
ENVIRONMENTAL ASSESSMENT

**Proposed Agreements to Resolve Revelstoke
Filling Issues and Access Reservoir
Storage Space in Canada**



**Office of Power and Resources Management
BONNEVILLE POWER ADMINISTRATION**

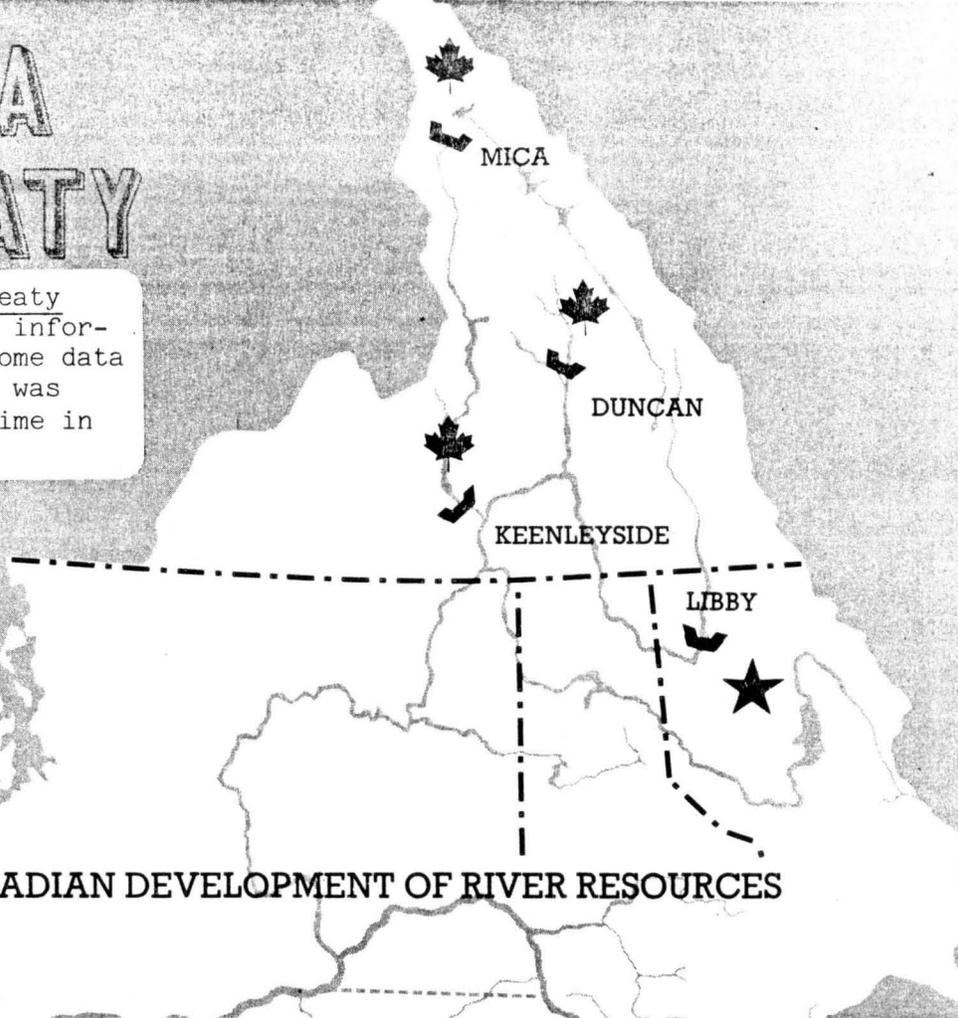
OCTOBER 1983

APPENDIX A

REPRODUCTION OF BPA BROCHURE ON THE COLUMBIA RIVER TREATY

COLUMBIA RIVER TREATY

Appendix A: Columbia River Treaty
This document is reprinted for informational purposes. Although some data may not be current, the report was appropriate for the point-in-time in which it was published.



JOINT UNITED STATES—CANADIAN DEVELOPMENT OF RIVER RESOURCES

INTRODUCTION

Until the 60's, dams on the Columbia River had been built only in the United States. In 1964, however, the Columbia River Treaty between the Canadian and United States governments inaugurated a dam construction program in Canada to harness the upper reaches of the Columbia and its tributaries and develop their potential to the mutual advantage of both countries.

The United States derives two major benefits from the Treaty. One is flood control — ending the danger of serious flooding on both the Columbia and Kootenay rivers (Kootenai in the United States). The other is a large block of low-cost power. For her part, Canada also receives flood control on the Columbia and Kootenay and an equal share of low-cost power from the Columbia River.

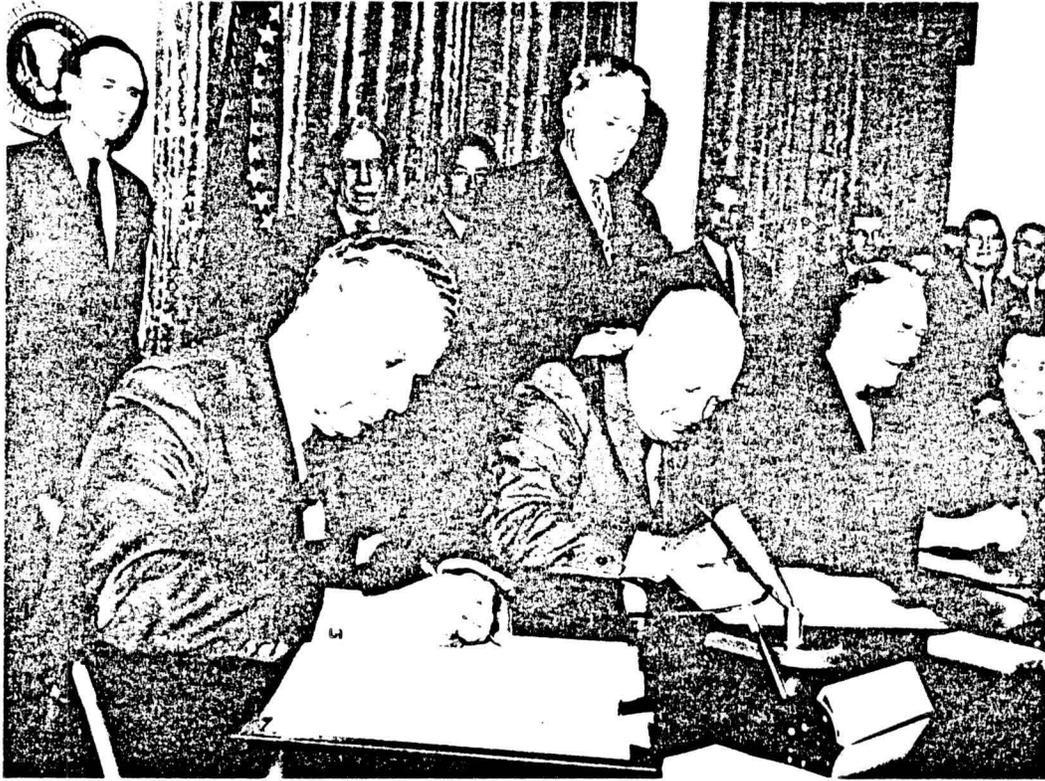
In accordance with the Treaty, Canada built three dams in British Columbia which were completed between 1967 and 1973. The Treaty also allowed the United States to construct a fourth

dam, Libby, in northwestern Montana. It backs water 42 miles into Canada. These dams have more than doubled the amount of water that can be stored to regulate flows on the main stem of the Columbia River.

