



The Business of B.C. Hydro

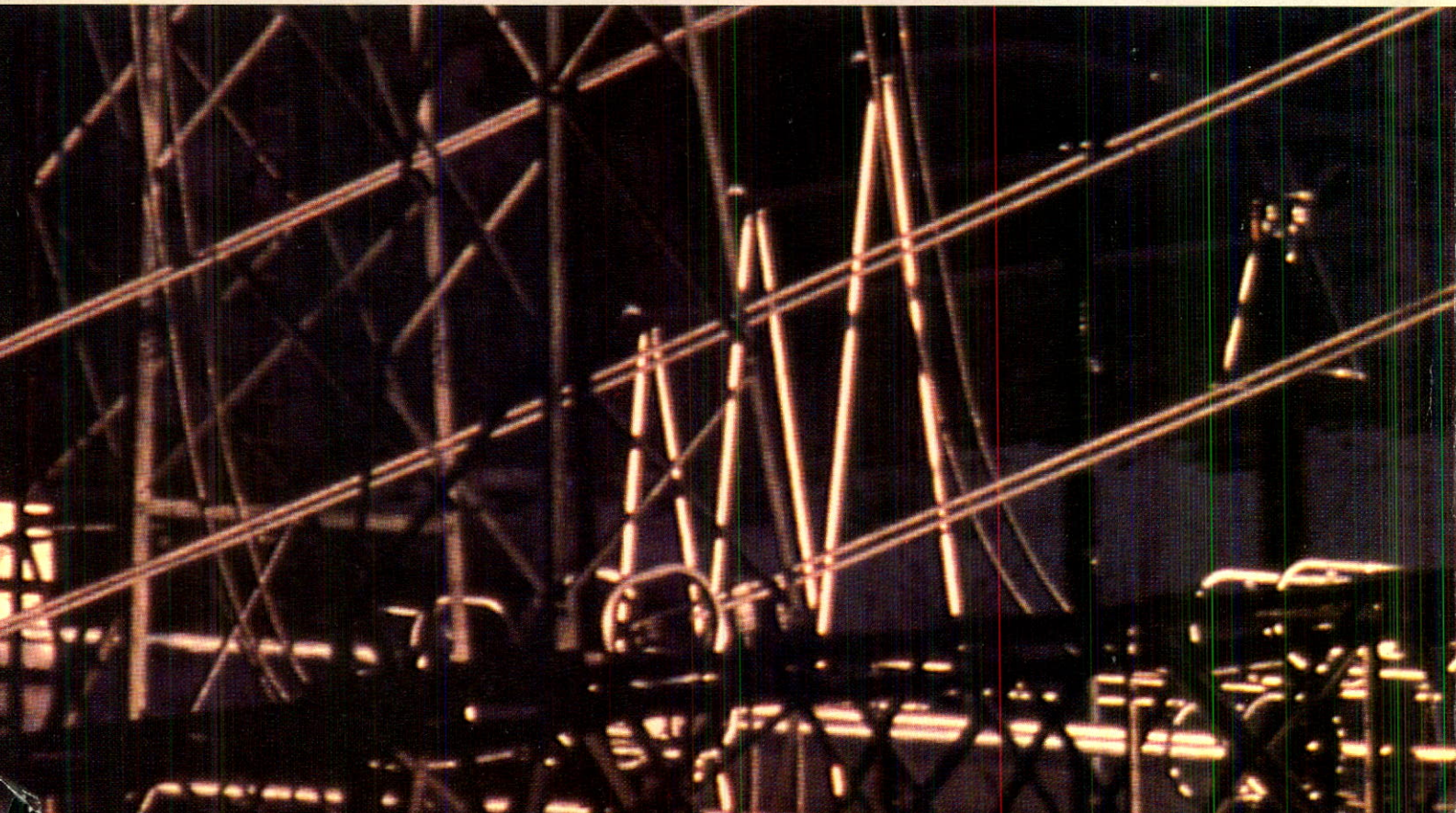
Hydro is a provincial Crown corporation. A Board of Directors, appointed by the provincial Cabinet, has overall responsibility for the management of the corporation.

Hydro generates, transmits and distributes electricity throughout areas containing more than 90% of the province's population. Most of the electricity comes from hydroelectric

plants and reaches customers through an interconnected, province-wide system of transmission lines. Remote communities not connected to main transmission lines are served by small local generating plants.

Hydro distributes natural gas in Greater Vancouver and the Fraser Valley and butane-air gas in Greater Victoria.

Hydro operates a local and terminal rail freight service in Greater Vancouver and the Fraser Valley.



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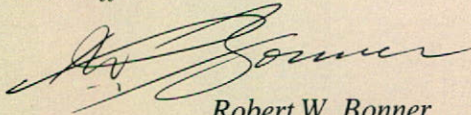
May 25, 1981

I am pleased to send you a personal copy of B.C. Hydro's 1980/81 Annual Report which records our activities and accomplishments during the year ended March 31, 1981.

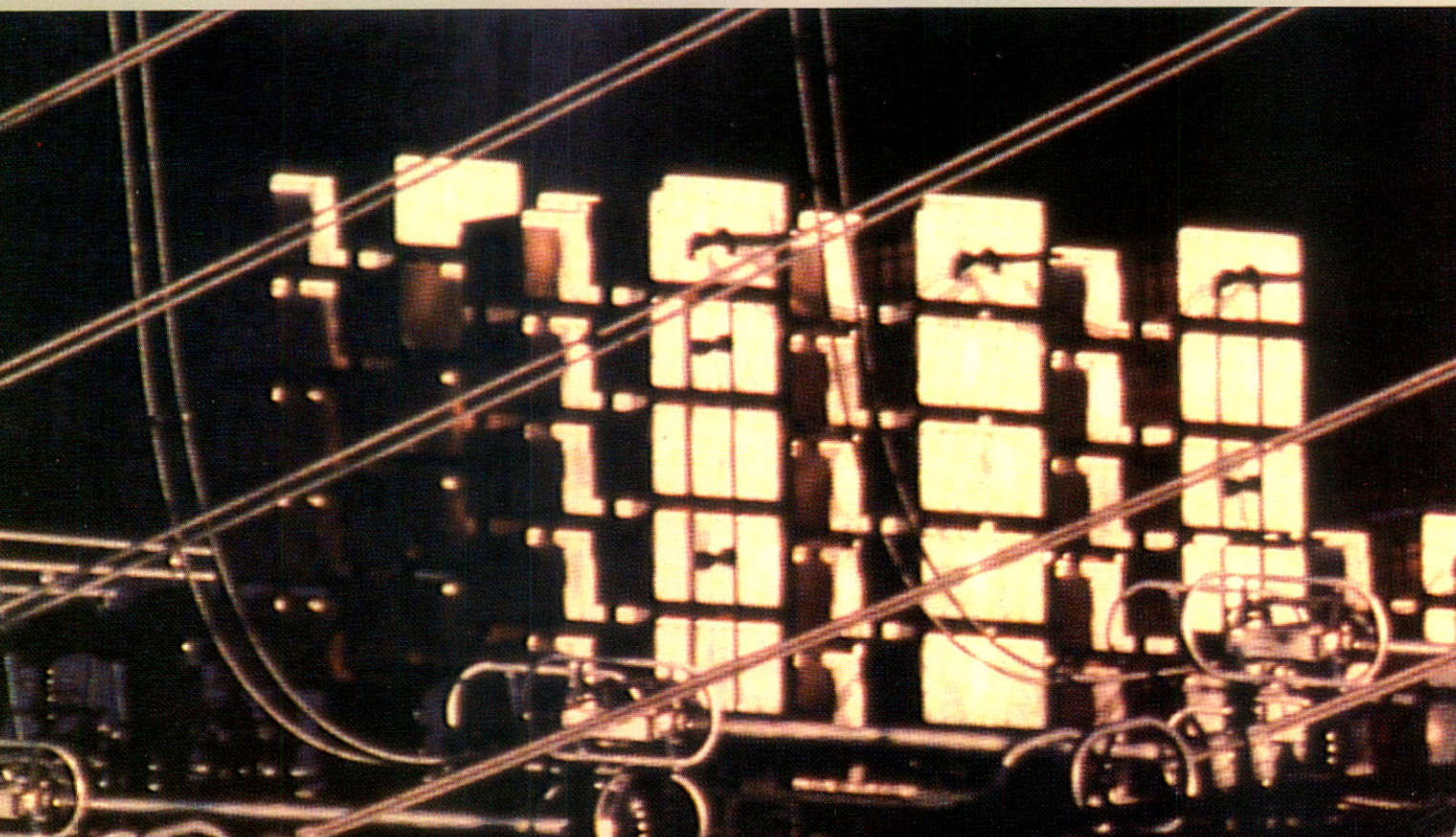
Because so much of our work is geared to planning a secure energy future for British Columbians, a segment of this year's Report discusses some of the technology we will use to carry us successfully into the 21st century.

To apply new and emerging technology, Hydro is fortunate in having a team of dedicated and skilled people who understand the important role they play in the development of this province. This report describes the results of their efforts last year.

Should you have any questions about this report, please write to me at head office in Vancouver.



Robert W. Bonner
Chairman





Highlights *for the years ended March 31*

CONTINUING OPERATIONS	1981	1980	1979
FINANCIAL	<i>(in thousands)</i>		
Revenues	\$1,096,909	\$916,006	\$862,514
Net income			
Electric.	\$ 105,088	\$ 82,375	\$ 95,256
Gas.	\$ 791	\$ 10,043	\$ 13,009
Rail freight.	\$ 3,019	\$ 2,025	\$ 1,395
Expenditures on fixed assets	\$ 739,902	\$754,800	\$718,520
OPERATING			
Electricity sold in British Columbia (millions of kW·h)	27 589	26 246	25 605
Gas sold (terajoules)	85 621	88 074	87 733
Freight carried (thousands of tonnes)	2 458	2 603	2 536

British Columbia Cataloguing in Publication Data

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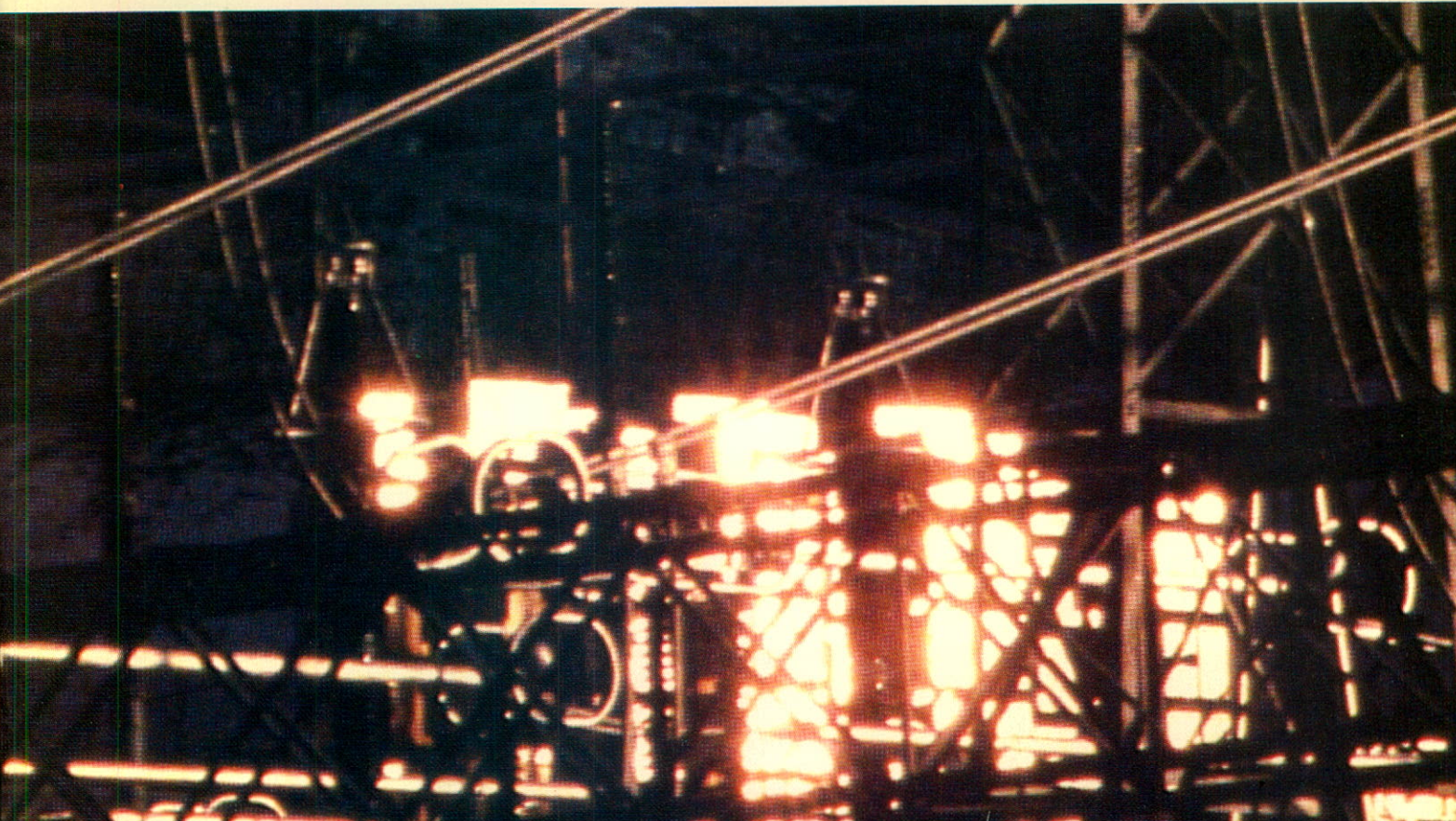
Report year ends March 31.

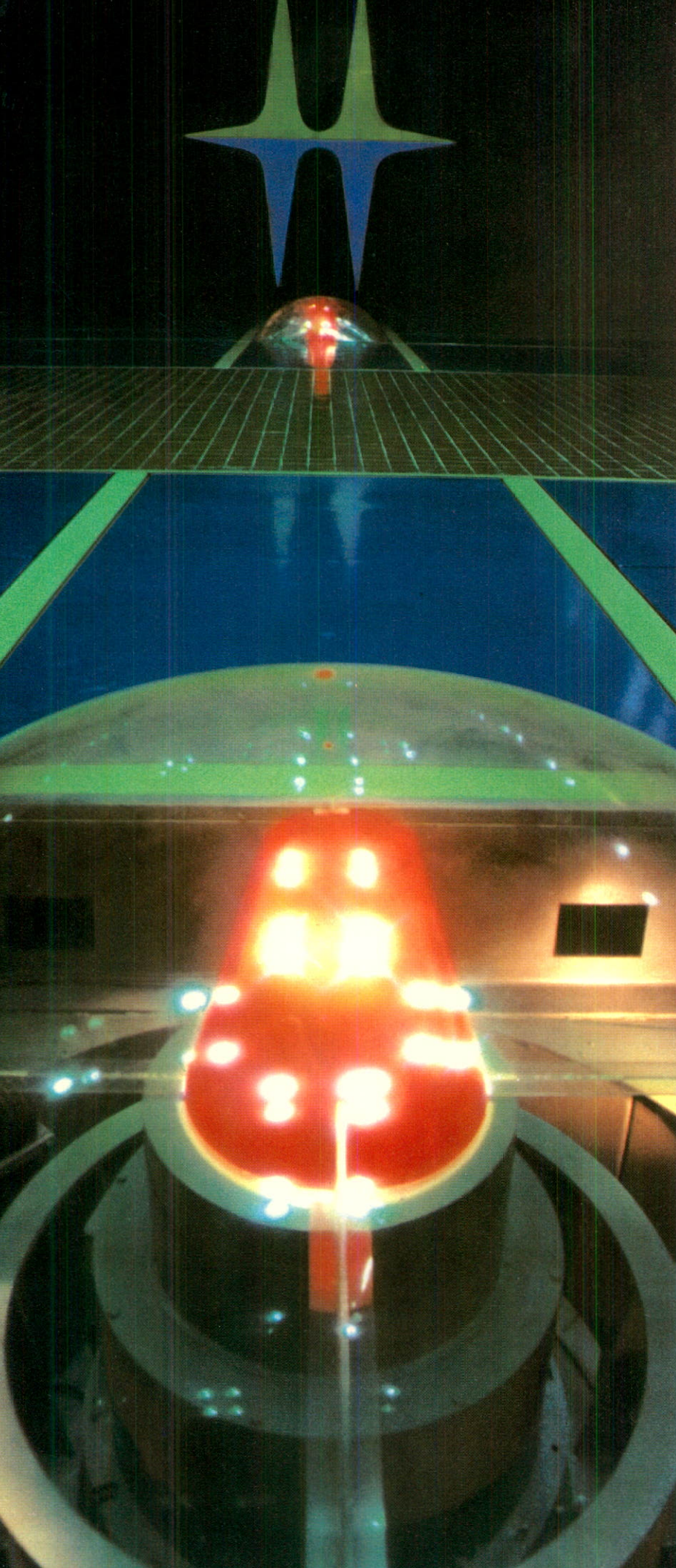
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Report of the Directors

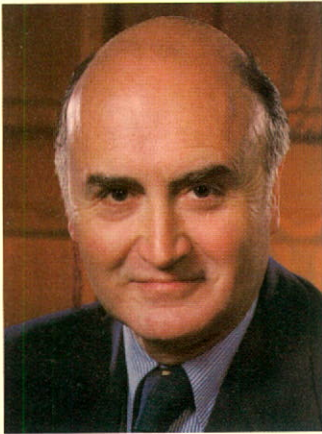
For the first time, Hydro's total revenues during the fiscal year exceeded \$1 billion. Net income was \$113 million, compared with \$96 million on electric, gas and rail freight operations the previous year. Revenues included proceeds from export sales of surplus electricity amounting to \$74 million. Exports again were made possible by reason of better than anticipated water conditions in Hydro reservoirs in the latter part of the year. Operating expenses totalled \$984 million for the year and fixed asset expenditures amounted to \$740 million.

