

u. s. columbia river

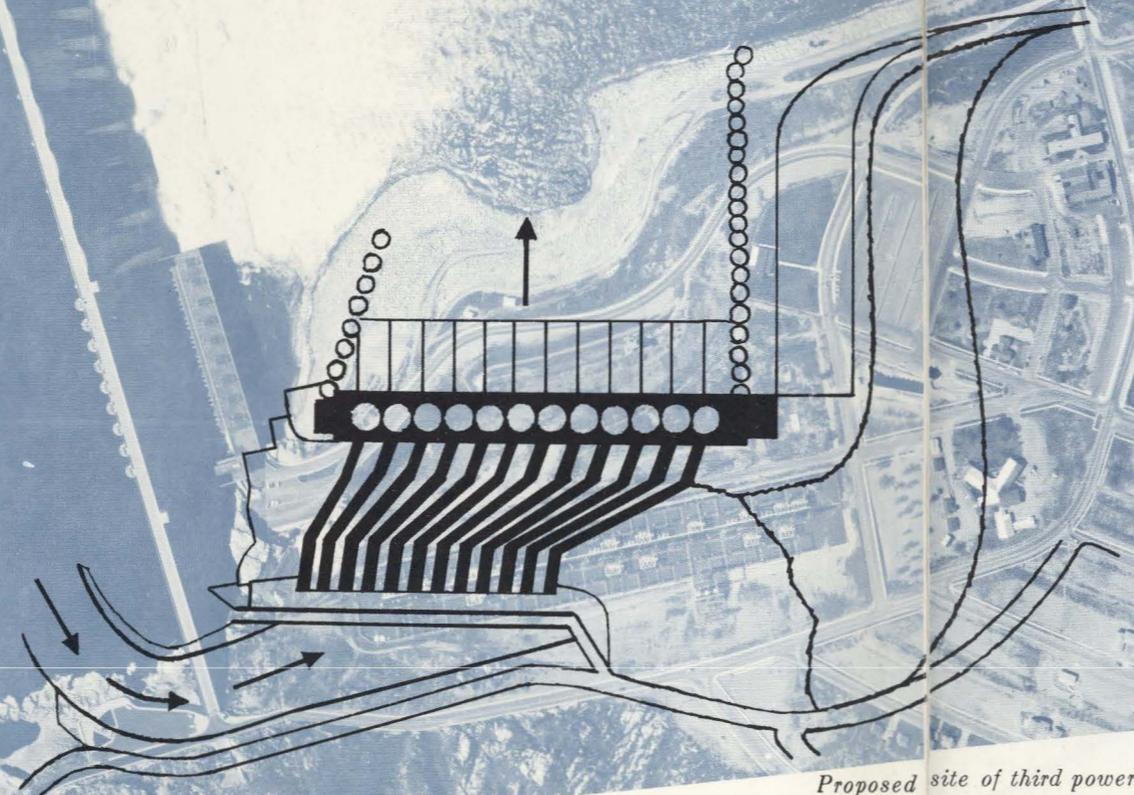
**1964 REPORT**

power system

*The U. S. Columbia River Power System consists of Bonneville Power Administration and the following projects: Bonneville Dam, Columbia Basin (Grand Coulee Dam), Hungry Horse, Albeni Falls, Detroit-Big Cliff, McNary, Lookout Point-Dexter, Chief Joseph, Yakima (Roza & Chandler), The Dalles, Ice Harbor, Hills Creek, Minidoka, Boise Diversion, Black Canyon, Anderson Ranch, Palisades, Cougar, Green Peter, Foster, John Day, Lower Monumental, Little Goose & Dworshak (Bruces Eddy).*

# 1964 REPORT

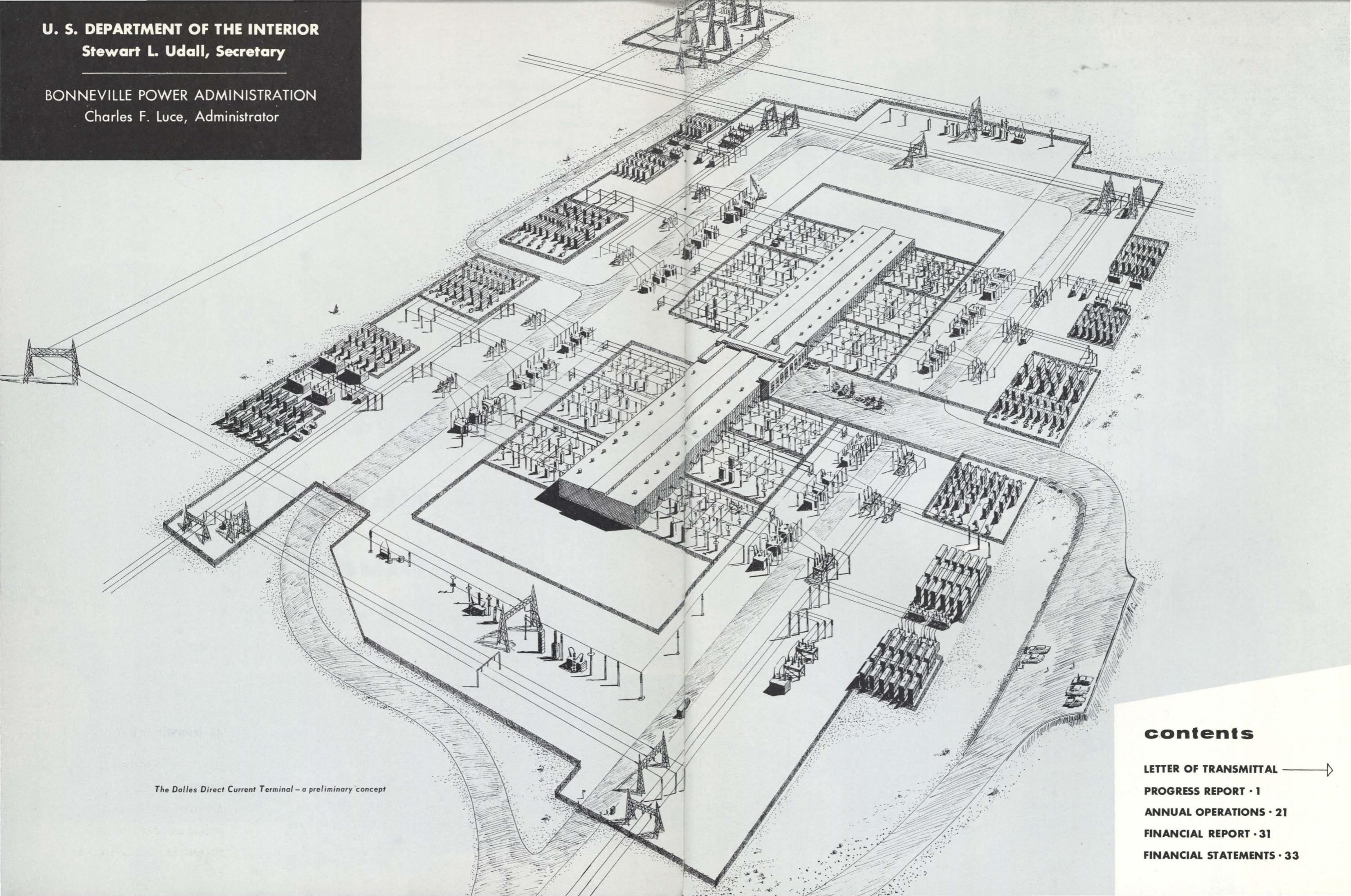
## u. s. columbia river power system



*Proposed site of third powerhouse at Grand Coulee Dam*

U. S. DEPARTMENT OF THE INTERIOR  
Stewart L. Udall, Secretary

BONNEVILLE POWER ADMINISTRATION  
Charles F. Luce, Administrator



*The Dalles Direct Current Terminal - a preliminary concept*

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*Secretary Udall, Governor Rossellini, Senator Jackson and Senator Magnuson watch President Johnson sign the Canadian Treaty*

*President Lyndon B. Johnson, Secretary Stewart L. Udall and Senator Maurine Neuberger help celebrate the Northwest-Southwest Intertie at breakfast in the Portland Sheraton Hotel.*



## **letter of transmittal**

December 31, 1964

Honorable Stewart L. Udall  
Secretary of the Interior  
Washington, D. C.

Dear Mr. Secretary:

Herewith is the Twenty-seventh Annual Report of the Bonneville Power Administration, as required by subsection 9 (c) of the Bonneville Project Act.

The past year has seen the fruition of programs we have worked on intensively for the past 3-1/2 years. Because some of our main programs were not finally approved until September we have deviated from the practice of reporting events only through June 30, end of our fiscal year, and have carried discussion of these programs to the time they were successfully concluded.

The report consists of three sections, a "Progress Report", "Annual Operations", and "Financial Statement".

These are the highlights of our report:

- The treaty with Canada for joint development of the Columbia River was proclaimed September 16, 1964, when President Johnson and Prime Minister Pearson met at the Peace Arch near Blaine, Washington. Canada has broken ground at Duncan Lake Dam, first of the three storage projects it will build under the treaty.
- The Pacific Northwest-Pacific Southwest extra high voltage interties were approved by Congress in August 1964. Funds were appropriated to start the Federal portions of three of the four big intertie lines. We have started line surveys and materials procurement for each of these three lines.

# Letter of Transmittal

- Public Law 88-552, the Bonneville marketing area bill, also was enacted in August. It gives first call on Northwest Federal hydroelectric energy to the people of the Northwest, with reciprocal rights to other regions interconnected with the Northwest.
- Construction of the Hanford atomic power plant is on schedule and costs are running below original estimates.
- For the second consecutive year our financial results of operations have improved. Our deficit in fiscal 1964 was only \$3,039,000 compared with deficits of \$17.7 million in fiscal 1962 and \$5,483,000 in fiscal 1963. We are still in an overall surplus position of \$19,916,000 for our 27 years of operations.
- We have deferred for 1 year consideration of a proposed rate increase. Any rate increase we may have to make will be much less than would have been necessary without the intertie and the treaty.
- New Federal dams started in the past 4 years, together with the Hanford atomic project, when completed will increase the generating capacity of the United States Columbia River Power System by about 50 percent.
- In the past 4 years we have started construction of lines that will nearly double our transmission capacity. Our program to build a 500,000-volt overlay grid, biggest in the nation, is well underway.
- We have increased our industrial sales by 25 percent over 4 years ago, and signed new industrial sales contracts which will increase our firm power industrial load by more than 40 percent. By the end of calendar year 1964 these increased industrial sales will mean about 1,000 additional jobs in the Northwest, together with substantial increases in plant investment and taxes. When all of the new industrial power contracts become effective, employment will increase by another 1,000. This does not include indirect employment which averages about two jobs for every one in basic industry.

We have demonstrated what many people were sure of 4 years ago--that given a forward-looking program, Bonneville Power Administration could produce results to benefit the economy of the region and the nation.

We could not have achieved those results without the strong support of the people of the region, including both public and private electric utilities, or without the support and encouragement of the President, the Secretary of the Interior, and the Northwest's congressional delegation.

Looking ahead 10 years it appears our loads, including our industrial loads, will double; our transmission capacity will double; and Federal generation in the region will double. To say it another way, in the next 10 years we will have to accomplish as much in hydroelectric resource development as it has taken us all of this century to accomplish.

The distinguishing characteristic of the coming 10 years, however, will be this: about 80 percent of the new hydro generation will be installed at existing dams, both Federal and non-Federal.

Dams have been built on most of the economic hydro sites in the Columbia River Basin. However, at many of these dams, additional generators can

*Letter of Transmittal*

be installed. For example at Grand Coulee Dam, plans are being completed for a third powerhouse with 3.6 million kilowatts of capacity. Added to the 2 million kilowatts at its existing two powerhouses, Grand Coulee will have a capacity of 5.6 million kilowatts, which is more than any other existing hydroelectric project in the world.

And there is space for a second powerhouse at Bonneville Dam, with six new units adding 360,000 kilowatts. If we are to take full advantage of the headwater storage we get in Canada and our markets for temporary surpluses in California, we will need the second powerhouse at Bonneville Dam by about 1975.

At Chief Joseph Dam there are 11 empty slots waiting for generators that will add 704,000 kilowatts. Eight additional units can be installed at The Dalles, with another 624,000 kilowatts of capacity. Ten generators are now being installed at John Day Dam, but there will be spaces for 10 more which will give John Day a total capacity of 2.7 million kilowatts. The authorized Asotin Dam will be constructed during this period with initial installation of 270,000 kilowatts of capacity in two units; one more unit can be added later.

This is not to overlook Libby and Lower Granite Dams, both authorized, with a combined initial installed capacity of 720,000 kilowatts. Both of these projects should be started without delay.

Non-Federal projects where generator additions are contemplated include the Chelan County Public Utility District's Rocky Reach Dam, Douglas County PUD's Wells project, and Grant County PUD's Priest Rapids and Wanapum projects. High Mountain Sheep Dam, presently in litigation, will add about 900,000 kilowatts when it is constructed.

The job of building lines and installing generators to match the region's growth in the next 10 years will require all of our talents and determination. With the support of the people of the Northwest, we will succeed.

Sincerely yours,

*Charles F. Luce*

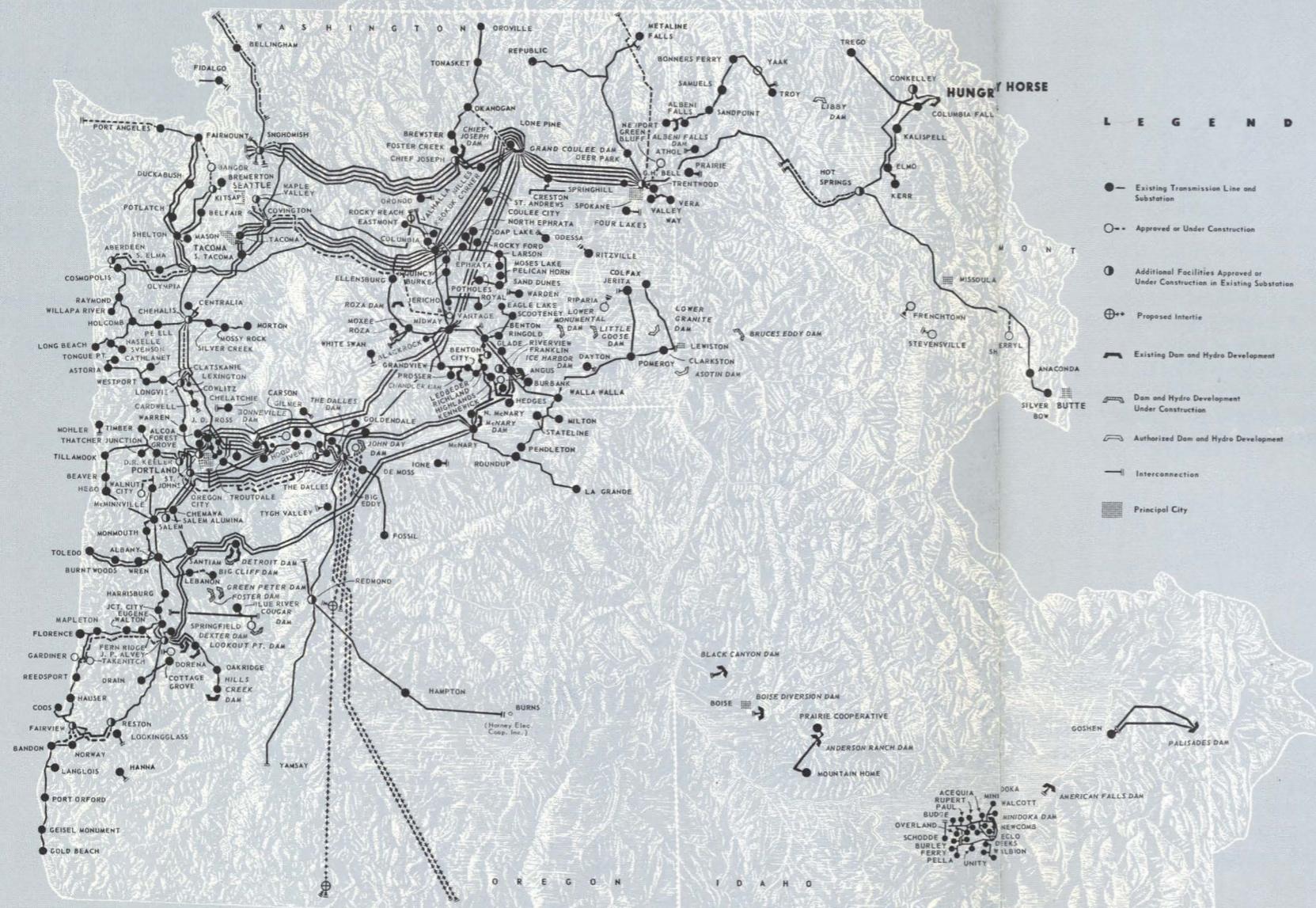
Charles F. Luce  
Administrator



# progress report

## BONNEVILLE POWER ADMINISTRATION TRANSMISSION GRID

### U. S. Columbia River Power System



Our fiscal 1961 annual report set forth as twin major goals of the Bonneville Power Administration:

1. To maintain our low rates.
2. To meet the load growth requirements of the region, including the needs of industries which would invest new capital in the region only if large blocks of low-cost power were available.

The situation then was this:

Bonneville Power Administration was incurring annual deficits which threatened to wipe out our previously accumulated surplus and force a major rate increase.

At the same time, surplus power was going to waste over our spillways worth up to \$30 million a year. But it was mainly secondary energy, the kind that could not be guaranteed for delivery under low-water conditions and therefore could not be marketed in the Northwest except in small amounts.

We had just gone through an 8-year period when Federal power policy was "no new starts". The demand for electric power in the Pacific Northwest was increasing at the rate of nearly 400,000 kilowatts of average annual energy a year. By the winter of 1965-66 the region would have a firm power deficit.

The only major new Federal dams under construction to provide additional firm power, John Day and Lower Monumental, were not scheduled to come on the line until 1967 or 1968. There was no firm power to sell new industries.