This means that water formerly flowing unchecked to the sea can be held back to control floods and released as needed to produce power at dams downstream in Canada and in the United States.

There are now 11 dams operating on the Columbia in the United States. Six are owned by the Federal government and five by three public utility districts of the State of Washington.

The regulation of streamflows made possible by the three Canadian reservoirs enables dams in the United States to produce up to 2.8 million kilowatts of dependable capacity, which Canada and the United States share equally. Canada has sold her share in the United States on a long-term contract. One-half the downstream power bene-



Signing the Columbia River Treaty, January 17, 1961

fits attributable to each Canadian project go to the United States purchasers for 30 years after the completion date of each project. Thereafter, they revert to Canada.

Generation at Libby Dam will add to this supply about 750,000 kilowatts of firm power at site and downstream in the United States. Thus total Treaty power benefits in the United States, including Canada's share, amount to as much as 3.5 million kilowatts. Canada, too, can reap downstream benefits from Libby Dam, estimated by the British Columbia Hydro and Power Authority to be about 200,000 kilowatts. This includes the Kootenay Canal project on that river in Canada.

The Treaty and the Pacific Northwest-Pacific Southwest Intertie made feasible the construction of a third powerhouse at Grand Coulee Dam. Ultimately the third powerhouse is capable of having an installed nameplate generating capacity of 7.5 million kilowatts, for a total of almost 10.1 million kilowatts, larger than any existing hydro plant in the world.

THE COLUMBIA RIVER

Heavy snows and rains which fall on the Canadian Rockies create the Columbia River. From Columbia Lake in British Columbia, deep in the rocky spine of the North American continent, the Columbia River flows northward for 200 miles, then abruptly turns south. It enters the United States near Northport, Washington, about 90 miles north of Spokane. From its source in Columbia Lake to its mouth in the Pacific Ocean the river flows 1,240 miles and drops 2,650 feet. Five hundred miles and 1,350 feet of the river's descent are in Canada.

Although only 15 percent of the drainage area of the Columbia River is in Canada, about 30 percent of its total flow originates there. In the 1948 flood which destroyed Vanport, Oregon, about 28 percent of the Columbia waters came from Canada.

The flood control benefits achieved during 1974 as a result of the reservoir capacity of Arrow Lakes and Duncan in Canada and the Libby

reservoir in the United States were significant.

It is estimated that Libby, Duncan, and Keenleyside (referred to as "Arrow Lakes" in the Treaty) projects contributed about 23 percent of the total effective storage for flood control regulation of the lower Columbia River during the peak runoff month of June 1974.

The Columbia is the second largest river in the United States. Only the Mississippi travels farther and carries more water. The Columbia's flow is 10 times that of the Colorado, 2½ times that of the Nile. It has one-third of the hydroelectric potential of the United States. As a source of power, the Columbia is the mightiest stream on the North American continent.

The Columbia River and its tributaries drain a basin larger than France, a basin of 258,000 square miles.

Like the main stream, the tributaries of the Columbia, rising high in the region's mountains, are fed by snows and rain. As the seasons change and the snows melt, the flows of the Columbia River and its tributaries fluctuate widely. At Revelstoke, British Columbia, the Columbia River's largest measured flow is 99 times the lowest. At the International Boundary, 130 miles south of Revelstoke, the Columbia's largest flow is 680,000 cubic feet per second, its smallest 12,900 cfs.

These characteristics intensify the problems of flood control and power production. The solution to both of these problems is to build storage dams to control the river and thus alleviate flood losses while regulating the flow to increase firm power production. Although equivalent control could be achieved by building storage on Columbia River tributaries within the United States, the sites where the needed amount of storage could be built at the least initial cost were in Canada. The Treaty provided for development of this storage to benefit both Canada and the United States.

TREATY SUMMARY

Under the Treaty Canada was to develop 15.5 million acre-feet of water storage by building

Duncan, Keenleyside (formerly Arrow Lakes), and Mica dams in British Columbia. All of this is usable for power production and for flood control.

Canada under the Treaty has agreed to operate 8,450,000 acre-feet of storage for flood control in the United States. The United States may call on Canada for additional flood control, but must then pay extra for it.

Two of the Canadian storage dams, Mica and Keenleyside, are on the main stream of the Columbia. The third, Duncan, is on a tributary of the Kootenay.

Duncan Dam was completed on July 31, 1967; Keeleyside Dam, October 10, 1968; and Mica Dam, March 29, 1973, all in advance of schedule.

The United States under the Treaty option built Libby Dam on the Kootenai River in Montana. Libby Dam adds nearly 5 million acre-feet of storage, all of it usable both for power and flood control. Storage was available for flood control July 1, 1973.

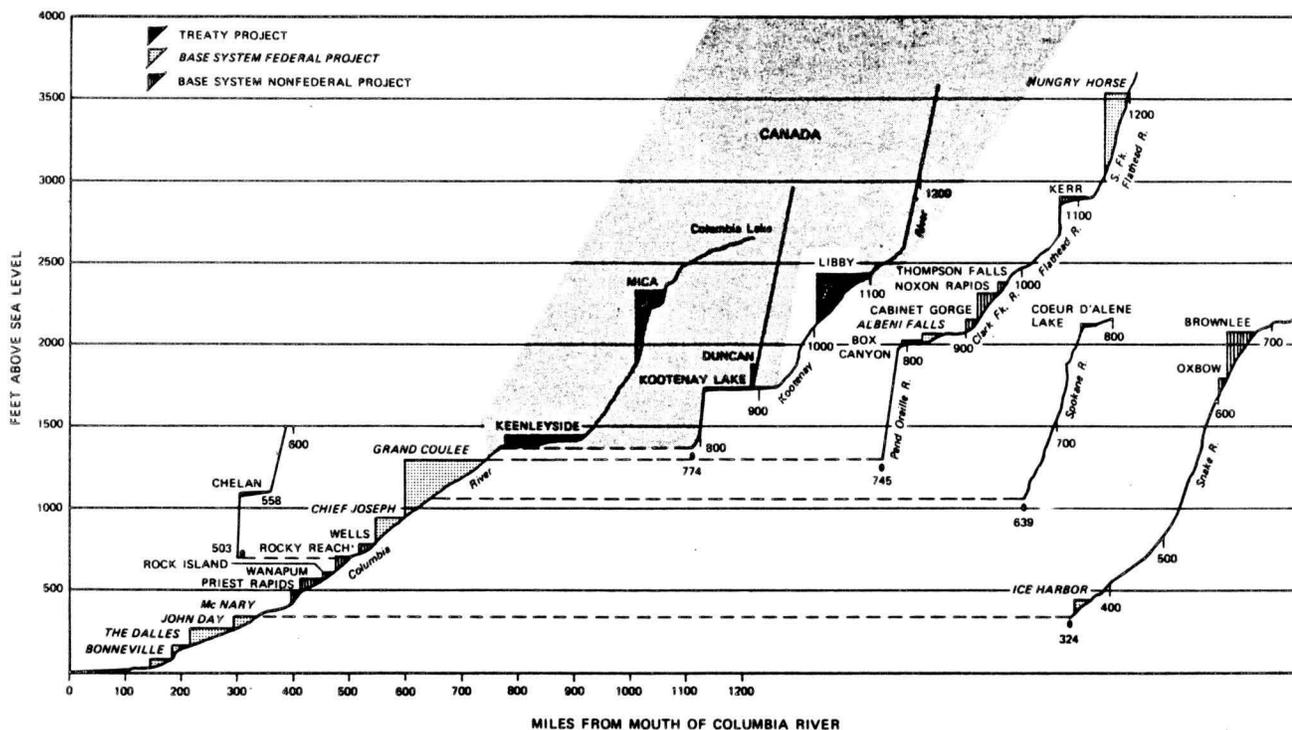
Existing non-treaty storage on the Columbia River and its tributaries, including non-Federal installations, totals 28 million acre-feet — all usable for power production and 16.9 million acre-feet usable for flood control.