In spring 1980 Hydro received triple A ratings from the two major financial rating agencies in the United States, Moody's Investors Service and Standard & Poor's Corporation.

To ensure that borrowings will be made on the best terms available, the provincial Cabinet issued a special direction to the British Columbia Utilities Commission on March 19, 1981, to guide Commission members in considering applications from Hydro on rates and other matters. It states that Hydro should achieve a financial position that allows it to borrow funds on the most economic terms available, that the financial standards to be observed by Hydro should include interest coverage ratio and debt/equity ratio objectives, and that Hydro should achieve by the 1983/84 fiscal year an interest coverage ratio of 1.3 to 1 and should maintain that ratio thereafter so as to achieve and ultimately maintain a debt/equity ratio of 80 to 20.

Because British Columbia is a developing province, rich in natural resources including energy, Hydro receives a large number of enquiries from present and potential industrial customers about the availability of significant amounts of electricity. In the past two years, the number of these enquiries has been substantial, the total exceeding Hydro's present generating capacity of about 8800

Gordon M. Shrum Generating Station on the Peace River, showing the tops of two of the ten generating units.



Robert W. Bonner

megawatts. Hydro recognizes that only a portion of the potential requirements for electricity represented by such enquiries is likely to materialize and has allowed 920 megawatts as a conservative estimate. However, even if several major electric generating plants now being considered were approved and constructed, Hydro would be unable to meet the full 920 megawatts of potential new industrial demand for electricity before about 1990.

It seems clear that the decade of the 1980s will be marked by rapidly increasing energy demand and the corresponding need for new facilities. It is now estimated that expenditures on new fixed assets for the next ten years will approximate \$22.6 billion, including overhead, interest during construction and allowance for future inflation.

During the past year official dedication ceremonies were held at three major new facilities. These were the hydroelectric projects at Seven Mile and Peace Canyon and the research centre in Surrey, which in total cost \$935 million.

Despite the new capacity added at Seven Mile and Peace Canyon and the major new plant at Revelstoke scheduled to start operating in late 1983, Hydro is concerned about the situation which could face its electric customers in the mid-1980s. If growth in demand continues as predicted and water conditions in Hydro reservoirs are not favourable, Hydro cannot be certain to meet the province's requirements for electricity from its own resources after 1986 until planned electric generating projects at Site C and Hat Creek, or their equivalents, are in place.

Proclamation of the Utilities Commission Act on September 11, 1980, brought Hydro's electricity and gas operations under regulatory control for the first time. This legislation established a regulatory process for Hydro rates and a review process for major projects. The Directors anticipate that regulation will increase public

participation in energy management, ensure that environmental and other public concerns are taken fully into account, and minimize delay in considering various project proposals.

Federal and provincial governments agree that dependence on imported oil must be reduced. In accordance with this policy Hydro began actively to promote the sale of natural gas for home heating, with excellent consumer response.

During the past year, the provincial government instructed Hydro to apply for approval to build an underwater pipeline to transport natural gas from the Lower Mainland to Vancouver Island via a southern route.

The year saw Hydro respond to a variety of new public requirements and the Directors wish to record their appreciation for the continued industry and commitment to public service of all Hydro employees.

On behalf of the Board

A handwritten signature in dark ink, appearing to read "R. W. Bonner". The signature is fluid and cursive.

Robert W. Bonner, *Chairman*

Corporate Management

Appointments

On March 9, 1981, William A. Best, formerly Vice-President, Electrical Operations, was appointed Vice-President, Corporate. Hugh J. Goldie, formerly Manager, System Engineering, replaced Mr. Best as Vice-President, Electrical Operations. Raymond H. Hunt, formerly Chief Engineer, was appointed to the new position of Vice-President, Engineering Projects. William M. Walker assumed the position of Chief Engineer reporting to the Board of Directors as Hydro's senior technical officer, while retaining the position of Vice-President, Engineering.

On March 13, 1981, Douglas K. Coupar, formerly Assistant Vice-President, was appointed Vice-President, Public Affairs, effective May 1, 1981.

Mr. Best succeeded Lawrence E. Wight, formerly Vice-President, Corporate Planning, who retired after 25 years' service. Mr. Coupar's appointment results from the retirement, after 36 years' service, of Charles W. Nash, Vice-President, Corporate Affairs and Executive Assistant to the Chairman.

Members of the Corporate Management Committee in 1980/81 were (l-r): Charles W. Nash, Vice-President, Corporate Affairs and Executive Assistant to the Chairman; John P. Sheehan, Executive Vice-President, Administration; J. Norman Olsen, President and Chief Operating Officer; Eric H. Martin, Executive Vice-President, Operations; and William D. Mitchell, Vice-President, General Counsel and Secretary.



Review of Operations

Electric Service

Revenues from electric service were \$882 million, up 22.9% from the previous year, primarily reflecting higher sales volume in British Columbia and rate increases for all customers in April 1980.

Sales of electricity in Hydro's service area totalled 27 589 million kW·h, an increase of 5.1%. The highest one-hour demand on the integrated transmission system — 5 475 000 kW — occurred on December 5, 1980, up 5.3% from the previous year's high.

At March 31, 1981, Hydro was serving 1 046 146 electricity customers, an increase of 3.6% during the year. Average annual consumption per residential customer was 9001 kW·h, compared with 8736 kW·h the year before.

A total of 8700 new customers was added on Vancouver Island, nearly twice as many as the year before. Until the mainland-Island 500 kV transmission connection becomes operational in late 1983, it will not be possible to meet all industrial demands for electricity on the Island. In the interim, new or expanding major industries are being offered supply on a limited basis only and some requests are subject to interruptible contracts. Peak winter demand was modified effectively for the second consecutive year by positive customer response to Hydro's appeal to reduce use of electricity during early evening hours.

During the early part of the year, sales of surplus interruptible electricity to the United States were curtailed in anticipation of low water conditions. Later in the year, improved water conditions and increased storage in Hydro reservoirs permitted resumption of export sales. Revenue from this source was \$74 million, compared with \$39 million the year before. Hydro exports electricity only when there is a surplus of water in its reservoirs and when market conditions permit.

Sales of electricity in B.C. by category of customer and percentage changes from the year before were:

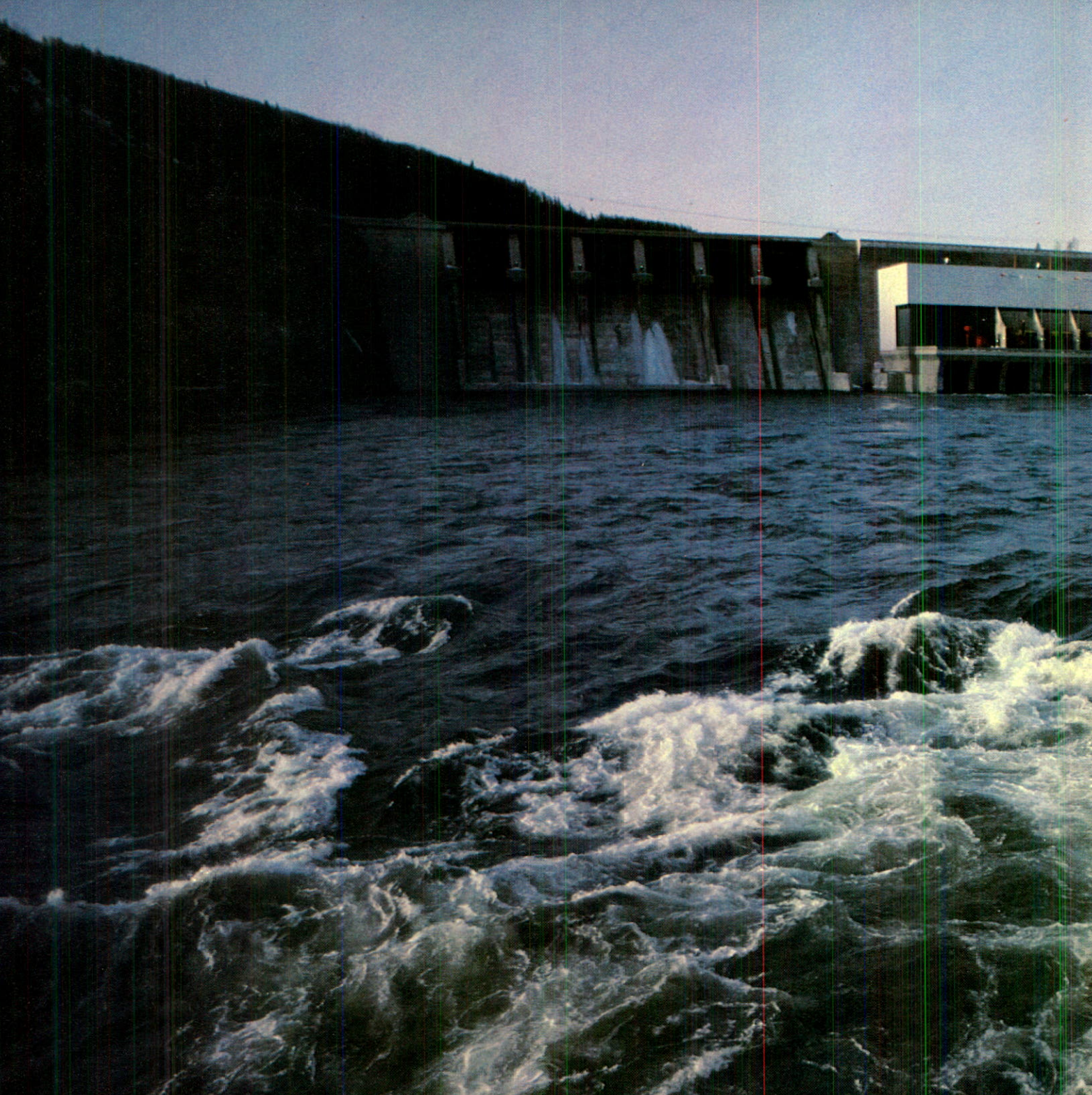
	Year ended March 31, 1981 kW·h in millions	% increase from previous year
Residential	8 104	6.5
General	9 642	5.0
Bulk	9 612	4.2
Other systems	231	1.7
	<u>27 589</u>	5.1

Total requirements for electricity and sources of supply were:

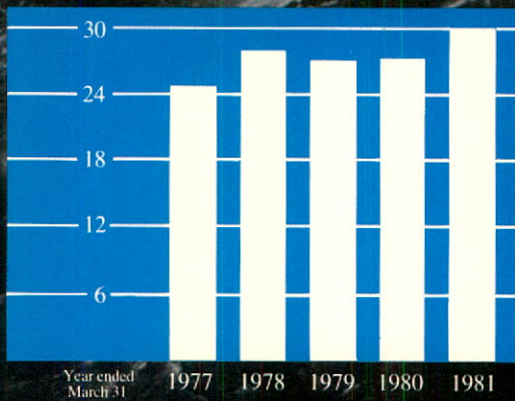
	kW·h in millions	% of total
Requirements:		
Sales in B.C.	27 589	82.1
Export	2 449	7.3
Line loss and system use	<u>3 569</u>	<u>10.6</u>
	<u>33 607</u>	<u>100.0</u>
Sources of supply:		
Hydro generation	233	
Gordon M. Shrum	9 345	27.8
Mica	6 574	19.6
Kootenay Canal	3 348	10.0
Seven Mile	2 532	7.5
Peace Canyon	2 296	6.8
Other	7 129	21.2
Thermal generation	124	
Burrard	357	1.1
Other	152	0.4
Purchases	<u>1 874</u>	<u>5.6</u>
	<u>33 607</u>	<u>100.0</u>

Major additions to Hydro's generating capacity during the year were four 175 000 kW units at Peace Canyon and a third 202 500 kW unit at Seven Mile on the Pend d'Oreille River. The total generating capacity of Hydro plants at March 31, 1981 was as follows:

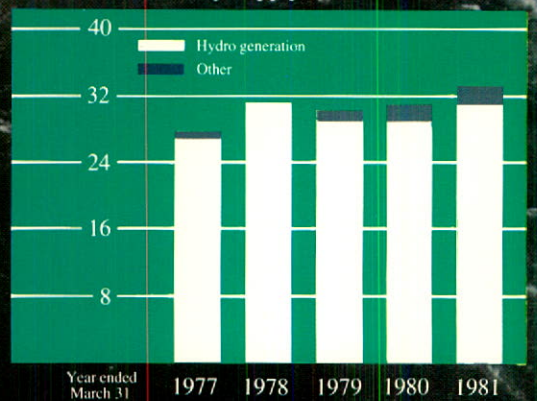
	Installed nameplate generating capacity (kW in thousands)
Hydroelectric plants	
Gordon M. Shrum	2 416.0
Mica	1 736.0
Peace Canyon	700.0
Seven Mile	607.5
Kootenay Canal	529.2
Bridge River	428.0
Other (25 plants)	<u>1 073.9</u>
	<u>7 490.6</u>
Thermal plants	
Burrard	912.5
Gas turbine (4 plants)	321.2
Diesel (77 plants)	<u>113.0</u>
	<u>1 346.7</u>
	<u>8 837.3</u>



Sales of Electricity (kW·h in billions)



Sources of Electricity Supply (kW·h in billions)

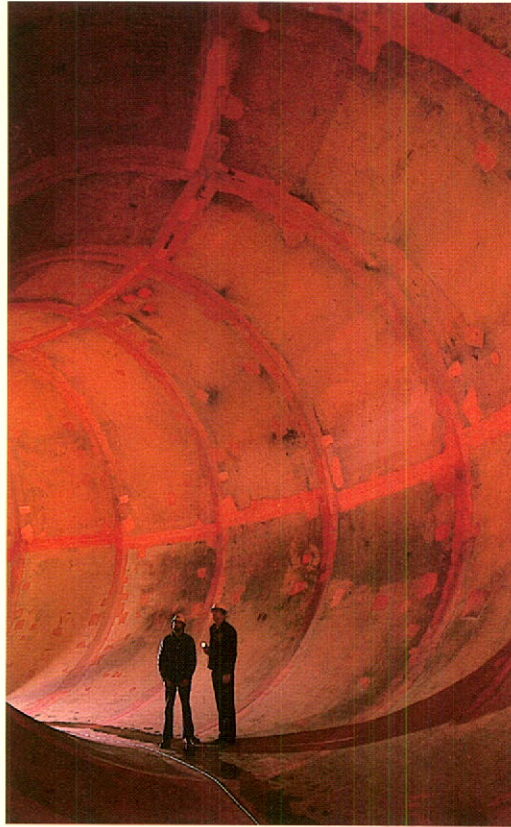


**Peace Canyon Dam and
Generating Station.**

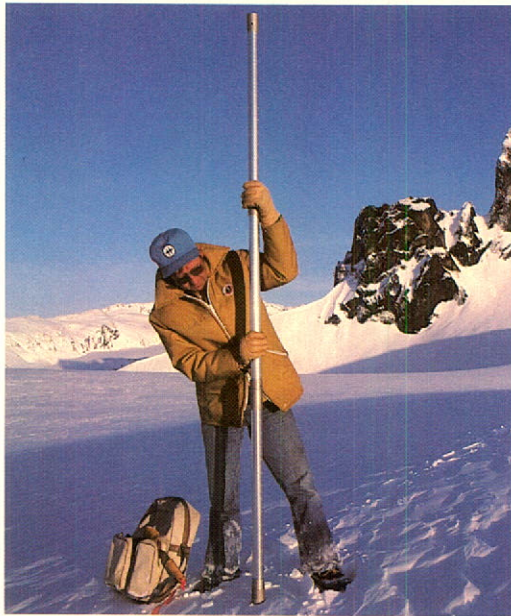


Review of Operations *(continued)*

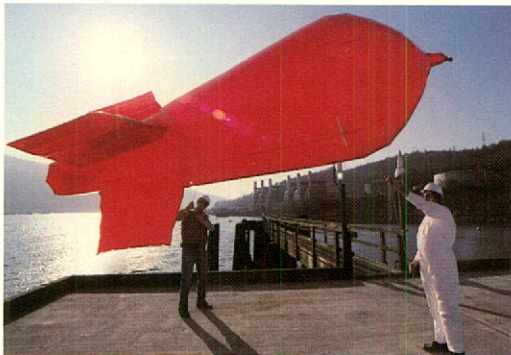
Inside the scroll case which directs water to the turbine blades of a 175 000 kW generating unit at Peace Canyon.



Measuring the depth of snowpack to help determine water content in reservoir drainage area.



This blimp was used in a program to map distribution patterns of stack gases from the Burrard Thermal Generating Plant near Vancouver.



