Scotia conducts geological and geophysical studies of the Atlantic and Arctic offshore regions and the sedimentary basins of the Atlantic region.

Major discoveries at the Venture and Hibernia fields have renewed interest in the Scotian and east Newfoundland basins. Seismic data from industry are helping the GSC interpret the geological structure in these areas.

Geological constraints to offshore hydrocarbon development were evaluated during the year. The petroleum resources of Georges Bank were assessed to strengthen the Canadian position in establishing the Canada-U.S. Boundary in this important offshore area. An AGC study showed that an industry program to restore the dunes on Sable Island was effective.

Terrain Sciences Division

The division provides comprehensive geological information on the surficial materials, landscape processes and natural terrain hazards of the Canadian landmass.

Its major achievements in 1982-83 were: completing integrated terrain mapping on Victoria Island, to facilitate planning and information gathering on surficial deposits, ground ice and vegetation; and studying landslides in rock and soil in the Cordilleran region and valley areas prone to invasion by debris flows.

Economic Geology Division

The division studies the processes leading to the formation of mineral deposits. It integrates regional geological studies and studies on the formation of mineral deposits to determine the probable distribution and potential abundance of Canada's non-hydrocarbon mineral resources.

Accomplishments included: initiating a study of chromite, a strategic mineral, of which Canada has no commercial sources, in the Bird River sill in conjunction with the Manitoba Department of Energy and Mines; and assessing Canada's uranium resources additional to established ore reserves, and mineral resources in the Yukon and at Bathurst Inlet in the Northwest Territories. The division studied gold deposits and conducted geochemical and geophysical surveys, and surficial and bedrock geological mapping in Nova Scotia; conducted geological and geochemical surveys in Newfoundland and Labrador; and studied gold deposits in Ontario and the Northwest Territories, tungsten-molybdenum-tin in New Brunswick, and uranium in the Northwest Territories, the Yukon and Saskatchewan.

Resource Geophysics and Geochemistry Division

This division develops and tests technologies for the acquisition and interpretation of geophysical and geochemical data. It demonstrates how the technologies apply to mineral exploration and to national and regional surveys of the Canadian landmass.

In January 1983 GSC was assigned the responsibility for airborne search operations should debris from the disintegrating Soviet satellite COSMOS 1402 fall anywhere in Canada, but the satellite did not break up over Canadian territory.

The division completed an aeromagnetic survey of the border between Quebec and Newfoundland-Labrador, fulfilling one of the terms of Newfoundland's entry into Confederation in 1949.

Other accomplishments included application of geophysical techniques in a successful snow water depth survey of the Lake Superior Basin, as part of an international program involving Environment Canada and the U.S. Corps of Engineers; compilation of radiation exposure levels in Canada from airborne survey data, which showed that Canada has one of the

lowest levels of natural radiation of all countries for which similar data are available; publication of a new magnetic map of the Canadian Arctic and seven magnetic anomaly maps at the 1:1 000 000 scale covering part of central Canada; and completion of a geochemical lake sediment and water survey in southern Ontario.

Geological Information Division

Public communication of the results of the GSC's scientific program is the responsibility of this division, which also operates Canada's largest earth science library.

During the year, 49 scientific reports, 52 geological maps and 85 geophysical maps were published. In addition, 58 622 maps, 37 148 reports and 119 666 indexes, brochures, posters and other items were distributed through Vancouver, Calgary and Ottawa sales offices.

Central Laboratories and Technical Services Division

This division provides analytical services and mineralogical expertise to other divisions of the GSC and conducts related research. During the year, two new minerals identified by the division, kiddcreekite and lapieite, were recognized by the International Mineralogical Association.

SURVEYS AND MAPPING BRANCH

The Surveys and Mapping Branch provides basic surveys and maps of Canada important to the exploration and development of Canada's resources. The branch provided scientific and technological advice to federal and provincial government agencies, consulting services in surveys and mapping for international development programs through the Canadian International Development Agency (CIDA), and for federal-provincial programs. Because of recent developments in technology and changing expectations of users, the branch prepared a long-term strategic plan and continued work on a digital topographic data base and procedures for acquiring a raster scanning system.