Total storage on the Columbia and its tributaries is now some 43.5 million acre-feet of which over 25 million acre-feet are usable for flood control, as shown in the following table:

	Usable for power (million acre-feet)	Usable for flood control (million acre-feet)
Non-treaty Columbia River storage in the U.S. above The Dalles OR.	28.0	16.9
Three Canadian Treaty Dams	15.5	8.450 ¹
Total	43.5	25.350

¹Under the Treaty the United States has paid for the use of 8,450,000 acre-feet of storage for flood control. The remaining 7 million acre-feet may be used on an "on-call" basis for control of large floods with additional payment to Canada.

PROFILE SHOWING ELEVATIONS AND RIVER-MILE LOCATIONS OF PROJECTS IN THE COLUMBIA RIVER BASE SYSTEM



Operating Plan

Under the terms of the Treaty, each nation has designated an operating entity. Canada's entity is British Columbia Hydro and Power Authority. The United States entity consists of the Administrator of the Bonneville Power Administration, Chairman, and the Division Engineer, North Pacific Division, U.S. Army Corps of Engineers. The entities are charged with formulating and carrying out the operating arrangements necessary to implement the Treaty.

Canada operates her three storage dams in accordance with plans agreed upon for optimum power generation and flood control on the Columbia River in the United States and Canada. The three Canadian projects are operated in coordination with all U.S. Columbia Basin projects. The purpose is to make the most effective use of the improvement in streamflows resulting from storage at the three Canadian dams.

A base system of 24 projects was used in determining power benefits under the Treaty. This

base system includes Kootenay Lake in British Columbia, the 11 dams on the main stem, and 12 dams on the Columbia tributaries.

Most of the Treaty power is produced at the 11 main stem dams. The six Federal dams are Bonneville, Grand Coulee, McNary, The Dalles, Chief Joseph and John Day. The five non-Federal main stem dams are Rock Island and Rocky Reach owned by Chelan County PUD; Priest Rapids and Wanapum owned by Grant County PUD; and Wells owned by Douglas County PUD.

The 12 base system projects on tributaries in the United States are in Federal, public and private ownership. They are Hungry Horse, Kerr, Thompson Falls, Noxon Rapids, Cabinet Gorge, Albeni Falls, Box Canyon, Brownlee, Oxbow, Ice Harbor, Chelan, and Coeur d'Alene.

Canada and the United States have agreed upon formulae for equal sharing of the power and flood control benefits that the United States will receive from three Canadian projects. This is explained in the succeeding sections.

TREATY POWER BENEFITS

Two terms are used to describe the increases in power production which result from the Treaty. These terms are "dependable capacity" and "energy." Both are common in the utility industry.

Dependable capacity credited to Canadian storage is the amount of firm peaking power that can be delivered from the base system in the United States at the average critical period load factor. Firm power is power that can be guaranteed for delivery when it is needed. Dependable capacity usually is expressed in kilowatts.

Energy is the amount of power produced by a plant in a given period expressed in kilowatt-hours.

The bulk of additional usable power made available under the Treaty results when the water stored behind the three Canadian dams is released to flow through the 11 United States dams on the main stem of the Columbia. The Canadian storage increases the amount of usable regulated streamflow at each downstream plant in the

United States. This additional dependable supply of water increases both the "dependable capacity" and "energy" at each of these plants.

During winter, when Columbia Basin streamflows are lowest, electrical loads of the region are highest. During summer, when Columbia streamflows reach their peaks, electrical loads of the region are lowest, and large amounts of water spill unused over the dams and are wasted. The Canadian dams hold back part of this summer flow and make it available during winter when the need for dependable capacity and energy increases.

At their maximum in 1974-75, the extra power benefits amounted to nearly 2.8 million kilowatts of dependable capacity and approximately 13.3 billion kilowatt-hours of energy. By year 2003 it is estimated that the dependable capacity benefits will decline about 740,000 kilowatts and energy benefits to about 3.6 billion kilowatt-hours.

The actual production of power at United States dams does not decline. It is just that the value of storage, including Canadian storage, be-

Some general and physical characteristics of the three Canadian storage dams and of Libby Dam are:

Location	Duncan Outlet of Duncan Lake	Keenleyside 5 miles upstream from Castlegar	Mica 90 miles upstream from Revelstoke	Libby 17 miles upstream from Libby, Montana
Drainage area	930 sq. mi.	14,100 sq. mi.	8,220 sq. mi.	8,985 sq. mi.
Average flow	3,600 cfs	39,800 cfs	20,700 cfs	11,970 cfs
Max. rec. flow	21,400 cfs	220,000 cfs	112,000 cfs	121,000 cfs
Min. rec. flow	268 cfs	4,800 cfs	2,140 cfs	895 cfs
Dam type	Earthfill	Earthfill	Earth and rockfill	Concrete gravity
Dam height (above riverbed)	130 feet	170 feet	640 feet	370 feet
Dam crest length	2,600 feet	2,850 feet	2,600 feet	3,055 feet
Dam volume	6,400,000 cu. yds.	8,500,000 cu. yds.	42,200,000 cu. yds.	3,760,000 cu. yds.
Live storage capacity	1,400,000 ac. ft.	7,100,000 ac. ft.	Storage only: 7,000,000 ac. ft. With at-site gen., 12,000,000 ac. ft.	4,934,000 ac. ft.
Length of reservoir	28 miles	145 miles	135 miles ³	90 miles
Initial Flood Control Payment in U.S. Dollars	\$11,182,000 ¹	\$52,296,000 ¹	\$1,200,000	²

¹Total includes additional payment for early completion.

²Annual flood control benefits are estimated to be \$3,055,000.

³Valemont on Canoe River to Donald on Columbia; Mica Dam to Donald is 85 miles.

comes less as the region adds to its powerplants.

The reasons energy benefits credited to Canadian storage decline over the years are basically two: (1) As the region's power requirements increase, more hydro capacity (generators) is being installed at United States dam sites; (2) In a few years the remaining economic hydro sites will be fully developed and the region will continue to build thermal (steam) plants to produce additional energy.

The combination of these two factors will enable the hydro generators to make increasingly effective use of the Columbia River flows, even without storage, and thus diminish the value assigned to storage. This requires further explanation.

At present the Northwest has a virtually all-hydro power system which is used to carry both base load and peak load. Base load is the minimum requirement around the clock. Peak load is the demand for power above the base load. Peak demands occur daily, during the breakfast and dinner hours, for example, and seasonally as in winter when lights go on earlier and electric heating systems run longer.

For a hydro system to carry a region's entire load it must be able to produce firm power — the kind of power, as explained above, that can be guaranteed for delivery any time of day or night as needed. The amount of firm power our hydro system can produce is limited by the amount of steady streamflow in the river under the lowest conditions of record. This is called "critical" streamflow. When streamflow is higher than critical, these hydro plants can produce additional power called secondary energy. Secondary energy cannot be guaranteed for delivery.