Because of relatively low spring runoff in the Williston Lake reservoir system, electricity from the Burrard thermal station was required in April 1980. The Burrard plant's role is to make up shortages of energy in low water years and to provide electricity during major emergencies. It is a relatively expensive source of energy and is used as little as possible. Hydro does not have all necessary permits for the Burrard plant; it is collecting the requisite air quality data in order to make the necessary application under the provincial Pollution Control Act. In 1978, the B.C. Pollution Control Board advised Hydro that operation of the Burrard plant up to full capacity using natural gas may be allowed at the discretion of the Director of Pollution Control.

Debris removal continued on various Hydro reservoirs. Clearing of the lake behind Duncan Dam, a Columbia River Treaty project, was completed. Drilling began for a seismic assessment of Alouette Dam as part of a continuing review of older dams using contemporary design standards to see if remedial work is necessary for flood and earthquake protection. Facilities are being installed at capacitor stations to contain any accidental release of the contaminant polychlorinated biphenyl (PCB) and an active program is under way to remove PCB-filled capacitors from locations where adequate containment is not feasible.

Hydro's policy is to purchase surplus electricity from industry through co-generation provided that safety, technical and economic concerns are satisfied.

During the year, Hydro allotted \$5.0 million to its rural electrification program. To cover operating deficiencies in isolated diesel generating areas, \$2.5 million was spent. The remaining \$2.5 million was allocated to extending electric distribution lines in rural areas of B.C.



Electric Transmission System at March 31, 1981 with planned additions

LEGEND

- Hydroelectric Generating Stations
- Diesel-Electric Generating Stations
- △ Gas Turbine Electric Generating Stations
- Substations
- Transmission Lines 60 kV-360 kV (existing and under construction)
- Transmission Lines 500 kV (existing and under construction)
- - - Transmission Lines 60 kV-360 kV (planned)
- - - Transmission Lines 500 kV (planned)

Vancouver Area

GENERATING PLANTS

Alouette: *Hydroelectric*
 Burrard: *Steam Turbine*
 Lake Buntzen: *Hydroelectric*

Port Mann: *Gas Turbine*
 Ruskin: *Hydroelectric*
 Stave Falls: *Hydroelectric*

MAJOR SUBSTATIONS

Arnott	Dal Grauer	Murrin
Atchelitz	Horne-Payne	Newell
Barnard	Ingledow	Sperling
Cambie	Kidd, Nos. 1 and 2	Strawberry Hill
Comosun	Mainwaring	Walters
Cypress	Meridian	

Victoria Area

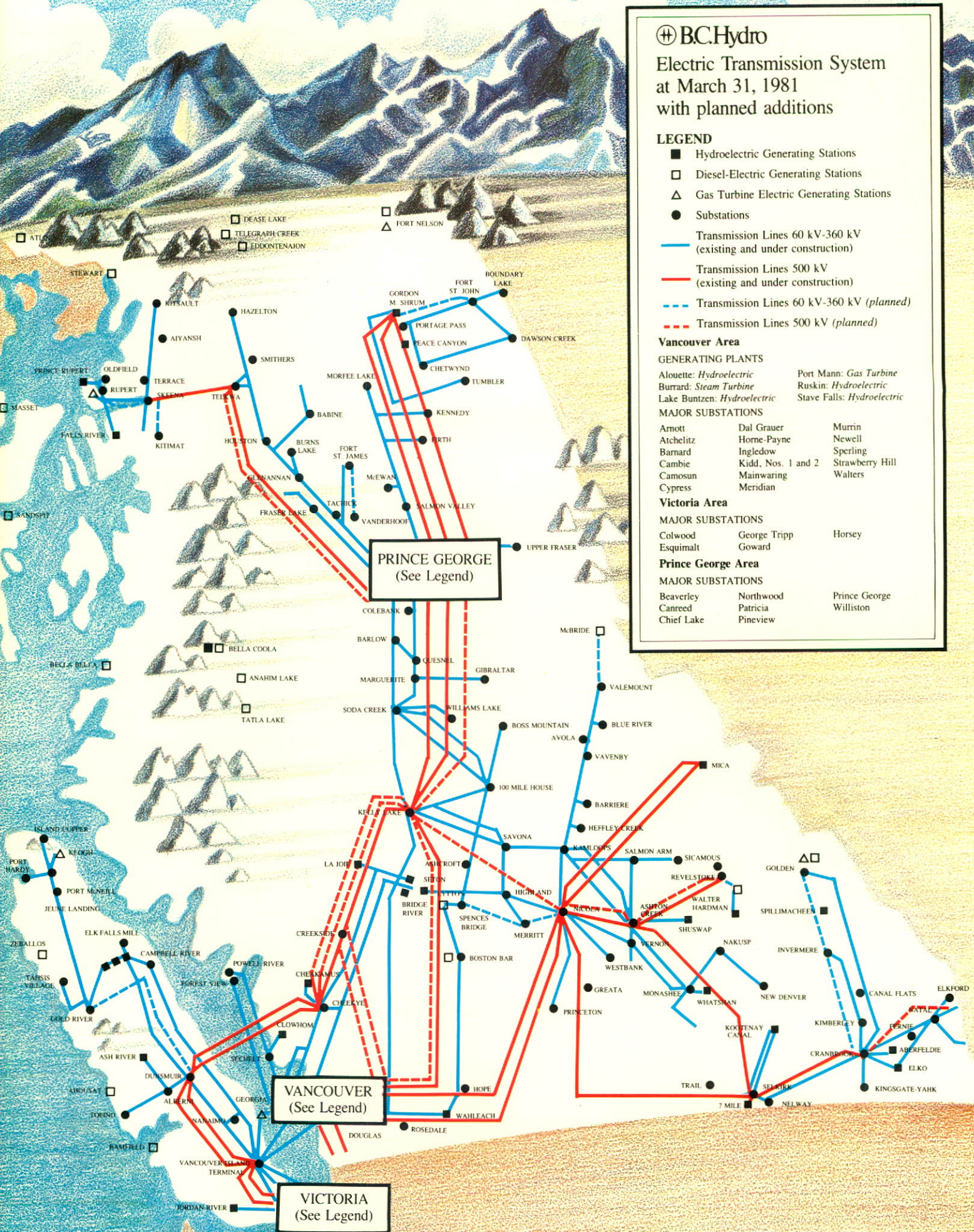
MAJOR SUBSTATIONS

Colwood	George Tripp	Horsy
Esquimalt	Goward	

Prince George Area

MAJOR SUBSTATIONS

Beaverley	Northwood	Prince George
Canreed	Patricia	Williston
Chief Lake	Pineview	





Gas Service

Hydro's natural gas distribution system delivers more energy in the Lower Mainland than any other single supplier, including oil companies and Hydro's electric service.

Revenues from sales of gas were \$185 million compared with \$173 million the previous year. The increase in revenue was chiefly attributable to the increase in the price of gas resulting from the federal excise tax introduced November 1, 1980 but owing to warm weather, conservation and strikes, sales volume decreased 2.8% to 85 621 terajoules.*

At March 31, 1981, Hydro served 313 891 natural gas customers in Greater Vancouver and the Fraser Valley, an increase of 7.2% from the previous year. Butane-air gas customers in Greater Victoria declined 3.9% to 4475.

During the year, Hydro conducted a promotional campaign in accordance with federal and provincial government policy to reduce dependence on imported energy through conversion of heating systems from oil to natural gas. Of the 20 870 new natural gas customers connected, approximately 40% converted from oil.

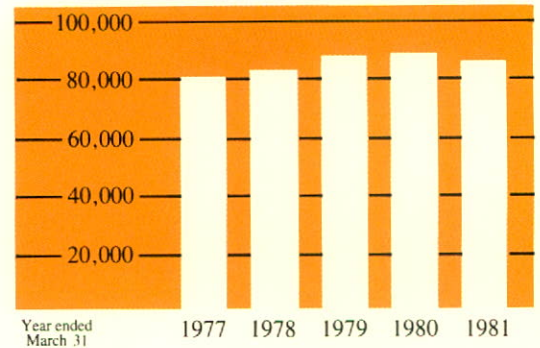
Hydro also began a pilot project to convert 50 vehicles used in its gas service operation to run on compressed natural gas, replacing about 75% of their gasoline consumption. It is hoped that information gained from the project will help develop a widespread program of natural gas-fuelled cars in B.C.

As part of its responsibility to ensure a continuing reliable supply of natural gas at the lowest long-term cost to customers, Hydro takes an active interest in the facilities built and the costs charged by its sole supplier, Westcoast Transmission. On January 19, 1981, the Federal Court of Canada dismissed appeals by Hydro and others against National Energy Board (NEB) decisions approving changes in the cost of service charged by Westcoast. Hydro filed a notice of motion dated March 24, 1981, for an application for leave to appeal to the Supreme Court of Canada.

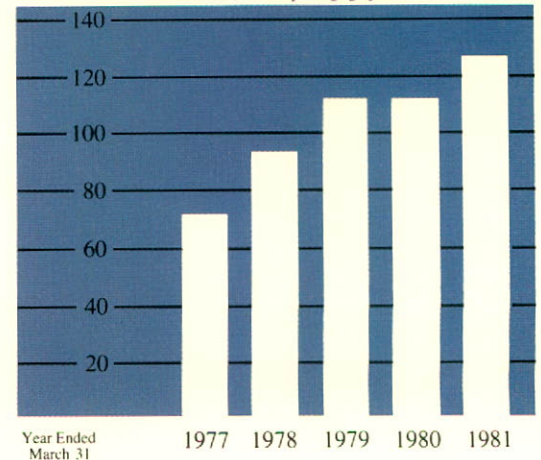
On August 25, 1980, the NEB announced it had approved Westcoast's

application to add capacity by looping, or doubling, 37 km of its pipeline. The application had been opposed by the Attorney-General of British Columbia, the B.C. Petroleum Corporation and Hydro on the grounds that reduced gas exports made the expenditure uneconomic. On December 30, 1980, following applications by Westcoast to increase its rate of return, the NEB awarded the company part of the increase sought and modified the basis on which return is calculated. The implications of the NEB decisions include substantial increases in the cost of transporting gas sold to Hydro and subsequently to Hydro customers.

Sales of Gas (terajoules)*



Average Cost of Natural Gas Purchased for Resale (cents per gigajoule)*



*The joule is the standard unit of heat content in metric measurement. A gigajoule is 1 000 000 000 (one billion) joules; a terajoule is 1 000 000 000 000 (one trillion) joules.

About 40% of Hydro's new gas customers during the year converted from oil heating.

Review of Operations *(continued)*

Rail Freight Service

Revenues from rail freight operations were \$25 million, up 7.2% from the previous year. For the second consecutive year, higher revenues resulted primarily from a variety of industry-wide rate increases and fuel surcharges.

The volume of freight handled declined slightly, from 2603 thousand tonnes to 2458 thousand tonnes. The United States lumber market, which normally absorbs about 70% of the lumber produced by Hydro's shippers, was severely depressed during the year, adversely affecting freight volume. This decline was offset somewhat by an increase in the number of motor vehicles carried.

Hydro freight train crosses False Creek on the way to downtown Vancouver.

Major repairs were made to railway bridges over the Fraser River and to the Kitsilano trestle following accidents involving barges. A major incident in August 1980 resulted in a two-week closure of the Marpole bridge over the Fraser and inconvenience to Richmond rail customers.

A computerized rail car control and information system which began operating in 1979 was expanded to include all billing functions. The system provides swift access to information about rail car movements, enabling the relatively small Hydro railway to compete effectively with larger carriers and to reduce costs associated with idle cars.



Rates and Billing

Hydro's general policy is to provide service to the greatest number of customers at the lowest practical cost consistent with sound financial management.

Hydro's rates for electricity and gas are subject to regulation by the B.C. Utilities Commission. Some railway rates are controlled by the Canadian Transport Commission.

On April 1, 1980, electricity rate increases averaging 7% for residential and general customers and 22% for bulk customers took effect.

Effective February 1, 1981, the B.C. Utilities Commission authorized an electricity rate increase of 2.6% for residential and general Hydro customers to pass on a substantial increase, effective January 1, 1981, in water rental fees charged by the provincial government for water used in hydroelectric generation. Following a hearing in March 1981, the Commission ordered the increased water rental fees be recovered from bulk customers commencing January 1, 1982.

During the year, Hydro made submissions to a B.C. Utilities Commission inquiry into field and wholesale prices of natural gas. The evidence presented by Hydro was intended to clear up misconceptions regarding the subsidy received by utilities and to protect customers' interests by showing the effects of the increases requested by others on consumers' bills and on the marketability of gas.

Following authorization by the B.C. Utilities Commission effective November 1, 1980, Hydro began collecting from its gas customers an amount to recover a new federal excise tax. Because of a dispute over the right to tax a provincial Crown corporation, the provincial Cabinet instructed Hydro not to remit the tax to the federal government.

The funds collected are placed in short-term investments and will be credited, with accumulated interest, to customers if the tax is found to be unconstitutional.

Since April 1, 1980, when responsibility for operation of transit systems in Greater Vancouver and Greater Victoria was transferred from Hydro, municipal transit levies have been added to electricity bills in those areas. The levies are established by and remitted to the Greater Vancouver Regional District in Greater Vancouver and the Capital Regional District in Greater Victoria. Under the Urban Transit Authority Act, Hydro is designated as a collector.

During the year, Hydro established a pre-authorized payment plan whereby customers paying equal monthly amounts may authorize deductions from their accounts in financial institutions. Initial response was favourable. The plan combines convenience with reduced handling costs and better cash management for both customers and Hydro.



Review of Operations *(continued)*

Cost of Providing Services

The total cost of providing services during the year was \$984 million, an increase of \$164 million or 20% over the previous year.

Interest and other costs on borrowed funds charged to operations during the year totalled \$400 million, up \$90 million or 29%. The increase reflected higher interest rates and the placing in service of new fixed assets. Interest on money borrowed to pay for new fixed assets becomes a charge against operations when the assets are placed in service.

Salaries, wages and employee benefits amounted to \$166 million, an increase of \$21 million or 15%, primarily reflecting higher rates of pay and increases in employee benefits established through the collective bargaining process.

Depreciation amounted to \$136 million, an increase of \$17 million or 15% over the previous year. Increases in depre-

ciation expense are directly related to the transfer to active service of new fixed assets.

Grants, school taxes and water rentals totalled \$90 million, an increase of \$19 million or 26% which resulted primarily from additions to fixed assets. Increased water rental fees also had a significant effect during the latter part of the year.

Purchases of natural gas for resale to the public totalled \$113 million, an increase of 11% over the previous year. Purchases of electricity totalled \$18 million, up \$1 million from the previous year.



Financing

Hydro finances its investment in fixed assets with funds generated from operations and from borrowings. While most borrowings in the past have been made from Province of British Columbia and Government of Canada trustee funds, Hydro also borrows in the financial markets of Canada, the United States and Europe.

At March 31, 1981, Hydro's outstanding bonds and debentures totalled \$5.9 billion; 76% was in Canadian dollars and the rest in U.S. dollars.

Long-term borrowings have sinking fund provisions to ensure that funds are available at maturity to repay a significant portion of the debt. At March 31, 1981, these sinking funds totalled \$477 million.

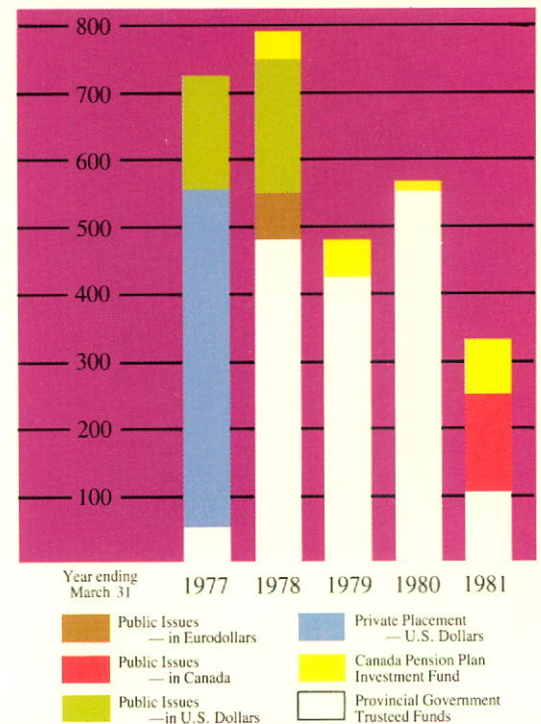
During the past year, \$328.7 million, all in Canadian funds, was borrowed from the following sources:

	\$ Millions
Public issues in Canada	150.0
Province of British Columbia trustee funds	100.0
Canada Pension Plan Investment Fund	78.7

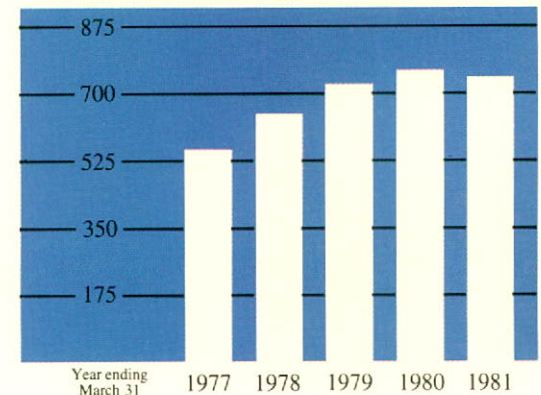
The average effective annual interest cost of long-term bonds sold during the year was 12.82%, compared with an average of 11.69% the previous year. The increase reflected generally higher interest rates in the bond market. The average effective annual interest cost on long-term debt outstanding at March 31, 1981, denominated in Canadian dollars, was 8.99% and denominated in U.S. dollars was 8.68%.

