1970 ANNUAL REPORT

U.S. DEPARTMENT OF THE INTERIOR · BONNEVILLE POWER ADMINISTRATION

Stringing conductor on 800,000-volt d-c intertie line in central Oregon

Cover: Scenic vista house and transmission structure, Hood River Valley, Oregon, jointly financed by BPA and Hood River County

DECEMBER 31, 1970

FEDERAL COLUMBIA RIVER POWER SYSTEM

1970 ANNUAL REPORT

U.S. DEPARTMENT OF THE INTERIOR

BONNEVILLE POWER ADMINISTRATION

Indian tepees on the shore, a canoe on the river and a wedge of flying geese against the face of Mt. Hood . . . this is the Northwest of a hundred years ago. What further changes will have taken place along the river by 2070 A.D.?

FROM AN OLD STEEL ENGRAVING

CONTENTS

LETTER TO THE SECRETARY 1

INTRODUCTION—BPA AND THE ENVIRONMENT... 13

HYDRO-THERMAL POWER PROGRAM 15

TRANSMISSION PLANNING AND CONSTRUCTION.. 19

POWER SALES AND OPERATIONS 25

POWER SYSTEM CONTROL PROGRAM 31

COLUMBIA RIVER TREATY 33

FINANCIAL STATUS 37

TABLES 42

FINANCIAL STATEMENTS 49

BPA MANAGEMENT AND ASSOCIATED GROUPS .. 64

LETTER TO THE SECRETARY

Above left: Duncan Dam, British Columbia
Above right: Main entrance, Celilo Converter Station, The Dalles, Oregon
Center: Transmission tower
Lower right: Tower construction

December 31, 1970

Secretary of the Interior
Washington, D.C. 20240

Dear Mr. Secretary:

This is Bonneville Power Administration's thirty-third Annual Report on the Federal Columbia River Power System. The report covers events of fiscal year 1970 and significant developments that have occurred since the fiscal year ended June 30.

Throughout its 33-year history, Bonneville Power Administration has focused its concern on forecasting power requirements, planning programs to meet those requirements, and implementing the planned programs. Significant milestone developments have reached fruition through this recurring cycle of forecasting, planning, and implementing—notable among which are the extra-high-voltage transmission grid, the Columbia River Treaty with Canada, and the Pacific Northwest-Pacific Southwest Intertie.

Hydro-Thermal Power Program

Today, Bonneville and the utilities of the Pacific Northwest stand at the implementation stage of the latest forecasting-planning-implementing cycle involving the coordinated construction and operation of hydro and thermal powerplants—the Hydro-Thermal Power Program.

The forecast indicates that Northwest electric energy requirements will triple in the next 20 years and that within a few years virtually all of the economically feasible hydro energy potential in the region will have been built or will be under construction. Thereafter, thermal plants will have to be built to augment hydro projects in order to provide an adequate supply of energy. Additional hydro generation will have to be installed to meet the region's peak power needs.

The plan requires integration of the region's present and future power facilities, both Federal and non-Federal, as though the entire power system were under a single ownership. This unprecedented level of integration will be necessary to achieve efficient and reliable production and distribution of power and to minimize impact on the environment.

Implementation has begun. It involves the painstaking job of hammering out countless engineering, financial, environmental, legal, and scheduling details needed to ensure that the 108 participating utilities and Bonneville attain the high degree of interutility coordination which the Hydro-Thermal Power Program envisions. I can report that the job is getting done—the Pacific

President Richard M. Nixon

Northwest is moving with confidence into the hydro-thermal era. (A progress report on the status of the program is contained in the text of this report.)

The Hydro-Thermal Power Program, while fixed in terms of principles and in the assignment of broad responsibilities among participants, is dynamic and flexible with respect to scheduling, ownership of facilities, and other details. Underlying forecasts will be continually modified and periodically updated with the passage of time. Plans will be revised and re-revised accordingly. All the while, the job of implementation upon which we are now embarked, will be moving forward and responding to the dynamics of this trailblazing cooperative effort to meet the power supply needs of the region reliably and economically while, at the same time, protecting environmental quality.

The genesis of the Hydro-Thermal Power Program is well-known and has been described in previous annual reports. During fiscal year 1970, the program was officially endorsed by President Richard M. Nixon's Administration. Implementation of the Federal portion of the program was initiated by Congress in the Public Works Appropriations Act of 1970. On October 7, 1970, President Nixon signed into law the Public Works Appropriations Act of 1971 which approved further implementation of the program through 1981.

From July 1, 1969, to June 30, 1970, a total of $389 million of plant investment was placed in service on the Federal Columbia River Power System. An approximately equal sum was also invested in non-Federal electric facilities in the Northwest during the same period. Close to $7 billion of additional investment will be made under the Hydro-Thermal Power Program in the coming decade, less than would otherwise have to be invested without the program. Of this sum, about 30 percent will be Federal and 70 percent non-Federal.

System Development

During fiscal year 1970, the Federal Columbia River Power System added 962,000 kilowatts of generating capacity, increasing the number of Federal dams producing electricity to 26 and their combined nameplate rating to more than 9 million kilowatts.

On May 21, 1970, the first direct-current line of the Pacific Northwest-Pacific Southwest Intertie, stretching from The Dalles Dam on the Columbia River to Los Angeles, California, went into commercial operation. The Celilo-Sylmar d-c line, as it is called, is unique in the United States and the world. It is the world's largest long-distance (846 miles), high-voltage (800,000 volts) direct-current transmission line. Together with terminal facilities at each end which convert alternating current to direct current and vice versa, the Celilo-Sylmar d-c line represents a major breakthrough in electric transmission technology.

Throughout fiscal year 1970, performance of the two 500,000-volt alternating-current transmission lines of the Pacific Northwest-Pacific Southwest Intertie continued to improve. With three lines now in service, one d-c and two a-c, the Intertie's usefulness and versatility have been materially expanded. The lines have been used extensively to exchange Northwest capacity for Southwest off-peak energy, thus increasing peaking capacity in the south and energy supply in the north. It is also used to exchange surpluses from one region to another.

Moreover, the Intertie has provided important emergency interregional support during times of system trouble. Whenever any generation source is lost in the Northwest, as during a "scram" of the Hanford nuclear powerplant, the Intertie provides support for the region. Conversely, California power systems have gained important support from the Intertie when large steam generation units in the Southwest have been tripped off the line. By interconnecting the power systems of two regions, the Intertie has increased power capabilities, reduced power costs, and improved power reliability in each region.

Libby Dam, Montana, under construction

As reported in last year's Annual Report, the first two Canadian storage dams under the Columbia River Treaty, Keenleyside and Duncan, have been fully operational for quite some time. Construction of the third Canadian project, Mica, and of Libby Dam in Montana, are on schedule. Full storage from Mica Dam will be available in 1973. Partial storage from Libby Dam, being constructed by the U.S. Army Corps of Engineers in accordance with the Treaty, will be available in 1972.

During fiscal year 1970, Bonneville Power Administration added 208 miles of 500,000-volt transmission line to the system in addition to the 265 miles of 800,000-volt direct-current line in Oregon which is part of the Intertie. Total circuit miles on our system were increased during the year to 11,378. By replacing lower voltage lines with higher voltage lines, we substantially increase the transmission capacity of existing right-of-way corridors and thus minimize the impact of our program on the environment.

Power Sales and Financial Results

Our energy sales increased 7.3 percent during fiscal year 1970, reaching a new high of 55.6 billion kilowatt-hours.

Revenues increased 7.6 percent to a record high of $147.7 million. Net revenues, after all expenses including depreciation and interest on the Federal investment, totaled $24.7 million. Cumulatively, BPA revenues to June 30, 1970, have exceeded $1¾ billion.

Bonneville ratepayers are required to bear the full cost of Federal power operations in the Pacific Northwest including the cost of operating and maintaining Federal Columbia River Power System facilities, of purchasing power or acquiring power through exchange and net billing arrangements, of interest on the Government's investment in power facilities, and of recovery of the capital investment in Federal power facilities as well as certain irrigation facilities assigned for repayment from power revenues. This Annual Report, as required by Public Law 89-448, presents a financial statement on a repayment basis for the Federal System which shows that under BPA's present rate structure, ratepayers are paying the full costs to the Government of producing, purchasing, and transmitting electric energy.

Despite increasing revenues, however, upward pressures will be exerted on future power rates. This will be so primarily because of higher interest rates and the higher cost of thermal power which will be acquired to mix with low-cost hydropower.

Power Operations

Exceptionally low streamflows were experienced in the Columbia River Basin in the late summer of 1969 and again in the late summer and early fall of 1970. For a hydroelectric power system such as ours, this can be a serious matter. As a result of low streamflows, secondary energy sales to industrial interruptible loads and to utilities were discontinued, first for two months starting in early August 1969, again briefly in January and in July 1970, and most recently starting in mid-August 1970 when a sharp recession in streamflows brought natural flows in the Columbia River down to 58 percent of critical year levels by mid-September 1970. (The critical year, 1936-37, was the year of the lowest natural streamflow of record.)

The power situation was aggravated by the unavailability of power from the Hanford nuclear powerplant which was shut down for scheduled maintenance and refueling in May 1970 and was not restored to service until mid-September, one month later than expected. In late September, Hanford was again beset

with trouble in the reactor and was shut down until late October. Delays in Federal generator installation schedules also contributed to a poor power situation.

Because of this power supply crisis, reservoirs of the Federal System had to be drafted below rule curve elevations on a provisional basis to meet firm loads. (The rule curve specifies the minimum surface level for any given time below which reservoirs cannot be drafted, except on an assured replacement basis, without imperiling firm load carrying capability.) At the end of September 1970, reservoirs were more than one billion kilowatt-hours below rule curve elevations, equivalent to nearly 1½ million kilowatts of generation operating at full capacity for one month. To keep operating, Northwest electroprocess industries have been forced to purchase high-cost replacement energy largely by imports over the Intertie and other interregional connections. Such energy is purchased on behalf of the industries by BPA through a trust fund financed by the industries.