Storage of spring and summer high streamflow has the effect of increasing the critical streamflow. This is because storage releases in autumn and winter can be timed to maintain a steady additional flow. This enables our hydro projects to produce more firm power. It gives storage a high power value now.

Two of the Canadian storage dams, Duncan and Keenleyside, produce no at-site power

under the Treaty; their sole function is to store water. At Mica, however, generating capacity has been installed by Canada. The Canadian storage dams also make it feasible for Canada to build several dams on the Columbia on her side of the border. Canada is considering a project at Revelstoke Canyon with an installed generating capacity of as much as 2 million kilowatts. The United States is not entitled to any portion of the power produced by generation installed in Canada as a result of the Treaty.

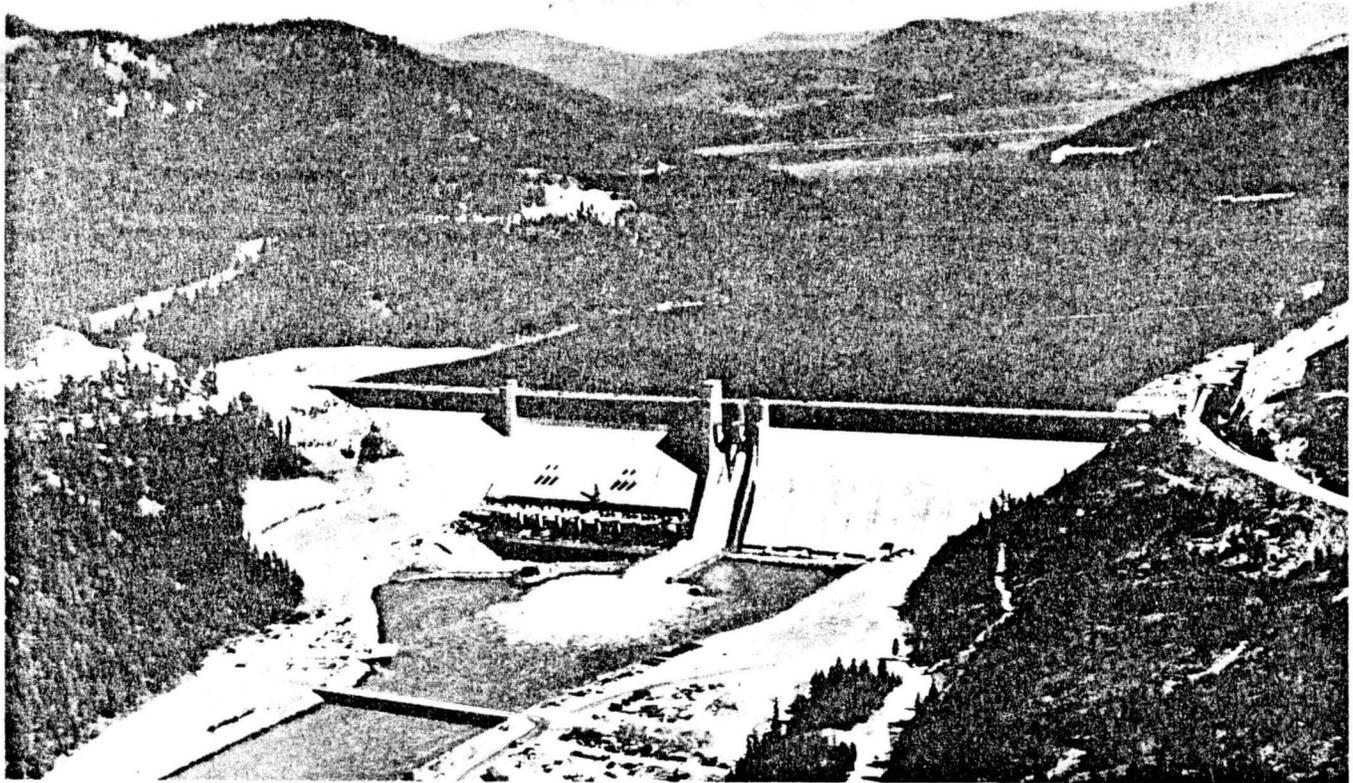
Libby Dam

Libby Dam provides nearly 5 million acre-feet of storage. It adds about 750,000 kilowatts of firm power at site and downstream in the United States and about 200,000 kilowatts downstream in Canada. The United States is entitled to all Libby power and flood control benefits on our side of the border, and Canada, in exchange for providing 42 miles of the Libby reservoir, to all downstream power and flood control benefits on her side of the border.

Benefits Shared

In return for building the three storage projects, Canada, under the Treaty, was to receive one-half of the increased dependable capacity — the extra power produced — at United States dams in the base system. The owners of the projects in the United States would retain the other half. The Treaty contemplated that Canada's share of Treaty power — 1.4 million kilowatts at the maximum — would be delivered at her International Border. The Treaty also provided, however, that if Canada so desired, and the United States agreed, Canada could sell her share in the United States. Canada chose the latter course and for 30 years after each Treaty project was completed has sold to the United States purchasers her share of downstream power attributable to each project for a total price of \$253,930,000 in United States dollars paid in a lump sum on September 16, 1964.

The power was purchased by the Columbia Storage Power Exchange (CSPE), a nonprofit corporation described more fully later in this



Libby Dam

handbook, and simultaneously resold by CSPE to 41 participating public and private utilities through an exchange agreement with BPA. Four private utilities took 50 percent of the Canadian entitlement and 37 public agencies and cooperatives the other 50 percent. Revenue bonds sold by CSPE in the United States, secured by all of these contracts, financed the purchase.

Several major arrangements had to be completed by the utilities in the United States before the Treaty could take effect. They include a division of the benefits among the separate owners of the downstream dams, an agreement to coordinate operations of a number of hydroelectric projects in the river basin, and resale of the Canadian entitlement.

ALLOCATION AGREEMENTS

Allocation agreements were needed because the downstream benefits would be produced at

11 dams under different ownerships, and the owners had to agree on how the benefits were to be attributed to each project. The United States Government owns six of these dams and the PUDs five. About 74 percent of the Treaty power is generated at Federal projects and 26 percent at the PUD dams.

BPA has available to it as the Federal portion of the U.S. share more than 1,000,000 kilowatts of firm power resulting from Canadian storage and about 585,000 kilowatts of firm power from Libby (at site and downstream) or, initially, a total of about 1.6 million kilowatts.

The PUD owners of main stem dams receive about 365,000 kilowatts of power benefits from Canadian storage and about 165,000 kilowatts from Libby or, initially, a total of more than 500,000 kilowatts.

The table on page 14 shows the firm power increases at United States dams attributable to the Canadian Treaty.

**TYPICAL DISTRIBUTION OF FIRM POWER INCREASES AT
U.S. COLUMBIA RIVER POWER PLANTS ATTRIBUTABLE TO CANADIAN TREATY**

	Megawatts Without Treaty	Megawatts With Treaty	Gain
Grand Coulee	1,770	2,510	740
Chief Joseph	910	1,230	320
Wells	400	550	150
Rocky Reach	580	790	210
Rock Island	170	220	50
Wanapum	500	690	190
Priest Rapids	500	660	160
McNary	650	860	210
John Day	940	1,240	300
The Dalles	810	1,050	240
Bonneville	570	700	130
	<u>7,800</u>	<u>10,500</u>	<u>2,700¹</u>
Libby	0	750	750
Total, including Libby	<u>7,800</u>	<u>11,250</u>	<u>3,450</u>

¹Excludes increases at "Base System" projects not directly affected by Canadian storage releases. When gains and losses at other base system projects are included, this figure is raised to about 2,800 megawatts.