Geodetic Survey

This division provides a national network of geodetic surveys fundamental to all other forms of surveying. This network ensures that surveys done in any part of the country are mutually consistent to a single fixed frame of reference and that they serve national interests. Internationally, the Geodetic Survey defines Canada's territorial limits in a global reference system. Satellites, inertial survey systems and lasers enable the Geodetic Survey to respond rapidly to requests for survey control in remote and previously inaccessible regions. Computerized data are stored in Ottawa and are available to the public.

Highlights of the division's achievements in 1982-83 included: beginning an investigation into a new application of inertial surveying for the measurement of gravity vectors in mountainous terrain; and measuring high precision trilateration networks, on Vancouver Island to monitor tectonic plate movement, and in New Brunswick to monitor structural deformation at a hydroelectric generating station.

Topographical Survey

Topographical maps portray the Canadian landmass in detail, showing relief elevations and such features as lakes, roads and buildings and political and administrative boundaries.

The entire country has been mapped at the reconnaissance scale of 1:250 000 in 918 map sheets. At the larger scale of 1:50 000, to complete coverage of Canada, 12 922 maps will be needed. Almost three quarters of these maps have been published and the remainder should be out by 1994. Satellite imagery is being used to revise the 1:250 000 scale maps and to detect changes on the 1:50 000 scale maps.

Highlights for 1982-83 included: production of 354 first-edition maps and revision of 239 existing maps at the 1:50 000 scale, and revision of 57 maps at the 1:250 000 scale; conversion of 1138 of 1690 maps of Quebec into bilingual format; participation in the technical management of programs for federal-provincial flood damage reduction; and provision of technical advice and inspection services on surveying and mapping projects under the auspices of CIDA in Nigeria, Tanzania, Indonesia, Zimbabwe and Barbados.

Geographical Services

The directorate uses maps produced by the Topographical Survey to portray Canada's geography. Information on soil, climate, population, demography, energy, mining, transportation, communications and other subjects is gathered and compiled in *The National Atlas of Canada*.

The directorate produces aeronautical charts and related flight information for navigators and air traffic controllers. It also produces small-scale maps, including the International Map of the World at a scale of 1:1 000 000, and other maps from 1:2 000 000 to 1:20 000 000.

Highlights for 1982-83 included: printing map sheets for the fifth edition of *The National Atlas of Canada*, covering subjects such as territorial evolution, coal, the 32nd Parliament, as well as two general maps of Canada at scales of 1:7 500 000 and 1:5 000 000; and producing about 80 maps for government departments without map production capabilities, including 65 maps for the Office of the Chief Electoral Officer.

Legal Surveys

This division manages and regulates all surveys of the Canada Lands, including national parks, the Yukon and Northwest Territories, the offshore and 2300 Indian reserves. Legal Surveys updates descriptions of properties within the Canada Lands. In 1982-83 work continued on projects to safeguard the interests of holders of land rights and to supply information on the land management by providing necessary surveys, plans and maps.

Other highlights included: implementing a property mapping system for Indian Lands to form the base for a multipurpose land information system for planning, developing and managing Indian Lands; and publishing the third edition of *Surveying Offshore Canada Lands for Mineral Resource Development* in English.

International Boundary Commission (Canadian Section)

The International Boundary Commission is a bilateral treaty organization maintaining and regulating the land and water boundary between Canada and the United States.

Highlights for the year included: operations on the Quebec–New York, Quebec-Vermont boundaries to maintain the six-metre-wide vista from Hemmingford, Quebec, to Lake Champlain, and also through the Dundee Swamp westward from Dundee, Quebec; surveys along the St. Clair River, on the Ontario-Michigan boundary during which monuments referencing the boundary line through the river were replaced and surveys made to locate precisely all monuments along the banks; and vista and monument maintenance along the entire 1434 km of the British Columbia–Alaska boundary, the most rugged section of the International Boundary, including clearance of 34 km between White Pass and the Alsek River Valley.

Reproduction and Distribution Division

On a cost recovery basis, this division publishes data compiled by other Surveys and Mapping Branch divisions. Topographical and geographical maps, aeronautical charts, and air information publications are reproduced and sold by map and chart dealers across Canada. Custom-made reproductions of aerial photography and satellite imagery are produced on request.

The National Air Photo Library maintains a catalogued hard-copy collection of all aerial photography acquired by the Government of Canada. This collection is used by other government departments and facilities planners from industry and the public.