The Pacific Northwest was threatened with a power brownout in 1965-66.

### OUR PROGRAM

To achieve the first goal, maintenance of our low rates, we proposed:



*Hotstick work--linemen work on live 500,000 volt line*

- Revision of the unnecessarily severe repayment schedule on the Federal investment in the U. S. Columbia River Power System.
- A revitalized power marketing program in the Northwest.
- The Pacific Northwest-Pacific Southwest Intertie, which would enable us to sell in California and other Southwest markets our surplus secondary energy going to waste.
- As a condition precedent to the intertie, we stressed the need for legislation defining the primary marketing area of Bonneville Power Administration and guaranteeing Northwest consumers first call on Federal hydroelectric energy produced in this area.
- Conclusion of the treaty with Canada for joint development of the Columbia River. The U. S. share of additional power resulting from three Canadian storage dams would add about 2.1 million kilowatts of firm power to resources of the Pacific Northwest, of which about 1.6 million would be on the BPA system.
- An orderly program of new starts on remaining economical hydro sites on the Columbia River and its tributaries.

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Since our 1961 report, these proposals either have become a reality or are well on their way to becoming realities.

To achieve the second goal, an adequate power supply, we proposed:

- Construction of the Hanford steam plant in time to avert the threatened firm power shortage in 1965-66.

We have revised our payout schedule to bring it more nearly in line with payout criteria followed by other Federal power marketing agencies in other river basins, and more closely related to the actual service lives of our dams and transmission system.

We have instituted a power marketing program that stresses self-help by our retail distributors.

Average home use has increased since 1961 about 1,300 kilowatt-hours per year and average commercial use about 4,500 kilowatt-hours. Our direct sales to industries have increased about 25 percent.

Congress has approved the intertie program and funds have been provided to start construction. S. 1007, the regional protection bill, has been enacted and signed by the President as Public Law 88-552.

The Hanford steam plant is under construction and on schedule.

The treaty with Canada has been concluded, and the first of the three dams to be built by Canada is under construction.

Six new Federal dams are under construction and a sound basis has been laid by the Canadian treaty and the intertie for economical additions to Northwest hydro projects sufficient to carry the region's load growth into the mid-1970's.

In summary, then, while we may be faced with a small rate increase next year, we have reversed the downward trend of our financial situation and avoided a large rate increase that could have harmed the economy of the region. And an adequate power supply for the Northwest is now assured for at least the next 10 years, provided that Congress appropriates funds for the necessary capital investment.

## THE INTERTIE

As approved by Congress in August 1964, the intertie will be built by a combination of public and private utilities and the Federal Government. It could not have been achieved without the cooperation of public and private utilities throughout the West.

The intertie consists of four long extra high voltage lines between the Columbia River Federal plants and Southwest points, and four lesser supporting lines. Two of the big lines will be 500,000-volt alternating current, and two will be 750,000-volt direct current--America's first and world's longest d.c. lines. The d.c. lines will put America in the forefront of application of this exciting new transmission technique. Studies are now in progress to determine whether the

voltage of the direct current lines can ultimately be raised to more than 750,000.

Total investment in the intertie program will be \$700 million. The Federal portion is about 40 percent or nearly \$300 million, divided between BPA and the Bureau of Reclamation. BPA's share is \$165.21 million for the Oregon portions of both d.c. lines, the Oregon portion of one 500,000-volt a.c. line, and an 80-mile portion in northern Oregon of the second 500,000-volt a.c. line.

Congress on August 14, 1964, appropriated \$42.2 million for BPA to start construction of its parts of the two d.c. lines and the first a.c. line. We have started ground surveys of the routes and initiated procurement of equipment and materials for all three of these lines.

The intertie program should net BPA an average of \$10 to \$12 million a year over the next 50 years, and increase our firm power resources by about 700,000 kilowatts. These benefits result from the sale of surplus secondary and peaking power, and from exchanges of capacity and energy between the Northwest and Southwest to take advantage of diversity in peak loads.

For many years, whenever our streamflows are high we will have surplus secondary energy that we can sell to the steam electric utilities of the Southwest, yielding revenues to BPA and saving fuel costs for Southwest utilities. In the summertime, when our streamflows are high and our peak loads low, we will ship power to the Southwest where summertime peaks are high. In the winter, when this situation is reversed, Southwest utilities will return capacity and energy to the Northwest to help us meet our high winter peaks. In addition, there will be year-round exchanges of Northwest hydro peaking capacity for Southwest off-peak steam energy. Such exchanges spare each region the necessity of installing extra generating capacity which would sit idle except during brief periods of peak loads.

The intertie is the biggest single electrical transmission program ever undertaken in this country. The lines will tie together electric systems of 11 Western States, and will put the BPA grid near the center of a vast transmission system of public and private lines stretching from northern Canada to the Mexican border.

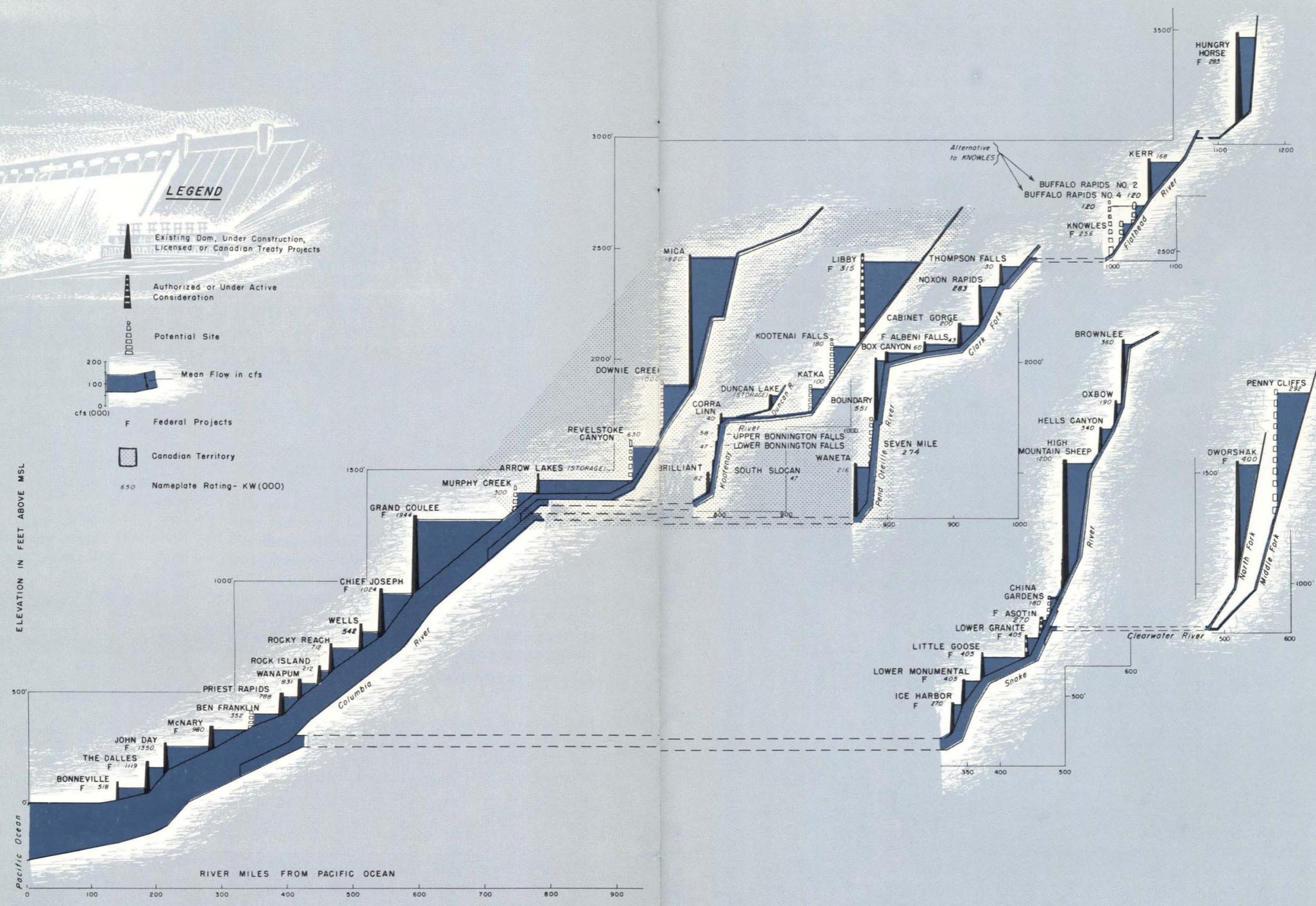


- LEGEND**
- Existing Dam, Under Construction, Licensed or Canadian Treaty Projects
  - Authorized or Under Active Consideration
  - Potential Site
  - Mean Flow in cfs
  - Federal Projects
  - Canadian Territory
  - Nameplate Rating- KW(000)

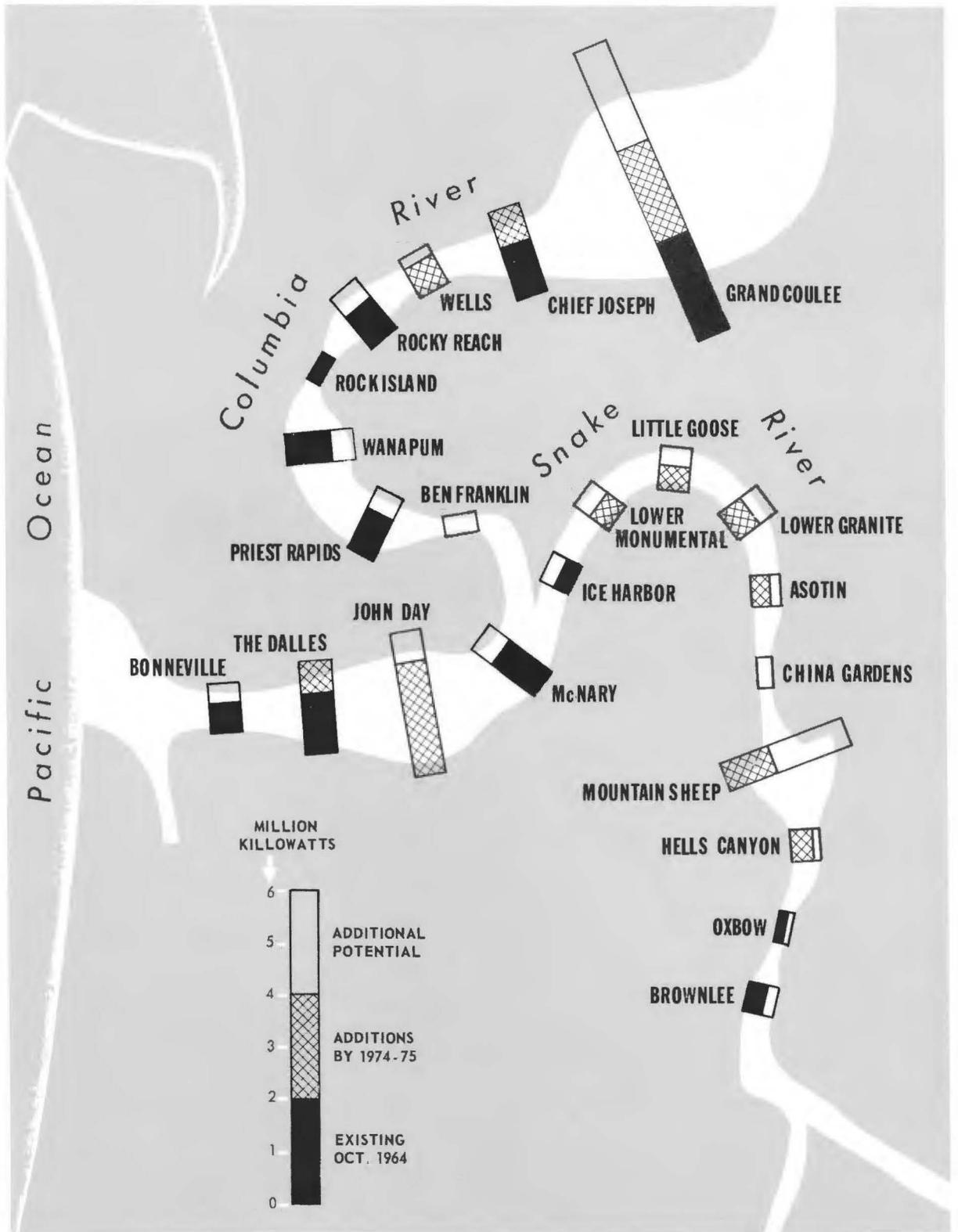
ELEVATION IN FEET ABOVE MSL

RIVER MILES FROM PACIFIC OCEAN

June, 1964



EXISTING & POTENTIAL POWER DEVELOPMENT, COLUMBIA RIVER & MAIN TRIBUTARIES



EXISTING & ULTIMATE GENERATING CAPACITIES, COLUMBIA & LOWER SNAKE RIVERS

## PROTECTIVE LEGISLATION

Federally generated hydro power needed in the Pacific Northwest by public agencies, cooperatives, industries or private utilities will not be exported over the intertie. This was assured by the passage of Public Law 88-552, the Bonneville marketing area bill, on August 20, 1964. Despite this limitation on use of the intertie lines, studies show the lines can be fully loaded with surplus secondary and peaking power, diversity exchanges and Canadian power.

P. L. 88-552, together with a secretarial order implementing it, defines the Pacific Northwest as all of the States of Washington, Oregon and Idaho, the part of Montana west of the Continental Divide, and the parts of Wyoming, Utah and Nevada that drain into the Columbia River. The Act makes this large region, comprising 259,000 square miles, Bonneville's primary marketing area.

Special provision is made to serve fringe area cooperatives which have no generating facilities and which have distribution systems both within and without the Pacific Northwest as above defined. The fringe area to be served, however, cannot be more than 75 airline miles outside the Northwest. The Act further provides that nothing in it shall be construed to modify the geographical preference of power users in the State of Montana which is established by the Hungry Horse Dam legislation.

Power surplus to the needs of this region may be sold outside the region under contracts making the power recallable if a need develops for it in the region. The bill, sought since 1948, extends reciprocal rights to consumers in regions interconnected with the Pacific Northwest.

## CANADIAN TREATY

The treaty with Canada for joint development of the Columbia River will add about 3.5 million kilowatts initially to U. S. Pacific Northwest power resources, including Libby Dam and Canada's share of treaty power which is being sold in the Northwest. The treaty also will put an end to serious flooding on the Columbia and Kootenai Rivers.

Under the treaty, Canada will build three large storage projects on her side of the border, and the United States is permitted to build Libby Dam

on the Kootenai River in Montana. Libby will back water 42 miles into Canada. The Canadian storage dams and their scheduled completion dates are: Duncan Lake, April 1, 1968; Arrow Lakes, April 1, 1969; and Mica, April 1, 1973. By terms of the treaty, the United States has until mid-1969 to start Libby Dam, although funds may be asked in fiscal year 1966 to begin construction.

The three Canadian storage projects provide 15.5 million acre-feet of storage on the Columbia River and its tributaries usable for power production in the United States. More than half of this storage is also usable for flood control. Libby Dam adds 5 million acre-feet, all of it usable both for power and flood control. Existing U. S. storage on the Columbia and its tributaries, including non-Federal installations, totals 18 million acre-feet. All of this existing storage is usable for power production, and over 10 million acre-feet can also be used for flood control. U. S. projects under construction or authorized add 2.5 million acre-feet, all usable for power production and flood control. Thus with completion of the treaty projects, total storage on the Columbia and its tributaries will be about 41 million acre-feet, of which 26 million acre-feet will be usable for flood control.

The Corps of Engineers' primary flood control goal of 800,000 cubic feet per second at The Dalles, Oregon, requires about 18 million acre-feet of storage usable for flood control, and the secondary--or ultimate--flood control goal of 600,000 c.f.s. requires about 32 million acre-feet. With the treaty the primary flood control goal will be met with some to spare. There is another 20 million acre-feet of potential storage available in the U. S. Pacific Northwest.

The treaty provides that for 20 years there will be no diversions from the Columbia River system in Canada other than for consumptive purposes. After 20 years, it provides for limited diversions of the Kootenay River (spelled Kootenai in the United States) into the headwaters of the Columbia River within limits that do not adversely affect power production at Libby Dam.

The three Canadian storage dams will hold back flood waters and release them as needed to produce additional power at dams downstream in the United States. The regulated flow of the upper Columbia will enable U. S. downstream dams to produce 2.8 million kilowatts of additional

firm power initially. Half of this extra power goes to each nation, but Canada has sold her share to public and private utilities in the United States for \$254 million for the first 30 years of operation of each of the storage projects. For flood control benefits, the U. S. Government will pay Canada \$64.4 million. Power benefits from the treaty will decline gradually after Northwest utilities begin the installation of steam electric generating facilities, but other benefits will become even more valuable as the years pass by.

Libby Dam will add about 750,000 kilowatts of firm power at site and downstream in the United States, and will permit Canada to add about 200,000 kilowatts downstream on the Kootenay in Canada. Each country retains the Libby power and flood control benefits that accrue on its side of the border.

After 16 years of negotiation, the treaty was signed in January 1961 by President Eisenhower and Prime Minister Diefenbaker. The U. S. Senate quickly ratified it, but ratification was held up in Canada because of an internal dispute over whether Canada should retain or sell her share of treaty power. Late last year the Canadian National Government and the British Columbia Government agreed that it should be sold. After another round of negotiations, the United States and Canada agreed in January 1964 on a price of \$254 million payable in lump sum in advance by October 1, 1964. Canada insisted on selling her share to a single U. S. purchaser. In May 1964, the single U. S. purchaser was agreed upon--Columbia Storage Power Exchange, a nonprofit corporation composed of representatives designated by 11 public and private utilities. CSPE's purpose was to execute the contracts to buy Canada's entitlement, to issue the revenue bonds necessary to finance the purchase, and to resell the power to retire the indebtedness.