There are five allocation agreements, one for each PUD project on the main stem of the river. They are called the Canadian Entitlement Allocation Agreements. They became effective on September 16, 1964, and will terminate March 31, 2003. The parties to the agreement are the PUDs and the BPA Administrator, who acts for BPA and the United States Entity in relation to these agreements.

The PUD's have agreed to supply the Administrator with stipulated amounts of dependable capacity and average usable energy as the share of the Canadian entitlement attributable to their projects. If the Districts lack sufficient capacity at their own projects to make up their share of the Canadian entitlement, they may purchase this capacity from the Administrator. In addition, they may purchase capacity from the Administrator to firm up their share of the United States entitlement without installing additional generating capacity.

A set of assignment agreements accompanies the allocation agreements. These agreements are between the PUDs and those who purchase

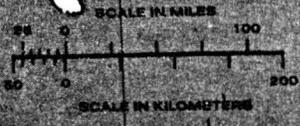
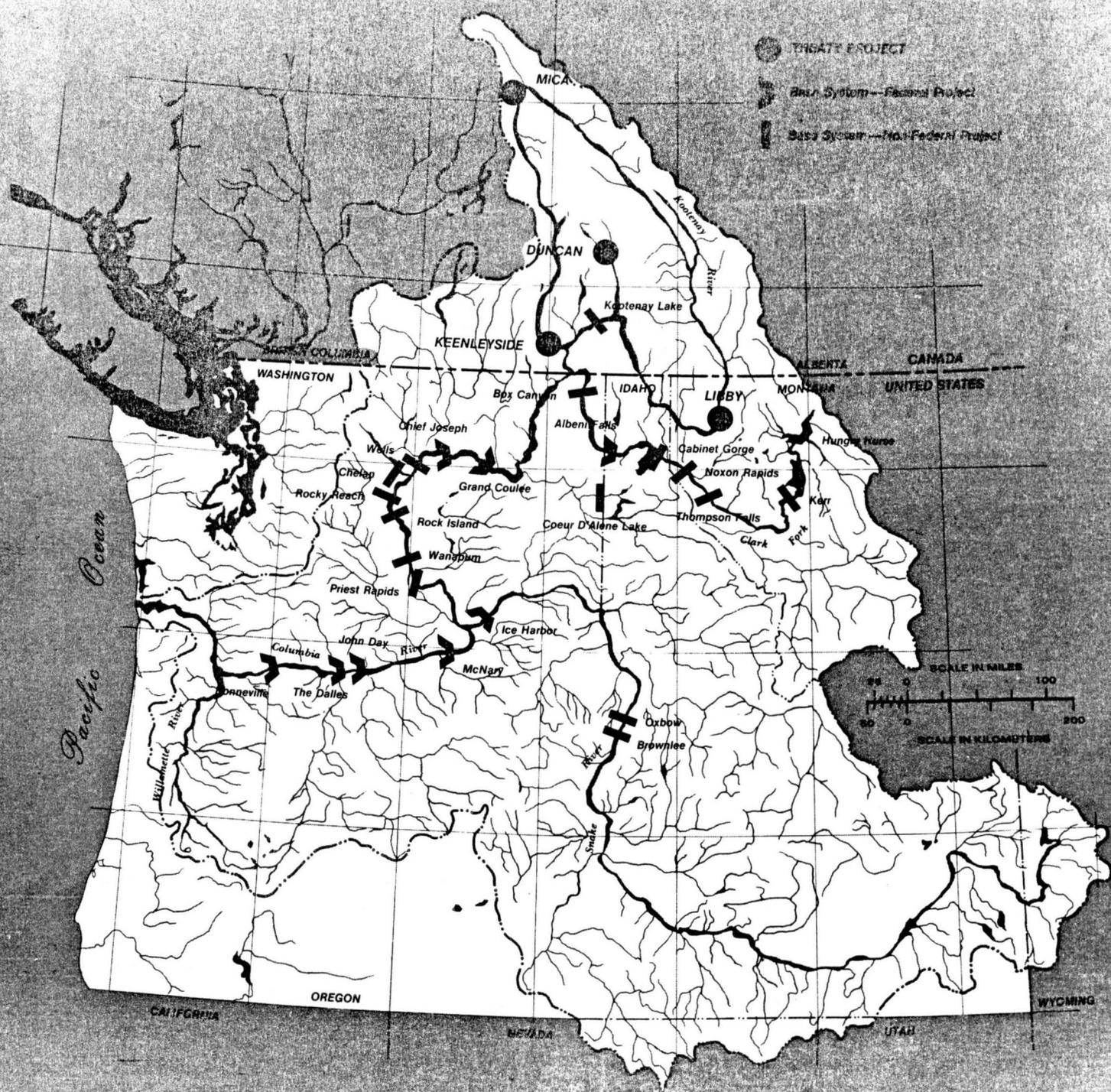
the output of their projects. In these agreements the purchasers consent to and approve the Districts' action in executing the allocation agreements.

Coordination Agreement

Under the Treaty the United States has to account to Canada for downstream benefits at all the downstream dams regardless of ownership on a formula which assumes that all the dams be operated as though under a single ownership. To produce benefits in accordance with the Treaty formula required an agreement among the various owners of the downstream dams to coordinate the operation of their dams, as well as other dams in the Columbia Basin. The purpose of the agreement is to coordinate operations of the dams owned by Federal, public and private interests to produce power and other benefits to meet the region's needs with the greatest possible efficiency, despite seasonal variations in streamflows. The coordination agreement involves complex technical details. It terminates in the year 2003.

LAND TREATY PROJECTS

-  TREATY PROJECT
-  Basin System—Federal Project
-  Basin System—Non-Federal Project