Highlights for 1982-83 included: responding to 104 847 requests for information and services by distributing more than 3.1 million items for a total revenue of $3 042 747; completing detailed studies to prepare for installation of an integrated computer system, expected to come on line in 1983-84, to automate order and subscription processing, distribution, inventory control, sales accounting and management reporting; and producing 558 175 airphoto reproductions in response to 6913 service requests, for a revenue of $1 223 334.

The division printed 1:5 000 000 and 1:7 500 000 full-colour maps of Canada with shaded relief to replace the existing 1″ to 64 mile and 1″ to 100 mile maps; a set of three maps entitled "Canada Then and Now", depicting Canada's growth from 1867 to 1982; a series of 41 preliminary maps, derived from the 1981 census, for the Federal Electoral Boundaries Commission; and 8 716 504 copies of maps, charts and graphics, comprising 3419 titles.

POLAR CONTINENTAL SHELF PROJECT

The Polar Continental Shelf Project studies scientific problems unique to the Canadian Arctic and provides logistics support and advice to other scientific research groups working in the Arctic Islands and the Arctic Ocean. It maintains base camps at Tuktoyaktuk in the Mackenzie Delta and at Resolute on Cornwallis Island to coordinate fieldwork generally carried out between mid-February and late September each year.

The Glacier Physics Section, the PCSP's research arm, continued to study the paleoclimate and climatology of the Arctic Islands and the modeling of glacier flow and temperature, and completed a review of the ice sheet bedrock conditions for nuclear waste disposal in the Canadian Shield.

During the 1982 summer field season, PCSP supported 167 scientific research parties, providing aircraft, a radio network, equipment and base camp support. With the Canadian Forces, the PCSP provided major logistics support for the Canadian Expedition to Study the Alpha Ridge (CESAR '83) in the Arctic Ocean. Other fieldwork supported by the PCSP included locating six archeological sites from the 1845 Sir John Franklin expedition; 82 artifacts and the remains of several crewmen were found. A study on population range and distribution of polar bears on Baffin Island continued, to determine the impact of oil development on the bear population. New Doppler stations, used to position points of the earth by satellite, were established in the western Arctic Islands and the Mackenzie Delta. A glacial geomorphology study, which may confirm the extent of ice during the last glaciation and document the presence of a full glacial sea, continued on Greenland and northern Ellesmere Island.

EARTH PHYSICS BRANCH

The Earth Physics Branch provides geophysical knowledge on the framework, dynamic processes and hazards of the Canadian landmass and offshore, operates national networks of geophysical observatories and provides geophysical standards. It comprises five scientific services: seismology, geomagnetism, gravity, geothermics and geodynamics.

In 1982-83 the branch was involved in multidisciplinary studies, including the management of nuclear fuel waste, the search for sources of geothermal energy and the geophysical delineation of Canada's offshore boundaries.

Major achievements included: completing a major seismic refraction survey across the Ottawa Valley Rift in cooperation with the Consortium for Crustal Reconnaissance Using Seismic Techniques; and occupying three of the original magnetic stations in the Far North to mark the centenary of the first International Polar Year.

Division of Seismology and Geomagnetism

The division operates several seismographic networks to monitor earthquake activity and determine seismic risk, and a network of recording geomagnetic stations across Canada to monitor variations in the earth's magnetic field. It conducts seismological and magnetic surveys on the structure and tectonics of the earth.

Highlights in 1982-83 included: determining the location of the 1982 New Brunswick earthquakes and their aftershocks; compiling a new seismic risk map for Canada, which will be used in the National Building Code; and participating in planning for Lithoprobe.

Division of Gravity, Geothermics and Geodynamics

The division conducts gravity surveys over the Canadian landmass and offshore areas, and maintains a network of gravity standards. It operates geodynamics observatories at Ottawa and Calgary and contributes data to international agencies on the earth's rotation, polar motion and earth tides. Crustal stability is investigated by measuring changes in gravity, surface movements and groundwater level variations. Tectonic processes and the distribution and character of permafrost are examined and the geothermal energy potential of Canada is evaluated.

Highlights of 1982-83 included: publication of a complete set of 95 gravity anomaly manuscript maps at a scale of 1:1 000 000; establishment of 1500 gravity stations in the Cordillera, Newfoundland and the Arctic; and recording of 23 000 line-kilometres of surface meter profiling off the east and west coasts.