Forty-one Northwest private and public utilities eventually agreed to purchase shares of the Canadian entitlement ranging from .005 to 17.5 percent each, under exchange agreements with BPA. Four private utilities will take 50 percent of the Canadian entitlement and 37 public agencies and cooperatives the other 50 percent. By the exchange agreements, CSPE assigns a share of the Canadian entitlement to each participating utility for 30 years. Each participating utility exchanges its share with BPA for an agreed-upon amount of firm power, which we guarantee to deliver even if Canada for any reason should fail to construct or operate its



Canadian Treaty dams,  
from top to bottom:  
Mica, Arrow Lakes,  
Duncan Lake & Libby

projects as contemplated. Canada has made guarantees to the United States that the projects will be constructed and operated in accordance with terms of the treaty. BPA takes the Canadian entitlement into its system at each of the 11 dams on the Columbia River in the United States, and delivers the firm power in exchange at the load centers of each participant. Each participating utility makes monthly payments to a trustee on behalf of CSPE for its share of power, and the trustee in turn pays off the revenue bonds.

While these arrangements were being perfected, Canada in June 1964 ratified the treaty subject to successful completion of the arrangements.

On August 13, 1964, the 41 Northwest public and private utilities signed the necessary agreements with CSPE and BPA. On August 26 a syndicate representing most of the investment bankers in America bought the bonds at an effective interest rate of 3.85 percent. And on September 16 the treaty was concluded in ceremonies at New York City, Ottawa, and Blaine, Washington. At New York City, Canadian officials were handed a check for \$254 million. At Ottawa, Canadian and United States representatives exchanged notes and formal ratifications. And at the International Peace Arch at Blaine, President Johnson and Prime Minister Pearson met to proclaim the treaty the law of their respective lands.

Of the U. S. share of added power initially resulting from Canadian storages, about 76 percent will be produced at Federal dams and 24 percent at non-Federal dams. This means Bonneville Power Administration will have more than 1 million additional kilowatts and the owners of non-Federal dams about 365,000 kilowatts. Of the 750,000 additional firm kilowatts attributable to Libby Dam, including downstream benefits in the United States, about 585,000 kilowatts accrue on the Federal system and about 165,000 kilowatts at non-Federal dams. Thus, as a result of the treaty, BPA will have about 1.6 million kilowatts of additional firm power to market.

## INTERRELATIONSHIP OF TREATY & INTERTIE

With Canada's share of treaty power being purchased in the United States, the entire 2.8 million-kilowatt block of treaty power (exclusive

of Libby Dam) will come on the market in the Pacific Northwest between 1968 and 1973. The first 380,000 kilowatts will be available in 1968 with Duncan Lake storage. In 1969, when Arrow Lakes is completed, some 2 million kilowatts will be available. And in 1973, when Mica comes in, the entire 2.8 million kilowatts will be on the line.

This is more power than Northwest markets could be expected to absorb in such a short period of time, taking into account other hydro projects now under construction that will be completed in this same period. Consequently, the U. S. purchasers of Canada's entitlement will in turn sell their shares of Canadian treaty power in California for periods--up to 15 years--when it would otherwise be surplus to Northwest needs. This power will be transmitted over the intertie facilities.

In the final phases of putting the treaty together, legislation defining Bonneville's marketing area and appropriation funds to start construction of the intertie were coming to a climax in Congress. About a week before the treaty bonds were sold, Congress approved the intertie program. The underwriters reported that the intertie helped substantially in bringing about the favorable interest rate on the treaty bonds. The intertie assured a market for the Canadian power from the first time it comes on the line in 1968, including the early years of the treaty when much of it will be surplus to Northwest needs.

The reverse also was true: the treaty helped the intertie. This is because the treaty enabled California to secure a quantity of firm power not otherwise obtainable from the Northwest under the terms of Public Law 88-552, the BPA marketing area legislation. The State of California, particularly, wanted a block of 300,000 kilowatts of firm power to pump water over the Tehachapi Mountains for the state water plan until such time as it could either build its own atomic generating plants, or make other arrangements for a permanent pumping power supply. We were able to offer the state the 300,000 kilowatts of Canadian firm power that it needed for this purpose.

●

In the final analysis, then, the treaty and the intertie were complementary.

## COORDINATION AGREEMENT

In August 1964, as a corollary of the Canadian treaty, BPA, the Corps of Engineers and 14 generating utilities signed a 39-year coordination agreement. Like its forerunners, this coordination agreement is designed to squeeze every kilowatt possible out of existing hydro projects.

Coordination has been practiced on a voluntary basis through the Northwest Power Pool for more than 20 years, and on a formal contract basis since 1961. It has always been desirable because it optimizes power production at the various public and private hydro projects in the Northwest. It became increasingly important with the Canadian treaty. This is because the treaty contemplates that, regardless of diverse ownerships, U. S. projects benefiting from Canadian storage will be operated to make the maximum use of that storage. Canada's half of treaty power benefits is computed on the assumption this will be done.

Under the coordination agreement, the various public and private utilities and the Federal Government agree to operate their projects much as if all were owned by a single entity. For example, water releases from storage projects are carefully timed so they will produce the maximum power at all downstream dams through which they flow. Thus, the owner of an upstream reservoir who might otherwise release stored water to produce power to meet his own loads at a time when the owners of downstream dams could not use the additional water agrees to hold his storage for later releases at such time as it will produce the most power on an overall basis. In the meantime, the owner of the upstream reservoir is supplied power from a downstream dam which has a surplus.

Owners of downstream dams agree to pay owners of upstream storage for the benefits they get from the storage. Non-Federal owners pay each other and BPA in cash. BPA makes its payments in kilowatt-hours. Because the U. S. Government owns most of the upstream storage, BPA nets about \$1.1 million annually from this arrangement.

Most important, the power consumers of the region are assured that all of the region's utilities are cooperating to produce the most power at the lowest cost possible.

## HANFORD STEAM PLANT

First power from the 800,000-kilowatt Hanford atomic power generating plant now under construction by the Washington Public Power Supply System will come on the line in October 1965. All of it will be on the line by January 1966.

The plant was 25 percent completed as of November 1, 1964, and construction was on schedule. About 75 percent of the direct construction contracts had been let, and costs were running substantially under the estimated \$73.6 million direct construction cost.

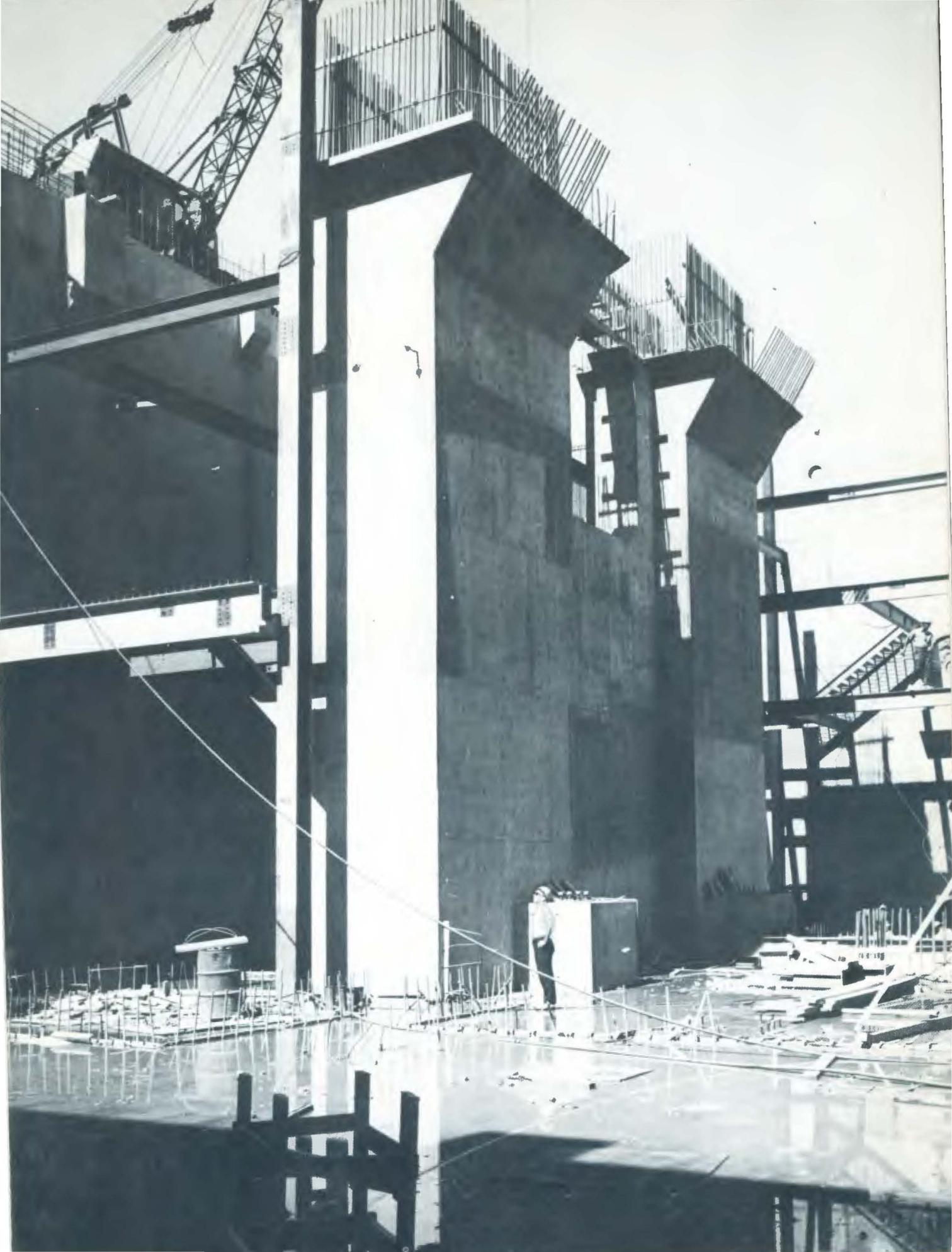
In 1961, the Hanford steam electric generating plant was still unauthorized and the region was threatened with a power shortage in 1965 and 1966. True, Congress in 1958 had approved construction of the New Production Reactor at Hanford as a "dual-purpose reactor". The reactor was to be designed and built in such a way that the waste heat could be converted to steam to produce electricity. But Congress had not yet approved use of that steam by the Federal Government or anyone else to actually produce electricity.

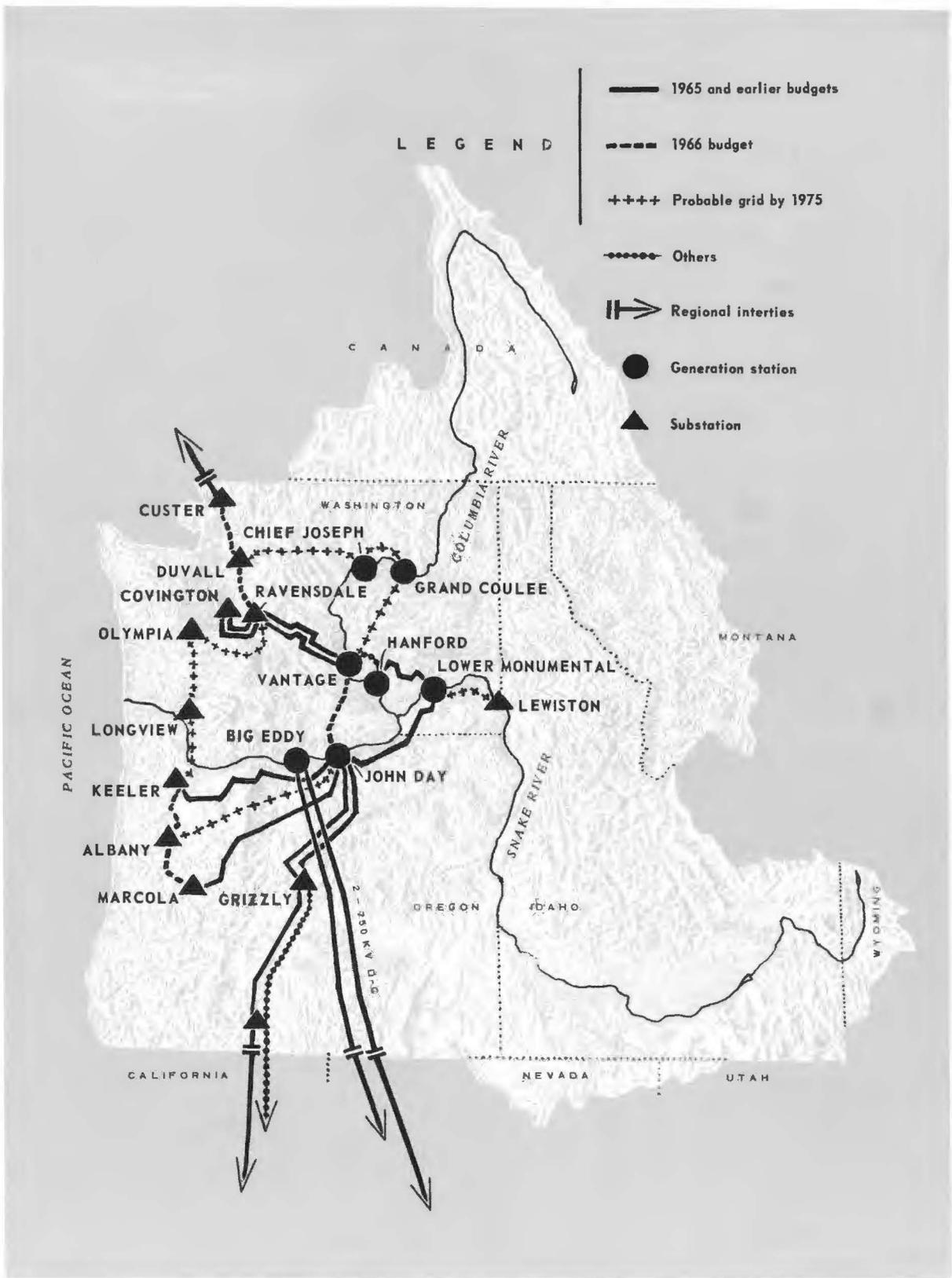
After having rejected the Hanford steam electric generating plant as a Federal project, Congress in 1962 approved its construction, financing and operation by the Washington Public Power Supply System. BPA will market the power over its regionwide grid system through a series of exchange agreements with 76 participating private and public utilities.

Because of the Hanford atomic power plant, we are confident there will be no power shortage even under critical water conditions in 1965-1966.

## NEW STARTS

Six new Federal hydroelectric projects are under construction. They are John Day (first 10 units), Lower Monumental, Little Goose, Green Peter, Foster and Dworshak. They will add 2.66 million kilowatts of installed capacity to the U. S. Columbia River Power System from which BPA markets power. That system now has 6,678,000 kilowatts of installed capacity. Construction under way, including the 800,000 kilowatts of installed capacity at Hanford, therefore represents more than a 50 percent increase in capacity.





EXTRA HIGH VOLTAGE TRANSMISSION GRID, U. S. COLUMBIA RIVER POWER SYSTEM

Lower Granite, Asotin and Libby with combined initial installed capacity of 990,000 kilowatts are authorized and scheduled for construction within the next 10 years. The Canadian treaty makes feasible the addition of about 4 million kilowatts of capacity at existing projects during the next 10 years--a third powerhouse at Grand Coulee, initially 1.8 million kilowatts; six additional units at John Day, 810,000 kilowatts; eight additional units at The Dalles, 624,000 kilowatts; and 11 more units at Chief Joseph, 704,000 kilowatts.

Later the third powerhouse at Grand Coulee will be enlarged by another 1.8 million kilowatts. By about 1975 a second powerhouse will be needed at Bonneville Dam, with 360,000 kilowatts of capacity. And still another four units can be added at John Day, with 540,000 kilowatts of capacity. Together with some smaller projects the foregoing list of new capacity not yet under construction totals approximately 8 million kilowatts, of which about 5 million should be on the line within 10 years.

## TRANSMISSION PROGRESS

Exclusive of the Northwest-Southwest intertie lines, we have started construction of 2,130 circuit miles of transmission lines since 1961. When completed, they will nearly double our transmission capacity.

In January 1961, our system had 8,156 circuit miles of transmission lines with ability to deliver about 8 million kilowatts to load centers. The average distance from generator to load in the BPA primary marketing area is about 160 miles. The 2,130 circuit miles started since then are typically of higher voltage and will have the ability to deliver an additional 6.5 million kilowatts to load centers. In practice, the entire system is never fully loaded at any one time because of diversity in transmission requirements. But all of this transmission capacity is required to reliably serve peak loads on the various parts of the system throughout the year.

Higher voltages provide more capacity at less cost per kilowatt, and require much less right-of-way to transmit the same amount of power. For example, a 500,000-volt line carries four times as much power as a 230,000-volt line of the same length, but costs only about twice as much to build. A 230,000-volt line requires 125 feet of right-of-way, a 500,000-volt line only 150 feet, and new tower designs make it possible

when necessary to put two 500,000-volt lines on 250 feet of right-of-way.

We are now in the process of building the nation's largest 500,000-volt grid to overlay our present transmission network. The first 300 miles of the grid are under construction, and Congress has approved another 525 miles, exclusive of the intertie lines. For our backbone grid, we will need about 1,600 miles of 500,000-volt lines in operation by 1973.

For the intertie program, BPA will build in Oregon another 364 miles of 500,000-volt alternating current lines and 530 miles of 750,000-volt direct current lines.