During the year, Hydro paid the trustees \$48 million to meet sinking fund requirements of bonds and debentures.

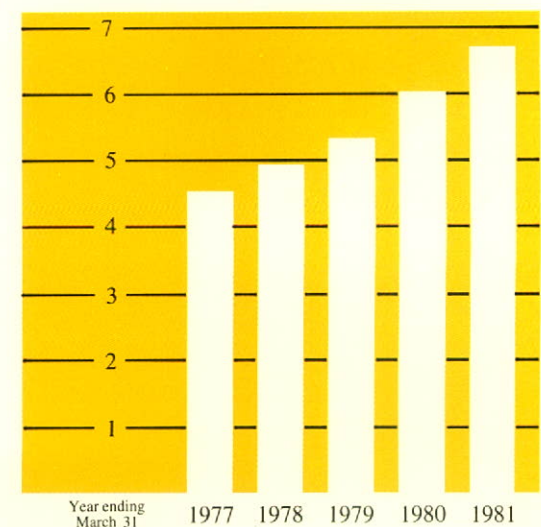
Bonds Issued by B.C. Hydro (dollars in millions)



Expenditures on Fixed Assets (dollars in millions)



Fixed Assets in Service, at cost (dollars in billions)





Review of Operations *(continued)*

Construction

Hydro spent \$740 million during the year on new fixed assets in the electric, gas and rail freight services. This was \$15 million less than the year before.

The expenditures were:

	\$ Millions
Electric service	
Generation	
Hydroelectric	
Revelstoke project	206
Seven Mile project	15
Peace Canyon project	15
Other	33
Thermal	12
Transmission	
Mainland-Vancouver	
Island 500 kV	59
Other 500 kV	98
Under 500 kV	19
Transformation (substations)	95
Distribution	107
General	36
Gas service	44
Rail freight service	1

The Peace Canyon hydroelectric project, on the Peace River about 100 km west of Fort St. John, was completed during the year and all four of its 175 000 kW units entered service. A dedication ceremony was held on September 22, 1980. A boat ramp has been constructed on the project reservoir and camping facilities adjacent to the ramp are being completed as well as a pilot fish hatchery.

During the year a third 202 500 kW unit began operating at the Seven Mile hydroelectric project, 22 km southeast of Trail on the Pend d'Oreille River. An official opening ceremony was held on June 13, 1980.

Both the Seven Mile and Peace Canyon projects yield substantial amounts of electricity from relatively small reservoirs because they use water regulated by upstream projects.

At the Revelstoke hydroelectric project, 5 km north of Revelstoke on the Columbia River, excavation for the

earthfill wing dam was completed and construction of the concrete dam and powerhouse began. Clearing of the reservoir area and relocation of Highway 23 are in progress. Monitoring of the Downie Slide area, about 55 km upstream of the dam site, continued in order to determine if additional stabilization work is needed. Construction of fish spawning and rearing facilities, to replace natural habitats which will be isolated by the dam, is nearly complete.

The Revelstoke project will have a 162-metre-high, 473-metre-long concrete dam in the river channel with a 122-metre-high, 1160-metre-long earthfill wing dam stretching across a terrace on the west bank of the river. It will have six 450 000 kW generating units, with the first two scheduled for completion in late 1983. Construction of the powerplant and concrete dam is behind schedule and progress was further hampered by a recent strike against B.C. cement suppliers. It will be difficult to maintain the in-service date unless the contractor can recover the lost time. Hydro and the contractor have been meeting to investigate ways of mitigating the effect of the delay.

The first four submarine cables for the 500 kV transmission line between the mainland and Vancouver Island are being manufactured in Italy and Norway for delivery and installation in 1982 and 1983. Contracts have been awarded for all major equipment for the project and for civil construction work on related 500 kV substations near Squamish and on the Sechelt Peninsula on the mainland, near Qualicum Bay on Vancouver Island and on Texada Island. Clearing for transmission lines from the mainland terminal is almost complete and tower foundations are being installed. A contract is expected to be awarded by late 1981 for supply and installation of two additional cables for the second circuit of the connection by 1984.

Revelstoke dam's rock foundation is pneumatically sealed with gunite, a sand-cement mixture.



Review of Operations *(cont.)*

Work continued towards scheduled completion in 1981 of the second stage of the 500 kV transmission system on Vancouver Island, linking the Qualicum and Victoria areas with the Vancouver Island Terminal station on the east coast of the Island. Major contracts were awarded for a 230 kV line to be built by 1982 between Pike Lake and Esquimalt on southern Vancouver Island.

Several other high-voltage transmission projects to strengthen the provincial grid and improve security of service for Hydro customers also are under construction.

Increasing requirements for electricity necessitated expansion of transmission and substation facilities in various parts of the province. New substations were completed in Coquitlam, Invermere and Port Hardy. Work continued on substations to be completed in 1981 in Duncan, North Vancouver, Port McNeill and Richmond. In downtown Vancouver, a large underground substation with a landscaped street-level park is being developed jointly by Hydro and the City of Vancouver. It is expected to be completed in 1983.

A new centre to control the operation of generating stations, transmission lines and substations in the Kootenays was established in Cranbrook. New district offices were completed in Sechelt and Smithers.

Hydro increased generating capacity at diesel plants in Dease Lake, McBride and Telegraph Creek and provided new facilities for those in Bella Coola, Eddontenajon, Hazelton, Masset and Tatla Lake.

A net total of 77 km of transmission lines and 1353 km of distribution lines and additional substation capacity of about 1 160 000 kVA were added to the electric system.

A 5.8-km-long, 762-mm-diameter pipeline was built in the City of Vancouver to meet the requirements of natural gas customers. A total of 233 km of mains and services, compared with 154 km the previous year, was added to the gas distribution system to accommodate new customers.

Planning

It takes 10 to 15 years to plan a major energy project and bring it into production. For this reason Hydro must adopt a planning horizon some decades ahead.

Hydro's probable load forecast indicates that demand for electricity by customers in B.C. will grow at an average annual rate of approximately 6% over the next decade. Demand for natural gas from Hydro is expected to grow at about 4% a year over the same period. Accordingly, preparations for a variety of major new energy projects were advanced during the year.

In September 1980 Hydro applied under the new provincial Utilities Commission Act for an energy project certificate for a proposed hydroelectric project at Site C on the Peace River. This project, located downstream of the W.A.C. Bennett and Peace Canyon dams and about 5 km from Fort St. John, would have a generating capacity of 900 000 kW. It is scheduled for completion by fall 1987, subject to regulatory approval. An environmental impact statement was issued during the year.

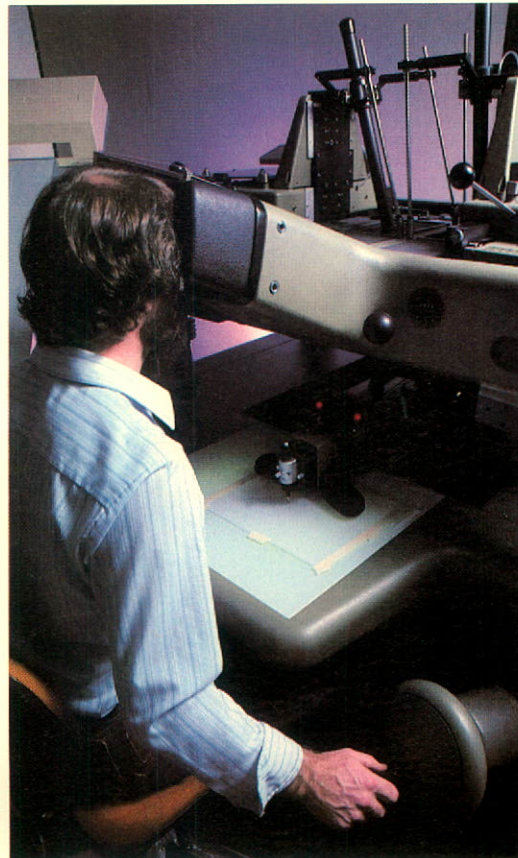
Work continued on preparations to apply for licensing of an open pit coal

mine and 2 000 000 kW conventional thermal generating station in the upper Hat Creek Valley between Lillooet and Cache Creek. Target date for first production from the plant was advanced by 14 months to August 1988 to serve increases in expected demand for electricity.

Feasibility, preliminary engineering and initial environmental impact studies for the project are complete. Updating of the environmental impact statement and some additional engineering investigations at the project site were under way in 1981. The licensing phase would have to begin in 1981-82 if the 1988 in-service date is to be met.

Facing page: Construction of Revelstoke dam and powerhouse proceeds in dewatered section of the Columbia River at Revelstoke Canyon.

Making a field check (below) of a map produced by the photogrammetric method (right). Photogrammetry is the science of making reliable measurements from aerial photographs in surveying and map making.



A B.C. Utilities Commission hearing was scheduled for May 5, 1981, to consider an application by Hydro to redevelop the 50-year-old Falls River hydroelectric plant 20 km southeast of Prince Rupert. Proposed modifications would increase the plant's generating capacity from 7 000 kW to 22 000 kW and its average annual output from 43 000 000 kW·h to 91 000 000 kW·h. The larger redeveloped plant would use more of the water available at the site and increase the amount of electricity generated in the Prince Rupert area. Studies are being carried out with the federal Ministry of Fisheries and Oceans to determine the extent to which fisheries might be affected by rehabilitation of the Falls River plant.

Engineering and environmental studies continued for a potential low-head hydroelectric project at Murphy Creek on the Columbia River, 3 km upstream from Trail. The project would use already-regulated flows of the Columbia and Kootenay rivers in ten 40 000 kW generating units. Earliest production would be in 1989.

Detailed studies continued towards defining an acceptable Kootenay Diversion project and preparing for a decision on whether or not to seek licensing. This project, permitted after 1984 under terms of the Columbia River Treaty, would divert water from the Kootenay River into the Columbia River and then into the Mica reservoir, increasing the energy available from the Mica and Revelstoke hydroelectric plants.

Review of Operations *(continued)*

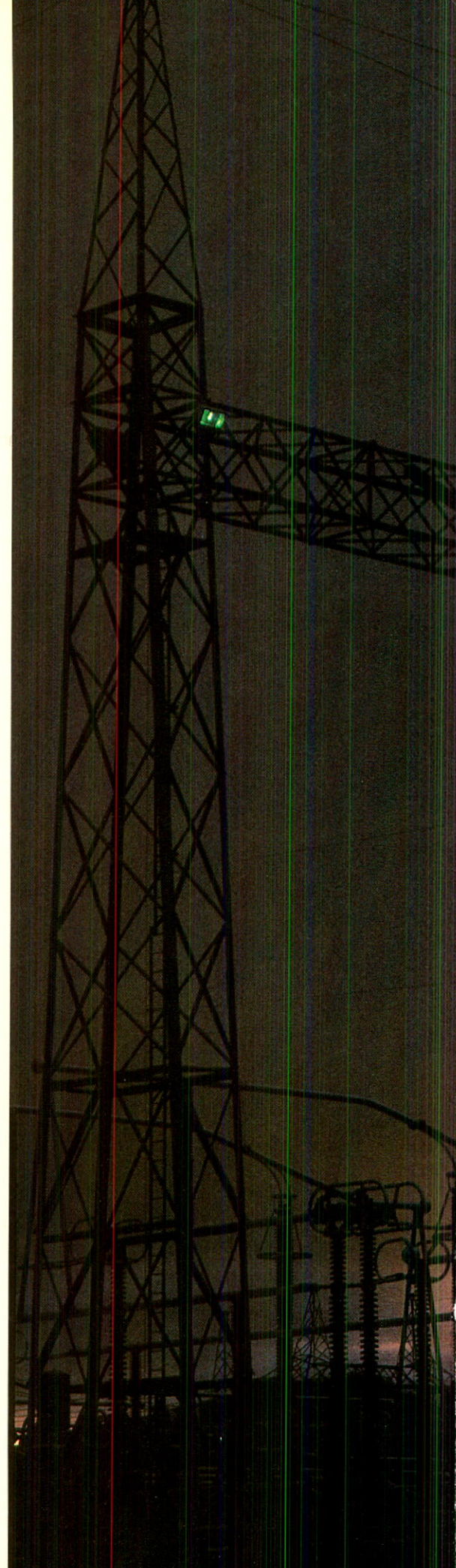
Engineering and environmental investigations continued to examine potential hydroelectric development in the Stikine-Iskut river basin in northwestern B.C. and on the Liard River near the B.C.-Yukon border. Possible effects of flow regulation on fisheries, wildlife, plants and trees, river flows and levels, temperatures and climate, recreation and heritage resources were studied. Preliminary studies of a possible hydroelectric site on the Skeena River near Cutoff Mountain in northwestern B.C. were begun in order to bring up to date the information reported in the B.C. Energy Board's 1972 Provincial Power Study.

Studies continued of transmission lines that would be required for various generation projects and for general growth of the electric system. Because of the long distances involved, transmission from the potential Stikine-Iskut and Liard sites requires extensive study to determine the optimum voltage and design specifications. Environmental and route location studies were begun to identify possible corridors from the distant northern hydroelectric sites to the transmission system in the Lower Mainland.

The feasibility of using voltages higher than 500 kV along existing and new routes from the Central Interior to the Lower Mainland is being studied. Route selection and environmental studies were initiated for a second 287 kV transmission line between Terrace and Prince Rupert.

Under the new Utilities Commission Act, all transmission lines of 500 kV or higher voltage are regulated projects and as such require applications for energy project certificates. Accordingly, Hydro submitted an application for a 500 kV interconnection between the Hydro system at Cranbrook and the Calgary Power system at the Alberta border. Preparatory work began on an application for a 500 kV line between Kelly Lake Substation near Clinton and Nicola Substation near Merritt.

In February 1981 the provincial government announced it would direct Hydro to apply under the Utilities





Commission Act to build an underwater pipeline to deliver natural gas to Vancouver Island. The government gave these reasons for choosing Hydro's proposal over others: (a) Hydro's proposed route would be shortest and have the least environmental impact; (b) its delivery point would be near the centre of the load on Vancouver Island, resulting in lower operational costs, and (c) a pipeline built by Hydro would come directly under provincial regulation.

During the year, Hydro completed the underwater pipeline engineering and environmental investigations required for government and public review. It also distributed relevant technical, environmental and land use information in a three-volume corridor and route nomination report. Work began on the preparation of an application for an energy project certificate to build the pipeline. Earliest completion date is early 1984.

Hydro applied during the year for approval to build in 1981 a 12.8-km-long, 914-mm-diameter natural gas transmission pipeline between its Roebuck and Tilbury stations in Surrey and Delta to meet the increasing load on the gas delivery system in Greater Vancouver. The addition would share the right-of-way of an existing pipeline for most of the route.

Subject to future gas pricing decisions by the B.C. Utilities Commission and the provincial government, Hydro plans to expand its liquefied natural gas storage capability to meet increased peak requirements while minimizing costs. The provincial government's decision during the year to permit exploration for petroleum and natural gas in the lower Fraser Valley could lead to identification of reservoirs suitable for storage of gas. Hydro also could benefit financially through sale to exploration companies of extensive seismic data compiled during Hydro's earlier geophysical studies in the area.

Research and Development

Hydro's new research and development centre in Surrey, which includes Canada's second-largest extra high-voltage laboratory, was opened officially on May 23, 1980.