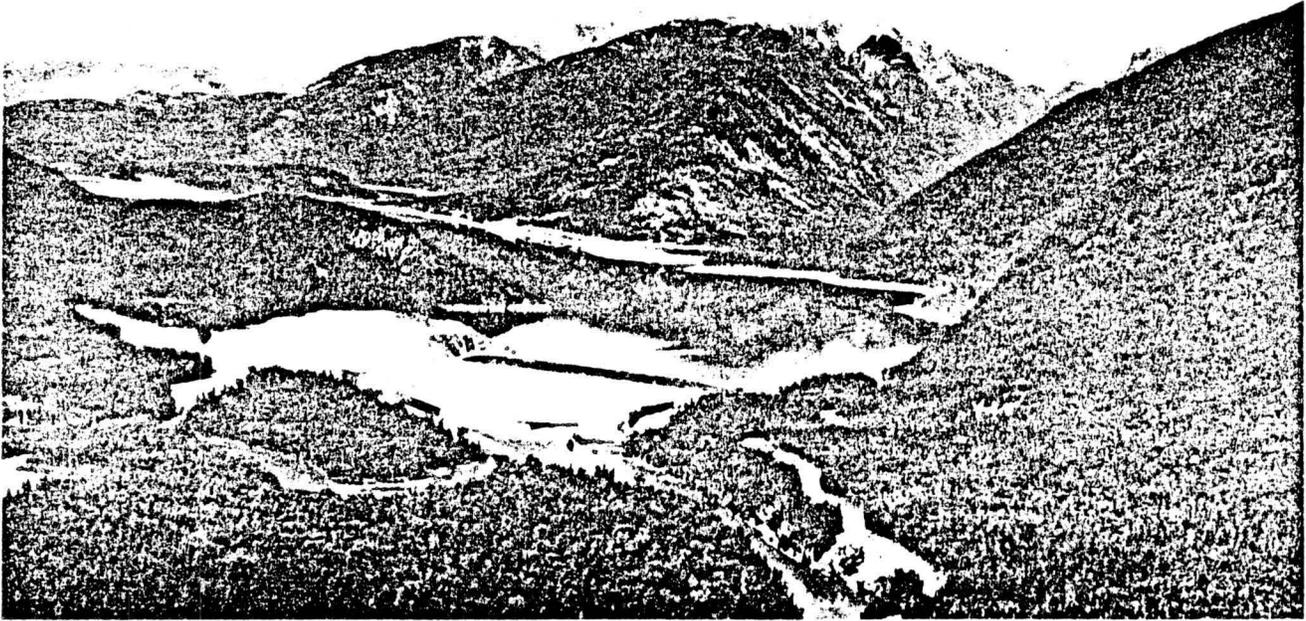
Pacific Ocean

CALIFORNIA

NEVADA

UTAH

WYOMING



Duncan Dam

Exchange Agreement

The bonds issued by CSPE to finance the purchase were secured with power exchange agreements among CSPE, the United States (acting through the Bonneville Power Administrator in his capacity as Administrator and on behalf of the United States Entity) and the 41 participating utilities. Under the exchange agreements CSPE assigns a portion of the Canadian entitlement to each participating utility for the 30 years that follow scheduled completion of each project. Each participating utility assigns to BPA its rights to the Canadian entitlement in exchange for an agreed upon amount of firm power from BPA, which BPA guarantees to deliver even if Canada, for any reason, should have failed to construct its projects or operate them as contemplated. Each of the participating utilities makes payments to a single trustee for its share of the power, and the trustee in turn pays off the revenue bonds. The aggregate of the payments by the participating utilities is sufficient to pay the principal, interest, and expenses of the bonds and pay administrative expenses of CSPE.

Cost

Based on the amount of capacity and energy to be made available to the participants, the Canadian entitlement costs \$5.05 per kilowatt-year plus 2.48 mills per kilowatt-hour for energy. At 60 percent load factor the cost would be 3.44 mills per kilowatt-hour. Transmission costs, line losses and taxes are not included.

TREATY FLOOD CONTROL BENEFITS

The Columbia River has experienced four unregulated peak discharges in excess of 1,000,000 cubic feet per second since man began to measure and record its flows. Those peaks at The Dalles were 1,240,000 cfs in 1894; 1,010,000 cfs in 1948; 1,050,000 cfs in 1972; and 1,010,000 cfs in 1974.

The river level during the 1894 flood was 35.5 feet at the site of the Interstate Bridge between Portland, Oregon and Vancouver, Washington. If a flood of this size were to hit again, storage built



Additional storage provided by the treaty will help prevent recurrence of the Vanport Flood of 1948

to date in the United States, excluding Libby, would enable man to hold the level of the river at Portland to 31.1 feet, 4.4 feet less. The three Canadian storage projects and Libby would reduce the river level to 26.1 feet, 9.4 feet below the highest flood on record in Portland.

The 1974 unregulated flow of 1,010,000 cfs was the third highest on record and would have produced a peak stage of 30.6 feet at Portland. With all of the Treaty storage projects, the observed flow was reduced to 590,000 cfs at The Dalles with a 21.1 foot stage at Portland, nearly 10 feet below the unregulated stage.

This means that thousands of acres of land along the lower Columbia have been made safe from floods. Over 80,000 acres of unprotected lands were flooded during the 1948 high flow period. In 1974, more than \$200 million of flood damage was prevented on the lower Columbia with the flood protection by the upstream reservoirs. Some of this land is suited for industrial uses. Its value for this and other uses has been greatly increased.

Flood Control Goals

The Corps of Engineers set two objectives on flood control for the river in a 1958 report on water resources in the basin. The first objective was enough storage to hold a flow equal to the 1894 flood to 800,000 cfs at The Dalles, which corresponds to a stage at Vancouver of 27.1 feet. This would require a total of nearly 18 million acre feet of usable flood control storage well distributed over the basin.

As a secondary goal, the Corps recommended a maximum flow of 600,000 cfs equivalent to a stage of 22.2 feet at Vancouver. The Corps said this could be obtained with an additional 14 to 15 million acre feet of usable storage, or some 32 million acre feet in all.

Flood damage at Vancouver begins at a river stage of about 16 feet; major flooding occurs when the river stage exceeds 26 feet.

Flood Control Distributed

It would be possible for the United States to



Mica Dam

build the total storage capacity needed by adding new projects to those within its own boundary. Storage built under the Treaty, however, better distributes the flood control over the basin to include direct control over Canadian drainages which contribute major portions of the Columbia River flood flows.

The percentage which Kootenay River flood flows contributed to the total flows at The Dalles in 1894, 1948, 1972 and 1974 are shown below.

PERCENTAGE FLOOD CONTRIBUTION

	1894 Flood	1948 Flood	1972 Flood	1974 Flood	Average
Columbia River Above the Kootenay	23%	16%	22%	23%	21%
Kootenay River Above its Mouth	17%	15%	16%	17%	16%
Columbia River at The Dalles, Oregon	100%	100%	100%	100%	100%