## DIRECT CURRENT

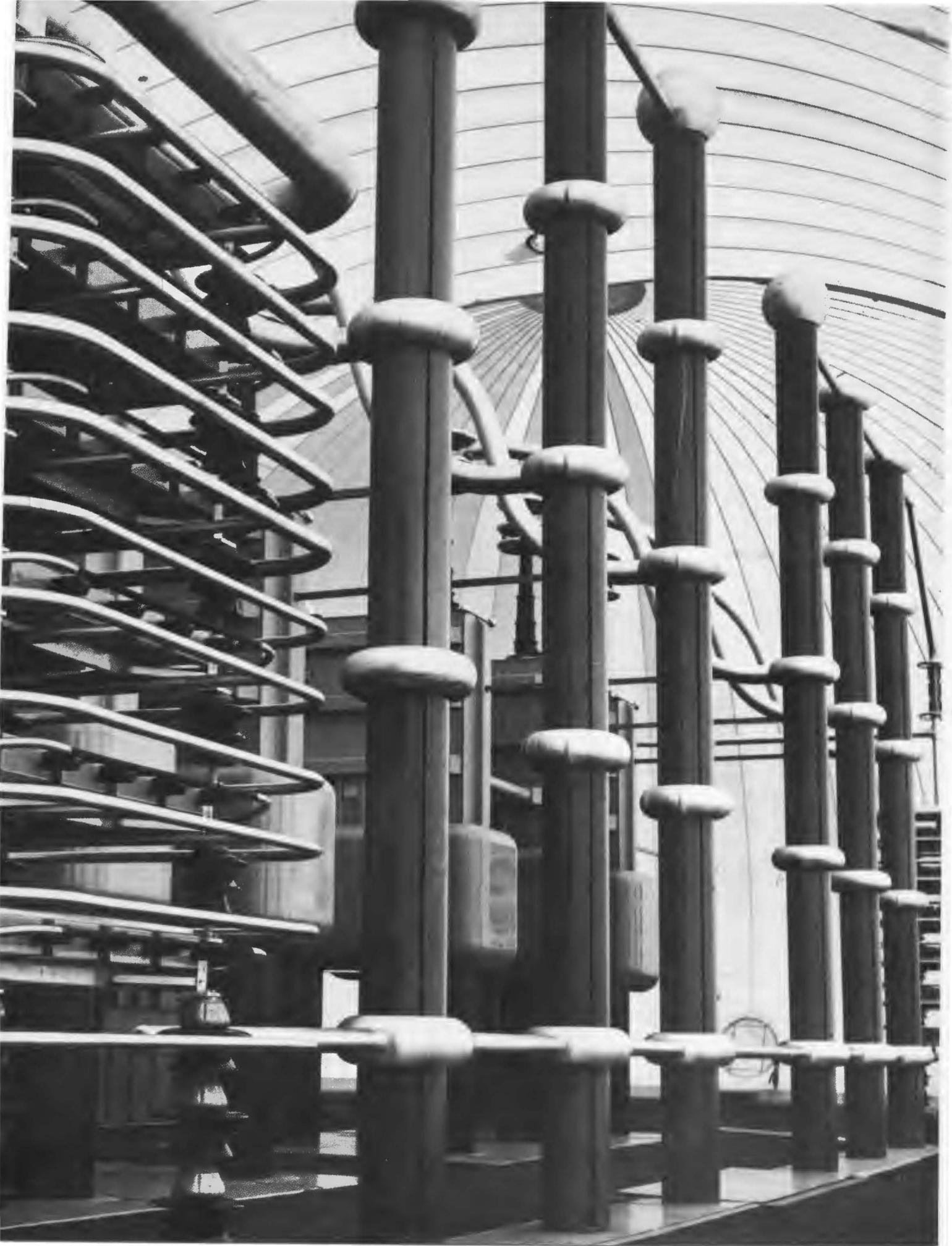
As noted earlier, two of the four big intertie lines will be direct current. Use of direct current was recommended by the special Interior Department Task Force which in 1961 studied the feasibility of the intertie.

Direct current, as the nomenclature suggests, is current moving in one direction only. Alternating current pulsates back and forth. Given certain conditions, such as those governing two of the intertie lines, direct current has advantages over alternating current.

For example, direct current can be used to move large amounts of power over long distances more economically, providing the line need not be tapped at frequent intervals. When lines have to be tapped to serve cities and industries, alternating current has the advantage. This is because d.c. transmission requires expensive terminal equipment to convert a.c. energy into d.c. for transmission and back to a.c. for ultimate use by consumers. Thus, to keep d.c. costs competitive, d.c. lines must serve as electrical freeways with few if any turnoffs. Both the d.c. intertie lines are nonstop lines about 825 miles long.

The major economy of direct current is that it requires only two conductors as opposed to the conventional three for alternating current. The towers have to carry less weight, can be smaller, and cost less. The economic crossover point for a given block of power is the transmission distance at which the savings in d.c. cable and towers offset the high cost of d.c. terminals.

Additionally, d.c. permits savings in right-of-





*Direct current test center at The Dalles*

way costs because fewer circuits, occupying less right-of-way, are needed to carry the same amount of power. It permits each region to retain its local frequency control. Distance is not a technically limiting factor. The larger the conductor, the farther power can be transmitted for a given voltage. For transmitting the same amount of power the same distance with the same size conductor at the same maximum voltage, a.c. line losses are about 33 percent greater than d.c. line losses.

On the basis of the task force report, Congress authorized funds in June 1962 for a high voltage direct current test and development program. Its purpose is to study and develop ways to cut construction costs of the interstate and future

d.c. lines by improving and refining design parameters.

The direct current test center, adjacent to the Big Eddy Substation at The Dalles, Oregon, was completed in the fall of 1963 and an intensive testing program was well under way by the end of that year. However we had housed the test equipment under a large plastic air-supported dome, and on May 20, 1964, the fabric ripped and the plastic dome collapsed. We had to rebuild the structure--this time a neoprene-coated plywood cover supported by laminated arch beams--and the test program was resumed in the fall of 1964. A more detailed discussion of the test program is contained in the Annual Operations section.

We have selected a 45-acre site for the northern terminals of the two direct current intertie lines. It is slightly less than a mile due south of the Big Eddy switchyard at The Dalles. One building will house the converter equipment for both terminals. It will be about 800 feet long and 120 feet wide--larger than our headquarters building in Portland. The associated switchyard will cover about 20 acres, 10 for each terminal. The grounds will be landscaped, with assistance from the National Park Service. Provision will be made to accommodate visitors and we fully expect this unique terminal to become a major tourist attraction for the area.

As BPA and utilities and manufacturers gain more experience with direct current transmission, and as the cost of rectifiers is reduced, we expect to see more widespread use of d.c.--for interconnections of large electric systems, for transmitting power from mine-mouth steam plants to load centers, for selling surplus Canadian hydroelectricity in the United States, and for easier right-of-way access to cities.

## SOUTHERN IDAHO

Effective September 1, 1963, BPA replaced the Bureau of Reclamation as power marketing agency for Federally generated power sold in southern Idaho. We assumed power marketing functions for the five Bureau dams in southern Idaho and immediately signed new contracts with 21 former Bureau customers. The new contracts put into effect BPA's lower standard wholesale power rates which reflect the average power costs of the U. S. Columbia River Power System.

Under standard BPA rates these customers--seven municipalities, 13 cooperatives and one private utility--are saving about \$750,000 a year in their wholesale power costs. Some of them made immediate rate reductions. Others are studying rate reductions and in some cases rate increases that otherwise might have been necessary have been avoided.

BPA serves these customers from the existing Bureau dams partly over transmission lines taken over from the Bureau but mainly by wheeling over transmission lines of the Idaho Power Company and Utah Power and Light Company.

However, the Bureau plants in southern Idaho

do not produce enough power to meet the load growth requirements of these customers, and BPA soon will have to move power into southern Idaho from its main system plants.

Because no Federal transmission lines connect the main system with southern Idaho and because a wheeling agreement could not be reached with the Idaho Power Company to provide this transmission, BPA in its fiscal year 1965 budget request to Congress sought \$1 million to start an extra high voltage transmission line from McNary Dam to the vicinity of Alexander, Idaho. The funds were to be used for planning, surveys and design, pending outcome of further wheeling negotiations with the company.

The need for new transmission capacity became greater when Monsanto Chemical Company entered into a new contract with BPA for 120,000 kilowatts of power, conditional on adequate transmission capacity becoming available. Monsanto planned to triple electric furnace phosphorus production at Soda Springs, Idaho.

Congress declined the \$1 million appropriation request, however, and directed BPA to negotiate further with the Idaho Power Company for transmission capacity to serve preference customers only. These negotiations were pending as this report went to press.

## RATES

The BPA basic wholesale rate is \$17.50 per kilowatt-year, or 2 mills per kilowatt-hour at 100 percent load factor. It has remained the same since we first started selling power in 1938.

Our rates are required by law or by long-established custom to accomplish four things: (1) Repay the capital investment in Federal power facilities in our service area, both transmission and generation, within a "reasonable" period of time. Congress recognizes 50 years as a reasonable period of time. (2) Return all costs of operation and maintenance of the transmission system and associated power generating projects. (3) Pay interest on the Federal investment in power facilities, both transmission and generation. (4) Return to the Treasury within fixed periods of time a substantial portion of the costs of irrigation which have been determined to be beyond the ability of the water users to repay.

We are now in the process of reviewing our rate requirements. Further studies may show the need for a small rate increase. However, the intertie and treaty have eliminated the need for a rate increase that could have been as high as 20 to 30 percent.

By law, BPA rates must be reviewed at least once every 5 years and approved by the Federal Power Commission. Contracts with nearly all of our customers require that rates be effective for 5 years at a time.

With the intertie program and the treaty still uncertain last year and with the rate review deadline approaching, BPA on November 1, 1963, announced preliminary plans for rate changes averaging 8-1/2 percent.

We announced that the size of the rate increases could be pushed either up or down by developments during the coming year, but that we wanted to give our customers a chance to analyze the impact of specific rate proposals on their operations.

Many of our customers suggested that we should wait until we knew the outcome of the intertie program and the treaty before considering any rate increase, and requested a 1-year delay. Subsequently, with Secretary of the Interior Stewart L. Udall's approval, we agreed to re-file our present rates for 1 additional year and our customers agreed to contract amendments permitting us to file different rates, if necessary, as of December 20, 1965.

## POWER USE GAINS

Part of our program as set forth in the fiscal year 1961 annual report was to stimulate power sales in the Northwest.

We added a power utilization section to our Division of Power Management in 1961. The new section was to work cooperatively with all BPA customers in suggesting power use programs, encouraging research and exchanging ideas through conferences and clinics. The theme of our program has been to encourage self-help by retail distributors of BPA power, and to improve utilization of their own facilities through load-building programs.

This new emphasis on power utilization throughout the electric industry in the Northwest is at least partly responsible for a spectacular growth

in average residential and commercial use for all electric utilities, and has contributed to economic growth of the region.

Average residential use has jumped from 9,623 kilowatt-hours in 1961 to approximately 11,000 kilowatt-hours per family in 1964. The average commercial use has increased from 28,922 kilowatt-hours in 1961 to about 33,380 kilowatt-hours for 1964.

The increase in average residential use is particularly impressive when measured against the national average of 4,500 kilowatt-hours. The average family in the Pacific Northwest uses well over twice as much power in the home, reflecting one of the nation's highest standards of electrical living. We look for continued growth and an average residential use in the Pacific Northwest ranging between 15,000 and 20,000 kilowatt-hours a year within the next decade.

## INDUSTRIAL SALES

New industrial sales likewise have increased spectacularly these past 3 years. Actual sales direct to industries in 1964 were up 25 percent over 1961.

New firm power contracts signed since 1961 with both new and existing industries--not yet all on the line--total nearly 500,000 kilowatts. These industries have indicated they will use another 125,000 kilowatts of interruptible power.

This is an increase of about 50 percent in our total industrial load, including interruptible power sales, and an increase of over 40 percent in our firm power contracts to industry. It contrasts with an industrial expansion requiring only 380,000 kilowatts, largely interruptible, in the 8 years prior to 1961.

Contracts since 1961 to serve new industrial plants include Intalco Aluminum and Georgia-Pacific (chlorine) in the vicinity of Bellingham, Washington; Montana Phosphates Company near Missoula; and Monsanto Chemical Company at Soda Springs, Idaho, the latter contingent upon adequate transmission becoming available.

Contracts for a larger supply of firm power at existing plants have been signed with Harvey Aluminum at The Dalles, Oregon; Alcoa Aluminum at Vancouver, Washington; Anaconda



Aluminum at Columbia Falls, Montana; Kaiser Aluminum at Spokane, Washington; and Pennsalt in Portland, Oregon. The Kaiser Aluminum Company plant at Tacoma, Washington, has reopened after a 5-year closure, and we are again serving it.

The impact on the Northwest's economy from these additional industrial sales is just beginning to be felt. In calendar year 1963 Northwest industrial plants served directly by BPA employed 10,297 workers with total wages and salaries in excess of \$75 million. The 1963 employment figure was up about 300 over 1961, but by the end of calendar year 1964 we expect employment in these plants to be up nearly 1,000 over 1961. And when all the plant expansion based on our new industrial sales contracts to date is completed, employment should increase another 1,000. This does not take into account the indirect employment of approximately two jobs for every one in basic industry.

Our industrial customers report by calendar year. In calendar year 1963 industries served directly by BPA purchased materials and supplies and services in the Northwest totaling \$62 million; they paid freight payments of \$38 million; they bought \$31 million worth of electricity; and paid state and local taxes of nearly \$8 million. They also spent \$17 million on plant additions in 1963.

On the basis of present prospects, we expect to double our direct industrial sales of firm power within the next 10 years. Expansions will take place not only in aluminum but in other metals such as magnesium, titanium, electric furnace steel, and in agricultural and industrial chemicals. This economic growth will mean the investment of nearly \$750 million for plant expansion and a proportionate increase in annual payments for payrolls, materials, supplies and taxes. Investment for plant expansion has been at a slower pace the past 3 years because much of the increase in power purchases from BPA was to make use of idle plant capacity. Today nearly

all plant capacity is being utilized, and additional industrial power sales will require investment in new plant facilities.

Our direct industrial sales for the most part are limited to electrochemical and electrometallurgical industries. We limit our direct industrial sales to this type of industry so as not to compete with our electric utility customers--the 112 publicly and privately owned utilities throughout the region to whom we sell power at wholesale.

Indirectly, however, through our utility customers we also supply large amounts of power for industrial growth. New large industrial loads contracted for since 1961 by utilities which purchase all or much of their wholesale power from BPA include the new International Paper plant at Gardiner, Oregon, and the expanded Georgia-Pacific paper mill at Toledo, by Central Lincoln PUD; the new Crown Zellerbach plant at Wauna, Oregon, by Clatskanie PUD; the new Air Reduction Corporation plant at Vancouver, Washington, by Clark County PUD; and the Ashgrove Lime Company of Portland, Oregon, by Portland General Electric Company. These and other utilities are also serving the increasing power requirements of a wide variety of growing chemical, metallurgical, forest products, agricultural and food-processing industries.

Our direct sales to industry last year totaled 14.47 billion kilowatt-hours, or about 50.3 percent of the region's industrial power sales. Non-Federal utilities sold 14.3 billion kilowatt-hours to industries, or 49.7 percent. But BPA provided these utilities with about 35 percent of their total power requirements. Therefore, we indirectly supplied to the industries taking power from the non-Federal utilities about one-third of their power supply. In total, BPA supplied directly and indirectly 67.5 percent of the power purchased by Pacific Northwest industries last year.