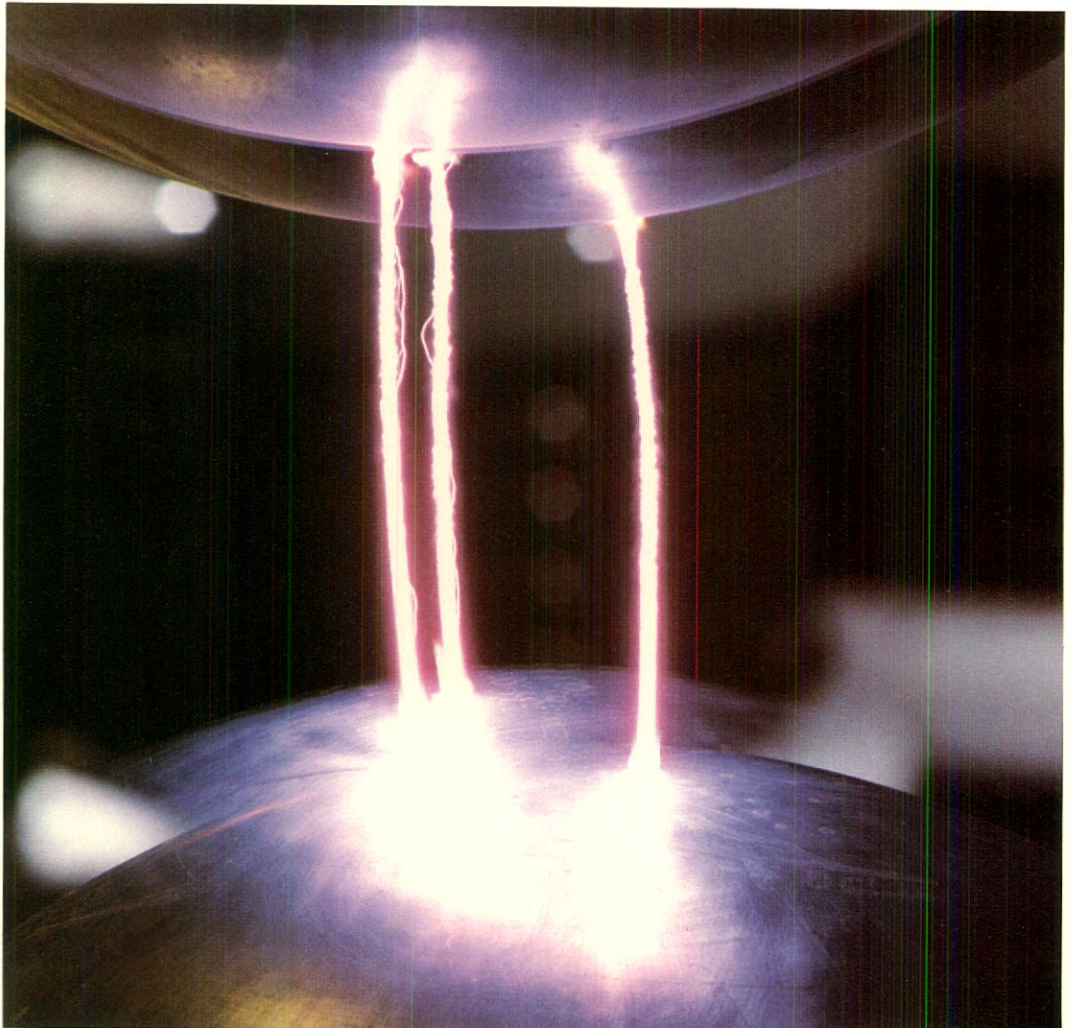
Researchers at the centre have developed a chemical process to destroy PCBs in contaminated insulating oils. The process could solve the problem of PCB disposal and result in substantial savings by reclaiming PCB-contaminated oil. Patents have been applied for in Canada and the United States.

The centre now has instrumentation which can detect sulphur hexafluoride (SF₆) gas in air at parts per trillion levels, which is the equivalent of finding a single grain of sand in 700 tonnes. The equipment is used to map distribution patterns of stack gases from thermal generating stations for local environmental impact studies.

Experimental anchor pins designed by research staff were inserted at the Revelstoke hydroelectric project to limit rock movement. The results were successful and provided information about rock stabilization techniques which will be applicable to future hydroelectric sites.

Engineering design studies of generating and transmission techniques to optimize efficiency are continuing. New designs for conductors, towers and hardware are being developed for use on future transmission lines.

The research and development centre has a number of research contracts for the Canadian Electrical Association to investigate problems on behalf of the Canadian electric utility industry.



High-voltage electricity flashes between spheres in laboratory at Hydro's research and development centre.

Hydro researchers have developed a chemical process which destroys polychlorinated biphenyls (PCBs) in contaminated insulating oils.





Review of Operations *(continued)*

Conservation of Energy

Since 1973, Hydro has promoted conservation through the wise use of energy by providing programs to encourage and assist customers to conserve.

Response to Hydro's low-cost financing program which assists homeowners to install insulation and multiple glazing increased sharply during the year. In the year ended March 31, 1981, 6243 customers took advantage of the plan, nearly as many as during the previous three years combined.

An aerial thermography program begun in 1977 is virtually complete. Approximately 500 000 homes and 50 000 commercial buildings have been surveyed by infra-red scanning flights to detect loss of heat. Results of the surveys continue to be available for viewing by customers and interpretation is provided to emphasize the need for adequate insulation.

Energy management seminars for operators of industrial plants were held in Burnaby, Cranbrook and Kamloops,

bringing to eight the number of seminars held since the series began in 1978. Energy specialists explain efficient methods of combustion, motor operation, lighting, heating and insulation and provide industrial customers with information about how to reduce energy costs.

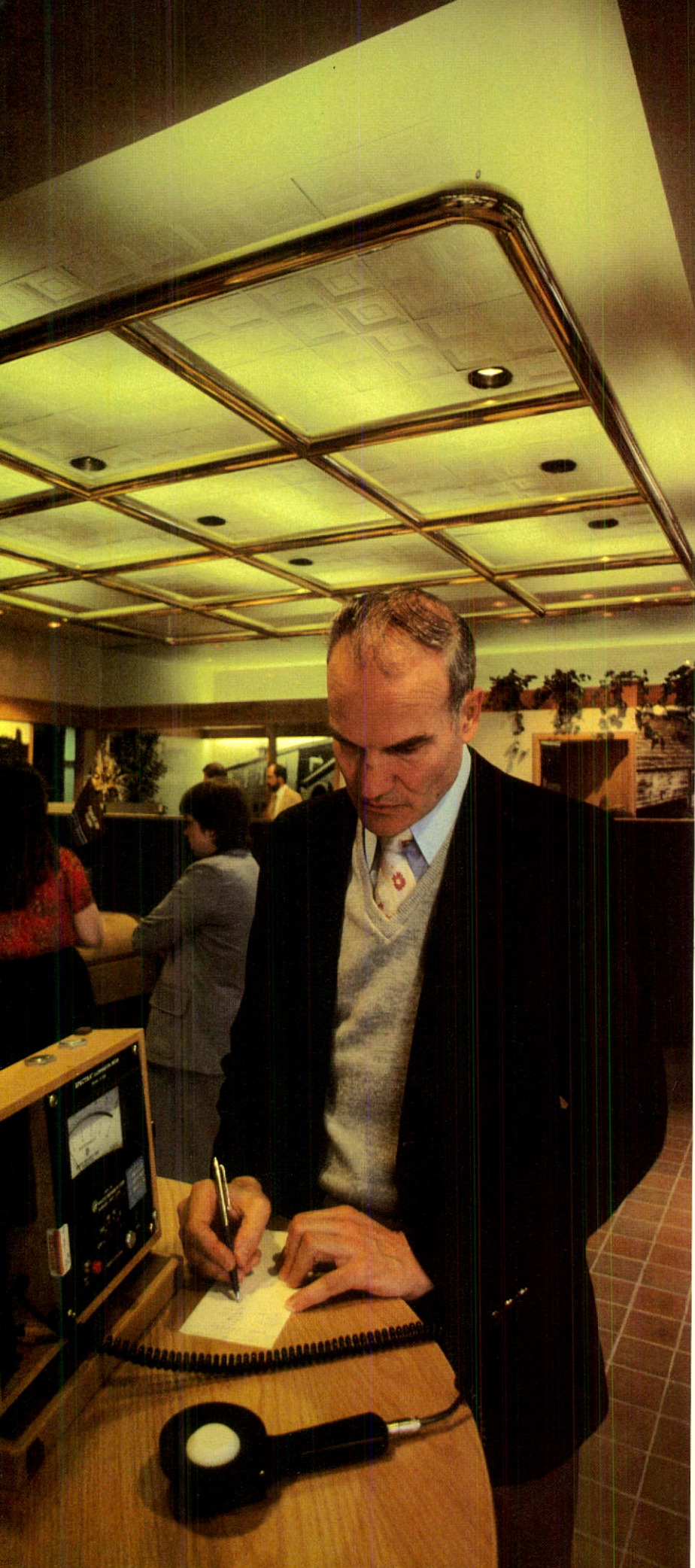
Hydro also held seminars for people involved in industrial electrical design and maintenance, road lighting and airport electrical maintenance, and continued an information program to help B.C. farmers use energy efficiently.

New recommended standards for efficient use of energy in homes were introduced by Hydro during the year as part of a program sponsored by the Canadian Electrical Association and endorsed by national government and consumer agencies. The new guidelines for insulation, water heating, lighting, windows, doors and major appliances surpass all present building codes and requirements.

Connected to electric and gas meters in the homes of 100 Hydro customers, Energy Cost Indicators will convert energy consumption into dollars and cents at the touch of a button. Hydro is preparing to participate in research programs being conducted in eight North American cities to see if people will conserve more energy if they know minute-by-minute how much the energy is costing them.



Many customers are taking advantage of Hydro's low-cost financing program to upgrade insulation in their homes.



Review of Operations *(cont.)*

The present phase of Hydro's "Save Energy Save Money" advisory program provides recommendations which could result in extensive reductions in energy use by industrial and commercial customers if implemented. Suggestions include installation of high-pressure sodium lamps, automated timers and lighting level controls.

Lighting audits for commercial and industrial customers are among Hydro's energy conservation programs.

Communicating with the Public

Hydro is committed to increased public awareness and understanding of its plans and operations.

During the year about 100 meetings were held with local and regional government representatives, Indian bands and other interest groups to develop public involvement in the planning process for new projects. Community activities are being intensified to create a dialogue with far northern communities which would be affected by potential electric generating projects on the Stikine, Iskut and Liard rivers and associated transmission lines.

Hydro wants these communities to have ready access to information about the projects, so that it can identify and consider their concerns at an early stage. Project information centres for the Site C and Hat Creek projects, which have reached a more advanced stage of planning, were opened in Fort St. John and Cache Creek.

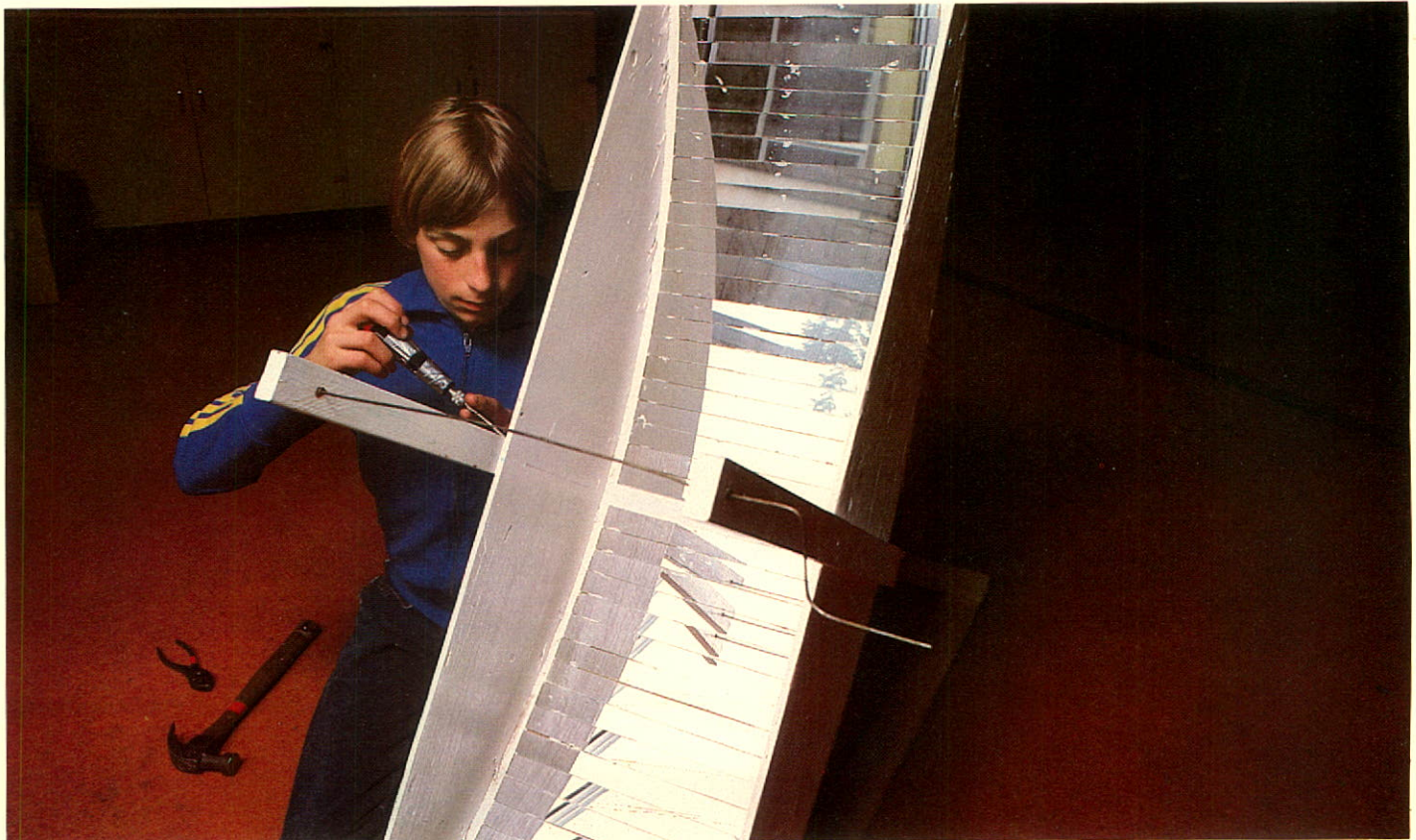
Information Place, for public viewing of reports and documents concerning proposed and existing energy projects, was opened in the lobby of Hydro's head office in Vancouver.

During the year Hydro established a speakers' bureau whose representatives are available to speak on energy-related topics to service, industrial, commercial, educational, professional, social, civic and other organizations.

Many primary and intermediate teachers in B.C. are making use of the teaching materials developed under Hydro's energy education program. Volunteer teacher-advisors assist in identifying needs and designing supplementary teaching materials for use in conjunction with existing curricula. Workshops and seminars are conducted to help teachers make effective use of the materials. Work continues on materials for the secondary level, which are expected to be available for the school year beginning in September 1981.

A visitors' centre was opened during the year at Peace Canyon Generating Station. It features an exhibit of prehistoric animals as well as other displays showing achievements of natives, explorers and pioneers.

Mark Scherbrucker, a grade seven student at Upper Lynn Elementary School in North Vancouver, shows a solar cooker he built. Hydro's energy education materials encourage students to learn more about energy and conservation.



Review of Operations *(continued)*

Hydro continued sponsorship of appearances and films by B.C. wilderness photographer Tommy Tompkins, whose programs have been seen by more than a million youngsters.

Programs to educate the public, particularly children, about safety around electricity, gas and railways continued. Hydro's "Be Electrically Alert" program for elementary school students entered its third year. Farmers were advised of possible electrical hazards by a special communications program. In conjunction with the Canadian Association of Fleet Supervisors, Hydro is developing a safety awareness program concerning railway level crossings.

Information Place in Hydro's head office provides a central location for public viewing of reports and other documents concerning proposed and existing energy projects.

Decals distributed to all Hydro's farm customers warn against contacting overhead electrical wires.



Employees

During the past year, more than 3000 employees received training to improve their job skills through internal and external courses. A total of 112 apprentice linemen from various B.C. employers attended classes given by Hydro under contract to the provincial Ministries of Labour and Education. Another 137 apprentices in eight electrical trades took part in an internal apprenticeship training program, operated in conjunction with Local 258 of the International Brotherhood of Electrical Workers.

Hydro provided about 2400 career testing and counselling sessions for prospective and incumbent employees to help them adjust to such factors as life stress or job change, which can affect work performance and safety. Programs to train and instruct employees in accident and hazard prevention and other safety measures continued.

Senior and middle managers were introduced to the concept of project management, in which diverse management functions are combined to focus responsibility for project planning, licensing, design and construction.

About 660 Hydro employees in

the Central Interior and Vancouver are participating voluntarily in a research project on employee fitness. The program centres on education and motivation of employees in fitness, health and a positive lifestyle. It includes evaluation of levels of fitness and nutrition and lifestyle risks and their effect on such factors as work performance and absenteeism. The aim of the project is to determine whether a fitness program should be implemented throughout Hydro.

Agreements with major bargaining units representing about 7600 Hydro employees expired on March 31, 1981, and negotiations are under way to renew these agreements.

The strong commitment to safety among Hydro employees was exemplified by staff in the North Coast region, who completed the year with only one lost-time accident.

The most northerly community served by Hydro is Atlin, in the northwest corner of British Columbia near the Yukon border.