Power Outlook

Notwithstanding the fact that the Hydro-Thermal Power Program is on schedule, delays made in earlier years in generator installation schedules at such key Federal hydro projects as The Dalles, Libby, Grand Coulee Third Powerplant, Dworshak, and Lower Granite, have plunged the Pacific Northwest into a period of power supply shortage. Since there are no suitable alternative power sources that can be developed on short notice, this shortage will persist through 1975 as indicated by the following table.

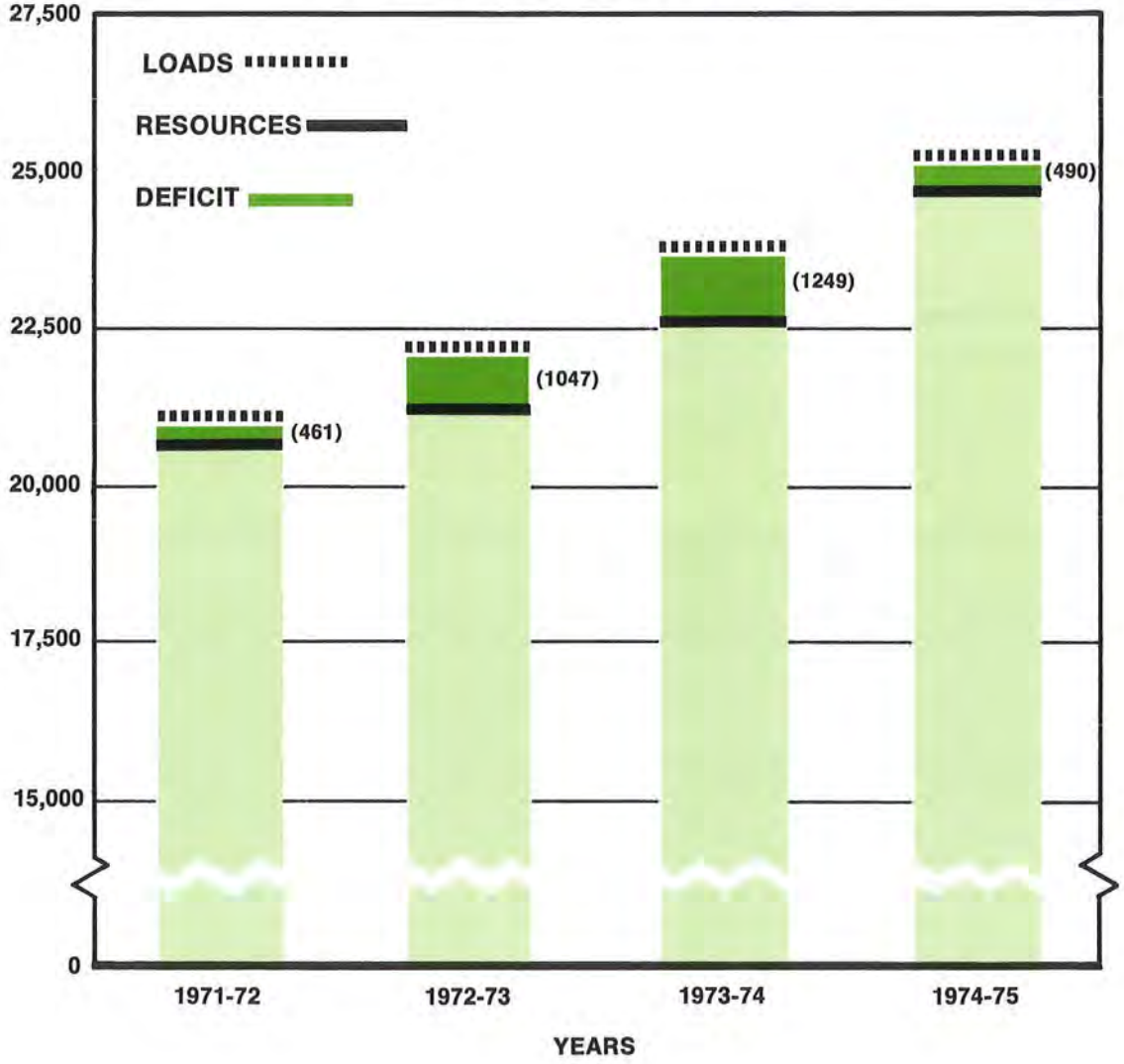
Peak Loads and Resources
West Group Area
(Thousands of Kilowatts)

	1971-72	1972-73	1973-74	1974-75
Loads (incl. interruptible)	21,383	22,467	23,880	25,377
Resources	20,922	21,420	22,631	24,887
(Deficit)	(461)	(1,047)	(1,249)	(490)

Even with the elimination of interruptible industrial loads (together with the reserves they provide), the firm peak deficit reaches 464,000 kilowatts in 1973-74. Northwest loads are forecasted to increase at a rate of less than 6 percent a year versus national load growth forecasts in excess of 7 percent annually. Moreover, except for commitments made years ago, no new firm

electroprocess industrial loads have been added in the region since 1966 nor have any additional firm power commitments for future industrial loads been made. The only new industrial power commitments we have made are for interruptible power. We are renewing expiring firm power contracts with existing industry to provide for firm power only until 1976 and for interruptible power thereafter unless resources greater than presently assured are available.

PEAK LOADS AND RESOURCES
WEST GROUP AREA
THOUSANDS OF KILOWATTS



Actual power deficits could be higher or lower than those forecasted. Some events could occur which would worsen the forecasted situation: (1) any additional significant delays in the installation schedules for hydro or thermal generating units, (2) forced outage failure of major generators, (3) load growth substantially in excess of expectations, or (4) severe weather conditions. On the other hand, some circumstances could improve the situation: (1) better than critical water runoff conditions, (2) higher than normal wintertime temperatures, (3) slower load growth than anticipated, or (4) improved availability of resources outside the region. Unfortunately, the likelihood of delays in generation schedules is greater than the likelihood of loads not materializing as predicted.

Environment

In the Pacific Northwest, as throughout the Nation, electric utilities have become increasingly sensitive to the new environmental ethic. Notwithstanding Bonneville's history of commitment towards preservation of the natural beauty of the region, we are giving increased emphasis to:

(1) eliminating any adverse impact of our facilities on air, and water quality;
(2) minimizing environmental impact of rights-of-way clearing, construction, and transmission line maintenance;
(3) improving the appearance of facilities; and
(4) replacing existing lines with higher capacity facilities to make greater use of existing rights-of-way.

Swan Valley-Teton 115-kv transmission line

In compliance with the National Environmental Policy Act of 1969, we have submitted our plans for fiscal year 1972 to Federal, state, and local governmental agencies within the region for their comments on the environmental impact of the proposed program. To inform the general public and receive comments, open meetings were held in eight cities throughout the region with a ninth regionwide meeting held in Portland on October 9, 1970.

Earlier, in August 1970, I was named defendant in a suit involving construction of a BPA transmission line between Bandon and Gold Beach along the southern Oregon coast. The suit, seeking to enjoin construction of the new line, was filed by an out-of-state corporate landowner. It alleged violation of the National Environmental Policy Act. On October 27, the U.S. District Court for Oregon in ruling against the complainant held that the National Environmental Policy Act, which became law on January 1, 1970, does not apply retroactively to the new transmission line which was authorized by Congress in fiscal year 1968 and on which construction had begun. The court also observed that in any event, even if the National Environmental Policy Act were applicable, "It is more probable than not that the Council on Environmental Quality would conclude that BPA's environmentalists had made a thorough study and arrived at the right decisions." Naturally, we are pleased about this decision in our favor. We do not, however, intend to become complacent. The problem of harmonizing the need for more electricity with the need for environmental quality requires continuing expenditure of our time and effort.

A superficially plausible view is that the dual objectives of ample, low-cost power and a desirable, congenial environment are the natural and sworn enemies of one another; that to achieve one, we must sacrifice the other. A popular theme nowadays is that advocates of ample power and those of a wholesome environment are on a collision course with one another; that more power and improved environment are mutually exclusive objectives; that we can have one or the other, but not both. We do not accept this view. On the contrary, we are committed to the twin objectives of achieving an adequate and reliable power supply and protecting the environment, and we believe we can attain both.