TABLE 1  
ELECTRIC ENERGY SALES TO CUSTOMERS OF THE BONNEVILLE POWER ADMINISTRATION  
FISCAL YEAR ENDED JUNE 30, 1964

Customers	Energy Delivered for year (000) kwh	Revenue from sale of energy Dollars	Customers	Energy Delivered for year (000) kwh	Revenue from sale of energy Dollars
<b>Publicly Owned Utilities</b>					
<b>Municipalities</b>					
Albion, Idaho	1,867	\$ 6,467	Had River Electric Coop.	32,854	\$100,114
Bandon, Oregon	26,640	88,175	Idaho L & P Coop. Assn.	25,076	81,172
Bonners Ferry, Idaho	5,372	32,493	Inland P & L Co.	144,332	459,085
Burley, Idaho	43,187	148,136	Kootenai Rural Electric Assn.	25,061	78,701
Canby, Oregon	23,869	86,777	Lane Co. Electric Coop.	107,755	356,179
Cascade Locks, Oregon	11,837	53,461	Lincoln Electric Coop., - Montana	18,742	65,128
Centralia, Washington	14,222	90,492	Lincoln Electric Coop., - Washington	36,092	107,527
Cheney, Washington	31,976	106,814	Lost River Electric Coop.	13,665	50,911
Coulee Dam, Washington	20,170	35,629	Lower Valley P & L Co.	25,279	90,214
Declo, Idaho	1,203	4,400	Midstate Electric Coop.	23,324	64,427
Deain, Oregon	20,055	68,024	Missoula Electric Coop.	22,783	74,796
Ellensburg, Washington	67,270	211,851	Nespelen Valley Electric Coop.	11,556	32,693
Eugene, Oregon	546,870	1,465,725	Northern Lights	41,367	138,749
Forest Grove, Oregon	64,112	222,287	Okanogan Co. Electric Coop.	7,348	21,786
Grand Coulee, Washington	20,764	45,228	Oreca Power & Light Co.	26,236	71,565
Heyburn, Idaho	24,941	79,780	Prairie Power Coop.	1,892	7,494
Idaho Falls, Idaho	104,567	431,463	Quinault Light Co.	3,858	9,875
McMinnville, Oregon	92,085	298,988	Raft River Electric Coop.	49,754	206,218
Milton-Freswater, Oregon	55,675	175,898	Ravalli Co. Electric Coop.	19,025	62,726
Minidoka, Idaho	697	2,504	Riverside Electric Co.	2,064	7,779
Momouth, Oregon	24,042	84,318	Rural Electric Co.	10,832	39,041
Port Angeles, Washington	263,127	663,159	Salem Electric	95,299	303,110
Richland, Washington	182,528	598,085	Simon River Electric Coop.	7,010	19,697
Rupert, Idaho	27,308	92,902	South Side Lines	7,033	27,711
Seattle, Washington	2,036,095	4,118,241	Surprise Valley Electric Corp.	19,975	66,470
Springfield, Oregon	112,537	331,939	Tanner Electric	2,605	8,295
Tacoma, Washington	1,010,255	2,037,721	Unatilla Electric Coop. Assn.	18,389	137,834
Vera Irrigation Dist. No. 15	46,101	149,941	Unity P & L Co.	13,964	49,302
Total Municipalities (28)	4,882,372	\$ 11,731,498	Walcott Electric Co.	541	2,073
<b>Public Utility Districts</b>					
Benton Co. PUD No. 1	\$330,814	\$1,016,143	Wasco Electric Coop.	51,651	175,032
Central Lincoln PUD	444,946	1,289,506	West Oregon Electric Coop.	29,588	97,682
Chelan Co. PUD No. 1	176,810	405,333	Total Cooperatives (49)	1,743,420	\$ 5,580,374
Clallam Co. PUD No. 1	106,014	313,733	B. C. Hydro & Power Authority	287	717
Clark Co. PUD No. 1	863,095	2,666,899	Total Publicly Owned Utilities	13,894,834	\$ 37,610,090
Clatskanie PUD	32,392	110,855	<b>Privately Owned Utilities</b>		
Cowlitz Co. PUD No. 1	1,233,925	2,679,673	California-Pacific Utilities Co.	\$13,087	\$ 29,360
Douglas Co. PUD No. 1	205,128	536,369	Idaho Power Co.	132,724	359,948
Ferry Co. PUD No. 1	21,411	62,095	Montana Power Co.	353,280	879,804
Franklin Co. PUD No. 1	179,137	556,576	Pacific Power & Light Co.	592,348	1,339,026
Grant Co. PUD No. 2	341,444	1,041,223	Paul Electric Co.	8,052	27,963
Grays Harbor Co. PUD No. 1	564,129	1,436,726	Portland General Electric Co.	1,637,865	3,298,256
Kittitas Co. PUD No. 1	14,102	42,273	Puget Sound Power & Light Co.	7,665	19,166
Klickitat Co. PUD No. 1	101,080	306,993	Utah Power Co.	39,290	78,582
Lewis Co. PUD No. 1	196,884	615,768	Washington Water Power Co.	49,302	123,256
Mason Co. PUD No. 1	16,205	49,824	Total Privately Owned Utilities (9)	2,833,613	\$ 6,155,361
Mason Co. PUD No. 3	126,981	376,301	<b>Federal Agencies (10)</b>		
Northern Wasco Co. PUD	42,653	139,051	<b>Industries</b>		
Okanogan Co. PUD No. 1	181,007	504,349	Aluminum		
Pacific Co. PUD No. 2	113,150	361,198	Aluminum Co. of America		
Pend Oreille Co. PUD No. 1	28,731	59,687	Vancouver Plant	1,783,224	3,585,815
Skamania Co. PUD No. 1	48,084	156,495	Wenatchee Plant	627,594	1,261,811
Snahomish Co. PUD No. 1	1,633,108	4,746,703	Anacosta Aluminum Co.	1,271,783	2,111,727
Tillamook PUD	190,478	616,128	Harvey Aluminum, Inc.	1,538,579	2,587,404
Wahkiakum Co. PUD No. 1	21,839	70,885	Kaiser Alum. & Chem. Corp.		
Whatcom Co. PUD No. 1	55,205	136,715	Spokane Alum. Fab.	304,810	757,275
Total Public Utility Districts (26)	7,268,755	\$ 20,297,501	Spokane Aluminum Reduction	3,419,340	6,891,438
<b>Cooperatives</b>					
Benton Rural Electric Assn.	71,495	221,535	Tacoma Aluminum Reduction	-	-
Big Bend Electric Coop.	98,092	267,567	Reynolds Metals Co.		
Blachly-Lane Co. Coop. Elec. Assn.	41,034	127,418	Longview Plant	1,214,130	2,433,123
Central Electric Coop.	35,611	103,910	Troutdale Plant	662,254	1,374,527
Clearwater Power Co.	56,778	197,179	<b>Other Industries</b>		
Columbia Basin Electric Coop.	23,170	76,882	American Tel & Tel Co.	23	240
Columbia Power Coop. Assn.	20,480	72,331	Carborundum Co.	220,270	445,830
Columbia Rural Electric Assn.	37,310	106,019	Crown Zellerbach Corp.	138,078	306,406
Consumers Power	134,596	443,206	Hanna Nickel Smelting Co.	661,865	1,393,125
Coos-Curry Electric Coop.	147,567	472,470	Ida Gem Dairymen	357	2,510
Douglas Electric Coop.	54,790	183,561	Keokuk Electro-Metals Co.	99,545	216,706
East End Mutual Electric Co.	2,823	10,220	Montana Phosphate Co.	9,974	27,815
Eastern Oregon Electric Coop.	7,063	24,026	Pacific Carbide & Alloys	38,785	91,878
Fall River Electric Coop.	12,978	57,293	Pacific Northwest Alloys	-	113,748
Farmers Electric Co.	1,730	5,820	Pennsalt Chemical Corp.	307,917	622,759
Flathead Electric Coop.	32,371	99,704	Rayonier Incorporated	54,268	121,447
Hamey Electric Coop.	37,579	97,847	Stauffer Chemical Co.	401,450	859,390
			Stewart Elsnor	70	422
			Union Carbide Metals Co.	133,172	285,782
			Total Industries (23)	12,887,488	\$ 25,491,178
			Total Sales of Electric Energy (145)	32,641,803 1/	\$ 76,528,847 1/

1/ These sales do not conform with accounting totals since they include adjustments for billing revisions made subsequent to close of accounting records.

# annual operations

## POWER DELIVERIES

Bonneville Power Administration sold 32.6 billion kilowatt-hours of energy to 145 wholesale customers in fiscal year 1964 for record sales revenues of \$76,262,000. Energy sales increased 8.1 percent over last year. Total revenues increased 6.6 percent and sales revenues 6 percent.

Aluminum and other industrial customers led the increased power demand with a 14.3 percent jump in firm and a 39.4 percent increase in nonfirm power deliveries. Deliveries to publicly owned utilities increased 5.1 percent and those to private utilities were off 28.9 percent.

Aluminum plants accounted for 33.2 percent of total energy sales, and 24 other industries including Federal agencies 15.6 percent. Kaiser Aluminum and Chemical Corporation was the largest purchaser with 3.7 billion kilowatt-hours, and Aluminum Company of America second with 2.4 billion. Among customers other than aluminum producers, Hanna Nickel Smelting Company led with purchase of 662 million kilowatt-hours.

Publicly owned utilities, numbering 103, took 42.5 percent of total energy sales. Nine privately owned utilities accounted for 8.7 percent. Largest publicly owned utility customer was the City of Seattle with purchase of 2 billion kilowatt-hours and the Snohomish County PUD No. 1, second with 1.6 billion. Portland General Electric Company led privately owned utility customers with purchase of 1.6 billion kilowatt-hours.

Power sales brought an average of 2.34 mills per kilowatt-hour. By class of customer, sales ranged from an average of 1.98 mills per kilowatt-hour for industries (including those on the at-site rate), 2.17 for privately owned utilities and 2.71 for publicly owned utilities, and were among the lowest in the nation.

Practically all private utilities have their own generation, permitting them to purchase BPA power at a high load factor and a correspondingly lower rate. Most of BPA's publicly owned utility customers purchase all of their power requirements from BPA.

## FEDERAL GENERATION

Completion of the 25,000-kilowatt Cougar Dam power plant in the Willamette Basin brought the installed generation of the U. S. Columbia River Power System up to 6,678,150 kilowatts as the fiscal year ended. The total includes 163,000 kilowatts in southern Idaho Federal plants. An additional 38,980 kilowatts of Federal generation produced by isolated Navy, Bureau of Reclamation, National Park Service, and Bureau of Indian Affairs plants in the Pacific Northwest is not marketed by BPA.

When Federal plants now under construction--Green Peter, Foster, John Day (10 units), Lower Monumental, Little Goose and Dworshak--are completed in 1972, the Federal system will add 2.66 million kilowatts of installed capacity. Completion of these Federal projects will increase the nameplate rating to 9,338,150. Construction of six additional authorized Federal projects would add 1,068,500 kilowatts, increasing the total installed capacity to 10,406,650.

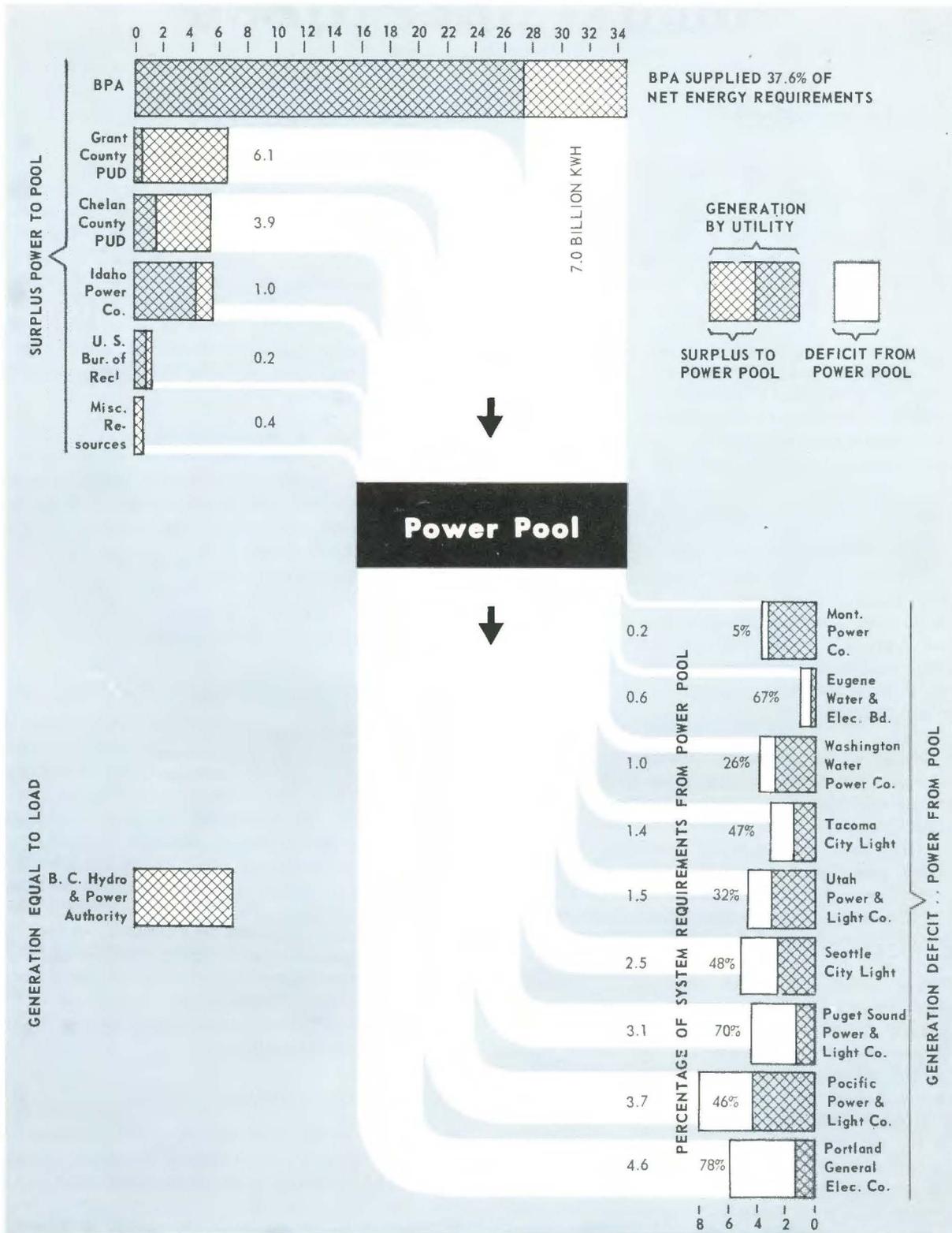
## NON-FEDERAL GENERATION

Non-Federal generation in the area served by Bonneville Power Administration totaled 7,667,680 kilowatts of installed capacity at the end of the fiscal year. Additions during the year included 831,250 kilowatts at the Wanapum plant of the Grant County PUD and 26,000 kilowatts at the Packwood plant of the Washington Public Power Supply System. Scheduled additions under construction or licensed would add about 3,087,350 kilowatts for a total non-Federal installed generation of 10,755,030 kilowatts. The High Mountain Sheep project, although licensed, was not included because the license is currently in litigation. If constructed, it would add about 900,000 kilowatts.

## NORTHWEST POWER POOL

Generation by the principal electric utility systems of the Pacific Northwest during the fiscal year 1964 is shown in the accompanying chart.

A total of 49.1 percent of the energy generated by the major utilities of the region was provided by the U. S. Columbia River Power System.



NORTHWEST POWER POOL, NET OPERATIONS ENDING JUNE 30, 1964

TABLE 2  
U.S. COLUMBIA RIVER POWER SYSTEM  
General specifications, projects existing, under construction and authorized  
November 3, 1964

Project	Operating agency 1/	Location	Stream	Plant installations		Date in service (initial unit)
				Number of units	Total capacity kilowatts 2/	
<u>Existing</u>						
<u>Primary System</u>						
Bonneville	CE	Washington-Oregon	Columbia	10	518,400	June 1938
Grand Coulee	BR	Washington	Columbia	18	1,944,000	September 1941
Hungry Horse	BR	Montana	South Fork Flathead	4	285,000	October 1952
Detroit	CE	Oregon	North Santiam	2	100,000	July 1953
McNary	CE	Washington-Oregon	Columbia	14	980,000	November 1953
Big Cliff	CE	Oregon	North Santiam	1	10,000	June 1954
Lookout Point	CE	Oregon	Middle Fork Willamette	3	120,000	December 1954
Alhoni Falls	CE	Idaho	Pend Oreille	3	42,000	March 1955
Dexter	CE	Oregon	Middle Fork Willamette	1	15,000	May 1955
Chief Joseph	CE	Washington	Columbia	16	1,024,000	August 1955
Chandler	BR	Washington	Yakima	2	12,000	February 1956
The Dalles	CE	Washington-Oregon	Columbia	16	1,119,000	May 1957
Roza	BR	Washington	Yakima	1	11,250	August 1958
Ice Harbor	CE	Washington	Snake	3	270,000	December 1961
Hills Creek	CE	Oregon	Middle Fork Willamette	2	30,000	May 1962
Cougar	CE	Oregon	South Fork McKenzie	2	25,000	February 1964
<u>Upper Snake River System</u>						
Minidoka	BR	Idaho	Snake	7	13,100	May 1909
Boise Diversion	BR	Idaho	Boise	3	1,500	1912
Black Canyon	BR	Idaho	Payette	2	3,000	1925
Anderson Ranch	BR	Idaho	South Fork Boise	2	27,000	December 1950
Palisades	BR	Idaho	Snake	4	114,000	February 1957
Subtotal - 21 Projects				6,678,150		
<u>Under Construction</u>						
Green Peter	CE	Oregon	Middle Santiam	2	80,000	
Foster	CE	Oregon	South Santiam	2	20,000	
John Day 3/	CE	Washington-Oregon	Columbia	10	1,350,000	
Lower Monumental	CE	Washington	Snake	3	105,000	
Little Goose	CE	Washington	Snake	3	105,000	
Dworshak	CE	Idaho	North Fork Clearwater	3	100,000	
Subtotal - 6 Projects				2,660,000		
<u>Authorized</u>						
Libby	CE	Montana	Kootenai	3	315,000	
Lower Granite	CE	Washington	Snake	3	405,000	
Asotin	CE	Washington-Idaho	Snake	2	270,000	
Strube	CE	Oregon	South Fork McKenzie	1	4,500	
Lost Creek	CE	Oregon	Bogue	2	52,000	
Fremont	BR	Idaho	Teton	2	22,000	
Subtotal - 6 Projects				1,068,500		
Total - 33 Projects				10,406,650		

1/ CE - Corps of Engineers; BR - Bureau of Reclamation

2/ Nameplate rating

3/ Additional units may be installed subsequent to completion of the present schedule

In addition to its other load, Bonneville Power Administration provided 7 billion kilowatt-hours of energy to meet the net requirements of eight other pool utilities.

With the exception of Pend Oreille County PUD, all utilities listed are members of the Northwest Power Pool. Pend Oreille County PUD is included because it provides a substantial part of its generation to the pool. The Utah Power and Light Company, British Columbia Hydro and Power Authority, and the U. S. Bureau of Reclamation are members of the pool but are not included because their major service areas are outside the region.

## WHEELING NON-FEDERAL POWER

BPA wheeled or transferred for other utilities 11.8 billion kilowatt-hours of energy in fiscal year 1964.

This is a 10.3 percent increase over the 10.7 billion kilowatt-hours wheeled or transferred during fiscal year 1963.

Power is being delivered under long-term firm capacity contracts from the Box Canyon project of the Pend Oreille County PUD, the Rocky Reach project of the Chelan County PUD, and the Carmen-Smith project of the City of Eugene.

TABLE 3  
**PACIFIC NORTHWEST GENERATION**  
 Nameplate rating of plants existing, under construction and authorized or licensed  
 Kilowatts  
 June 30, 1964

Ownership	Existing		Under construction		Licensed or authorized		Total	
	No. of plants	Nameplate rating	No. of plants	Nameplate rating	No. of plants	Nameplate rating	No. of plants	Nameplate rating
<b>Federal Agencies</b>								
Hydro . . . . .	26	6,698,710	6	2,660,000	6	1,068,500	38	10,427,210
Thermal . . . . .	3	18,420	0	0	0	0	3	18,420
Total Federal Agencies . . . . .	29	6,717,130	6	2,660,000	6	1,068,500	41	10,445,630
<b>Publicly Owned Agencies</b>								
Hydro . . . . .	44	3,888,590	3	1,470,400	3	140,000	50	5,498,990
Thermal . . . . .	18	188,880	1	860,000	0	0	19	1,048,880
Total Publicly Owned Agencies . . . . .	62	4,077,470	4	2,330,400	3	140,000	69	6,547,870
<b>Privately Owned Agencies</b>								
Hydro . . . . .	94	3,334,580	2	616,950	0	0	96	3,951,530
Thermal . . . . .	12	255,630	0	0	0	0	12	255,630
Total Privately Owned Agencies . . . . .	106	3,590,210	2	616,950	0	0	108	4,207,160
<b>Total</b>								
Hydro . . . . .	164	13,921,880	11	4,747,350	9	1,208,500	184	19,877,730
Thermal . . . . .	33	462,930	1	860,000	0	0	34	1,322,930
	197	14,384,810	12	5,607,350	9	1,208,500	218	21,200,660

Excess capacity contracts provide for delivery of power from the Swift project of the Pacific Power & Light Co., the Rock Island project of the Chelan County PUD, the Mayfield project of the City of Tacoma, the Priest Rapids and Wanapum projects of the Grant County PUD, and the energy wheeled into the Northwest from the Idaho Power Co.