Corporate Organization

as at March 31, 1981

DIRECTORS:

Robert W. Bonner, Q.C.
*Charles W. Brazier, Q.C.
The Honourable Robert H. McClelland
The Honourable Patrick L. McGeer

*Member of the Audit Committee

OFFICERS:

Robert W. Bonner, Q.C., *Chairman*
J. Norman Olsen, *President and Chief Operating Officer*
Eric H. Martin, *Executive Vice-President, Operations*
John P. Sheehan, *Executive Vice-President, Administration*
William D. Mitchell, *Secretary*
Elizabeth B. Fulwell, *Associate Secretary*
William M. Walker, *Chief Engineer*

GROUP ORGANIZATION:

OFFICE OF THE CHAIRMAN

William D. Mitchell, *Vice-President and General Counsel*

OFFICE OF THE PRESIDENT

CORPORATE AFFAIRS

Charles W. Nash, *Vice-President and Executive Assistant to the Chairman*
Douglas K. Coupar, *Assistant Vice-President, Public Affairs*

CORPORATE

William A. Best, *Vice-President*

OFFICE OF THE EXECUTIVE VICE-PRESIDENT, OPERATIONS ELECTRICAL OPERATIONS

Hugh J. Goldie, *Vice-President*

DIVISION MANAGERS:

Evan T. Davis, *North Coast*
Thomas V. Farmer, *South Interior*
W. Basil Gale, *Operations Administration*
William D. Gill, *Operations Engineering*
Donald J. McLennan, *Lower Mainland*
Gordon J. Roper, *Vancouver Island*
P. Donald Swoboda, *Central Interior*

ENGINEERING

William M. Walker, *Vice-President*

DIVISION MANAGERS:

Donald G. McFarlane, *System Engineering*
James C. Stevens, *Engineering Services*

ENGINEERING PROJECTS

Raymond H. Hunt, *Vice-President*

DIVISION MANAGERS:

Eamon Crowley, *Transmission Projects*
Maurice A. Favell, *Thermal Generation Projects*
Wallace E. Lyle, *Hydro Force Construction*
F. James Patterson, *Hydroelectric Generation Projects*
Edwin T. Quirk, *Station Projects*

GAS OPERATIONS AND ENERGY

CONSERVATION

R. Keith Kidd, *Vice-President*

DIVISION MANAGERS:

Kenneth S. Henderson, *Gas Transmission and Distribution*
Alistair H. MacPherson, *Gas Engineering*
Timothy J. Newton, *Energy Conservation*

RESEARCH AND DEVELOPMENT

Harry M. Ellis, *Director*

OFFICE OF THE EXECUTIVE VICE-PRESIDENT, ADMINISTRATION

FINANCE

Lyle E. Beard, *Vice-President*

DIVISION MANAGERS:

Ronald E. Avery, *Treasurer*
David A. Harrison, *Comptroller*

GENERAL CORPORATE SERVICES

Thomas A. Nordstrom, *Vice-President*

DIVISION MANAGERS:

Ernest S. Collins, *Properties*
Richard Johnson, *Purchasing and Supply*
Desmond G. McKillop, *General Services*
Robert J. Steele, *Computer and Management Systems*

PERSONNEL

James J. Donnelly, *Vice-President*

DIVISION MANAGERS:

Richard H. Downey, *Personnel*
Bert A. Hawrysh, *Manpower Planning and Development*
C. Mark Leffler, *Labour Relations*

INTERNAL AUDITOR, S. Edwin Banning

RAILWAY OPERATIONS

Gerald I. Stevenson, *Manager*

Financial Statements

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Statement of Changes in Financial Position	36
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Corporate Information

HEAD OFFICE
970 Burrard Street, Vancouver, British Columbia,
Canada V6Z 1Y3

AUDITORS
Price Waterhouse & Co.

BANKERS
Canadian Imperial Bank of Commerce

REGISTRARS
Securities issued by B.C. Hydro:

Canadian issues:
B.C. Hydro

United States issues:
The Canadian Bank of Commerce
Trust Company, New York

Securities issued by the former British Columbia
Electric Company Limited:

Callable Bonds:
Montreal Trust Company

First Mortgage Bonds:
Montreal Trust Company

Debentures:
The Royal Trust Company

Securities issued by the former British Columbia
Power Commission:
B.C. Hydro

British Columbia Hydro and Power Authority

Management Report

The financial statements of B.C. Hydro have been prepared by management in accordance with accounting principles generally accepted in Canada for public utilities consistently applied. Because a precise determination of many assets and liabilities is dependent upon future events, the preparation of periodic financial statements necessarily involves the use of estimates and approximations. These have been made using careful judgement and with all information available up to May 25, 1981. The financial statements have, in management's opinion, been properly prepared within reasonable limits of materiality and within the framework of the accounting policies summarized in Note 1 of the notes to the financial statements. Financial information presented elsewhere in this Annual Report is consistent with that in the consolidated financial statements.

The Board of Directors pursues its responsibility for these financial statements principally through its Audit Committee which meets periodically with management as well as with the internal and the independent auditors who have full and free access to the Audit Committee, and meet with it to discuss auditing and financial reporting matters. Management is responsible for, and the Board of Directors has approved, all of the information in the Annual Report.

Report of the Auditors

The Lieutenant Governor in Council,
Province of British Columbia:

We have examined the balance sheets of British Columbia Hydro and Power Authority as at March 31, 1981 and 1980, and the statements of income and earnings employed in the business and changes in financial position for the years ended March 31, 1981, 1980 and 1979. Our examinations were made in accordance with generally accepted auditing standards, and accordingly included such tests and other procedures as we considered necessary in the circumstances.

In our opinion, these financial statements present fairly the financial position of British Columbia Hydro and Power Authority as at March 31, 1981 and 1980 and the results of its operations and the changes in its financial position for each of the years in the three-year period ended March 31, 1981, in accordance with generally accepted accounting principles consistently applied during the period.

Vancouver, British Columbia
May 25, 1981

PRICE WATERHOUSE & CO.
Chartered Accountants

British Columbia Hydro and Power Authority

Statements of Income and Earnings Employed in the Business

for the years ended March 31

	1981	1980 <i>(in thousands)</i>	1979
Revenues	<u>\$1,096,909</u>	<u>\$916,006</u>	<u>\$862,514</u>
Expenses:			
Salaries, wages and employee benefits	165,675	144,296	132,144
Materials and services	191,997	175,773	164,602
Grants, school taxes and water rentals	89,714	71,176	66,444
Depreciation	136,276	118,925	106,292
Interest (Note 7)	<u>400,208</u>	<u>309,760</u>	<u>283,002</u>
	<u>983,870</u>	<u>819,930</u>	<u>752,484</u>
Net income for the year from continuing operations <i>(Note 11)</i>	113,039	96,076	110,030
Loss for the year on passenger transportation operations <i>(Notes 10 and 11)</i>	<u>—</u>	<u>(55,918)</u>	<u>(61,407)</u>
Net income for the year before extraordinary item	113,039	40,158	48,623
Extraordinary item:			
Loss on discontinuance of passenger transportation service (Note 10)	<u>—</u>	<u>(37,900)</u>	<u>—</u>
Net income for the year	113,039	2,258	48,623
Earnings employed in the business:			
At beginning of year	<u>279,601</u>	<u>277,343</u>	<u>228,720</u>
At end of year	<u>\$ 392,640</u>	<u>\$279,601</u>	<u>\$277,343</u>

British Columbia Hydro and Power Authority

Balance Sheets

as at March 31

	1981	1980
	(in thousands)	
FIXED ASSETS:		
Fixed assets in service, at cost	\$6,690,590	\$5,991,376
Less —		
Accumulated depreciation	<u>1,198,852</u>	<u>1,063,730</u>
Unfinished construction	<u>5,491,738</u>	<u>4,927,646</u>
	<u>1,056,736</u>	<u>1,042,777</u>
	<u>6,548,474</u>	<u>5,970,423</u>
CURRENT ASSETS:		
Cash	1,512	1,393
Temporary investments (Note 2)	16,502	315,743
Accounts receivable and unbilled revenues	237,257	163,523
Materials and supplies, at average cost	59,333	53,632
Prepaid expenses	10,840	1,444
	<u>325,444</u>	<u>535,735</u>
OTHER ASSETS:		
Mortgages and other deferred accounts receivable	7,148	6,598
Insurance fund	—	5,000
Unamortized discount and expense on bonds and debentures	<u>30,661</u>	<u>30,012</u>
	<u>37,809</u>	<u>41,610</u>
	<u>\$6,911,727</u>	<u>\$6,547,768</u>

APPROVED BY THE DIRECTORS:



Charles W. Brazier, Q.C., Director



Robert W. Bonner, Q.C., Director

	1981	1980
	<i>(in thousands)</i>	
LONG-TERM LIABILITIES:		
Bonds and debentures <i>(Notes 3 and 4)</i>	\$5,324,318	\$5,175,727
Notes payable <i>(Notes 3 and 4)</i>	48,000	—
Deferred liabilities	<u>50,734</u>	<u>35,555</u>
	<u>5,423,052</u>	<u>5,211,282</u>
PARITY DEVELOPMENT BONDS,		
8½% Series EA due September 1, 1980	<u>—</u>	<u>25,000</u>
CURRENT LIABILITIES:		
Bank indebtedness	10,516	8,928
Accounts payable	217,997	227,670
Accrued interest	146,411	139,588
Bond and debenture payments due within one year —		
Sinking fund instalments	87,131	48,181
Maturities, less sinking fund	<u>57,381</u>	<u>46,693</u>
	<u>519,436</u>	<u>471,060</u>
CONTRIBUTIONS ARISING FROM COLUMBIA RIVER TREATY	<u>405,399</u>	<u>414,612</u>
CONTRIBUTIONS IN AID OF CONSTRUCTION	<u>171,200</u>	<u>146,213</u>
EARNINGS EMPLOYED IN THE BUSINESS	392,640	279,601
COMMITMENTS <i>(Note 8)</i>		
	<u>\$6,911,727</u>	<u>\$6,547,768</u>

British Columbia Hydro and Power Authority

Statements of Changes in Financial Position for the years ended March 31

	1981	1980 <i>(in thousands)</i>	1979
SOURCE OF FUNDS:			
Continuing operations —			
Net income for the year	\$113,039	\$ 96,076	\$110,030
Charges not affecting current funds:			
Depreciation	136,276	118,925	106,292
Other	180	666	1,019
Funds provided by continuing operations	<u>249,495</u>	<u>215,667</u>	<u>217,341</u>
Passenger transportation operations —			
Loss for the year	—	(55,918)	(61,407)
Charges not affecting current funds:			
Depreciation	—	2,800	3,865
Funds required by passenger transportation operations	<u>—</u>	<u>(53,118)</u>	<u>(57,542)</u>
Total funds provided by operations	249,495	162,549	159,799
Bonds	325,178	563,040	473,722
Notes payable (<i>Note 3</i>)	48,000	—	—
Contributions in aid of construction	31,839	24,364	18,815
Return of payment in respect of litigation	—	—	36,500
Miscellaneous	36,842	(2,136)	2,610
	<u>691,354</u>	<u>747,817</u>	<u>691,446</u>
APPLICATION OF FUNDS:			
Fixed assets	739,902	754,800	721,611
Sinking funds —			
Instalments	47,902	48,887	43,771
Income (<i>Note 7</i>)	40,886	33,106	25,568
Retirement of bonds and debentures	46,693	—	7,341
Retirement of Parity Development Bonds	25,000	25,000	25,000
Extraordinary item — portion of loss on discontinuance of passenger transportation service affecting working capital	—	2,022	—
	<u>900,383</u>	<u>863,815</u>	<u>823,291</u>
Decrease in working capital*	209,029	115,998	131,845
Working capital at beginning of year*	159,549	275,547	407,392
Working capital (deficiency) at end of year*	<u>\$(49,480)</u>	<u>\$159,549</u>	<u>\$275,547</u>

*Exclusive of current portion of bonds and debentures and changes therein.

Notes to Financial Statements *as at March 31, 1981, 1980 and 1979*

Note 1 SIGNIFICANT ACCOUNTING POLICIES:

B.C. Hydro is a Crown corporation of the Province of British Columbia. On September 11, 1980 the Utilities Commission Act was proclaimed establishing the British Columbia Utilities Commission and empowering it to regulate generally B.C. Hydro's electric and gas services, including rates, subject to any general or special direction of the Lieutenant Governor in Council with respect to the exercise of its powers.

In a special direction to the Commission regarding B.C. Hydro, the Lieutenant Governor in Council directed that B.C. Hydro should generate adequate funds from the efficient operation and conduct of its business to support all of its activities and debt and should achieve a financial position that allows it to borrow funds on the most economical terms available. Specifically, the direction stated that B.C. Hydro should achieve by the 1983-84 fiscal year an interest coverage ratio of 1.3:1 and should maintain that ratio thereafter so as to achieve and ultimately maintain a debt/equity ratio of 80:20.

The accounting policies of the corporation conform to accounting principles generally accepted in Canada for public utilities. A description of significant accounting policies follows.

Fixed assets and depreciation —

Fixed assets consist principally of land, water rights, storage dams, plants for the generation, transmission and distribution of electricity and gas, freight railway and rolling stock.

Fixed assets include the cost of plant financed by contributions in aid of construction and contributions arising from the Columbia River Treaty. Contributions in aid of construction are being amortized over the estimated service lives of the related assets, and the credit resulting therefrom is offset against the corresponding provision for depreciation. Contributions arising from the Columbia River Treaty are being amortized over the remaining term of the Treaty, which expires in 2025, and the credit resulting therefrom is offset against and is equal to the annual provision for depreciation of the related assets.

B.C. Hydro charges interest to unfinished construction at rates equivalent to the cost of borrowing those funds which have been expended annually on each construction project. The rate applied to expenditures in the year ended March 31, 1981 was 12.6% (1980 — 10.2%; 1979 — 9.4%).

The depreciation policy of B.C. Hydro is to charge the original cost of fixed assets to income over the estimated service lives of the assets. Depreciation is provided on all depreciable assets in service at the beginning of each year and is computed on the straight-line method. Composite rates by service were as follows:

	1981	1980	1979
	(%)	(%)	(%)
Electric	2.59	2.61	2.56
Gas	2.74	2.70	2.65
Rail freight	3.57	3.64	3.20

Insurance —

B.C. Hydro generally follows a policy of self-insurance for damage to plant and equipment and for general liability for losses up to \$5,000,000. During the year, B.C. Hydro discontinued the maintenance of a separate insurance fund. To protect against losses in excess of \$5,000,000, B.C. Hydro carries catastrophe liability and catastrophe direct damage insurance, with a \$100,000,000 limit on the catastrophe liability insurance and a \$125,000,000 limit on the catastrophe direct damage insurance.

Insurance coverage on major projects under construction is purchased either by B.C. Hydro or by its contractors as required by B.C. Hydro. Fire insurance coverage on certain plant and equipment is also purchased to comply with trust deed requirements.

Unamortized discount and expense on bonds and debentures —

These costs are amortized by charges to income over the life of the respective issues.

Foreign exchange —

The liability for bonds and debentures payable in United States currency is translated to Canadian currency at the rates of exchange prevailing at the date the debt was incurred. Current assets and current liabilities in United States currency, including bonds and debentures payable within one year, are translated at the rate of exchange prevailing at the date of the balance sheet. Foreign exchange adjustments are included in income.

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Note 2 TEMPORARY INVESTMENTS:

	1981	1980
	<i>(in thousands)</i>	
Temporary investments, at lower of cost or market —		
Deposits with banks and other financial institutions	\$ 4,015	\$106,967
Notes of banks and other financial institutions	7,000	205,279
Other	5,487	3,497
	<u>\$16,502</u>	<u>\$315,743</u>

Note 3 BONDS AND DEBENTURES:

	1981	1980
	<i>(in thousands)</i>	
Total bonds and debentures outstanding —		
Payable in Canadian currency	\$4,503,152	\$4,253,822
Payable in United States currency (U.S. \$1,418,800; 1980 — U.S. \$1,420,050)	1,442,469	1,436,509
	<u>5,945,621</u>	<u>5,690,331</u>
Less: Sinking funds on deposit with Trustee, Minister of Finance for the Province of British Columbia	476,791	419,730
	<u>5,468,830</u>	<u>5,270,601</u>
Less: Bond and debenture payments due within one year —		
Sinking fund instalments	87,131	48,181
Maturities, less sinking fund	57,381	46,693
	<u>144,512</u>	<u>94,874</u>
	<u>\$5,324,318</u>	<u>\$5,175,727</u>

Had the bonds and debentures payable in United States currency all been translated to Canadian currency at the rate prevailing at March 31, 1981, the liability would have been increased by approximately \$239,000,000 (1980 — \$262,000,000).

B.C. Hydro (including its predecessor companies) had 149 series of bonds and debentures outstanding at March 31, 1981 (1980 — 148). Coupon rates on these bonds and debentures range from 3¼% to 13½%. The average effective interest cost on bonds and debentures denominated in Canadian dollars outstanding at March 31, 1981 is 8.99% (1980 — 8.67%). For bonds and debentures denominated in United States dollars at March 31, 1981 the cost is 8.68% (1980 — 8.68%).

The following bonds were issued by B.C. Hydro during the year ended March 31, 1981:

Coupon Rate %	Series	Date of Maturity	Principal
12.45	WO	November 10, 2000	\$ 78,651,000
11¾	FB	June 12, 2005	100,000,000
13½	FD	January 15, 2011	150,000,000
			<u>\$328,651,000</u>

Many of the series have annual sinking fund requirements. Total bond and debenture maturity payments and sinking fund instalments of the bonds and debentures outstanding at March 31, 1981 are as follows:

Year ending March 31	Principal Amount of Maturities	Estimated Funds Accumulated to Maturity Date in Sinking Funds	Cash Requirements		
			Net Debt Maturities	Sinking Funds	Total
<i>(in millions)</i>					
1982	\$ 134.6	\$ 77.2	\$ 57.4	\$ 87.1	\$ 144.5
1983	167.7	99.9	67.8	90.5	158.3
1984	135.6	48.2	87.4	96.6	184.0
1985	286.1	51.1	235.0	101.3	336.3
1986	115.3	91.4	23.9	98.4	122.3
	839.3	367.8	471.5	473.9	945.4
1987-1991	769.8	428.2	341.6	439.6	781.2
1992-1996	1,235.2	957.4	277.8	387.7	665.5
1997-2001	1,030.7	872.0	158.7	197.9	356.6
2002-2006	1,529.0	1,529.0	—	96.4	96.4
2007-	541.6	541.6	—	25.6	25.6
	<u>\$5,945.6</u>	<u>\$4,696.0</u>	<u>\$1,249.6</u>	<u>\$1,621.1</u>	<u>\$2,870.7</u>

Note 3 (continued):

Net debt maturities represent gross debt maturities minus estimated sinking funds at maturity, based on assumed earnings of 10% on existing sinking fund investments and future sinking fund instalments, and estimated discounts on anticipated purchases of bonds subject to annual mandatory redemption.