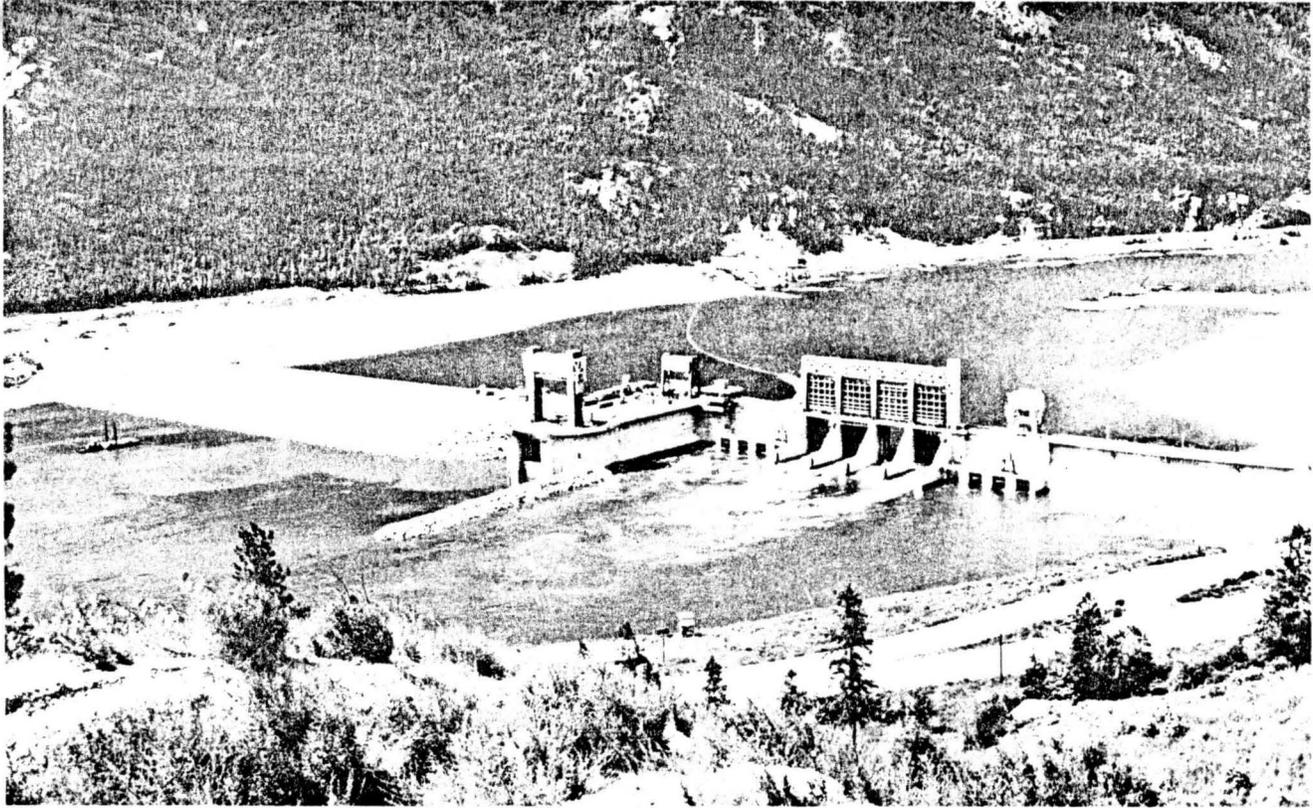
How Flood Control Benefits Computed

Despite the difficulties of predicting future

floods and the damage they might cause, the value of Canadian storage for flood control must of necessity be based on forecasts. The damage prevented was estimated on a 1985 level of development for the areas lying in the path of floods. The estimate took into account increases in values for lands freed from floods.

Of the 15.5 million acre-feet of storage available, 8,450,000 acre-feet is assured for flood control on a year-to-year basis. The remaining 7 million acre-feet may be used on an "on-call" basis for control of large floods, with payment of additional funds to Canada. The Treaty provides that with the flood control payments this amount of storage will be operated for flood control needs of the United States through September 16, 2024.

The 8,450,000 acre-feet of storage usable for flood control consists of 7,100,000 acre-feet behind Keenleyside Dam in Arrow Lakes, 1,270,000 acre-feet in Duncan Lake and 80,000 acre-feet behind Mica Dam. Out of this total storage of 7,100,000 acre-feet at Arrow Lakes, only about



Keenleyside Dam

3,300,000 acre-feet would have been available through natural storage.

This storage was judged to be worth \$5,700,000 a year in flood control benefits. The \$64.4 million flood control payment to Canada was based on one-half of this annual benefit; capitalized for a period equal to 60 years minus the time required for construction at an annual interest rate of 3½ percent. The interest rate represents the average for long term United States government bonds outstanding in December 1960.

The \$64.4 million required by the Treaty was paid to Canada in three installments. As each of the three projects was completed and began operation for flood control, that portion of the \$64.4 million attributable to its storage became due. \$11,182,00* was paid after Duncan Dam was declared operational July 31, 1967, \$52,296,000* was paid when Keenleyside Dam was declared operational October 10, 1968, and \$1,200,000 was paid when Mica was declared operational on March 29, 1973. As stated earlier, the United States may

call on Canada for additional flood control at an added cost of \$1,895,000 per call for the first four calls. No further charge will be made for additional calls.

*The United States paid sums higher than agreed to in the Treaty because of early completion of the dams.

Future Provisions

After the first 60 years have passed Canada will continue to operate its storage in the Columbia River Basin to control floods, when asked to do so by the United States. The United States has agreed to pay for this service. For each flood period for which this flood control is provided Canada is to be paid (a) the operating cost incurred in providing flood control and (b) compensation for the economic loss to Canada arising directly from "Canada foregoing alternative uses of the storage to provide the flood control."

TREATY HISTORY

The Columbia River is the central geographic fact of the Pacific Northwest. Development of the

river since 1933 has changed the character of the region. It is now the nation's principal source of hydroelectric energy, and supports a growing industrial and agricultural economy.

In an early stage of this development — on March 9, 1944 — the governments of Canada and the United States asked the International Joint Commission to determine whether the construction of projects on the Columbia would be advantageous to both nations. The Commission established the International Engineering Board. The Board made extensive technical studies and reported to the Commission in 1959 on possible plans.

Meanwhile the United States in 1951 applied to the Commission under the Boundary Waters Treaty of 1909 for approval to build Libby Dam. The United States later withdrew the application, and in 1954 resubmitted it. The Commission did not agree on approval. The Treaty gave the United States the Authority it needed from Canada to build Libby Dam.

In January 1959 the two nations asked the Commission for its report and recommendations on the principles to be used in determining the benefits and how they were to be apportioned between the two countries. The Commission reported in December 1959. It provided valuable guidelines for the delegations of the two governments who began formal treaty negotiations in early 1960. The United States delegation was composed of one representative each from the Department of the Interior, Department of State, and the Army Corps of Engineers.

Months later, and as the culmination of years of comprehensive study and negotiations, the Treaty was agreed upon. President Eisenhower and Prime Minister Diefenbaker signed it January 17, 1961, at Washington, D.C.

Ratification Delayed

The United States quickly ratified the Treaty. Canada, however, delayed ratification because of a difference between the Canadian national gov-

ernment and the Province of British Columbia over disposition of Canada's share of the Treaty power.

The issue was not resolved until after the April 1963 general election in Canada. The Canadian and British Columbia Governments then agreed Canada's entitlement should be sold in the United States but that the Treaty first should be clarified in certain particulars thought necessary by the new Canadian government to fully protect Canada's interests.

Treaty Ratification

In the round of negotiations which followed, the two countries arrived at a price for Canada's share of the power. And on January 22, 1964, notes were exchanged ratifying the agreement on terms of sale.