Sincerely yours,

H R Richmond

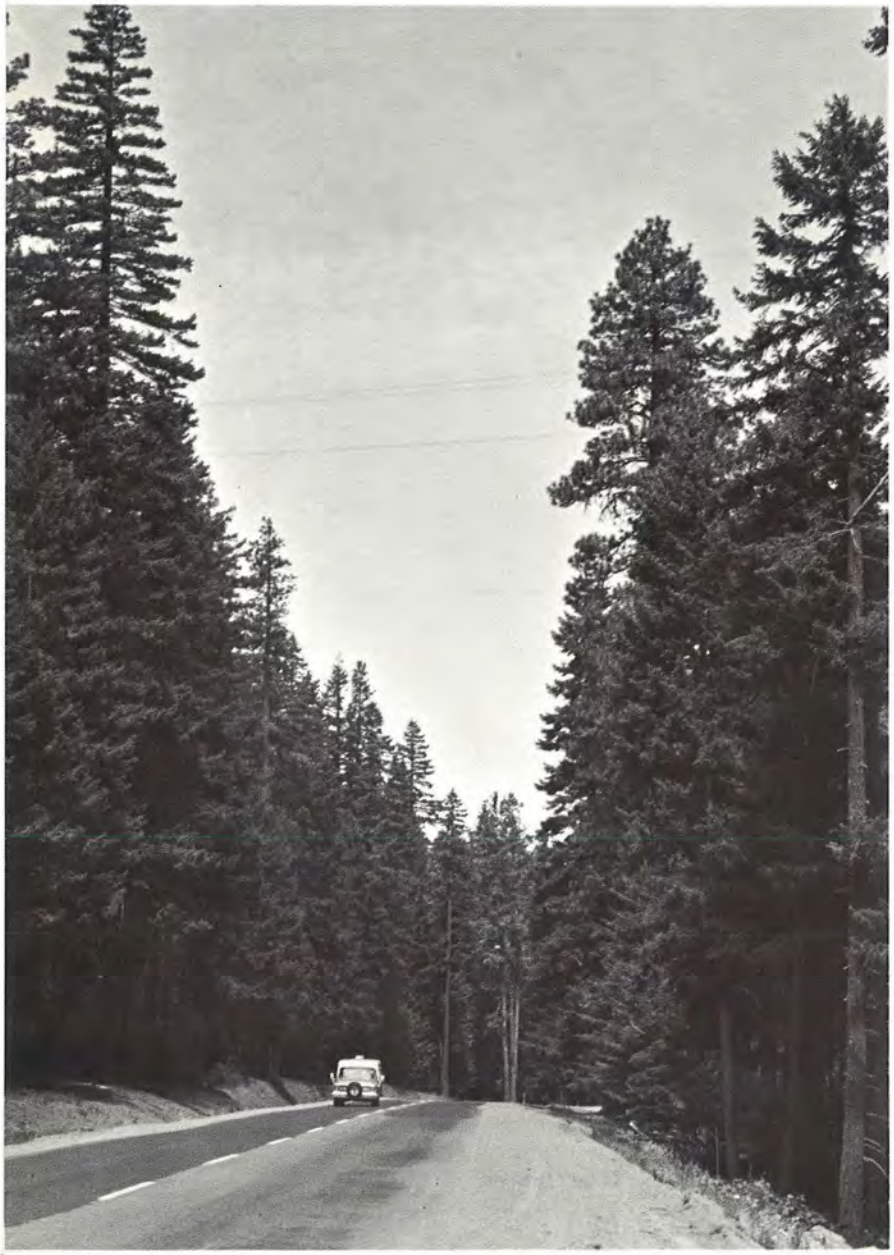
H. R. Richmond
Administrator

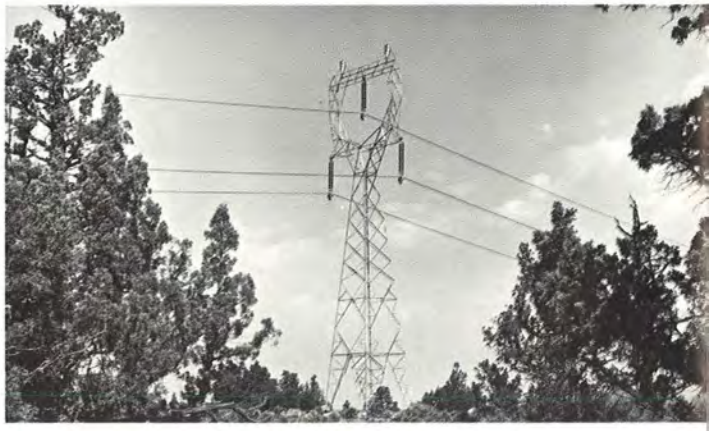
U.S. DEPARTMENT OF THE INTERIOR

HOLLEY

◀ Over, left: Secretary of the Interior Walter J. Hickel delivering dedicatory address, Celilo Converter Station
Over, right: Ceremony marking first concrete pour, Grand Coulee Third Powerplant

INTRODUCTION— BPA AND THE ENVIRONMENT





Above left: Screening of 500-kv line right of way crossing Mount Hood highway preserves scenic beauty
Above right: 500-kv a-c intertie line, central Oregon
Center: Deer browse in transmission line right of way
Lower right: Kettle Falls exposed by drawdown of Grand Coulee reservoir

On January 1, 1970, President Richard M. Nixon signed the National Environmental Policy Act (NEPA) of 1969. The NEPA re-emphasizes the need for the Bonneville Power Administration to build and operate a reliable regional electric transmission grid most compatible with the environment of the Pacific Northwest.

The effect of power operations on the environment has been a consideration of BPA's planning for 30 years since its first transmission lines were constructed.

The environmental integrity of one of North America's most scenic areas, the Columbia Gorge, has been preserved by building the transmission lines from Bonneville Dam directly up the bluffs and running them westward to Portland and Vancouver on the high benches north and south of the river where they are out of sight of travelers in the most scenic portions of the Gorge.

Natural growth left standing to minimize visual impact of right of way

The National Environmental Policy Act of 1969 and the implementing Executive Orders have placed new requirements on all Federal agencies. Most significant of these is the requirement that Federal agencies in consultation with environmental agencies, Federal, state and local, prepare a detailed statement of the environmental effect of a proposed action before undertaking that action.

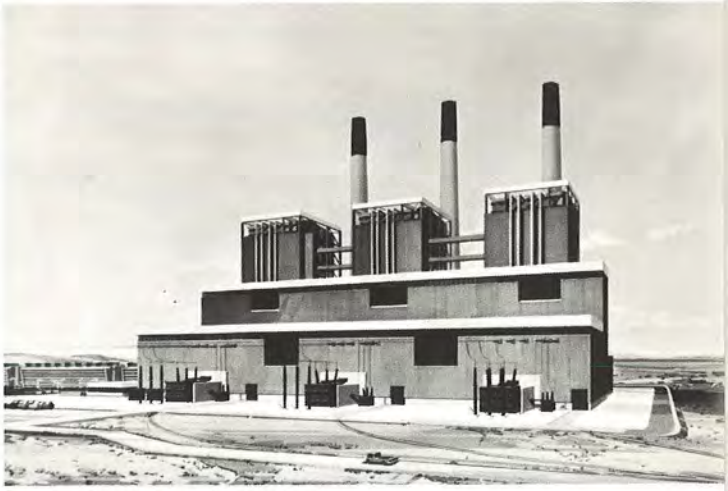
BPA's first opportunity to follow this procedure came in preparing its budget for fiscal year 1972. Presentation of budgets typically leads actual expenditures by many months. BPA consulted with 14 Federal, 36 state and 80 local environmental agencies regarding the potential effect of the proposed program. Then BPA went one more step. Although not specifically required by the National Environmental Policy Act, eight public meetings were held in cities throughout the service area to inform the public of the proposals and to receive comments on them. These meetings were held in September 1970. On October 9, at Portland, a system-wide meeting was held to receive additional environmental comments.

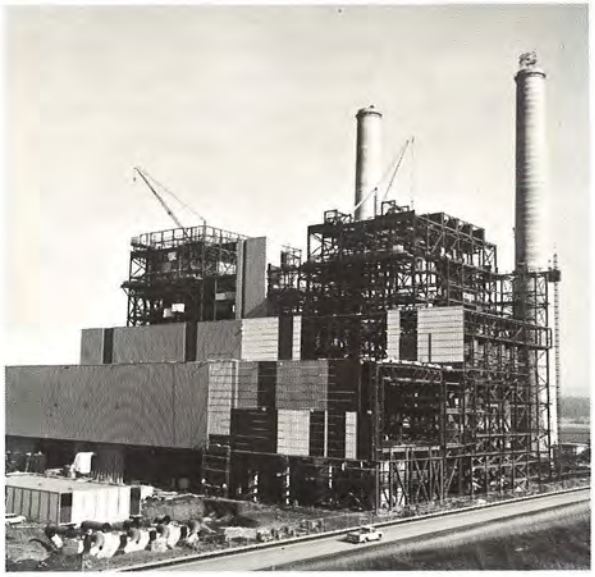
An Environmental Statement, incorporating BPA's evaluation of the environmental considerations of the fiscal year 1972 proposals and the comments of other agencies and the public, was sent through the Secretary of the Interior to the Council on Environmental Quality.

Carrying out the provisions of Executive Order 11507, BPA during 1970 reviewed its existing facilities to be certain that these facilities met requirements of appropriate Federal, state and local air and water quality standards. In almost all cases, the appropriate standards had been incorporated in the original design of the facilities and corrective measures were necessary in only a few cases.

Further illustration of BPA's concern for and protection of the environment of the Pacific Northwest will be found throughout portions of the Annual Report which follow.

HYDRO-THERMAL POWER PROGRAM





Above: Trojan nuclear power plant site, Rainier, Oregon
Center: Centralia coal-fired power plant under construction near Centralia, Washington
Right: Artist's concept of Jim Bridger coal-fired power plant, Wyoming
Bottom: Model of Trojan nuclear power plant

The Pacific Northwest Hydro-Thermal Power Program, a long-range plan to assure a continued supply of reliable, low-cost electricity for the region, faltered briefly near the end of the fiscal year but quickly recovered its forward pace.

On May 26, 1970, the voters of the city of Eugene passed a charter amendment requiring a four-year delay of construction of a nuclear power plant planned by the Eugene Water and Electric Board. The 1,100-megawatt plant was to have been the fourth thermal plant under the Program (after a coal-fired plant at Centralia, Wash., and a nuclear plant at Rainier, Ore., and Unit 2 of a coal-fired plant in Wyoming), and was to have begun operation by September 1976.

The Joint Power Planning Council, a planning group made up of 108 publicly and privately owned utilities and the Bonneville Power Administration, met after the Eugene election to find a way to fill the gap left in the power resources picture by the loss of the EWEB plant. Contributing to the difficulty in filling this gap was the fact that much of the preliminary engineering for the EWEB plant had been accomplished and there was insufficient time left for planning and construction of a similar project to meet the needs of 1976.