## DIRECT CURRENT RESEARCH & DEVELOPMENT

Direct current transmission, described earlier in this report, is a major element of the Pacific Northwest-Pacific Southwest Intertie program. Consequently, we gave high priority to the direct current test program at The Dalles, Oregon.

Tests begun in fiscal year 1964 were well advanced before the air-supported plastic dome housing the equipment failed, and had to be replaced. All critical data and standards required for the first 750,000-volt direct current transmission line from The Dalles, Oregon, through Nevada to Los Angeles, California, will be completed by January 1965.

TABLE 4  
**Electric energy account for fiscal year 1964**

Energy received (millions of kilowatt-hours):	
Energy generated for BPA	
Bureau of Reclamation . . . . .	22,080,229
Cops of Engineers . . . . .	13,028,861
Power interchanged in . . . . .	14,575,754
Total received . . . . .	49,684,844
Energy delivered (millions of kilowatt-hours)	
Sales . . . . .	32,641,803
Power interchanged out . . . . .	14,878,918
Used by Administration . . . . .	37,239
Total delivered . . . . .	47,557,960
Energy losses in transmission and transformation . . . . .	2,126,884
Losses in percent of total received - percent . . . . .	4.3
Maximum demand on Federal plants (kilowatts)	
December 12, 1963, at 9-10 a.m. PST . . . . .	5,214,000
Load factor, total generated for BPA, percent . . . . .	76.7

Progress in the key fields of investigation include:

- Ground electrodes--Direct current transmission lines such as those to be used in the intertie will not normally produce a flow of current in the ground. However, during extreme emergency conditions such as loss of a line conductor, ground currents might flow for a matter of hours until

the line is back in service or other arrangements made to carry the load. Extensive tests to determine the effect of ground current flows during such situations were completed in the Columbia Basin, central Oregon, Shasta Dam and Los Angeles areas during the year, using BPA equipment.

The completed tests established the adequacy of ground electrode design and available protective techniques to prevent interference with railroad track signals, radio navigation aids and other communication channels. These tests also established the adequacy of protective techniques to control to minimal degree the effect of d.c. return currents, in addition to electrical currents already in the ground, on corrosion damage to buried pipelines, water systems, or telephone cables. Surface voltages at the electrodes will not approach values dangerous to persons or animals.

Direct currents ranging from 90 to 400 amperes were caused to flow through the earth between electrodes separated as much as 40 to 140 miles. Railroad, communication, pipeline, utility, geophysical, Federal agency and state utility officials and engineers cooperated in the tests.

- Radio noise--Comprehensive tests, using special monitoring instruments, were made during the year to determine radio interference voltages and corona losses under varied conditions. Tests included a.c. lines and d.c. lines. The results indicated that in dry weather, direct current and alternating current voltages of comparable levels produce similar radio interference and corona loss values on the same conductor. However, under rainy weather conditions, direct current shows lower corona loss and radio interference than alternating current.

In the summer of 1964 the line was re-conducted to obtain comparisons on different conductor proposals. The tests, now well under way, compare behavior of a two-conductor bundle with a single-conductor design.

- Inductive interference--Inductive interference characteristics of direct transmission at extra high voltages have been substantially determined. Work included studies on the

combined effect of high current circulation and changes in the firing angle of grid-controlled rectifiers.

- Vibration--Initial tests under varying wind and weather conditions for the large direct current conductor are nearing completion. These studies will underlie design of the conductor-insulator suspension assembly, basic clearances to supporting structures, and designs of vibration dampers and line hardware. Similar information is now being obtained for a twin-bundle conductor design.
- Insulator tests--Little experience is available to guide the selection of the optimum insulator design for high voltage direct current lines. An intensive program is underway to test the flashover characteristics of various types and assemblies of insulators under wet, dry, and contaminated conditions.

Initial tests indicate little difference between alternating current and direct current characteristics in normal applications. Studies are continuing to explore the performance under heavy contamination conditions. These are being coordinated with flashover tests on air gaps to optimize tower design.

## TESTS FOR 500,000-VOLT LINES

Key tests were completed during the fiscal year on 500,000-volt conductor, tower and switchyard designs preparatory to start of construction on BPA's new 500,000-volt grid. They included:

- Self-supported towers, with flat configuration and single conductor--Bonneville's first 500-kilovolt lines were planned as 345-kilovolt facilities, and work was started on the latter basis. To effect the transition in the time remaining in the work schedules, the results of tests conducted at Bonneville and elsewhere were utilized in extrapolating tower and conductor designs upward to 500 kilovolts.

For this reason, the 500-kilovolt lines nearing completion employ self-supporting towers having a flat horizontal configuration. The designs provide for the use of overhead ground wires, as needed, and for an expanded type of aluminum conductor having a central steel core. The unit cost of the expanded conductor, incidentally, is lower than

costs of other conductors used in recent years.

Studies, research, and testing of 500-kilovolt line components were intensified as the first lines took shape. These culminated in a decision to employ an arrangement having two cables in each conductor position.

- Bundled conductor, flat configuration--Again relying on data from whatever source available, certain of the self-supporting tower designs were modified to accommodate the two-conductor bundle and to minimize the weight of steel. Both designs, single conductor and bundle conductor, are being utilized in hazardous areas involving very long spans, extreme icing, etc.
- Bundled conductor, triangular or delta configuration--The studies leading to use of bundled conductors and those of the Pacific Northwest-Pacific Southwest Intertie lines showed a potential benefit from further exploitation of the bundling principle. As the intertie studies intensified, it became clear the savings in the intertie will be immediate rather than potential. Many tower and conductor arrangements were considered.

The arrangement finally adopted as standard employs a self-supporting strut carrying two bundles on either side of the centerline, with a third above the first two but on centerline. This triangular arrangement is called the delta tower.

Designs for use in the 500-kilovolt a.c. lines of the intertie will include two ground wires spaced symmetrically at the top of the structure. To save steel, towers designed for use in most parts of the Northwest will omit the ground wires. This reflects the generally lower rate of lightning hits in the Northwest and Bonneville's use of high-speed circuit breaker reclosing techniques.

Tower manufacturers, steel and aluminum, have displayed considerable interest in the delta tower, particularly in the guyed structure. The guyed structure does have some limitations in developed areas and in rugged terrain. Except for these locations, the guyed structure will generally be used.

- Switchyards--Design is progressing rapidly

with the approaching construction of Vantage Substation and John Day, Big Eddy and Keeler terminals scheduled for energization in the fall of 1967. A full-size bus unit has been constructed and tested for deflection, bus vibration, insulator stability, and footing requirements. The insulators, bus fittings, and terminals have been tested and adjusted to give corona-free installation.

Extensive testing of electrical and mechanical properties of the bus and other components of these switchyards has been completed to assure safe, economical and efficient stations. Results of the tests have been incorporated into design standards and will control basic parameters of all future stations. To give greater reliability at no greater cost, the "breaker and a half" design concept has been substituted for the more conventional "double bus, single breaker" system.

## ENGINEERING ACHIEVEMENTS

Although there were many outstanding engineering achievements in the routine work of the year several innovations are of special interest.

- Helicopter tower erection--Construction engineers worked with contractors on the Alvey-Tahkenitch 230,000-volt transmission line in use of a large helicopter to erect steel towers in rough and almost inaccessible terrain. The machine, capable of a 4,000-pound lift, made it possible to erect light steel towers in three to four lifts of pre-assembled tower sections. They were able to erect an average of about six and as many as eleven towers in one day by this method. Possibility of future applications is under study.
- Portable bypass equipment--BPA engineers have been plagued by the constant problem of additions and revisions to existing substation equipment without causing unnecessary interruptions and extended outages to customers. Working over the past 3 years engineers now have developed and perfected special equipment that includes a portable 115,000-volt shu-fly bus, 15,000-volt self-contained power circuit breaker, power cables, disconnect switch and a revenue metering set. Since 1961 the equipment has been used at a number of important substations with minimum or no outages to customers,



*Insulators hung for new 500,000 volt line*

reliable temporary service and reduction of overall costs on the jobs.

- Brush control--In 1961 unit costs and man-hours required for brush control began to rise slowly after a constant downward trend since 1954. This was due largely to the difficult-to-kill conifers invading the right-of-way after deciduous brush had been largely eliminated. Experiments showed that addi-

tion of trichloroacetate to the regular spray solution easily killed the needles on conifers. As a result the man-hour and dollar requirements for control are again on a downward trend. Trials with a new herbicide on conifers and other tough species such as maple, oak and ash are expected to further enhance control. If thick solutions can be developed that will not drift with helicopter applications, further cost reductions are in sight.

- Reuse of insulating oil--Tests conducted by the BPA technical laboratory and confirmed by an independent laboratory opened the way for reuse of insulating oil from retired equipment in new circuit breakers. This permits use of oil that is primarily considered at salvage value, eliminates disposal problems and at the same time saves 20 cents per gallon. For three oil circuit breakers retired during the year this represents a saving of nearly \$9,000. The cost of the project was 10 man-days and a \$50 laboratory fee.

## TRANSMISSION SYSTEM CONSTRUCTION

A highlight of the year was start of construction on the initial transmission lines of Bonneville's 500,000-volt grid.

Bonneville Power Administration at the end of the fiscal year had 8,997 circuit miles of transmission line in operation, ranging from lower service voltages to 345,000 volts. A total of 258 substations had an installed transformer capacity of 14,930,507 kilovolt-amperes. Devices to provide the system's reactive power requirements totaled 2,873,820 kilovolt-amperes.

## CONSTRUCTION UNDERWAY

Main facilities under construction at the end of the fiscal year included:

- A 70-mile, 500,000-volt line between Arlington and Blaine, Washington, to be operated initially at 230,000 volts. This line provides additional transmission capacity for Bellingham loads, for the Intalco service to be energized in 1966, and for emergency backup and surplus power interchanges between British Columbia and the U. S. Pacific Northwest.
- A 120-mile, 500,000-volt line between Vantage Substation near Vantage, Washington, and Covington Substation near Kent, Washington, to serve the Bonneville load growth in the Puget Sound area of Washington, and provide an adequate level of reliability.
- New 500-kilovolt facilities at Vantage Substation near Vantage, Washington. This new 500,000-volt switchyard will initially serve to integrate the power from the Hanford NPR project with the 230,000-volt grid. Power will be transmitted at 500,000 volts from Hanford to Vantage and transformed to 230,000 volts. This will be the first 500,000-volt transformation station in the western part of the United States.
- A 110-mile segment of the John Day-Keeler line between Big Eddy Substation near The Dalles, Oregon, and Keeler Substation near Portland, Oregon. This segment will be composed of three sections. Two will be built for 500,000 volts and one for 345,000 volts; initial operation will be at 230,000 volts. Ultimately the entire line will be completed to the John Day switching stations and operated at 500,000 volts. The 345,000-volt section will be incorporated in a future 345,000-volt line. These new facilities reinforce the Portland-Willamette Valley transmission system.
- A 93-mile, 230,000-volt line between the Glenn H. Bell Substation at Spokane, Washington, and the Canadian boundary north of Metaline Falls, Washington, to provide an interconnection with the West Kootenay Power and Light Co., Ltd. This interconnection enables the seasonal interchange of energy and makes possible the coordinated operation of hydroelectric plants in both systems. In the future, this line will enable the Administration to transmit a part of the output of the City of Seattle's Boundary hydroelectric project into the BPA main grid.
- A 47-mile, 230,000-volt line between Olympia Substation at Olympia, Washington, and Aberdeen Substation at Aberdeen, Washington. This new line will provide more reliable service to the Aberdeen area and prevent overloading of existing lines when outages occur.
- A 10-mile, 230,000-volt line between Maple Valley Substation and Covington Substation in the Puget Sound area of Washington. This new line will provide capacity to serve the load growth in the Puget Sound area.
- A 30-mile, 230,000-volt line between Reston Substation and Fairview Substation in southwestern Oregon. This new line will strengthen the service to the southwestern Oregon coastal region.
- A 78-mile, 230,000-volt line between Alvey



Substation near Eugene, Oregon, and Tahkenitch Substation near Reedsport, Oregon. This new facility initially will be operated at 115,000 volts to strengthen service in the central Oregon coastal area and provide power for increasing loads. When loads justify it, the line will be operated at the higher voltage.

- A 20-mile, 115,000-volt line between Fairview Substation and Bandon Substation in southwestern Oregon. This new line will provide needed voltage regulation and assure reliable service to the Bandon-Gold Beach area of the southwestern Oregon coast.
- A 7-mile, 115,000-volt tap line between the existing Bell-Trentwood line and Green Bluff Substation near Green Bluff, Washington. These new facilities will serve the increasing power requirements of the Inland Power and Light Co., an REA-financed cooperative in northeastern Washington.
- A 42-mile, 115,000-volt line between Port Angeles and Sappho, Washington, to serve the increasing power requirements of western Clallam County, Washington, and improve voltage regulation.

#### Major Construction Started Since the End of Fiscal Year 1964

Since the end of fiscal year 1964, construction has begun on several major lines. These include three new 500,000-volt lines to integrate generation in central and southeastern Washington, including the new Lower Monumental Dam, with the remainder of the BPA system. These are:

- A 138-mile, 500,000-volt line from Lower Monumental Substation on the lower Snake River to John Day Substation on the Columbia River; a 21-mile, 500,000-volt line between John Day Substation and Big Eddy Substation at The Dalles, Oregon; a 57-mile, 500,000-volt line from Lower Monumental Substation to Hanford Substation at the Hanford NPR project. A non-Federal 500,000-volt line between Hanford and BPA's Vantage Substation will complete the integration.

Another major new line begun since the end of fiscal year 1964 is:

- A 169-mile, 500,000-volt line from John Day

Dam on the Columbia River to the new Marcola Substation near Eugene, Oregon. This will provide the additional transmission capacity required to supply power needs of the southwest Oregon area and to give adequate support to the system supplying the lower Willamette Valley in the Portland area.

Finally, work has begun on three of the intertie lines:

- A 265-mile, 500,000-volt alternating current line from John Day Substation through central Oregon to the California border, where it will connect with a similar line to be built from the border to Los Angeles by the Bureau of Reclamation and the California Power Pool.
- A 265-mile, 750,000-volt direct current line from the vicinity of Big Eddy Substation near The Dalles, Oregon, to the Nevada border, to connect with a similar line being built from the border to Los Angeles by the Los Angeles Department of Water and Power.
- A parallel 265-mile, 750,000-volt direct current line from the vicinity of Big Eddy Substation near The Dalles, Oregon, to the Nevada border where it will connect with a similar line to be built by the U. S. Bureau of Reclamation from the border to Hoover Dam.



# financial report

Bonneville Power Administration's gross revenues for fiscal year 1964 reached a new record high of \$82,851,000. This is a gain of \$5,147,000 or 6.6 percent over the previous year. Energy sales represented \$76,262,000 of the total. Wheeling charges for carrying non-Federal power over the BPA system accounted for most of the other revenues. Total cash receipts were \$80,225,000, slightly less than revenues which include accounts receivable and noncash exchange account transactions.

Increased revenues, spurred by improvement of the aluminum market and the generally high level of business and industrial activity, reduced BPA's net deficit for the year to \$3,039,000 as compared with the \$5,483,000 deficit of fiscal year 1963. However, on a cumulative basis for 27 years, BPA was still \$19,916,000 in the black as of June 30, 1964.

During fiscal year ending June 30, 1964, we paid \$49.5 million into the Treasury for the

TABLE 5  
UNITED STATES DEPARTMENT OF THE INTERIOR  
BONNEVILLE POWER ADMINISTRATION  
REVENUE AND REVENUE TRENDS  
Sales of energy, firm and nonfirm,  
by class of customer and miscellaneous power revenues

Class of customer	(In thousands of dollars)								
	F.Y. 1956	F.Y. 1957	F.Y. 1958	F.Y. 1959 1/	F.Y. 1960	F.Y. 1961	F.Y. 1962	F.Y. 1963	F.Y. 1964
<b>Aluminum Industry:</b>									
Firm	\$ 13,119	\$ 13,693	\$ 13,980	\$ 14,227	\$ 15,293	\$ 14,978	\$ 14,341	\$ 14,382	\$ 15,733
Non-firm	6,979	6,333	3,512	2,384	2,168	1,981	3,042	3,715	5,297
Total Aluminum	20,098	20,026	17,492	16,611	17,461	16,959	17,383	18,097	21,030
Trend Percentages 1/	100%	100%	87%	83%	87%	84%	86%	90%	105%
<b>Other Industry:</b>									
Firm	2,569	2,836	3,006	3,138	3,163	3,205	3,194	2,927	3,431
Non-firm	1,313	748	407	680	868	613	855	625	1,064
Total Other Industry	3,882	3,584	3,413	3,818	4,031	3,818	4,049	3,552	4,495
Trend Percentages 1/	100%	92%	88%	98%	104%	98%	104%	92%	116%
<b>Publicly Owned Utilities:</b>									
Firm	19,324	21,384	22,593	24,861	28,304	29,520	32,598	35,466	36,965
Non-firm	181	660	981	768	357	583	1,340	682	746
Total Publicly Owned Utilities	19,505	22,044	23,574	25,629	28,661 2/	30,103	33,938	36,148	37,711
Trend Percentages 1/	100%	113%	121%	131%	147%	154%	174%	185%	193%
<b>Privately Owned Utilities:</b>									
Firm	9,226	10,476	11,526	11,846	9,907	8,338	5,678	6,900	4,974
Non-firm	2,773	3,974	2,645	2,552	2,659	1,301	1,536	332	781
Total Privately Owned Utilities	11,999	14,450	14,171	14,398	12,566	9,639	7,214	7,232	5,755
Trend Percentages 1/	100%	120%	118%	120%	105%	80%	60%	60%	48%
<b>Federal Agencies:</b>									
Firm	4,253	4,777	5,860	6,015	5,986	6,194	6,217	6,646	7,089
Non-firm	52	90	194	388	239	281	253	303	182
Total Federal Agencies	4,305	4,867	6,054	6,403	6,225 2/	6,475	6,470	6,949	7,271
Trend Percentages 1/	100%	113%	141%	149%	145%	150%	150%	161%	169%
<b>Total Sales of Electric Energy:</b>									
Firm	48,491	53,166	56,965	60,087	62,653	62,235	62,028	66,321	68,192
Non-firm	11,298	11,805	7,739	6,772	6,291	4,759	7,026	5,657	8,070
Total Sales of Energy	59,789	64,971	64,704	66,859	68,944	66,994	69,054	71,978	76,262
Trend Percentages 1/	100%	109%	108%	112%	115%	112%	115%	120%	128%
<b>Miscellaneous Power Revenues:</b>									
	1,045	1,299	1,871	1,615	2,054	2,707	5,429	5,726	6,589
Trend Percentages 1/	100%	124%	179%	155%	197%	259%	520%	548%	631%
<b>Total Revenue:</b>									
	60,834	66,270	66,575	68,474	70,998	69,701	74,483	77,704	82,851
Trend Percentages 1/	100%	109%	109%	113%	117%	115%	122%	128%	136%

1/ F.Y. 1956 base year.