Prior to March 31, 1981, B.C. Hydro had arranged for the issue of \$100,000,000 of 14½% Series FC bonds, due April 14, 2006, which were issued in April 1981. Part of the proceeds of this issue was used to repay \$48,000,000 of short-term notes payable outstanding at March 31, 1981, therefore, these short-term notes have been included with long-term liabilities in the accompanying balance sheet. Also in April 1981, B.C. Hydro issued the following securities:

	<u>Coupon Rate %</u>	<u>Date of Maturity</u>	<u>Principal</u>
Series FF Notes	14½	April 15, 1991	U.S. \$150,000,000
Series FG Bonds	15	April 15, 2011	250,000,000
			<u>U.S. \$400,000,000</u>

Note 4
GUARANTEE BY
PROVINCE OF
BRITISH COLUMBIA:

The Government of the Province of British Columbia has unconditionally guaranteed the principal of and premium, if any, and interest on B.C. Hydro's bonds, debentures and notes payable.

Note 5
PAYMENT
IN RESPECT OF
LITIGATION:

A lawsuit started on July 17, 1967 in the Supreme Court of British Columbia by the contractors constructing the underground powerhouse and associated works at Gordon M. Shrum Generating Station, alleging breach of contract, was settled on August 4, 1978 by direct payment to the contractors of \$33,950,000. This amount was capitalized as part of the cost of construction and included in fixed assets. The \$36,500,000 previously paid into Court by B.C. Hydro was then returned.

Note 6
PENSION
PLANS:

Employees of B.C. Hydro are covered under contributory pension plans. It is B.C. Hydro's practice to obtain periodic actuarial valuations of the plans for purposes of determining annual pension costs and funding requirements. Current service costs are provided for and funded when incurred. Past service pension costs and accrued deficits arising from plan amendments, changes in actuarial assumptions and indexing supplements to existing pensioners are provided for and funded over periods and in amounts recommended by the actuary.

An actuarial report prepared as of December 31, 1979 indicated an evaluated accrued deficit in the principal plan as of that date of approximately \$41,000,000. It is estimated that the deficit has remained substantially unchanged through December 31, 1980. The deficit arose principally as a result of plan improvements introduced over the years, including minimum pension benefit provisions for present members and indexed supplements to existing pensioners. It is being funded, principally, by continuation of payments of \$3,061,000 per annum until 1999.

During the year to March 31, 1981 those employees of B.C. Hydro who had been associated with the urban transit operations were transferred to the Metro Transit Operating Company. The Lieutenant Governor in Council has issued a regulation whereby the pension rights, including appropriate pension funds, are to be transferred from existing pension plans to the Public Service Superannuation Fund. Although this transfer has not been finalized, an actuarial report prepared on the transfer indicates that there will be no significant effect upon the information shown above.

The total cost to B.C. Hydro's continuing operations in respect of pension plans, including its share of Canada Pension Plan costs, for the year ended March 31, 1981 was \$21,886,000 (1980 — \$18,508,000; 1979 — \$16,823,000), of which \$12,497,000 (1980 — \$10,508,000; 1979 — \$9,641,000) was charged to income.

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Note 7
INTEREST: Interest and other financing expenses for the three years ended March 31, 1981 comprise the following:

	1981	1980 <i>(in thousands)</i>	1979
Interest on bonds and debentures	\$529,267	\$467,004	\$423,360
Amortization of discount and expense	2,868	2,654	2,574
Exchange adjustment on U.S. debt due within one year	7,304	—	—
Other interest	3,197	1,481	1,196
	<u>542,636</u>	<u>471,139</u>	<u>427,130</u>
<i>Less:</i>			
Income from sinking fund investments held by Trustee	40,886	33,106	25,568
Income from temporary investments	23,141	30,208	42,629
Interest charged to construction	78,401	94,833	72,790
Interest (net) charged to passenger transportation operations	—	3,232	3,141
	<u>142,428</u>	<u>161,379</u>	<u>144,128</u>
	<u>\$400,208</u>	<u>\$309,760</u>	<u>\$283,002</u>

Note 8
COMMITMENTS: Purchase commitments and contracts of B.C. Hydro for capital projects aggregated approximately \$1,005,000,000 at March 31, 1981.

Note 9
SALES OF SURPLUS
ELECTRICITY: Revenues for the year ended March 31, 1981 include \$74,445,000 from sales of surplus electricity to the United States (1980 — \$38,757,000; 1979 — \$34,466,000).

Note 10
PASSENGER
TRANSPORTATION: In accordance with the provisions of the Urban Transit Authority Act and the Metro Transit Operating Company Act and with the written directions of the Minister of Municipal Affairs issued under the latter Act, B.C. Hydro discontinued its public passenger transportation service effective April 1, 1980 and has transferred to the Urban Transit Authority and the Metro Transit Operating Company its interest in those assets identified in the directions. B.C. Hydro is being reimbursed for the costs of services provided to the Metro Transit Operating Company.

The estimated loss to B.C. Hydro resulting from the discontinuance of the passenger transportation service, amounting to \$37,900,000, has been shown as an extraordinary item in the statement of income and earnings employed in the business for the year ended March 31, 1980. Passenger transportation revenues and expenses for the years ended March 31, 1980 and 1979 have been combined and the net loss for each year shown as "loss for the year on passenger transportation operations" on the statements of income and earnings employed in the business. Sources and applications of funds pertaining to passenger transportation operations have been shown separately on the statements of changes in financial position. The passenger transportation assets, which comprised mainly fixed assets and inventories, have been included at a nominal value with accounts receivable at March 31, 1980. Particulars on passenger transportation revenues, expenses and assets appear in Note 11.

Note 11
SEGMENT
INFORMATION: B.C. Hydro is engaged in the operation of three principal continuing services: generation, transmission and distribution of electricity; distribution of gas; and provision of a railway freight service. Until March 31, 1980, the corporation was also engaged in the operation of a passenger transportation service (Note 10).

Most expenses are directly attributable to specific segments. Common expenses are allocated among the segments using appropriate bases established by regular review and analysis. Revenues and expenses include transactions between continuing services and passenger transportation.

Identifiable assets are those assets that are used in each segment's operations. Corporate assets are principally temporary investments and unamortized discount and expense on bonds and debentures.

Note 11 (continued):

Year ended March 31, 1981 (in millions)	Electric	Gas	Rail Freight	Sundry	Combined	
Revenues	\$ 881.7	\$185.0	\$25.2	\$ 5.0	\$1,096.9	
Expenses:						
Salaries, wages and employee benefits	128.6	26.5	10.6	—	165.7	
Materials and services	66.4	119.7	5.9	—	192.0	
Grants, school taxes and water rentals	83.4	5.1	1.2	—	89.7	
Depreciation	125.4	9.1	1.8	—	136.3	
Total expenses	403.8	160.4	19.5	—	583.7	
Operating income before interest	477.9	24.6	5.7	5.0	513.2	
Interest (Note 7)	372.8	23.8	2.7	.9	400.2	
Net income for the year	\$ 105.1	\$.8	\$ 3.0	\$ 4.1	\$ 113.0	
Identifiable assets as at March 31, 1981	\$6,449.5	\$344.2	\$50.6	\$13.8	\$6,858.1	
Corporate assets as at March 31, 1981					53.6	
Total assets as at March 31, 1981					\$6,911.7	
Expenditures on fixed assets	\$ 694.8	\$ 44.1	\$.6	\$.4	\$ 739.9	
Year ended March 31, 1980 (in millions)	Electric	Gas	Rail Freight	Sundry	Continuing Operations Combined	Passenger Transportation (Note 10)
Revenues	\$ 717.4	\$172.6	\$23.5	\$ 2.5	\$ 916.0	\$ 40.5
Expenses:						
Salaries, wages and employee benefits	112.5	22.3	9.5	—	144.3	77.7
Materials and services	63.3	106.9	5.6	—	175.8	11.5
Grants, school taxes and water rentals	65.4	4.3	1.5	—	71.2	1.2
Depreciation	109.0	8.2	1.7	—	118.9	2.8
Total expenses	350.2	141.7	18.3	—	510.2	93.2
Operating income before interest	367.2	30.9	5.2	2.5	405.8	(52.7)
Interest (Note 7)	284.8	20.8	3.2	.9	309.7	3.2
Net income (loss) for the year before extraordinary item	\$ 82.4	\$ 10.1	\$ 2.0	\$ 1.6	\$ 96.1	\$(55.9)
Identifiable assets as at March 31, 1980	\$5,814.9	\$305.1	\$50.6	\$14.1	\$6,184.7	
Corporate assets as at March 31, 1980					363.1	
Total assets as at March 31, 1980					\$6,547.8	
Expenditures on fixed assets	\$ 726.4	\$ 26.9	\$ 1.5	\$ —	\$ 754.8	
Year ended March 31, 1979 (in millions)	Electric	Gas	Rail Freight	Sundry	Continuing Operations Combined	Passenger Transportation (Note 10)
Revenues	\$ 670.5	\$170.1	\$20.7	\$ 1.2	\$ 862.5	\$44.2
Expenses:						
Salaries, wages and employee benefits	102.3	20.8	9.1	—	132.2	81.1
Materials and services	53.5	106.3	4.8	—	164.6	16.4
Grants, school taxes and water rentals	61.3	3.7	1.4	—	66.4	1.1
Depreciation	97.6	7.4	1.3	—	106.3	3.9
Total expenses	314.7	138.2	16.6	—	469.5	102.5
Operating income before interest	355.8	31.9	4.1	1.2	393.0	(58.3)
Interest (Note 7)	260.5	18.9	2.7	.9	283.0	3.1
Net income (loss) for the year	\$ 95.3	\$ 13.0	\$ 1.4	\$.3	\$ 110.0	\$(61.4)
Identifiable assets as at March 31, 1979	\$5,210.0	\$287.0	\$52.0	\$11.5	\$5,560.5	\$ 43.7
Corporate assets as at March 31, 1979					434.3	—
Total assets as at March 31, 1979					\$5,994.8	\$ 43.7
Expenditures on fixed assets	\$ 686.1	\$ 24.2	\$ 7.4	\$.8	\$ 718.5	\$ 3.1

British Columbia Hydro and Power Authority

Financial Statistics *(in millions) years ended March 31*

	1981	1980	1979	1978	1977	1976	1975	1974	1973	1972	1971
Sources of Revenue											
Electric	\$ 881.7	717.4	670.5	611.2	466.9	344.5	299.5	270.0	236.9	213.2	194.6
Gas	185.0	172.6	170.1	135.9	104.5	89.5	77.9	60.9	55.4	51.9	47.7
Rail freight	25.2	23.5	20.7	18.3	16.5	15.1	13.8	12.5	11.2	10.9	8.7
Sundry	5.0	2.5	1.2	0.3	0.9	2.1	0.3	0.3	0.2	0.2	0.4
Provincial Government special subsidy	—	—	—	—	32.6	32.6	—	—	—	—	—
Total	<u>\$1,096.9</u>	<u>916.0</u>	<u>862.5</u>	<u>765.7</u>	<u>621.4</u>	<u>483.8</u>	<u>391.5</u>	<u>343.7</u>	<u>303.7</u>	<u>276.2</u>	<u>251.4</u>
Disposition of Revenue											
Salaries, wages and employee benefits	\$ 165.7	144.3	132.2	125.7	114.5	103.5	79.1	60.4	51.3	47.8	40.9
Materials and services	192.0	175.8	164.6	138.9	107.7	91.4	78.6	69.5	47.5	46.1	41.1
Grants, school taxes and water rentals	89.7	71.2	66.4	53.4	45.4	38.9	28.4	24.7	21.9	19.7	18.3
Depreciation	136.3	118.9	106.3	97.3	78.3	70.4	63.5	59.9	56.0	51.3	48.4
Interest charged to operations	400.2	309.7	283.0	261.6	186.9	142.0	116.0	104.0	100.3	90.4	83.0
Total	<u>983.9</u>	<u>819.9</u>	<u>752.5</u>	<u>676.9</u>	<u>532.8</u>	<u>446.2</u>	<u>365.6</u>	<u>318.5</u>	<u>277.0</u>	<u>255.3</u>	<u>231.7</u>
Loss on passenger transportation operations	—	55.9	61.4	61.3	50.0	36.3	21.5	10.0	4.7	3.5	3.0
	<u>983.9</u>	<u>875.8</u>	<u>813.9</u>	<u>738.2</u>	<u>582.8</u>	<u>482.5</u>	<u>387.1</u>	<u>328.5</u>	<u>281.7</u>	<u>258.8</u>	<u>234.7</u>
Loss on discontinuance of passenger transportation operations	—	37.9	—	—	—	—	—	—	—	—	—
Employed in the business	113.0	2.3	48.6	27.5	38.6	1.3	4.4	15.2	22.0	17.4	16.7
Total	<u>\$1,096.9</u>	<u>916.0</u>	<u>862.5</u>	<u>765.7</u>	<u>621.4</u>	<u>483.8</u>	<u>391.5</u>	<u>343.7</u>	<u>303.7</u>	<u>276.2</u>	<u>251.4</u>
Fixed Assets											
Fixed assets in service, at cost	\$6,690.6	5,991.3	5,339.3	4,920.5	4,541.3	3,606.7	3,254.4	3,002.3	2,887.1	2,423.8	2,242.2
Accumulated depreciation	1,198.9	1,063.7	980.5	877.9	784.3	706.1	634.1	568.7	511.9	463.5	417.2
	<u>\$5,491.7</u>	<u>4,927.6</u>	<u>4,358.8</u>	<u>4,042.6</u>	<u>3,757.0</u>	<u>2,900.6</u>	<u>2,620.3</u>	<u>2,433.6</u>	<u>2,375.2</u>	<u>1,960.3</u>	<u>1,825.0</u>
Bonds and Debentures — Net	\$5,324.3	5,175.7	4,739.5	4,337.5	3,604.7	2,990.3	2,514.7	2,055.1	1,862.4	1,726.4	1,588.3
Expenditures on Fixed Assets	\$ 739.9	754.8	721.6	641.1	548.5	590.5	463.8	332.3	230.2	217.9	216.0

Operating Statistics *years ended March 31*

	1981	1980	1979	1978	1977	1976	1975	1974	1973	1972	1971
Electric											
Generating nameplate capacity at year-end (rated kW in thousands)*											
Hydro	7 491	6 588	5 883	5 883	5 449	3 882	3 618	3 318	3 318	2 814	2 455
Thermal	1 346	1 360	1 363	1 293	1 301	1 299	1 104	1 061	1 041	1 038	1 059
Total	8 837	7 948	7 246	7 176	6 750	5 181	4 722	4 379	4 359	3 852	3 514
Peak one-hour demand, integrated system (kW in thousands)	5 475	5 198	5 091	4 621	4 258	4 063	3 791	3 578	3 499	2 970	2 769
Customers at year-end (in thousands)	1 046	1 010	984	952	917	875	843	801	765	726	690
Electricity sold (kW·h in millions)											
Sales in British Columbia**	27 589	26 246	25 605	24 149	22 922	20 553	20 726	19 940	17 978	15 992	14 412
Other sales	2 449	1 077	1 478	3 908	1 961	85	808	2 038	1 165	221	464
Total	30 038	27 323	27 083	28 057	24 883	20 638	21 534	21 978	19 143	16 213	14 870
Increase (decrease) over previous year (%)	9.9	0.9	(3.5)	12.8	20.6	(4.3)	(2.0)	14.8	18.1	9.0	8.9
By class of customer (%)											
Residential	27	28	27	25	27	30	27	24	25	28	28
General	32	33	33	30	31	36	32	30	31	34	32
Bulk	32	34	34	30	33	33	36	36	37	36	36
Other systems	1	1	1	1	2	1	1	1	1	1	1
Export to United States***	8	4	5	14	7	—	4	9	6	1	3
Residential Service											
Average annual kW·h use per customer	9 001	8 736	8 747	8 620	8 452	8 370	7 928	7 694	7 365	7 342	6 949
Average revenue per kW·h (cents)	3.8	3.5	3.4	3.1	2.7	2.3	2.1	1.9	1.9	1.9	1.9
Lines in service											
Distribution (kilometres)	39 632†	38 279	37 125	36 129	35 093	34 089	32 701	31 378	29 735	27 861	26 579
Transmission (circuit kilometres)	15 335	15 258	14 793	14 259	14 082	12 733	12 424	12 435	12 374	12 040	11 555

*Excludes electricity available from other systems. Rated capacity has been exceeded on occasion.