The JPPC considered a number of complex alternatives and, with the concurrence of the individual utilities involved, agreed a third 500-megawatt unit of the Jim Bridger plant (planned by Pacific Power & Light Company and Idaho Power Company in Wyoming) could be advanced from 1979 to begin operation in September 1976. The nuclear plant planned by the Washington Public Power Supply System would be advanced from March 1978 to September 1977. Plants 5, 6 and 7 would have to be rescheduled and new sponsorship and participant-sharing arrangements made for them. In addition, it was necessary to inform the California utilities of earlier than anticipated withdrawal of Canadian power they have been purchasing under the Canadian Storage Power Exchange agreement. Currently California utilities are receiving up to 1,137 megawatts on peak and 601 megawatts average energy. This will be reduced to 314 megawatts on peak and 168 average in April 1975 with further reductions in 1978 and subsequent years.

An additional requirement to make possible the rescheduling of thermal plants under the Program was approval of net billing arrangements with the participating public and consumer-owned utilities. (Net billing permits BPA to acquire the public agencies' share of plant output and to pay for it by deducting from amounts owed by the public agencies to BPA for power purchases and other services.) Rescheduling of the WPPSS plant required that the net billing contracts for the entire output of the plant be executed soon if BPA is to avoid having to issue by July 1, 1971, notices of insufficient power supply to preference customers for their 1976-77 load and beyond. The contracts have been negotiated, approved by the Secretary of the Interior, reviewed by the Office of Management and Budget, and forwarded to the Congressional Appropriations Committees for review.

Net billing contracts for plant number 2, the Portland General Electric sponsored Trojan Nuclear Power Plant, had already been through this review and approval procedure when they were signed by BPA, EWEB and 13 other participating public agencies on October 5, 1970.

The cost of acquiring power under net billing will require no Federal appropriations. The higher cost thermal power acquired by BPA through these arrangements will be combined with the lower cost Federal hydro power and will be sold at BPA rates adjusted from time to time in the future to reflect higher costs. These adjusted rates will reflect not only the higher cost thermal power but costs of all Federal hydro generation and transmission facilities. The resulting higher power rates will provide sufficient revenues to the U.S. Treasury to meet all Federal power system repayment obligations. All costs associated with the net billing transactions and all other Federal costs assigned for repayment out of power revenues will be borne by BPA power customers.

The Federal Government's investment in hydroelectric plants and transmission lines under the Program through the ten-year period (1971-72 through 1980-81) is estimated at approximately $2 billion. (See tabulation below.) The public and private utilities'

investment in generation, transmission and distribution facilities is estimated at about $4.7 billion during this same period.

ESTIMATED FINANCIAL REQUIREMENTS FOR THE HYDRO-THERMAL PROGRAM
1971-72 through 1980-81

(Millions of Dollars)

	Federal	Public & Private Utilities	Total
Hydro Generation	975	2	977
Thermal Generation	—	2,335	2,335
Total Generation	975	2,337	3,312
EHV and HV Transmission	1,040	220	1,260
Low Voltage Transmission and Distribution	—	2,100	2,100
Total Transmission and Distribution	1,040	2,320	3,360
Total Hydro-Thermal Program	2,015	4,657	6,672

Minimizing the ecological and environmental impact of powerplants, transmission lines and substations under the Hydro-Thermal Power Program presents an even greater challenge than has been faced in the past. Although the Federal Government will not build any of the thermal plants, BPA as a participating Federal agency is charged with the responsibility of complying with such legislation as the Federal Water Pollution Control Act, the Fish and Wildlife Coordination Act, the Water Quality Act, the Clean Air Act, and the National Environmental Policy Act of 1969.

To summarize, the Pacific Northwest Hydro-Thermal Power Program is on schedule as this report is written. Here is the status of each of the plants:

PLANT 1—CENTRALIA STEAM-ELECTRIC PROJECT

The first project under the Program is a coal-fired powerplant being built in the Hanaford Valley five miles northeast of Centralia, Washington, under prime sponsorship of Pacific Power & Light Company and the Washington Water Power Company, with Portland General Electric, Puget Sound Power & Light, Seattle City Light, Tacoma City Light, and Snohomish and Grays Harbor Public Utility Districts having smaller ownership participation. The plant is more than 50 percent complete. One 700-megawatt unit is scheduled for commercial operation September 1, 1971, and another one September 1, 1972.

The Centralia project includes not only a large steam-electric generating station but also a coal field strip-mining development. An earth-fill dam to supply water for the cooling towers is completed and the reservoir is filling. Assuming good progress continues, the plant will be in service on schedule.

PLANT 2—TROJAN NUCLEAR POWER PLANT

Portland General Electric Company is the principal sponsor of the 1,100-megawatt Trojan Nuclear Power Plant near Rainier, Oregon. The City of Eugene will own 30 percent of the plant and Pacific Power & Light Company 2.5 percent. One Washington and 12 Oregon publicly-owned utilities will purchase power from Eugene Water and Electric Board for assignment to BPA under net billing. EWEB will also assign its remaining share of the project output (14.5 percent) to BPA under net billing. The power plant is scheduled for commercial operation in September 1974. Site clearing for the reactor, cooling tower, switchyard and recreational areas has been completed, and engineering of the plant itself is more than 70 percent complete. Issuance of the construction permit by the Atomic Energy Commission is anticipated subsequent to hearings held in November.

PLANT 3—THE JIM BRIDGER POWER DEVELOPMENT

The Jim Bridger project is a coal-fired powerplant being constructed jointly by Pacific Power & Light Company and Idaho Power Company, 25 miles north-

George L. Beard, Senior Vice President, PP&L; Frank M. Warren, President, PGE; H. R. Richmond, Bonneville Power Administrator; and Byron Price, General Manager, EWEB, announcing signing of Trojan nuclear power plant contracts.

east of Rock Springs, Wyoming. The name Jim Bridger is associated with the early exploration and settlement in this part of Wyoming.

Unit 1 of 500 megawatts will be utilized primarily by Idaho Power Company. Units 2 and 3 will be part of the Hydro-Thermal Power Program. Major plant equipment is under contract and site preparation has started. Unit 2 is scheduled for completion in September 1975. As noted earlier, Unit 3 originally scheduled for September 1979 could be advanced to September 1976.

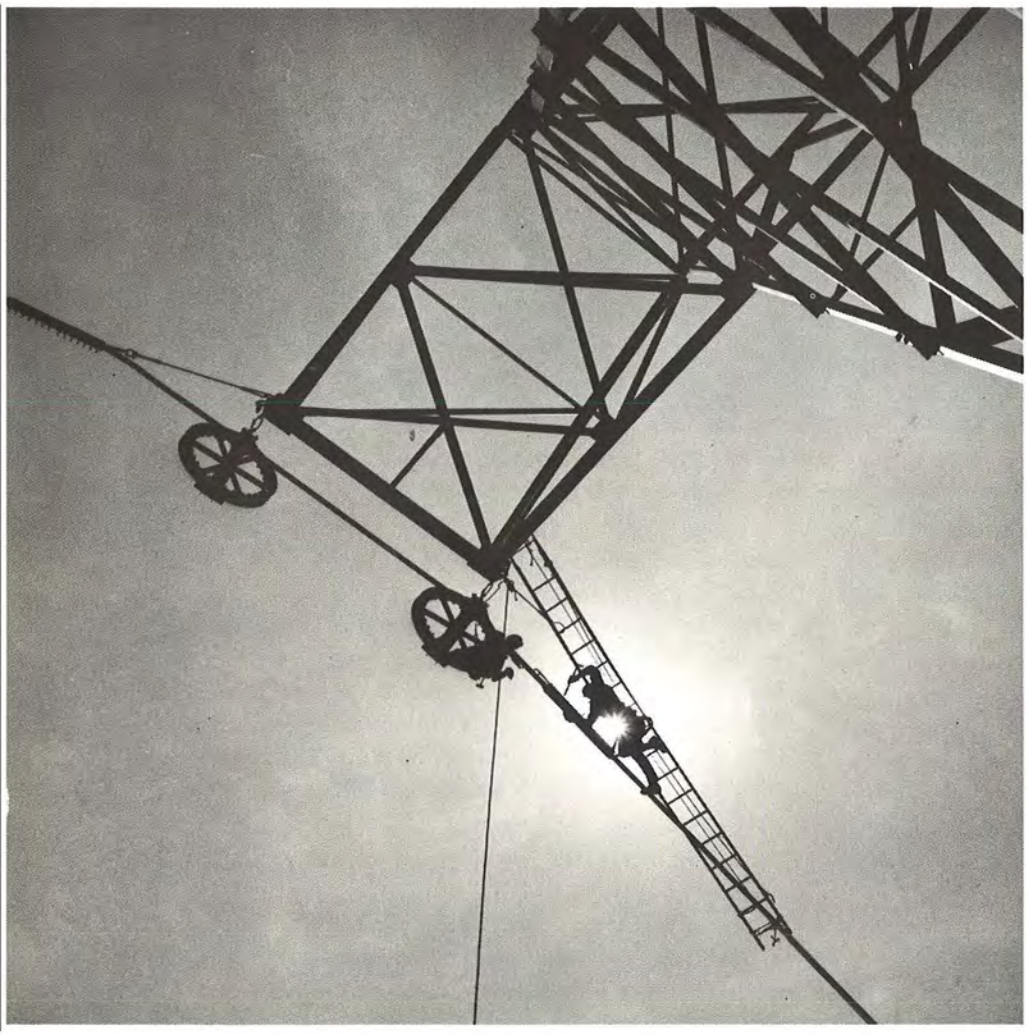
PLANT 4—HANFORD NUMBER 2

A plant with Washington Public Power Supply System as principal sponsor will be located on the Hanford Reservation near Richland, Washington. Present plans provide for a 1,100-megawatt nuclear plant. It will be 100 percent publicly owned with most of the 104 public and consumer-owned utilities of the region as participants. Commercial operation of the plant is scheduled for September 1977. The entire output will go to BPA under net billing.