2/ Restated - Richland Village reclassified from Federal Agency to Publicly Owned Utility.

account of the associated projects to cover operation and maintenance expenses of \$8,393,000, interest of \$25,277,000, and plant investment repayment requirements of \$15,830,000. In addition, we paid \$30,725,000 into the Treasury for the account of the Bonneville Power Administration to cover operation and maintenance expense, interest, and power investment repayments. Thus, our total cash receipts of \$80,225,000 were repaid to the Treasury during fiscal year 1964.

The associated projects for which we have repayment responsibility are built and operated by the Bureau of Reclamation and the Corps of Engineers.

As of June 30, 1964, total investment in the Bureau's operating projects was \$576,844,000. Of this amount \$145,332,000 had been repaid, leaving a balance of \$431,512,000.

The power investment in the Corps of Engineers' operating projects amounted to \$940,659,000 as of the same date. Of this amount \$110,469,000 had been repaid, leaving a balance of \$830,190,000.

The investment in the Bonneville Power Administration's transmission system in service as of June 30, 1964, amounted to \$574,695,000. Of this, \$121,521,000 had been repaid, leaving

a balance of \$453,174,000.

Gross revenues since the beginning of operations in 1938 passed the one billion dollar mark, totaling \$1,039,290,000 as of June 30, 1964. Cash receipts totaled \$1,013,682,000, all transferred to the U. S. Treasury to repay operating and capital costs charged to power, including interest. These receipts have been allocated \$598,756,000 to the U. S. Columbia River Power System projects of the Corps of Engineers and Bureau of Reclamation, and \$414,926,000 to the Bonneville Power Administration.

Bonneville's current method of financial reporting, adopted in fiscal year 1963, is based upon payout requirements for the entire system of 21 dams and related transmission lines. These requirements, plus operating expenses and interest, determine minimum rate levels. The new payout plan uses all system power revenues to repay each power project within 50 years after its completion, with the exception of the Kennewick Division of the Yakima project in which case the law specifies a 66-year repayment period. System revenues also are used to repay all irrigation assistance allotted to power revenues as it falls due.

The following financial statements are subject to audit by the General Accounting Office.

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## **financial statements**



UNITED STATES DEPARTMENT OF THE INTERIOR  
BONNEVILLE POWER ADMINISTRATION  
FINANCIAL STATEMENTS  
FISCAL YEAR 1964

- Schedule 1 – Statement of revenues and expenses for fiscal year 1964 and cumulative to June 30, 1964
- Schedule 2 – Comparative balance sheet as of June 30, 1964
- Schedule A – Net requirements of associated projects for fiscal year 1964 and cumulative to June 30, 1964
- Schedule B – Revenues and funds returned to U. S. Treasury for fiscal year 1964 and cumulative to June 30, 1964
- Schedule C – Plant investment of associated projects returnable from commercial power revenues and status of repayment at June 30, 1964
- Schedule D – Amount and allocation of plant investment of associated projects at June 30, 1964
- Schedule E – Notes to financial statements

SCHEDULE 1

UNITED STATES DEPARTMENT OF THE INTERIOR  
 BONNEVILLE POWER ADMINISTRATION  
 STATEMENT OF REVENUES AND EXPENSES  
 FISCAL YEAR 1964 AND CUMULATIVE TO JUNE 30, 1964  
 (In thousands of dollars)

<u>Operating Revenues</u>	F. Y. 1964	Cumulative to June 30, 1964
Sales of electric energy	76,262	1,002,531
Other electric revenues	6,589	36,759
Total operating revenues	<u>82,851</u>	<u>1,039,290</u>
 <u>Operating Expenses</u>		
Associated projects costs -		
Depreciation basis (Schedule A)	42,487	488,882
Purchased power	830	13,696
Operation expenses	10,244	127,958
Maintenance expenses	4,877	42,431
Provision for depreciation - amortization	10,567	118,427
Property losses chargeable to operations	(15)	5,303
Total operating expenses	<u>68,990</u>	<u>796,697</u>
 Net operating revenues -		
Cost basis	<u>13,861</u>	<u>242,593</u>
 <u>Interest and other Deductions</u>		
Interest on Federal investment	10,407	121,293
Interest charged to construction	(479)	(9,333)
Miscellaneous income deductions - net	(41)	843
Total interest and other deductions	<u>9,887</u>	<u>112,803</u>
 <u>Net Revenues - Cost Basis</u>	3,974	129,790
 Less, amortization requirements at associated projects in excess of depreciation (Schedule A)	<u>7,013</u>	<u>109,874</u>
 <u>Net Revenues (Deficit) - Amortization basis</u>	<u>(3,039)</u>	<u>19,916</u>

"Notes to financial statements" (schedule E) are an integral part of this statement.

( ) Denotes red figures

This statement was prepared by Bonneville Power Administration and is subject to audit by the U. S. General Accounting Office.

**UNITED STATES DEPARTMENT OF THE INTERIOR**  
**BONNEVILLE POWER ADMINISTRATION**  
**BALANCE SHEET AS OF JUNE 30, 1964**

(In thousands of dollars)

<u>ASSETS</u>			<u>LIABILITIES</u>		
	June 30, 1964	June 30, 1963		June 30, 1964	June 30, 1963
<u>Fixed assets – transmission system</u>			<u>Investment of U.S. Government – transmission system</u>		
Electric plant in service	535,256	520,244	Congressional appropriations, including amounts for expenses of operation, maintenance, administration, etc.	762,241	712,019
Electric plant leased to others	463	463	Revenues transferred to continuing fund	3,209	2,974
Construction work in progress	36,118	16,091	Transfers from other Federal agencies – Net	22,465	19,736
Electric plant held for future use	2,858	1,293	Interest on Federal investment	121,293	110,886
Total fixed assets	<u>574,695</u>	<u>538,091</u>	Gross Federal investment	<u>909,208</u>	<u>845,615</u>
Less reserve for depreciation (amortization) (note 3)	<u>101,605</u>	<u>90,760</u>	Less funds returned to U.S. Treasury (schedule B)		
Transmission system original cost, net	<u>473,090</u>	<u>447,331</u>	Total funds returned	1,013,682	
			Returned for associated projects	<u>(598,756)</u>	
			Funds returned for transmission system	<u>414,926</u>	<u>384,201</u>
<u>Deferred charge for repayment obligation at associated projects (schedule C)</u>	<u>1,261,702</u>	<u>1,214,592</u>	Net investment of U.S. Government – transmission system	<u>494,282</u>	<u>461,414</u>
<u>Current assets</u>			Accumulated net revenues		
Unexpended funds	36,619	31,123	Balance – beginning of year	22,955	28,438
Special funds	821	960	Net revenues (deficit) – current year	<u>(3,039)</u>	<u>(5,483)</u>
Accounts receivable	4,574	3,632	Balance – end of year	19,916	22,955
Accrued utility revenue	7,070	6,536			
Material and supplies	4,643	4,204	<u>Unamortized investment in associated projects</u>		
Total current assets	<u>53,727</u>	<u>46,455</u>	Returnable from commercial power revenues (schedule C)		
			Total plant investment to be amortized	1,517,503	
<u>Special funds</u>			Less repayments to date	598,756	
Trust funds	493	334	Repayments for O & M and interest	<u>(353,386)</u>	
Advances – Bureau of Reclamation	–	30	Repayments for amortization – BPA	245,370	
Total special funds	<u>493</u>	<u>364</u>	Repayments for amortization – Bureau of Reclamation	<u>10,431</u>	
			Total repayments for amortization to date	<u>255,801</u>	
<u>Other assets and deferred charges</u>			Unamortized amount	<u>1,261,702</u>	<u>1,214,592</u>
Clearing accounts	(35)	(22)			
Other work in progress	687	953	<u>Current liabilities &amp; other credits</u>		
Other deferred charges	51	41	Accounts payable	10,529	7,698
Total other assets and deferred charges	<u>703</u>	<u>972</u>	Employees' accrued leave	2,793	2,721
	<u>1,789,715</u>	<u>1,709,714</u>	Trust fund advances	493	334
			Total current liabilities & other credits	<u>13,815</u>	<u>10,753</u>
				<u>1,789,715</u>	<u>1,709,714</u>

“Notes to financial statements” (schedule E) are an integral part of this statement.

( ) Denotes red figures.

This statement was prepared by Bonneville Power Administration and is subject to audit by the U. S. General Accounting Office.

UNITED STATES DEPARTMENT OF THE INTERIOR  
 BONNEVILLE POWER ADMINISTRATION  
 NET REQUIREMENTS OF ASSOCIATED PROJECTS  
 FISCAL YEAR 1964 AND CUMULATIVE TO JUNE 30, 1964

(In thousands of dollars)

Project	(1) Operation & Maintenance Expense	(2) Interest Expense	(3) Depreciation Expense- Compound In- terest Basis 1/	(4) Project Costs Depreciation Basis (1 + 2 + 3)	(5) Less Miscel- laneous Pro- ject Revenues	(6) Net Project Costs-Depre- ciation Basis (4 - 5)	(7) Amorti- zation 2/	(8) Amount of Amortization Over Depreciation	(9) Net Payout Requirements (6 + 8)
<u>Fiscal year 1964</u>									
Albeni Falls (CE)	356	697	266	1,319	—	1,319	447	181	1,500
Boise (BR)	304	16	57	377	140	237	200	143	380
Bonneville (CE)	1,094	855	1,007	2,956	12	2,944	363	(644)	2,300
Chief Joseph (CE)	986	3,546	1,176	5,708	—	5,708	2,018	842	6,550
Columbia Basin (BR)	2,052	2,421	775	5,248	494	4,754	3,241	2,466	7,220
Cougar (CE)	13	122	25	160	—	160	165	140	300
Detroit-Big Cliff (CE)	352	922	267	1,541	—	1,541	576	309	1,850
Hills Creek (CE)	88	341	104	533	—	533	151	47	580
Hungry Horse (BR)	463	1,872	163	2,498	8	2,490	853	690	3,180
Ice Harbor (CE)	452	2,274	623	3,349	26	3,323	1,050	427	3,750
Lookout Point-Dexter (CE)	296	938	271	1,505	—	1,505	566	295	1,800
McNary (CE)	1,217	5,580	2,123	8,920	65	8,855	2,838	715	9,570
Minidoka (BR)	175	9	54	238	89	149	215	161	310
Palisades (BR)	439	198	108	745	343	402	706	598	1,000
The Dalles (CE)	1,190	5,405	1,742	8,337	12	8,325	2,217	475	8,800
Yakima (BR)	206	81	56	343	101	242	224	168	410
Total fiscal year 1964	<u>9,683</u>	<u>25,277</u>	<u>8,817</u>	<u>43,777</u>	<u>1,290</u>	<u>42,487</u>	<u>15,830</u>	<u>7,013</u>	<u>49,500</u>
<u>Cumulative through fiscal year 1964</u>									
Albeni Falls (CE)	2,707	7,235	5,033	14,975	241	14,734	4,424	(609)	14,125
Boise (BR)	304	16	57	377	140	237	200	143	380
Bonneville (CE)	19,572	26,778	16,487	62,837	99	62,738	28,274	11,787	74,525
Chief Joseph (CE)	8,134	27,498	18,087	53,719	—	53,719	14,918	(3,169)	50,550
Columbia Basin (BR)	45,959	57,748	23,144	126,851	6,115	120,736	117,987	94,843	215,579
Cougar (CE)	13	122	25	160	—	160	165	140	300
Detroit-Big Cliff (CE)	3,352	10,273	6,023	19,648	—	19,648	5,965	(58)	19,590
Hills Creek (CE)	213	717	355	1,285	—	1,285	475	120	1,405
Hungry Horse (BR)	4,491	23,167	3,018	30,676	185	30,491	13,963	10,945	41,436
Ice Harbor (CE)	1,005	5,443	2,644	9,092	61	9,031	2,563	(81)	8,950
Lookout Point-Dexter (CE)	2,613	9,060	5,341	17,014	—	17,014	5,127	(214)	16,800
McNary (CE)	13,343	53,219	36,993	103,555	690	102,865	33,883	(3,110)	99,755
Minidoka (BR)	175	9	54	238	89	149	215	161	310
Palisades (BR)	439	198	108	745	343	402	706	598	1,000
The Dalles (CE)	7,828	28,896	17,748	54,472	79	54,393	14,675	(3,073)	51,320
Yakima (BR)	1,149	728	379	2,256	976	1,280	1,830	1,451	2,731
Cumulative total June 30, 1964	<u>111,297</u>	<u>251,107</u>	<u>135,496</u>	<u>497,900</u>	<u>9,018</u>	<u>488,882</u>	<u>245,370</u>	<u>109,874</u>	<u>598,756</u>

CE - Corps of Engineers Project

BR - Bureau of Reclamation Project

1/ See Schedule E, Note 3

2/ See Schedule E, Note 4

UNITED STATES DEPARTMENT OF THE INTERIOR  
 BONNEVILLE POWER ADMINISTRATION  
 REVENUES AND FUNDS RETURNED TO THE U.S. TREASURY  
 FISCAL YEAR 1964 AND CUMULATIVE TO JUNE 30, 1964  
 (In thousands of dollars)

	Fiscal year 1964	Cumulative to June 30, 1964
Total operating revenues	<u>82,851</u>	<u>1,039,290</u>
Less:		
Accounts receivable 1/ Net change in accounts receivable during the year	— 819	8,747 —
Exchange account transactions Net deductions	<u>1,909</u> <u>2,728</u>	<u>27,851</u> <u>36,598</u>
Remainder	80,123	1,002,692
Add: Miscellaneous receipts 2/ Funds returned to U.S. Treasury	<u>102</u> <u>80,225</u>	<u>10,990</u> <u>1,013,682</u>
Allocation of funds returned:		
Reclamation fund	12,500	261,436
General fund:		
For account of Corps of Engineers	37,000	337,320
For account of Bonneville Power Administration 3/ BPA continuing fund	<u>30,489</u> 236	<u>411,717</u> 3,209
Total allocation	<u>80,225</u>	<u>1,013,682</u>

1/ Consists of revenues billed or accrued, but uncollected as of June 30, 1964.

2/ Consists of receipts arising out of other than operating revenue transactions; e.g., proceeds from sale of assets or from salvage of plant retirements.

3/ Includes payments made direct to the Federal Power Commission by owners of downstream licensed projects pursuant to section 10 (f) of the Federal Power Act for benefits received from upstream Federal reclamation storage projects. Amounts are \$ 750 thousand for F.Y. 1964 and \$ 961 thousand for the period from inception to June 30, 1964. The downstream licensees also have made payments pursuant to section 10 (f) on account of benefits received from Corps of Engineers projects but such sums are taken into the accounts of the Corps of Engineers projects and are netted against the requirements of such projects returnable from the Administration's operating revenues. To date the Albeni Falls project is the only Corps of Engineers project on account of which such payments have been made by licensed projects.

UNITED STATES DEPARTMENT OF THE INTERIOR  
 BONNEVILLE POWER ADMINISTRATION  
 PLANT INVESTMENT OF ASSOCIATED PROJECTS RETURNABLE FROM COMMERCIAL POWER REVENUES  
 AND STATUS OF REPAYMENT AS OF JUNE 30, 1964

SCHEDULE C

(In thousands of dollars)

Project	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Commercial power plant investment (schedule D)	Irrigation plant investment returnable from commercial power revenues (schedule D)	Net retirements from inception to 6-30-64	Total plant investment returnable from commercial power revenues (1+2+3)	Repayments to June 30, 1964			Unamortized amount 6-30-64 (4-7)
					By Bonneville Power Admin.	By Bureau of Reclamation <sup>1/</sup>	Total (5+6)	
Albeni Falls (CE)	31,824	—	—	31,824	4,424	—	4,424	27,400
Boise (BR)	4,810	11,471 <sup>2</sup>	—	16,281	200	4,610	4,810	11,471
Bonneville (CE)	61,147	—	848	61,995	28,274	—	28,274	33,721
Chief Joseph (CE)	155,260	1,199	53	156,512	14,918	—	14,918	141,594
Columbia Basin (BR)	175,011	259,064	1,424	435,499	117,987	—	117,987	317,512
Cougar (CE)	16,831	—	—	16,831	165	—	165	16,666
Detroit-Big Cliff (CE)	41,888	—	232	42,120	5,965	—	5,965	36,155
Hills Creek (CE)	13,999	—	—	13,999	475	—	475	13,524
Hungry Horse (BR)	77,471	—	165	77,636	13,963	—	13,963	63,673
Ice Harbor (CE)	92,832	—	3	92,835	2,563	—	2,563	90,272
Lookout Point-Dexter (CE)	41,908	—	37	41,945	5,127	—	5,127	36,818
McNary (CE)	255,743	—	138	255,881	33,883	—	33,883	221,998
Minidoka (BR)	1,610	—	—	1,610	215	1,240	1,455	155
Palisades (BR)	10,529	20,410	—	30,969	706	4,581	5,287	25,682
The Dalles (CE)	224,076	2,598	43	226,717	14,675	—	14,675	212,042
Yakima (BR)	4,601	10,235	13	14,849	1,830	—	1,830	13,019
Total	<u>1,209,540</u>	<u>305,007</u>	<u>2,956</u>	<u>1,517,503</u>	<u>245,370</u>	<u>10,431</u>	<u>255,801</u>	<u>1,261,702</u>

CE — Corps of Engineers project  
 BR — Bureau of Reclamation project

<sup>1</sup> Reflects repayments made from power revenues prior to July 1, 1963, the effective date for accounting purposes for inclusion of Southern Idaho in BPA marketing area by Secretary of the Interior order of May 21, 1963. (See Schedule E, Note 2)  
<sup>2</sup> Reflects application of \$64,000 to repayment of irrigation assistance through 6-30-64.