Pacific Geophysics Division

The division is in the Pacific Geoscience Centre at the Institute of Ocean Sciences near Sidney, B.C. It is responsible for west coast operations of all five geophysical services, in consultation with branch management in Ottawa. It operates the west coast seismological network, conducts multidisciplinary offshore geophysical cruises, analyzes and interprets seismic, geomagnetic, geothermal, gravity and geodynamic data obtained onshore and offshore, and estimates earthquake risk to industry.

Highlights of 1982-83 included: two major multidisciplinary cruises to aid interpretation of the tectonics and structure off the west coast; acquisition of shipborne gravity coverage over an area of 35 000 km^2 southwest of the Queen Charlotte Islands; completion of the new paleomagnetic laboratory for studies of the tectonic history of the region; and inauguration of planning for geophysical research in the International Boundary and offshore polymetallic sulphide projects.

Research and Technology Sector

CANADA CENTRE FOR MINERAL AND ENERGY TECHNOLOGY

The Canada Centre for Mineral and Energy Technology (CANMET) is the principal federal agency for research and development in mining, minerals, metals and fossil fuels technologies.

A Treasury Board review concluded that CANMET is a mature organization with strong scientific and professional capabilities. An evaluation of research and development trends was conducted by CANMET's scientific staff, followed by consultations with industry through the National Advisory Committee on Mining and Metallurgical Research, culminating in three state-of-the-art papers on mining, minerals and metals technology, to be made public in 1984.

The technology sectors include policy research and development, which supports federal mineral policies, standards and certification programs; protection technologies to improve health and safety, the environment and the safety of materials and structures; and productivity technologies to improve industrial productivity and competitiveness.

In early 1983, Cabinet approved the Short Term Assistance in Research and Technology Program (START), which provides for increased research and development assistance to the Canadian mineral industry. A two-year, $5 million program, it will allow industry to use CANMET's special facilities and technological expertise. START will provide funds to sponsor contract research and development, and provide selected capital items in CANMET to enhance the effectiveness of short-term programs. The cost of some CANMET services will be reduced and industry will be able to place staff in CANMET temporarily to work with scientists on industrial problems.

Minerals

CANMET continued to emphasize the development, evaluation and testing of technology for the mining, processing, utilization and conservation of Canada's non-energy minerals and metals.

More than 150 explosive materials were tested and evaluated for the Canadian Explosives Research Laboratory. Rock burst and ground control research continued in the Elliot Lake mines. A silica dust study in cooperation with other federal, provincial and university agencies was concluded in the Labrador West iron mines. The number of units of equipment and material certified for use in coal mines increased significantly. Research continued on the control and suppression of toxic emissions from diesel engines in underground mining operations. Studies in mineral conservation and resource assessment focused on industrial minerals, complex sulphide ores, the recovery of precious metals from waste materials and the industrial use of primary mineral wastes.

The Mine Evaluation Group completed two computerized systems to evaluate mineral deposits. Development of software packages for the foundry industry and advances in casting technologies for iron, aluminum and copper-based alloys, reduced the industry's costs.

Energy

Improving the supply, processing and use of Canada's coal, petroleum, natural gas and uranium were main concerns. The Coal Research Laboratory designed new pilot plant facilities at Devon, Alberta and the Hydrocarbon Processing Research Laboratory was established in January 1983 to develop processes to convert and separate fossil fuel materials. The Combustion and Carbonization Research Laboratory developed advanced high-efficiency gas furnaces and low-emission wood stoves, studied fuel savings available from energy-intensive industrial processes, and monitored the performance of three industrial wood-fired boilers. A new pilot-scale research boiler for low-grade pulverized coal was installed and commissioned.

The Synthetic Fuels Research Laboratory continued its applied research and development for the production of synthetic fuels from oil sands bitumen, heavy oil and coal. The pilot plant experimental program supported the CANMET hydrocracking demonstration plant, scheduled to start up in 1985.

EXPLOSIVES BRANCH

The Explosives Branch is responsible for safety in regulating the manufacture, distribution and transportation of explosives. No major accidents occurred in 1982-83. Ninety-two factories were licensed to manufacture explosives, 2141 magazines were licensed for storage and 724 permits were issued to vehicles for transportation. These were supported by more than 2000 inspections. Fireworks supervisor courses were conducted at centres across Canada, and 984 supervisors were qualified.

The Canadian Explosives Research Laboratory provides the Chief Inspector of Explosives with the technical experts required by statute and performs the necessary advisory and testing functions. It assesses the properties of explosive samples submitted for authorization testing and correlates the physical and chemical properties of explosives with the mechanisms of initiation.