PLANTS 5, 6 AND 7

Plants 5, 6 and 7 will probably be 1,100-megawatt nuclear plants located in Washington and Oregon to be completed by 1981. The immediate objective is to determine plant sizes, type, location, schedules, sponsors and participants.

TRANSMISSION PLANNING AND CONSTRUCTION

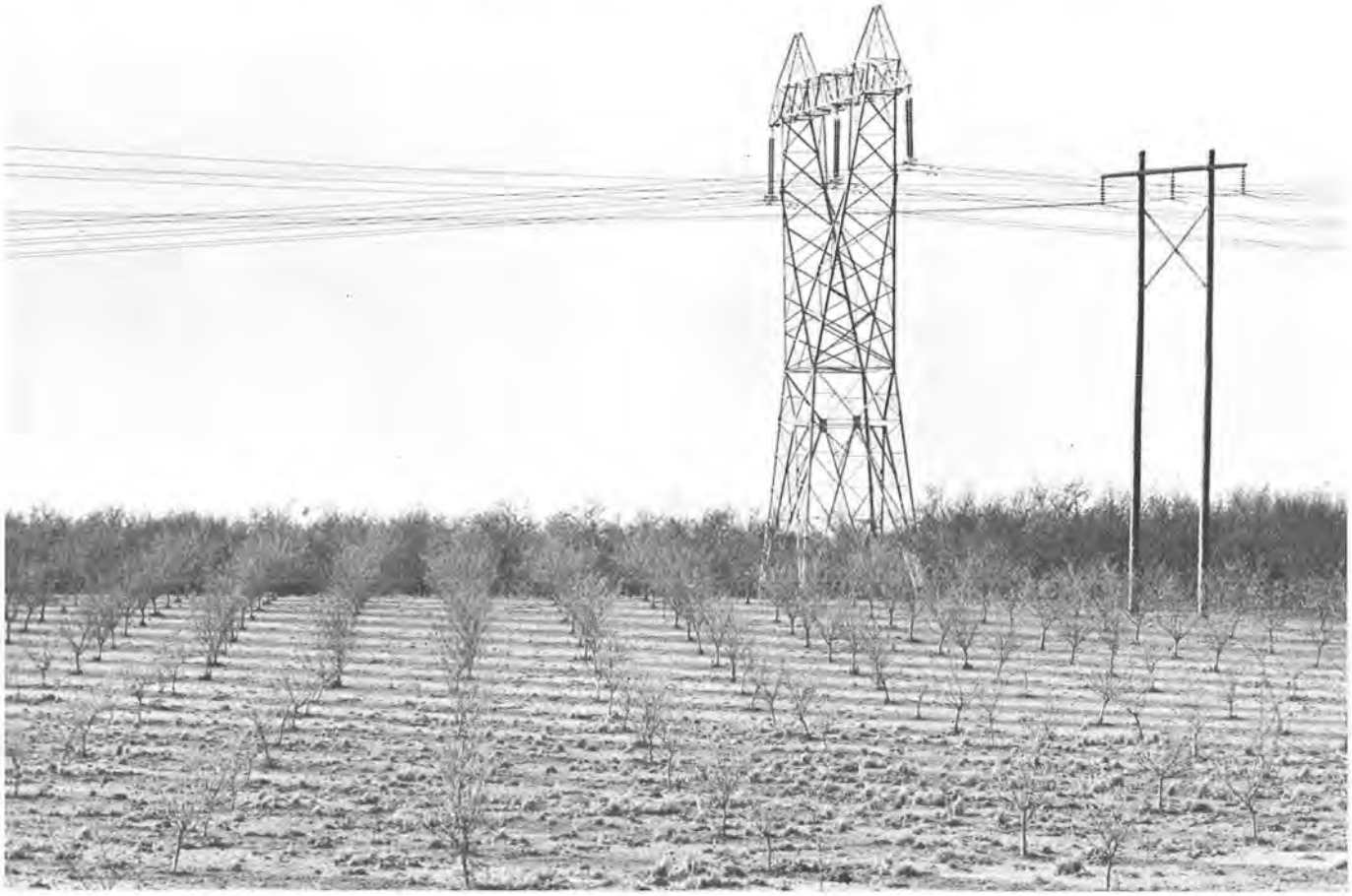


Bonneville Power Administration handled over 97 billion kilowatt-hours of energy in fiscal year 1970, an increase over fiscal year 1969 of almost 8 percent. This figure includes all power generated for BPA, plus power interchanged in and out and energy losses in transmission and transformation. (See Table 4.) This increase follows the general trend throughout the United States.

Almost universally, the demand for power keeps increasing—roughly doubling every decade—and, paradoxically, opposition to expanding electrical transmission facilities is becoming increasingly more vocal. The crux of the matter is concern for the environment, yet demand for power translates directly into demand for facilities to carry that power.

In constructing and operating its transmission grid, BPA continues to make every effort possible to avoid pollution of air, water and space. Physical environment is protected by using the same right-of-way for more than one transmission line to minimize land use. Control of construction and maintenance operations, and waste disposal practices at BPA installations help preserve natural beauty, as does careful design of powerlines and substations to lessen their effect on scenery. By using natural and cultivated plant growth as screening, the appearance of facilities

Orchard growing under transmission line near Keeler Substation, Oregon, illustrates multiple use of rights of way.



is improved where intrusion into the scenery is unavoidable.

Since the 1950's, BPA has worked closely with the U.S. Forest Service and other Federal agencies in locating transmission lines across public lands. Consultation with these agencies is carried on at the earliest stages of planning in order to locate, design and construct facilities which will least affect forests and other public lands.

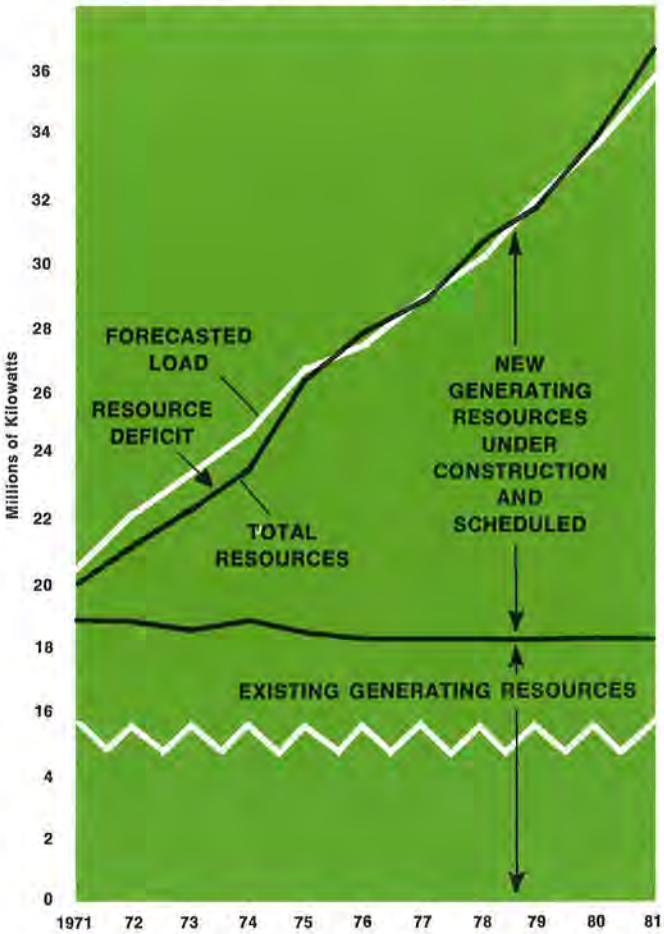
Design criteria are making transmission lines and substations less obtrusive. Right-of-way clearing practices are being followed which preserve natural growth wherever there is no danger of interference with conductors. Lines in hilly ground are being kept below the horizon wherever possible. Highway crossings are being screened by preserving trees and using long span towers (higher and farther apart) and long straight stretches of line are avoided by occasionally deflecting the right-of-way. These are examples of the design criteria developed by BPA which have been adopted by the Departments of the Interior and Agriculture and have been issued as recommendations for all utilities constructing high voltage transmission and substation facilities.

As of June 30, 1970, BPA had more than 1,500 miles of 500,000-volt lines in operation. Replacement of approximately 600 miles of lower voltage lines with 500,000-volt lines is underway. Most of these will be on existing rights-of-way. A 230,000-volt line requires a right-of-way width of 125 feet. A 500,000-volt line has a capacity four to five times that of a 230,000-volt line and requires a right-of-way width of 125 to 150 feet.

BPA has taken still another step to meet the challenge of preserving the environment while carrying out the requirement of the Bonneville Act to market Federal power at the least possible cost. Research and development in the art of electric power transmission are being carried on which are expected to further reduce the effect of power operations on the environment. Included in these efforts are investigation of ultra-high-voltage transmission in the million-volt range which, if successful, would permit transmission of larger blocks of power with proportionately less tower construction and right-of-way space use. BPA's next step up in transmission will be construction of lines in the 700,000-volt range.

Higher voltage means fewer lines, less right-of-way and consequently less effect on the scenic environment.

January Peak Load and Resource Forecast
Pacific Northwest Utilities—West Group Area



Already BPA is participating in the operation of the world's longest (846 miles), high-voltage (800,000-volts) direct-current transmission system.