**UNITED STATES DEPARTMENT OF THE INTERIOR  
BONNEVILLE POWER ADMINISTRATION  
AMOUNT AND ALLOCATION OF PLANT INVESTMENT OF ASSOCIATED PROJECTS  
AS OF JUNE 30, 1964**

(In thousands of dollars)

**ALLOCATED TO:**

Project	Total	IRRIGATION				NONREIMBURSABLE					% of total plant investment returnable from commercial power revenues
		Commercial power	Returnable from commercial power revenues	Returnable from other project revenues	Total irrigation	Navigation	Flood control	Fish & wildlife	Recreation	Other	
Albeni Falls (CE)	32,383	31,824	—	—	—	133	172	—	254	—	98.3
Boise (BR)	65,388	4,310	11,471	34,176	45,647	—	14,931	—	—	—	24.9
Bonneville (CE)	88,954	61,147	—	—	—	27,807	—	—	—	—	68.7
Chief Joseph (CE) 1/	165,056	155,260	1,199	8,426	9,625	—	—	57	114	—	94.8
Columbia Basin (BR)	559,877	175,011	259,064	75,779	334,843	1,000	48,521	—	—	502	77.5
Cougar (CE)	56,312	16,831	—	2,744	2,744	568	36,169	—	—	—	29.9
Detroit-Big Cliff (CE)	66,197	41,888	—	3,799	3,799	131	20,379	—	—	—	63.3
Hills Creek (CE)	48,660	13,999	—	4,981	4,981	623	29,057	—	—	—	28.8
Hungry Horse (BR)	102,130	77,471	—	—	—	—	24,659	—	—	—	75.9
Ice Harbor (CE)	133,344	92,832	—	—	—	39,870	—	—	642	—	69.6
Lookout Point-Dexter (CE)	94,180	41,908	—	5,068	5,068	853	46,278	—	73	—	44.5
McNary (CE)	304,802	255,743	—	—	—	48,800	—	—	259	—	83.9
Minidoka (BR)	36,201	1,610	—	34,564	34,564	—	—	—	27	—	4.5
Palisades (BR)	59,873	10,529	20,440 3/	6,304	26,744	—	22,456	—	144	—	51.7
The Dalles (CE) 2/	273,342	224,076	2,598	3,624	6,222	41,214	1,328	479	23	—	82.9
Yakima (BR)	63,434	4,601	10,235	47,446	57,681	—	—	1,152	—	—	23.4
Total plant investment at 6-30-64	<u>2,150,133</u>	<u>1,209,540</u>	<u>305,007</u>	<u>226,911</u>	<u>531,918</u>	<u>160,999</u>	<u>243,950</u>	<u>1,688</u>	<u>1,536</u>	<u>502</u>	70.4

CE – Corps of Engineers project

BR – Bureau of Reclamation project

1/ Includes Foster Creek and Greater Wenatchee divisions of Bureau of Reclamation.

2/ Includes Crooked River Project of Bureau of Reclamation.

3/ Includes irrigation assistance for Michaud Flats and Fort Hall Projects.

NOTE: See Schedule E, Note 1 for discussion of the status of cost allocations for the associated projects.

UNITED STATES DEPARTMENT OF THE INTERIOR  
 BONNEVILLE POWER ADMINISTRATION  
 NOTES TO FINANCIAL STATEMENTS  
 FISCAL YEAR 1964

General

The financial statements for fiscal year 1964 have been prepared in formats similar to those used in fiscal year 1963. However, additional information has been provided on Schedule 1, Statement of Revenues and Expenses, and Schedule A, Net Requirements of Associated Projects, to show the cost of generation on a cost accounting-depreciation basis. The fiscal year 1963 reporting basis presented data for associated projects only on the amortization-payout basis, which is the basis which governs power rate and repayment requirements.

These statements have been prepared by BPA and are subject to audit by the U. S. General Accounting Office.

The financial data for the associated projects of the Bureau of Reclamation and the Corps of Engineers reflected in these statements have been furnished to the Bonneville Power Administration by those agencies. The Administration records in its own accounts the applicable investment data for the associated projects.

Footnotes

1. The following comments apply to the plant investment data for associated projects:

a. Tentative cost allocations have been used for the following projects:

Chief Joseph	Lookout Point-Dexter
Cougar	McNary
Detroit-Big Cliff	The Dalles
Hills Creek	Yakima
Ice Harbor	

In addition, an interim revision of the allocation of the costs of the Columbia Basin project has been used. Such allocation was officially adopted by the Department of the Interior in fiscal year 1963, effective as of the beginning of that year.

- b. Data for the McNary and The Dalles projects have been based on the latest revisions of their tentative cost allocations. These data have not been recorded in the project's official accounts pending definite action on the allocations.
- c. The balance sheet data for irrigation costs returnable from power revenues are based partially on the estimated future repayment ability of the water users.
- d. Five multiple-purpose projects which have power generating features and for which BPA is designated power marketing agent were under construction at June 30, 1964. Costs incurred to that date for construction of those projects are as follows:

Plant Investment-Projects Under Construction June 30, 1964  
 (In thousands of dollars)

	Work in Progress at 6-30-64	Estimated Tentative Allocation to Power
Dworshak	8,112	7,365
Green Peter-Foster	28,207	10,231
John Day	174,068	108,554
Little Goose	10,972	7,780
Lower Monumental	54,949	43,045.
	276,308	176,975

These projects will be included in the balance sheet data and supporting schedules in the year in which they are placed in service.

2. By order dated May 21, 1963, the Secretary of the Interior designated BPA as the marketing agent for federal power generated and sold in Southern Idaho. The transmission facilities, personnel, and marketing agreements were transferred to BPA on September 1, 1963, with an effective date for accounting purposes of July 1, 1963.

Investment in transmission facilities transferred to the plant accounts of BPA total \$4.84 million at June 30, 1964, and the Southern Idaho revenues for fiscal year 1964 were \$1.8 million. (Revenues in July and August 1963 were based on the Bureau of Reclamation's rates. The revenues from September 1, 1963, through June 30, 1964, were based on the lower BPA system rates).

Plant investment data for the three projects, Minidoka, Palisades, and Boise, including related irrigation assistance for these projects, are shown on Schedules C and D. Schedule A shows the BPA revenues assigned to these projects in fiscal year 1964. On Schedule A, the cumulative amount shown for these three projects is the same as the fiscal year 1964 amount since BPA repayment responsibility with respect to these projects began in fiscal year 1964.

3. Provisions for depreciation (amortization) shown on Schedule I pertain to the transmission system of the Bonneville Power Administration. Effective in fiscal year 1963, Bonneville Power Administration adopted the compound-interest method of depreciation for its own plant investment, and restated the accounts to give effect to the compound-interest method. The cumulative effect of the change from the former straight line method through June 30, 1963, was a reduction in the reserve for depreciation (amortization) in the amount of \$38.85 million.

Depreciation expense for associated projects shown in Schedule A for fiscal year 1964 is on the compound-interest basis, which produces a level annual charge to operations when combined with interest expense. The straight line method, when combined with interest expense, produces its highest annual charge in the early years. This is inverse to the trend of benefits from the projects. Benefits from early projects increase as more projects are added to the system. Heavier annual charges should be made when project benefits are high, and lower annual charges should be made when project benefits are lower.

The official accounts of the associated projects for fiscal year 1964 were maintained on the straight line depreciation method. Depreciation accounting on the official accounts of the projects of the Bureau of Reclamation dates back to the start of fiscal year 1963, at which time the straight line method was adopted. The associated projects of the Corps of Engineers have used depreciation accounting from the start of operations of the projects, principally on the straight line method. In fiscal year 1963, depreciation was reported in official project financial statements, but the BPA financial statements did not contain depreciation data for associated projects. BPA's obligation to the projects was reported only on the amortization-payout basis in the BPA statements. The additional data added to the fiscal year 1964 financial statements to show cost of generation on a depreciation-cost accounting basis required careful consideration of the depreciation method to be used, and the compound-interest method was selected. The compound-interest depreciation which was adopted for the fiscal year 1964 financial statements of BPA was developed on a memorandum basis for each project, based on the undepreciated plant balances at June 30, 1963, and the remaining service lives.

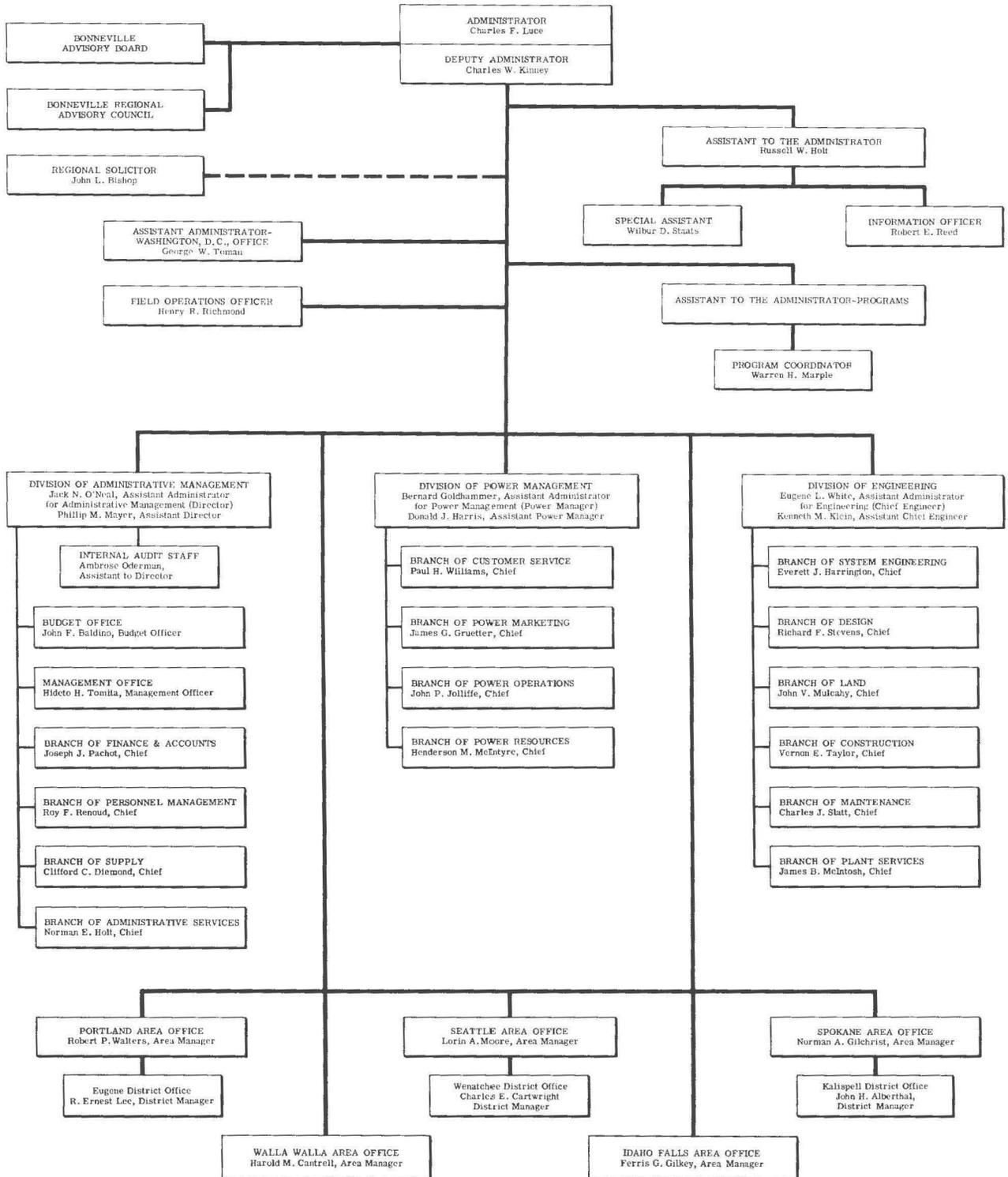
The aggregate compound-interest depreciation expense for the associated projects for fiscal year 1964 is \$9.85 million less than the straight line depreciation reported by the projects in their statements for fiscal year 1964. Negotiations are underway with both the Bureau of Reclamation and Corps of Engineers to adopt the compound-interest method of depreciation in their accounts, starting with fiscal year 1965. The compound-interest depreciation reported in Column 3 of Schedule A has been computed on a memorandum basis for fiscal year 1964 only. The cumulative data through fiscal year 1963 are on a straight line basis, and were not recomputed. Hence, the cumulative total shown on Schedule A is straight line depreciation through fiscal year 1963 plus the compound-interest depreciation for fiscal year 1964. For Bureau of Reclamation projects, the former "Reserve for Replacements" was converted to a "Reserve for Depreciation" at July 1, 1962, when straight line depreciation was adopted officially for Bureau projects. The reserve balances on the books of the projects at June 30, 1964, were analyzed to develop the cumulative depreciation expense.

4. Amounts shown on Schedule A for amortization (Column 7) cover repayment of initial power investment, interim replacements, and irrigation construction costs assigned for return from commercial power revenues. The amount of \$15.84 million shown as the power system total for amortization for fiscal year 1964 is sufficient to repay these items on a system basis according to the consolidated system rate of repayment plan approved by the Secretary of Interior in April 1963. The total is sufficient to repay all power investment, replacements, and irrigation assistance falling due within the period ending in 2014, which is 50 years after the in-service date for the Cougar Project, the newest project in the system. In addition, the system total of \$15.84 million is sufficient to repay each project within its own 50-year period, also a requirement of the Secretary's policy.
5. Revenues recorded in fiscal year 1964 under the Coordination Agreement for the 1963-1964 water year, and for downstream benefits pursuant to Section 10 (f) of the Federal Power Act totaled \$1.88 million. Of this amount, \$1.26 million was recorded under the Coordination Agreement for the period 9-1-1963 through 6-30-1964, and \$0.62 million was recorded for calendar year 1956 on a determination made for that year by the Federal Power Commission under Docket E-6384. The FPC determinations are now complete for the affected projects under Docket E-6384 through December 31, 1956. FPC's findings under Section 10 (f) have also been made for the periods 9-1-1961 through 8-31-1962, and 9-1-1962 through 8-31-1963. These two periods coincide with the annual Coordination agreements made between Bonneville Power Administration and other utility systems of the Pacific Northwest.

Downstream benefits under Docket Number E-6384 for the period 1-1-1957 through 8-31-1961 are now under study by the Federal Power Commission.

Through June 30, 1964, downstream benefits revenues attributable to the Columbia Basin and Hungry Horse Projects have been recorded by Bonneville Power Administration and remain in the accounts of BPA. Downstream benefits revenues attributable to the Albeni Falls Project have been transferred to the accounts of that project at the request of the Corps of Engineers.

6. In addition to the \$305.01 million irrigation plant investment returnable from commercial power revenues shown on Schedules C and D, BPA will become liable for repayment of additional amounts of irrigation costs when projects under construction are completed. At June 30, 1964, there were six reclamation projects under construction for which the authorizing legislation obligates BPA to repay the construction costs allocated to irrigation which are beyond the ability of the irrigators to repay. The six projects, the fiscal year in which BPA's repayment liability will begin (based upon scheduled project completion dates), and the estimated amounts are as follows: (1) Chief Joseph Dam Project, Greater Wenatchee Division, 1966, \$3.82 million; (2) The Dalles Project, Western Division, 1966, \$3.39 million; (3) Avondale, Dalton Gardens and Hayden Lake Irrigation Districts, 1966, \$0.98 million; (4) Mann Creek Project, 1969, \$3.18 million; (5) Spokane Valley Project, 1969, \$3.11 million; and (6) Baker Project, Upper Division, 1970, \$4.04 million. The repayment obligation for these six items will thus total \$18.52 million. None of these projects will include power generation. In addition, the Columbia Basin Project, for which BPA is presently obligated to repay \$259.06 million of irrigation plant (see Schedules C and D), is programed for construction of additional irrigation facilities which ultimately are expected to add \$339.15 million to BPA's repayment obligation. Additional irrigation construction at the Columbia Basin Project is scheduled each year through 1986.



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Created in 1849, the Department of the Interior – America's Department of Natural Resources – is concerned with the management, conservation, and development of the Nation's water, wildlife, mineral, forest and park and recreational resources. It also has major responsibilities for Indian and Territorial affairs.

As the Nation's principal conservation agency, the Department works to assure that nonrenewable resources are developed and used wisely, that park and recreational resources are conserved for the future, and that renewable resources make their full contribution to the progress, prosperity, and security of the United States – now and in the future.



FRONT COVER →

Stars indicate Canadian Treaty projects and heavy black lines show Pacific Northwest – Pacific Southwest Intertie. Triangles show the principal terminals on the Intertie network.