CANADA CENTRE FOR REMOTE SENSING

The Canada Centre for Remote Sensing (CCRS) participated in the European Space Agency Earth Resources Satellite (ERS-1) Program, which was in the pre-design stage during 1982 and will launch a remote sensing satellite in 1987-88. The department is involved in the management and technical review of this program. Canadian industry participated in program and technology development contracts.

CCRS is planning for a Canadian remote sensing satellite, RADARSAT, and has completed the concept design and economic assessment. It has international agreements with the United States and the United Kingdom for collaboration in the program, is developing critical radar technology for the space and ground systems, and has conducted aircraft experiments to simulate satellite performance over ice, icebergs and land.

CCRS continued application development and technology transfer activities, concentrating on crop and forest monitoring, surficial geology mapping and the application of the microwave sensors to sea-ice classification. It reached an agreement with the Government of Manitoba to transfer remote sensing technology to provincial resource management agencies and made progress toward a similar agreement with the Council of Maritime Premiers.

OFFICE OF ENERGY RESEARCH AND DEVELOPMENT

The Office of Energy Research and Development coordinates the federal energy research and development program. It acts as Secretariat to the Interdepartmental Panel on Energy Research and Development and is the primary research and development contact with the Ministry of State for Economic and Regional Development and the Treasury Board Secretariat.

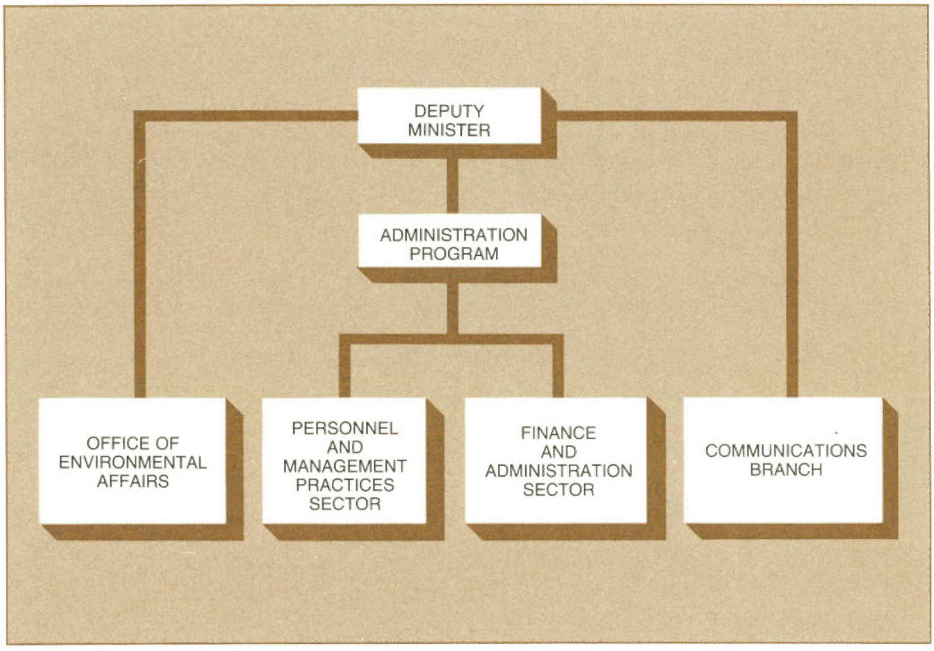
Recent Canadian energy policies have provided for expanding federal energy research and development, which is expected to reach approximately $105 million in 1983-84, bringing resources under review of the Interdepartmental Panel to about $154 million.

The program emphasizes projects which help to achieve and sustain domestic energy self-sufficiency, increasing the need for more research and development of alternative liquid fuels, energy conservation and new energy sources. The *National Energy Program – Update 1982* emphasized the need to develop oil and gas resources offshore in the Canada Lands. Many of the new resources for 1983-84 will be devoted to technical problems associated with these developments.

Canada participated in research and development programs under the umbrella of the International Energy Agency, a group of major oil-importing countries. Liaison and coordination with provincial and university research and development programs continued, through participation on governing committees for the Alberta/Canada Energy Resources Research Fund and the Strategic Grants of the Natural Sciences and Engineering Research Council.