At one minute past midnight May 21, 1970, the direct current transmission line, extending from the Celilo Converter Station near The Dalles, Oregon, to the Sylmar Converter Station near Los Angeles, California, was placed in operation. The Celilo Station and 265 miles of the transmission line were built by BPA.

During the months preceding revenue operation, a lengthy series of commissioning and acceptance tests was held. The system was operated for substantial periods at its full rating of 1,440,000 kw. The system was also successfully tested for one hour at overload (1,545,000 kw) north to south.

Direct current system operation has been generally satisfactory. Monthly availability of the system during the initial operating period has been between 80 and 90 percent. Transmission of full rated power will be permitted when several remaining deficiencies on the a-c and d-c interties have been corrected in California and the Pacific Northwest.

A ceremony dedicating the Celilo Converter Station and the BPA portion of the d-c system was held at the Station August 25, 1970. Participating in the ceremony were Secretary of the Interior Walter J. Hickel, Assistant Secretary for Water and Power James R. Smith, and dignitaries representing the Joint Venture contractors — Allmanna Svenska Electriska Atkiebolaget (ASEA), the Swedish manufacturer of the mercury arc converters which are the heart of the sys-

Celilo Converter Station dedication

Right: Dr. Edgar L. Kanouse, General Manager, Los Angeles Department of Water and Power at Celilo Converter Station dedication

tem, and General Electric, American manufacturer of related equipment — and representatives of other participants.

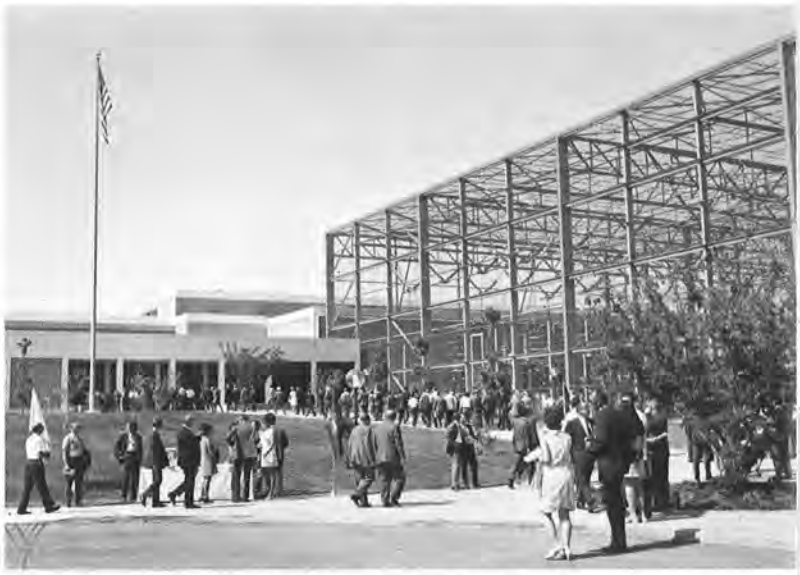
The d-c transmission system is part of the Pacific Northwest-Pacific Southwest Intertie. It is used extensively for the exchange of power between the Pacific Northwest and Southwest areas during differing peak load periods. Since any region must plan generation for its maximum or peak load period, peak load energy exchanges makes it possible to build less generation at both ends of the line. This exchange takes place on an hourly, daily, weekly and seasonal basis. At times, hydro-generated power is sent from the Northwest to supplement thermal generation in the Southwest. Later, thermal power is sent from Southwest to Northwest to permit the Northwest reservoirs to refill. This exchange not only reduces the need for additional generation, it also reduces the consumption of fossil fuel in the Southwest. Thus, power needs are met with lessened impact on the environment.

The addition of the d-c section of the Intertie strengthened and stabilized this Northwest-Southwest link, making this system one of the most stable, yet flexible systems in the world.

In addition to the 265 miles of 800,000-volt direct-current line energized as BPA's portion of the Pacific Northwest-Pacific Southwest d-c Intertie, 208 miles of 500,000-volt lines were completed during the fiscal year.

At the end of the fiscal year, the total number of circuit miles of all voltages in the system stood at 11,378. The additional 500,000-volt lines increased the 500,000-volt grid to 1,523 miles.

BPA's program to replace older, low voltage transmission lines with 500,000-volt lines got underway during the fiscal year with the award of construction contracts for the Chief Joseph-Monroe line. This new 500,000-volt line will use the right-of-way occupied by the Chief Joseph-Snohomish 230,000-volt lines No. 1 and No. 2. When completed in the fall of 1971, the old right-of-way will have a new line with twice the capacity of the former two 230,000-volt lines.



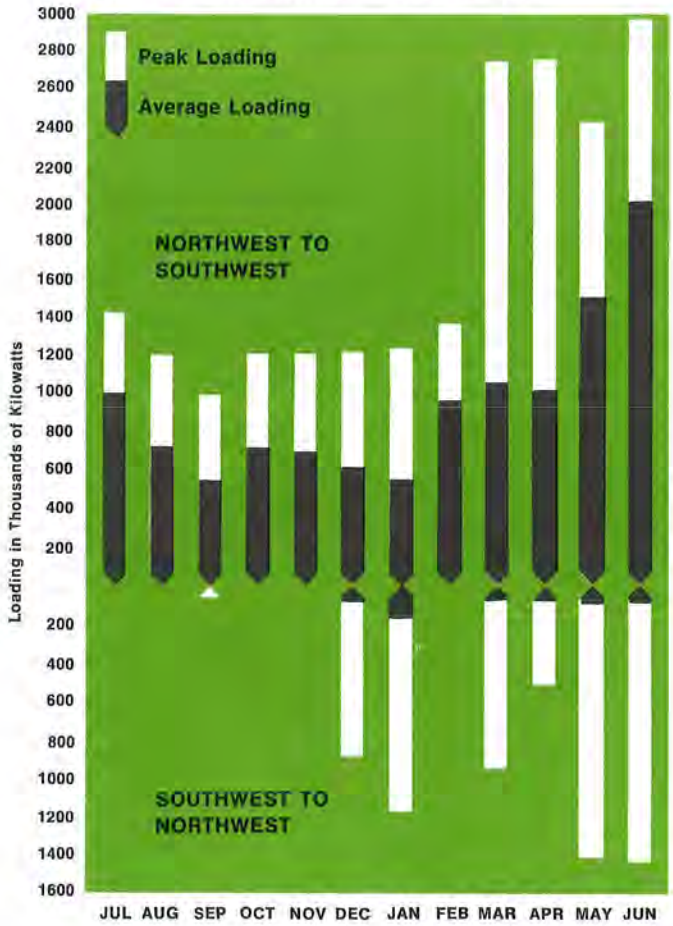
Above: Sylmar Converter Station, near Los Angeles, southern terminus of direct-current intertie

Currently BPA has 1,692 miles of transmission lines and three substations under construction.

With interconnections to adjoining regions, BPA planning can no longer be confined exclusively to its own marketing areas. Interconnected operation of power systems in the western states, as a result of high capacity tie lines, contributed to the formation of Western Systems Coordinating Council (WSCC). The WSCC coordinates the planning and operation of investor-owned power companies and consumer and publicly-owned and government agency power systems in an area of 1,110,000 square miles that includes 13 western states and British Columbia with a population of 35,000,000. BPA is a member of WSCC.

A dramatic example of the type of situation which necessitates interregional planning was an occurrence which started at 11:03 a.m. on July 8, 1970. Test washing of insulators on one of two conductors of the d-c Intertie was being carried on when there was a flashover to the nozzle of the washing equipment. This caused the entire power load to transfer to the other conductor. The line was carrying 700,000 kilowatts at the time. Operating procedures in effect at that time did not permit monopolar (single conductor) operation of the line with current return through the ground, and the load was manually switched over to the 500 kv a-c lines.

INTERTIE UTILIZATION · FISCAL 1970



When the alternating-current Intertie picked up the added load, the a-c system started to oscillate causing voltage fluctuations in the entire West. Loading of the 500-kv Intertie increased to more than two million kilowatts, and this, along with the voltage swings, opened protective relays at the Malin Substation in central Oregon separating the Pacific Northwest from the Pacific Southwest.