**Includes power to transit.

***Less than 1/2 of 1% in 1976.

†Estimated

Gas

One-day capacity at year-end (terajoules)											
Mainland — firm pipeline contracts	380	380	422	422	422	422	411	344	281	253	259
— plant	105	105	105	105	105	105	105	105	105	105	105
Greater Victoria — plant	6	6	6	6	6	5	6	6	6	6	6
Peak one-day demand (terajoules)											
Mainland system — including interruptible	493	507	510	404	377	430	368	384	365	346	310
— excluding interruptible	490	486	508	402	365	364	356	331	354	323	291
Greater Victoria system	2	2	2	2	2	2	2	3	3	3	2
Customers at year-end (in thousands)	318	298	286	278	270	259	249	238	227	215	205
Gas sold (terajoules)											
Total	85 621	88 074	87 733	83 273	80 006	80 556	77 099	75 105	68 443	63 382	58 401
Increase (decrease) over previous year (%)	(2.8)	0.4	5.4	4.1	(0.7)	4.5	2.8	9.6	8.0	8.5	14.2
Average revenue per gigajoule (dollars)	2.14	1.95	1.93	1.62	1.30	1.11	1.01	0.81	0.81	0.82	0.81

Rail Freight

(tonnes in thousands)	2 458	2 603	2 536	2 397	2 393	2 321	2 494	2 539	2 246	2 364	1 996
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Employees At Year-End*

Regular	8 441	11 330	11 618	11 611	11 339	11 226	10 361	8 945	7 474	7 173	7 205
Temporary	1 099	865	932	946	1 001	807	1 255	1 080	772	669	481
Total	9 540	12 195	12 550	12 557	12 340	12 033	11 616	10 025	8 246	7 842	7 686

*1971 to 1980 includes passenger transportation employees.

Special Supplement

Looking to the Future





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Lasers. Fibre optics. Silicon chips. Photovoltaic cells. They are the tools of tomorrow's world, where computers draw maps and draft engineering diagrams, eliminating hours of routine work and freeing skilled people for more productive activity.

Microscopic silicon chips, each containing thousands of transistors, provide high-speed access to volumes of information at the touch of a button.

Messages by microwave arrive instantly.

And there are new ways to use familiar phenomena — the sun, the wind, the tides, coal and gas — for energy, and more efficient ways to use that energy, though these sources are not yet developed for large-scale use.

A picture of the 21st century, perhaps, but for B.C. Hydro, the next century is not far off — just beyond our present planning schedule.

So we're finding out now about the new processes, techniques and approaches that may be needed to ensure a reliable future energy supply and provide services to our customers.

Though at present no solar energy techniques are considered economic for B.C. on a large scale, we're keeping a close watch on the situation.

At our new research centre in Surrey, photovoltaic cells convert sunlight directly into electricity for experimental purposes. Nearly half the centre's hot water needs are supplied by a solar-powered system.

We're also evaluating collectors installed in the hot water system, providing instrumentation, data logging and computing for solar energy systems and operating a weather station to help evaluate solar testing results.

Sunlight measuring devices using silicon cells to record data on solar radiation have been installed on Hydro buildings in Abbotsford, Prince George, Terrace, Vancouver, Vernon and Victoria. These "sunstations" enable us to give accurate data to customers interested in building solar heaters.

We provide a monitoring service for customer-owned solar heating systems and have published a book explaining how to build solar water heaters.

At our Meager Creek geothermal exploration site this year, following encouraging results from slim-hole drilling, we're planning to drill a large hole to flow-test the underground reservoir.

A 50 kW vertical axis wind turbine to assess wind energy potential is now in operation at Christopher Point on southern Vancouver Island. This is a joint project involving the National Research Council of Canada, the provincial Ministry

of Energy, Mines and Petroleum Resources and Hydro.

Together with industry and the provincial government, we've done environmental and engineering feasibility studies of a potential 50 000 kW thermal plant which would use processed wood waste, known as hog fuel. During the past year we completed a study of hog fuel availability in the Quesnel region and passed on the results to the provincial energy ministry.

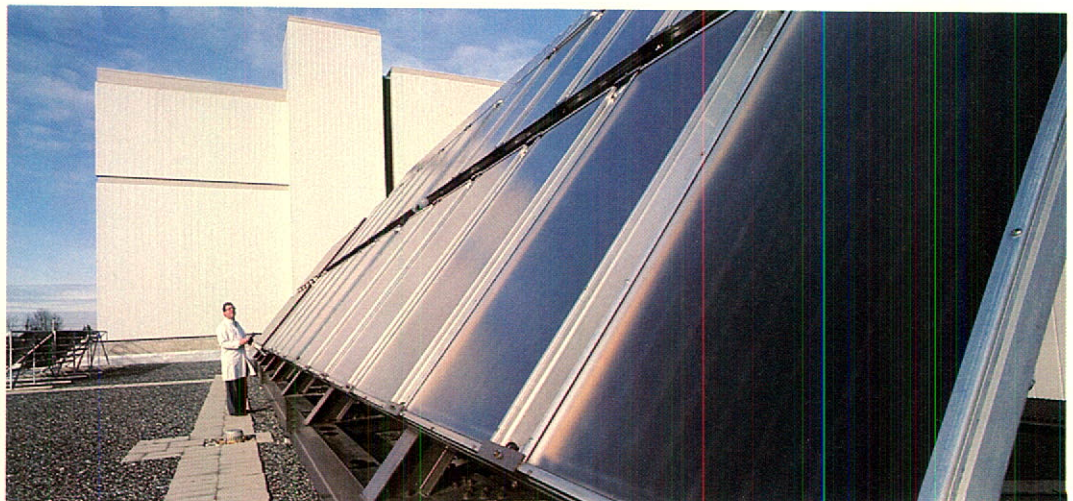
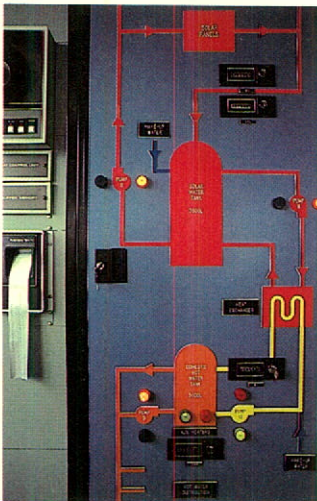
We're assessing the feasibility of small hydroelectric projects to reduce the use of oil-fired diesel plants in isolated areas.

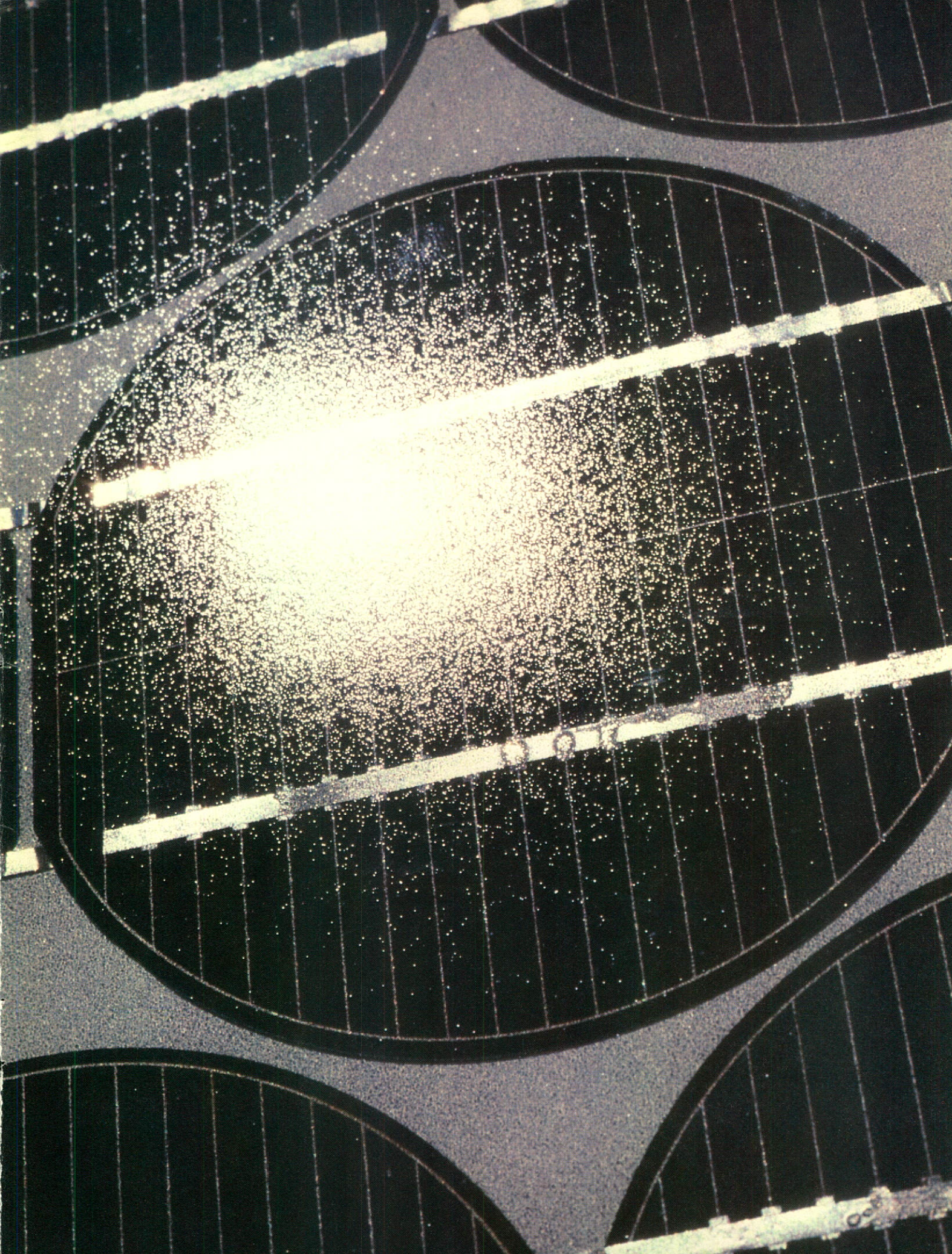
We're helping the provincial energy ministry study possible conversion of Hat Creek coal to liquid fuels such as gasoline and diesel oil, and we initiated tests by the National Coal Board of the United Kingdom to complement the ministry study.

We're studying the possibility of building a demonstration plant using pressurized fluidized bed combustion of coal. This new process could improve efficiency while effectively controlling emissions of sulphur dioxide and oxides of nitrogen.

We're doing studies to see if a 600 000 kW thermal generating plant could be built to use waste by-products from metallurgical coal mining operations in the East Kootenay region. The latest developments in nuclear technology are

Control panels (below) in our research centre monitor roof-top solar panels (below right) and experimental solar cells (facing page). Solar panels supply nearly half the centre's hot water needs, while solar or photovoltaic cells convert sunlight directly into electricity.





being recorded against the time when it may be necessary for B.C. to consider this option.

The oil and gas industry is changing fast. Conversion from oil to natural gas is being supported by both federal and provincial governments, and increasingly accepted by consumers. We are planning new distribution and storage facilities to meet the resulting increased demand and maintain a safe and efficient system.

The province has enough natural gas to last until well into the 21st century. The provincial energy ministry has determined there are reserves to meet both domestic requirements and export commitments through the year 2000, and estimates the ultimate potential of conventional reserves at a level which can meet domestic needs until about the year 2025.

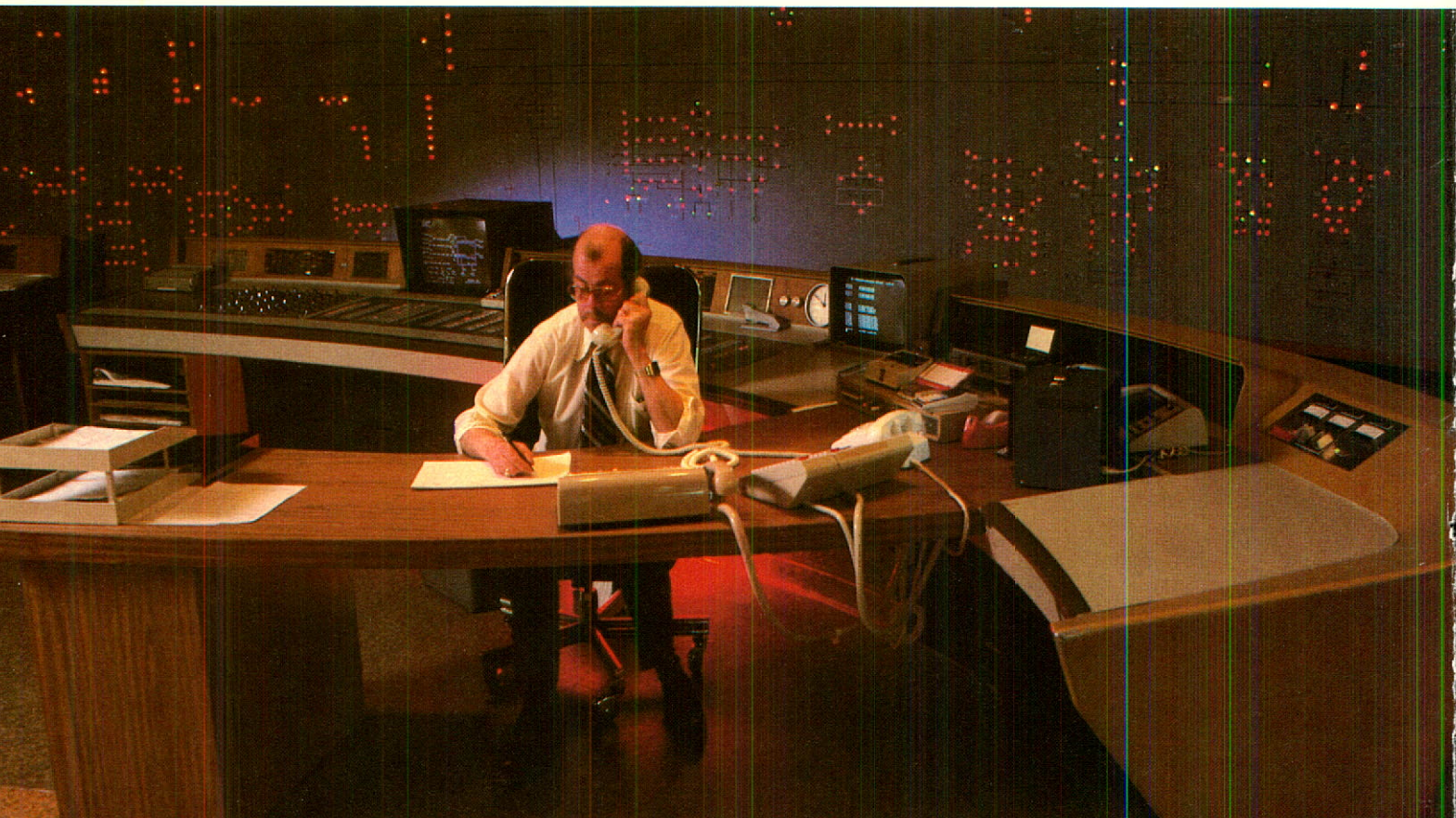
In addition, there are potential supplementary reserves such as "tight" gas in B.C.'s Deep Basin area, unexplored sedimentary basins, supplies from Alberta, the Yukon and the Northwest Territories, offshore supplies and the possibility of converting some of B.C.'s vast coal reserves into gas.

Mountain-top tower is part of a microwave communications system linking the electric system control centre (lower photo) with generation and transmission network.



Possible hydroelectric projects in far northern B.C. pose special challenges for us because of their distance from centres of demand in the central and southern parts of the province. As a result, we're looking into new transmission line structures and insulation systems, the effects of extremely cold temperature on materials and equipment, and new fibre optics and laser technology for high-speed measurements of voltage and current and for quick locations of faults on lines.

Whenever we can, we use new technology to maintain reliable service to customers while minimizing costs. Satellites transmit information about stream flows, temperatures and rain and snow levels from remote automated monitoring stations in reservoir watersheds to regional control centres. Operational instructions are sent by microwave to generating stations and by fibre optics to other control centres and to substations. Micro-computer equipment provides remote control of substations so service can be restored rapidly after any interruption.



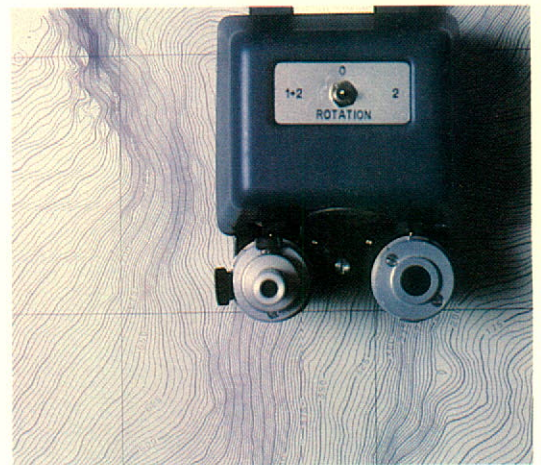
Thousands of hand-drawn maps showing natural gas line routes in the Lower Mainland are being redrawn to metric standards by a new computer graphic system, which permits indefinite storage and quick extraction for display or reproduction, thereby improving drafting productivity. This project is expected to be completed by the end of 1982.

Computer-assisted drafting systems are being implemented to produce, modify, store and recall designs such as schematic and physical layout drawings for substations and gas regulator stations.

We're using a high-gain image intensifier — a device originally developed for military use to locate enemy personnel at night — to find and photograph minute electrical discharges from high-voltage equipment. The device can pick up infinitesimal specks of light and magnify them up to 60 000 times. Early detection is expected to reduce the incidence of discharges which can cause radio and television interference and damage to substation and transmission equipment.

Computers are helping us respond faster to customer enquiries and improve collection procedures. An on-line terminal system providing access to customer account information records stored in a centralized computer system has been extended to 36 district offices serving 94% of our electric and gas customers.

At B.C. Hydro, we're preparing for the future. In fact, some of our people already are living in it. We're investigating tomorrow's tools and technologies — and using many of them — today.



New computer graphic system (right and below) will store map information for all natural gas routes previously contained on thousands of hand-drawn maps.





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