ADMINISTRATION PROGRAM

Personnel and Management Practices Sector



PERSONNEL BRANCH

Energy, Mines and Resources, in consultation with central agencies, is developing long-range plans to meet its future requirements for scientific and professional personnel, in a market where specialized skills are in great demand. Well qualified petroleum engineers and geologists are difficult to recruit and the recruitment of research scientists will become acute over the next several years. Many departmental specialists will be reaching retirement age within the next decade.

OFFICE OF EQUAL OPPORTUNITIES

The Office of Equal Opportunities develops, promotes, monitors and modifies programs, policies and practices to ensure equal employment opportunities and career development for women, natives and disabled persons.

During 1982-83 the office sponsored the Handicapped Awareness Week and the Native Awareness Session. In the Women's Initiative Network Program 15 of 17 trainees succeeded in officer level competitions. A Voluntary Identification Survey was conducted in July 1982. Other initiatives included a new policy regarding women on selection boards, the establishment of a Resource Information Centre and the inclusion of an equal opportunities statement on all competition posters. New inventories were established to receive the curriculum vitae of women, natives and disabled people.

COORDINATION AND PRIORITIES BRANCH

The branch is engaged in improving the corporate planning program, analyzing operational plans and providing advice and information to senior departmental managers.

The branch coordinated the activities of the Management and Control Project, produced the Strategic Overview, and guided the A-Base Expenditure Review of the Minerals and Earth Sciences Program to conclusion.

INTERNAL AUDIT BRANCH

The branch conducts an audit program covering all departmental operations. The development of audit methodology was emphasized with particular focus on management audit. Audits this year were conducted on responsibility centres such as the Communications Branch and EMR Classification Operations. Systems audits were conducted of the Petroleum Incentives Program, the Propane Vehicle Grant Program and the Gas and Electrical Conversion Assistance Program. With the Auditor General's Office, an audit of the acquisition of goods and services and an audit of electronic data processing operations in the Minerals and Earth Sciences Program were carried out.

PROGRAM EVALUATION BRANCH

The branch examines the relevance and effectiveness of program objectives. In 1982-83 it completed a program evaluation of the Geological Survey of Canada and approved an implementation plan complying with the recommendations.

Other areas of program evaluation nearing completion included mineral development activity, the Canadian Home Insulation Program and remote sensing activity. Evaluation frameworks were established for the Canada Oil Substitution Program and the Forest Industry Renewable Energy Program.

Finance and Administration Sector

ADMINISTRATIVE SERVICES BRANCH

With the Department of Communications, EMR will initiate a project in office automation to focus on improving administration and dissemination of administrative policies and manuals.

In 1982-83 Technical Field Support Services played a key role in the provision of materials needed by CESAR '83 personnel. The branch began planning to bring all local EMR offices under one roof in five major urban centres and the transfer of the Petroleum Incentives Administration to Hull, Quebec. A Government Telecommunications Agency study was conducted on telecommunications administration, the recommendations of which will result in savings.

FINANCIAL MANAGEMENT BRANCH

In 1982-83 the department made expenditures of $5400 million for the Energy Program, $224.7 million for the Minerals and Earth Sciences Program and $23.8 million for the Administration Program. Offsetting revenue totaled $3064 million, including levies of $3059 million collected under the Energy Administration Act. The department's total net expenditures were $2598 million.

The branch reviewed the Management, Accounting and Recording System in three pilot branches and developed modifications to incorporate commitment information and to integrate the system more closely with cash accounting for appropriations. Computer programming is proceeding, and will be department-wide in 1983-84.

COMPUTER SCIENCE CENTRE

During 1982-83 the workload on the Cyber 730 system installed in 1981-82 continued to grow. Interactive sessions and batch jobs increased by 18 and 11 per cent, respectively, during the year. The additional workload was processed at 1.5 per cent less cost to the department than in the previous year. The workload increase, however, resulted in saturation of the existing system. Plans have been made to augment the centre's computing capacity.

Communications Branch

The branch provides support for major departmental programs and initiatives. In 1982-83 this included assistance to the inauguration of the Canada Oil and Gas Lands Administration and Petroleum Incentives Administration, and related energy matters such as the Distribution Systems Expansion Program; and the management of communications activities for the Canadian Expedition to Study the Alpha Ridge, resulting in considerable coverage by major Canadian and international media.