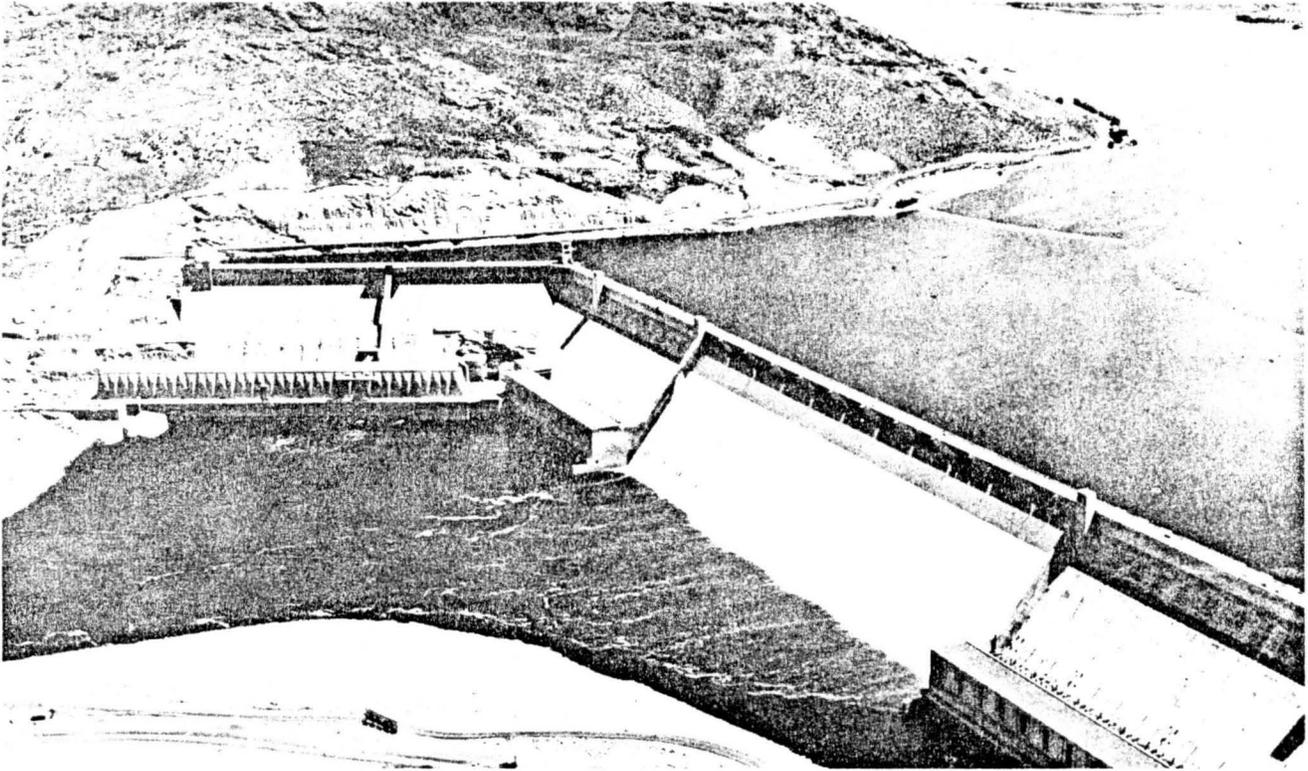
Among other things, these new documents contained a pledge by the United States that it would use its best efforts to arrange the sale of Canada's share of Treaty power for 30 years to a single purchaser in the United States for \$254.4 million U.S. dollars (\$274.8 million Canadian dollars) payable in full as of October 1, 1964. Canada pledged her best efforts for early ratification.

Because a great many things had to be done in a comparatively short time, leaders on both sides of the International Boundary moved quickly.

The Canadian Parliament approved ratification in June, subject to consummation of the sale, and payment of the purchase price, as described above. Approval by the House of Commons came on June 5, 1964, and by the Senate just five days later.

Columbia Storage Power Exchange

The single United States purchaser, a non-profit corporation, Columbia Storage Power Exchange, was organized May 11, 1964. It was sponsored by Chelan, Douglas and Grant County Public Utility Districts. CSPE's purpose was to execute the contracts to buy Canada's Treaty power, to issue the bonds necessary to finance the purchase, and to resell the power to retire the indebtedness.



Grand Coulee Dam, showing third powerhouse on the left

The management of CSPE is vested in a board of trustees composed of 11 members. These members are appointed, one each, by five public utility districts, three municipalities, and three private power companies. The PUDs are Chelan, Douglas, Grant, Cowlitz and Pend Oreille, the cities Seattle, Tacoma and Eugene, and the private power companies are Portland General Electric Co., Puget Sound Power and Light Co. and Washington Water Power Co.

Cooperative Efforts

The major agreements, as well as lesser agreements, had to be negotiated and signed before the Treaty could take effect. Activity to meet the October 1 deadline was intense.

The work required the cooperative efforts of private firms, public utilities and government agencies. On August 13, 1964, a small mountain of documents was signed. The arrangements were extremely complicated. They included purchase agreements, power exchange agreements,

power allocation agreements, agreements to coordinate generating projects, escrow agreements, and payment agreements. All of these documents were put in escrow pending the sale of the bonds.

Bond Sale

The next big step was to sell the bonds.

Bond underwriters in the United States were kept informed as the arrangements progressed, and on August 26, 1964, a syndicate announced it would buy the bonds at an effective interest rate of 3.85 percent. The total amount of the issue was \$314.1 million. (This figure includes interest during construction.) It was at that time the fourth largest revenue bond issue in the history of the country. At this interest rate the cost of power to United States purchasers was reduced to 3.44 mills per kilowatt-hour at 60 percent load factor.

Treaty and Intertie Are Related

The underwriters explained, after the issue



Intertie transmission lines, central Oregon.

was sold, that the favorable interest rate was possible because Congress earlier in August approved the Pacific Northwest-Pacific Southwest Intertie.

The Intertie assured that the Canadian entitlement could be resold to the California market during the early years of the Treaty when the Pacific Northwest did not need the entitlement. By April, 1970, the California utilities who purchased entitlement power were given 5-year notice of withdrawal. Until April 1, 1975, they had received a maximum of 1,086 megawatts on peak and 696 megawatts average energy. After that date they were reduced to 300 megawatts on peak and 160 megawatts average energy through March 1978, after which further reductions to 150 megawatts on peak and 75 megawatts average energy were made. All power will be withdrawn by April 1, 1983.

The formal exchange of ratifications which implemented the Treaty occurred in Ottawa Sep-

tember 16, 1964. That same day President Johnson and Prime Minister Pearson appeared together at an historic ceremony on the International Boundary at the Peace Arch at Blaine, Wash. Meanwhile, in New York City, bankers handed representatives of the Canadian government the check for \$253,930,000. The actual payment was somewhat less than the \$254.4 million agreed upon because the payment was made two weeks before the October 1, deadline and was adjusted for interest. The events occurred almost simultaneously. The Treaty became a reality.

APPENDIX B

LIMITATIONS ON SCOPE OF ENVIRONMENTAL ASSESSMENT

The proposed agreements, the no action alternative, and the filling agreement alternative would each affect the environment in both Canada (particularly the Province of British Columbia) and the United States. The Department of Energy, pursuant to Executive Order 12114 of January 4, 1979, has issued guidelines (46 FR 1007-1011) for the scope of environmental analyses undertaken for proposals having effects abroad. Section 4 of these guidelines lists four categories of actions abroad for which environmental review is mandatory. These are as follows:

- A. "4.1 Major Federal actions significantly affecting the environment of the global commons outside the jurisdiction of any nation (e.g., the oceans or Antarctica)."
- B. "4.2 Major Federal actions significantly affecting the environment of a foreign nation not participating with the United States and not otherwise involved in the action."
- C. "4.3 Major Federal actions significantly affecting the environment of a foreign nation which provide to that nation:
 - (a) A product, or physical project producing a principal product or an emission or effluent, which is prohibited or strictly regulated by Federal law in the United States because its toxic effects on the environment create a serious public health risk (see Appendix A): or
 - (b) A physical project which in the United States is prohibited or strictly regulated by Federal law to protect the environment against radioactive substances."
- D. "4.4 Major Federal actions outside the United States, its territories and possessions which significantly affect natural or ecological resources of global importance designated for protection by the President pursuant to section 2-3(d) of Executive Order 12114 or, in the case of such a resource protected by international agreements binding on the United States, by the Secretary of State."

The proposed agreement with B.C. Hydro will not impact the global commons, or natural or ecological resources of global importance to any identifiable degree, and it does not result in any toxic products or emissions. Therefore, subsections 4.1, 4.3, and 4.4 are not applicable. With respect to subsection 4.2, B.C. Hydro is the "Entity," or appointed representative, of the Canadian Government for matters relating to the Columbia River Treaty, and is also a provincial Crown corporation with a Board of Directors appointed by the Lieutenant Governor in Council of British Columbia. The agreement is conditional upon B.C. Hydro's obtaining necessary licenses and approvals from the Province of British Columbia and the Canadian government. Therefore, the foreign nation is participating in the action, and subsection 4.2 also appears to be inapplicable. Thus, environmental review of impacts abroad is not required in this case.