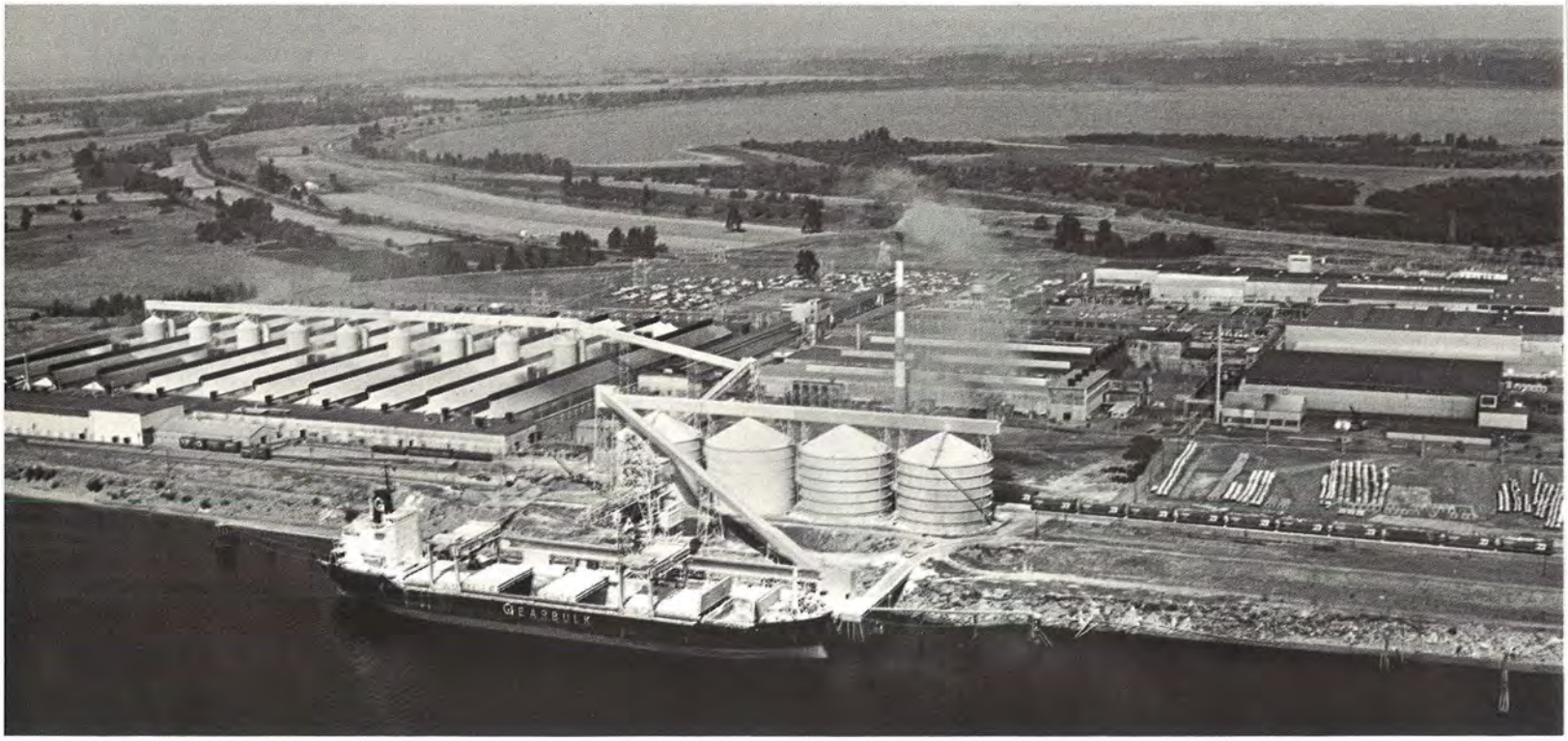
The total load loss (2,000,000 kw) was nearly twice as great as that which caused the massive blackout of the Northeastern United States in November 1965.

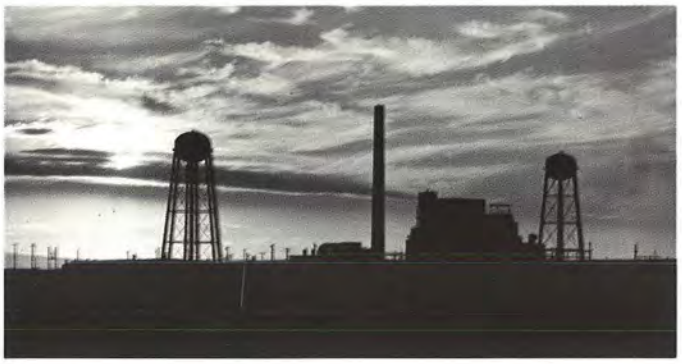
Both ends of the Intertie faced severe problems: The Northwest suddenly had 2,000,000 kw too much generation. The Southwest had 2,000,000 kw too little. Rather than both systems "breaking up" and causing cascading blackouts, the separation triggered individual area protective devices in various parts of the West. Generators were automatically dropped at Chief Joseph Dam in the state of Washington, taking 600,000 kilowatts out of the system. Individual areas were automatically separated in Utah, Arizona, Montana and Colorado. Underfrequency protection devices dropped small amounts of load in California, Arizona and New Mexico. In Colorado 250 megawatts of load was lost due to underfrequency or uncontrolled tripping of transmission lines.

There were a few outages of about four minutes in widely scattered parts of California, Colorado, Wyoming, Utah, Idaho and Juarez, Mexico. The largest disruption was at Denver where about half the city was without power for seven minutes. Other communities lost power only momentarily, all relatively brief inconveniences in widely scattered areas compared to the enormous catastrophe that could have occurred without adequate interregional planning.

Planning for the reliable power system of the future requires a realistic program of research and development. New techniques and methods must be found to solve the technical and environmental problems of the future. Although BPA is not equipped to do basic research, it does provide direction and some financial support to educational institutions and other research oriented groups working on problems confronting the electrical industry.

POWER SALES AND OPERATIONS

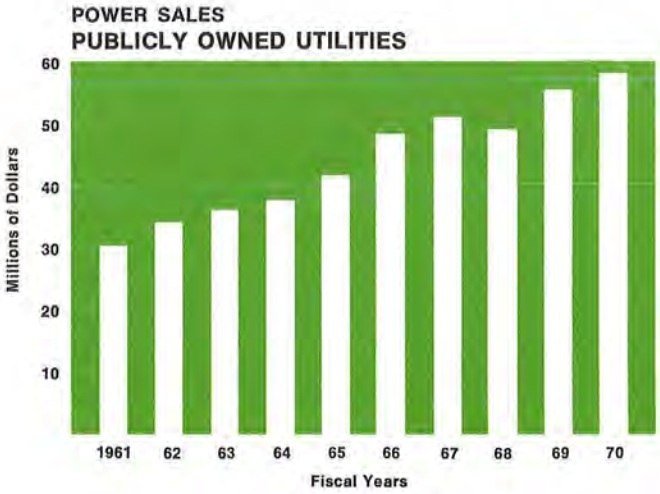




Top: Chelan County PUD's Rock Island Dam, Columbia River, central Washington
Middle: Alcoa aluminum plant, Vancouver, Washington
Lower left: Aluminum ingot pour
Lower right: Hanford nuclear power plant, south central Washington

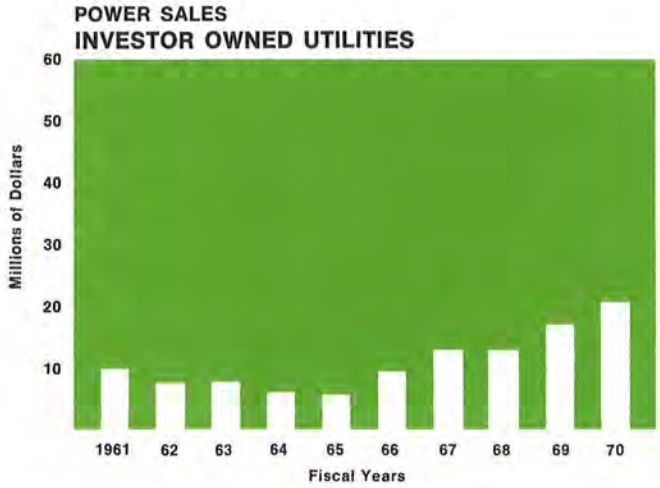
During fiscal 1970, energy sales reached a record high of 55.6 billion kilowatt-hours. This amounts to a 7.3 percent increase over fiscal year 1969 sales.

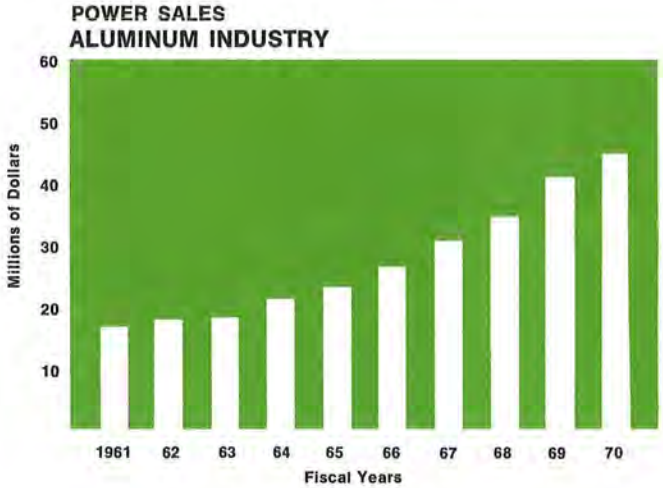
Public utility districts, cooperatives, and municipal systems, experienced 4.2 percent growth over fiscal year 1969. These public agencies purchased 19.7 billion kilowatt-hours from BPA in fiscal year 1970 or 35.4 percent of total energy sold by BPA in the year.



Investor-owned utilities purchased 8.8 billion kilowatt-hours during the year for resale to their customers. This amounts to 15.8 percent of Bonneville's annual sales and is a 22.2 percent increase over fiscal year 1969. Sales to Federal agencies and sales outside the Pacific Northwest were both down for the fiscal year. They total less than five percent of Bonneville's annual sales. Shutdowns at the AEC's Hanford Works accounted for most of the 33.3 percent decrease in Federal loads while the sales outside the Pacific Northwest suffered a 7.1 percent decrease as a result of low streamflows reducing available secondary energy.

The aluminum industry converted 22 billion kilowatt-hours into aluminum ingot and rolled and extruded products. While this market represents 39.6 percent of the total energy sold by Bonneville, the growth in sales (8.9 percent) is less than that experienced in fiscal year 1969. Bonneville's inability to meet all of the secondary energy requirements of its industrial customers during the year is reflected in the lower-than-usual sales growth rate. The major portion of this year's sales growth results from new potlines at the Longview Plant of Reynolds Metals Company. The Pacific Northwest accounts for 35 percent of the nation's primary aluminum capacity.