Energy, Mines and Resources regional offices remain the focus of public relations activities across Canada by responding to public inquiries. In 1982-83 advertising initiatives were launched for the government's energy-saving programs and for the Minerals and Earth Sciences Program. In response to a national campaign on potential careers in the earth sciences, more than 10 000 information requests were received.

The department participated in 88 national, provincial, regional and local exhibitions. Enercentre kiosks were set up in 318 shopping centres across Canada, from which 780 000 pieces of departmental literature were distributed. In addition, the branch responded to almost 20 000 written and phone requests for information.

The department's scientific quarterly *GEOS* again won awards for design, articles and journalistic excellence and increased its press run by about 50 per cent. A new employee newspaper *Entre nous* was launched in March with a circulation of 5500.

Office of Environmental Affairs

The department has responsibilities in areas that fall under the general heading of environmental affairs. It participates in the federal Environmental Assessment and Review Process by screening departmental initiatives and by providing earth sciences expertise in all EARP reviews.

The department supports research and development on the environmental and public health implications of Canada's energy policies, such as the introduction of new liquid fuels into the marketplace, hydrocarbon development and increased uses of coal.

Energy, Mines and Resources is involved in the development of broad environmental policies affecting energy and mineral strategies on such matters as acid rain, lead in gasoline and nuclear power development.

Crown Corporations and Agencies

Crown Corporations

Atomic Energy Control Board

Atomic Energy of Canada Limited

Petro-Canada Limited and its subsidiary Canertech

Petro-Canada International

Uranium Canada Limited

Agencies

Board of Examiners for Dominion Land Surveys

Canadian Permanent Committee on Geographical Names

Energy Supplies Allocation Board

National Energy Board

Petroleum Compensation Board

Petroleum Monitoring Agency

FINANCIAL SUMMARY

	Operating Expenditures	Capital Expenditures	Grants and Contributions and Transfer Payments	Total
		(thousands of dollars)		
Administration Program				
Corporate Management	6 950	100	72	7 122
Common Services	14 549	242		14 791
Employee Benefit Plans	1 881			1 881
	23 380	342	72	23 794
Less: Revenues for Computer Services	4 977			4 977
TOTAL COSTS OF PROGRAM	18 403	342	72	18 817
Energy Program				
Energy Policy	14 348	97	178	14 623
Petroleum sources: supply, demand and substitution	5 319	34	44 625	49 978
Non-Petroleum sources: supply, demand and substitution	17 335	100	188 206	205 641
Energy Conservation	34 962	399	256 629	291 990
Energy Research and Development	2 589	16		2 605
Management of Federal Interests in Non-renewable Resources	3 255	121		3 376
Pricing and Compensation including the Petroleum Compensation Board	8 159	167	4 403 468	4 411 794
Petroleum Monitoring Agency	8 332	160		8 492
Emergency Planning including Energy Supplies Allocation Board	1 485	14		1 499
Energy Public Information	9 859	21		9 880
Employee Benefit Plans	6 001			6 001
Petroleum Compensation Revolving Fund			408 585	408 585
	111 644	1 129	5 301 691	5 414 464
Less: Receipt of levies pursuant to Section 65 of the Petroleum Administration Act			3 059 186	3 059 186
TOTAL COSTS OF PROGRAM	111 644	1 129	2 242 505	2 355 278
Minerals and Earth Sciences Program				
Mineral Development	8 049	7	280	8 336
Administration of the Canada Explosives Act	1 443	61		1 504
Minerals Technology	15 423	1 526	46	16 995
Energy Technology	28 011	7 369	450	35 830
Geological Surveys	44 093	2 419	43	46 555
Earth Physics	11 750	742	27	12 519
Polar Continental Shelf	5 608	30		5 638
Remote Sensing	15 518	13 377	2 300	31 195
Surveys and Mapping	42 618	1 840	67	44 525
Minerals and Earth Sciences Public Information	2 328			2 328
Program Management Support	3 482	251	1 398	5 131
Employee Benefit Plans	14 162			14 162
TOTAL COSTS OF PROGRAM	192 485	27 622	4 611	224 718
TOTAL EXPENDITURES FOR THE DEPARTMENT	322 532	29 093	2 247 188	2 598 813

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Halifax, Nova Scotia
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Prince Edward Island
Waterfront Shopping Centre
98 Water Street
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Summerside, P.E.I.
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Newfoundland
140 Water Street
5th Floor – Suite 501
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