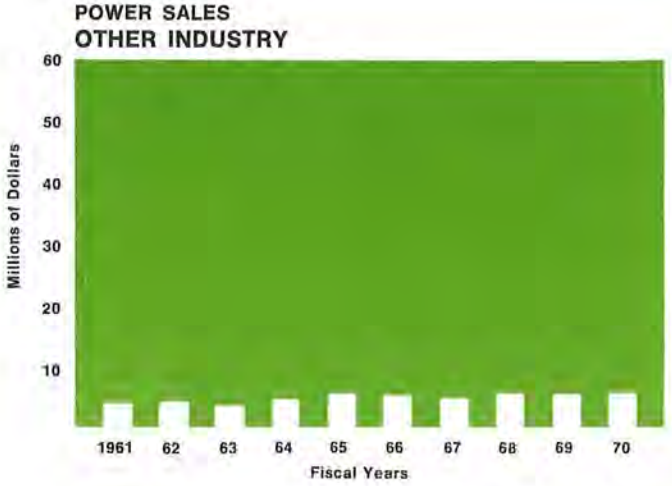


Other industries consumed 2.5 billion kilowatt-hours which represents 4.5 percent of annual sales. As a class of customers, these industries consumed 100 million kilowatt-hours (4.5 percent) more than fiscal year 1969. Oregon Metallurgical Corporation, an electrolytic magnesium producer, was brought on line at Albany, Oregon, during April 1970, under a contract signed in 1966.

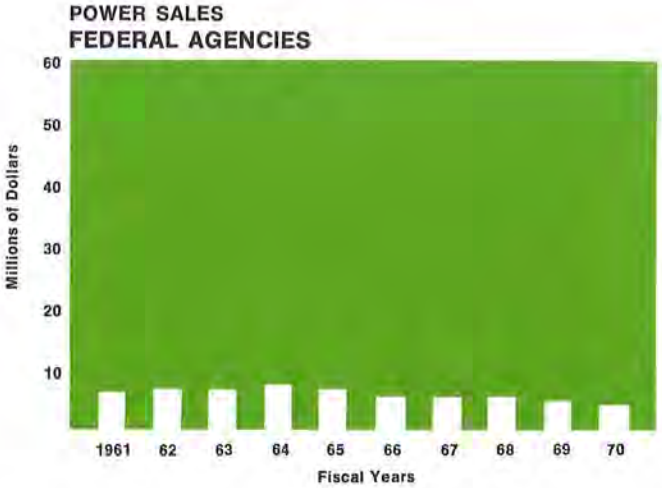
Power sales brought an average of 2.39 mills per kilowatt-hour, exclusive of capacity sales and other revenues.

Under provisions of their purchase contracts, six BPA industrial customers were notified in May 1970 that up to 317,000 kilowatts of their firm-power deliveries will be curtailed effective August 1, 1971, for approximately eight months due to a shortage of firm power in the Northwest. Up to 102,000 kilowatts of firm power will be curtailed for varying periods between August 1, 1970, and August 31, 1973, under two additional industrial contracts.

The companies affected are: Aluminum Company of America at Vancouver and Wenatchee, Wash.; Anaconda Aluminum Company, Columbia Falls, Mont.; Harvey Aluminum, Inc., The Dalles, Ore.; Intalco Aluminum Company, Bellingham, Wash.; Kaiser Aluminum and Chemical Company, Spokane and Tacoma, Wash.; Reynolds Metals Company at Longview, Wash., and Troutdale, Ore.; and Stauffer Chemical Company, Silver Bow, Mont.



Contracts provide that BPA will give the affected companies a priority on interruptible power up to the amount of these firm power reductions.

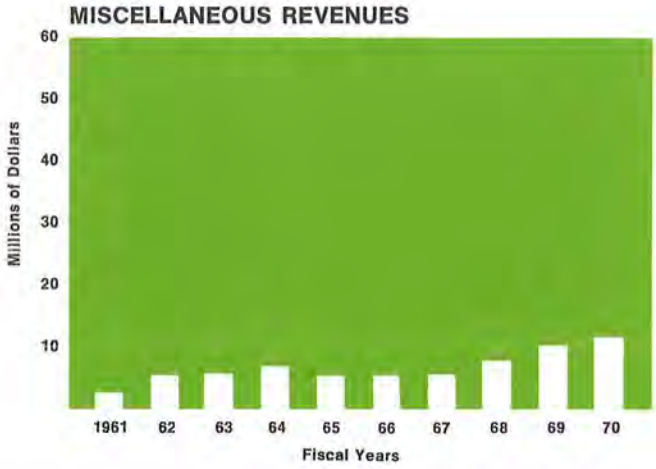


BPA power contracts reflect the long-time concern for environmental quality in the region.

Since 1939, a provision has been included in all BPA industrial sales contracts giving the Administrator the right to stop delivery of power whenever a customer's activity pollutes a Pacific Northwest river or detracts from the scenic beauty of the Columbia Gorge. This same provision was part of BPA contracts with electrical utility customers until 1966 when BPA broadened its contract provisions to permit curtailment of power delivery if a Federal, state or local pollution agency determines that the utility served by BPA is not in compliance with water quality standards of the agency.

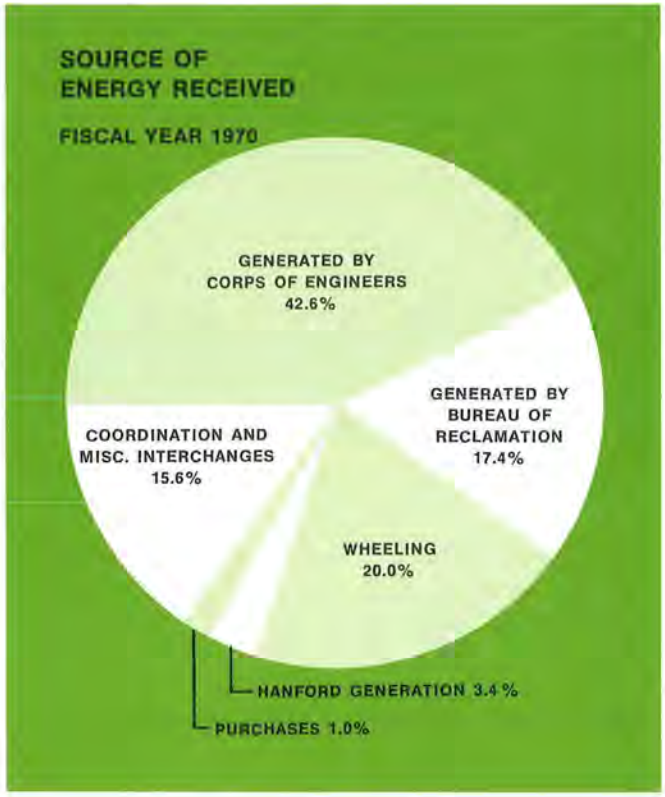
Since 1966, all BPA industrial customers who want to increase their power purchases for new or expanded plants have been required to sign an agreement obligating them to install the best commercially available equipment for the prevention of air and water pollution and to comply with applicable pollution control regulations.

In future power sales contracts, BPA is incorporating an even stronger environmental provision which reflects new Federal law and policy. This provision, which applies to industrial plants served by BPA and generating plants of its utility customers, provides that the customer must make both air and water pollution control plans and specifications for new or expanded plants available to BPA. BPA will not be obligated to provide service to that customer if (1) such plans have been disapproved by any responsible governmental pollution control agency, (2) such an agency has finally determined that an industrial plant served by BPA or a utility customer's electric generating plant is in violation of anti-pollution requirements, or (3) BPA determines such a plant is harming the scenic beauty of the Columbia Gorge.



The record sales and production during fiscal year 1970 were achieved despite an unusually dry spell early in the fiscal year with the accompanying need to discontinue secondary energy deliveries from the Federal Columbia River Power System. BPA has a variety of exchange and purchase agreements which enable continued service to its secondary energy customers when shortages occur on the Federal System. Several of these were used during fiscal 1970.

Utility customers purchase secondary energy from BPA to avoid use of higher cost thermal generation or

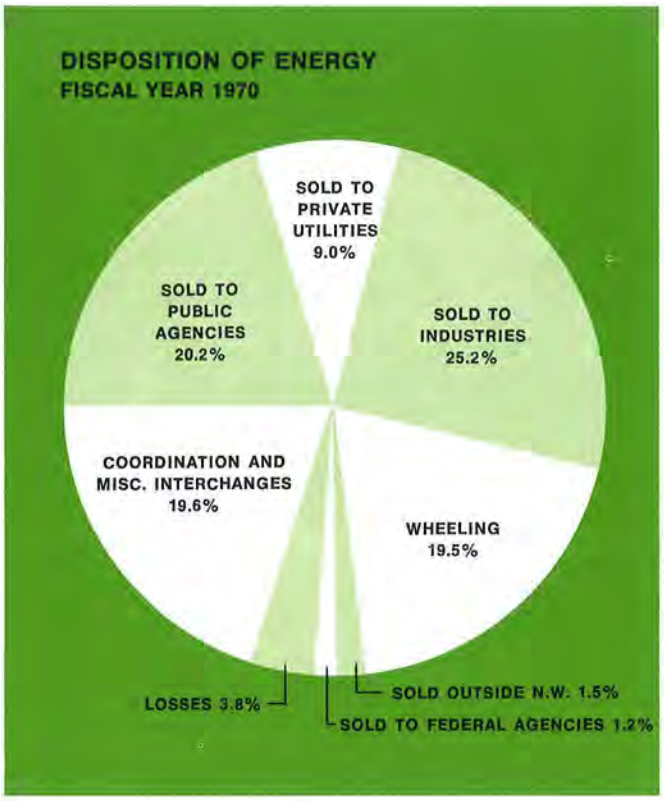


purchases from other sources. About 25 percent of the power needs of large industrial customers in the area, mainly associated with aluminum production, is served on an interruptible basis, with Federal System secondary energy. Only energy not required to meet firm power commitments is made available to secondary energy customers.

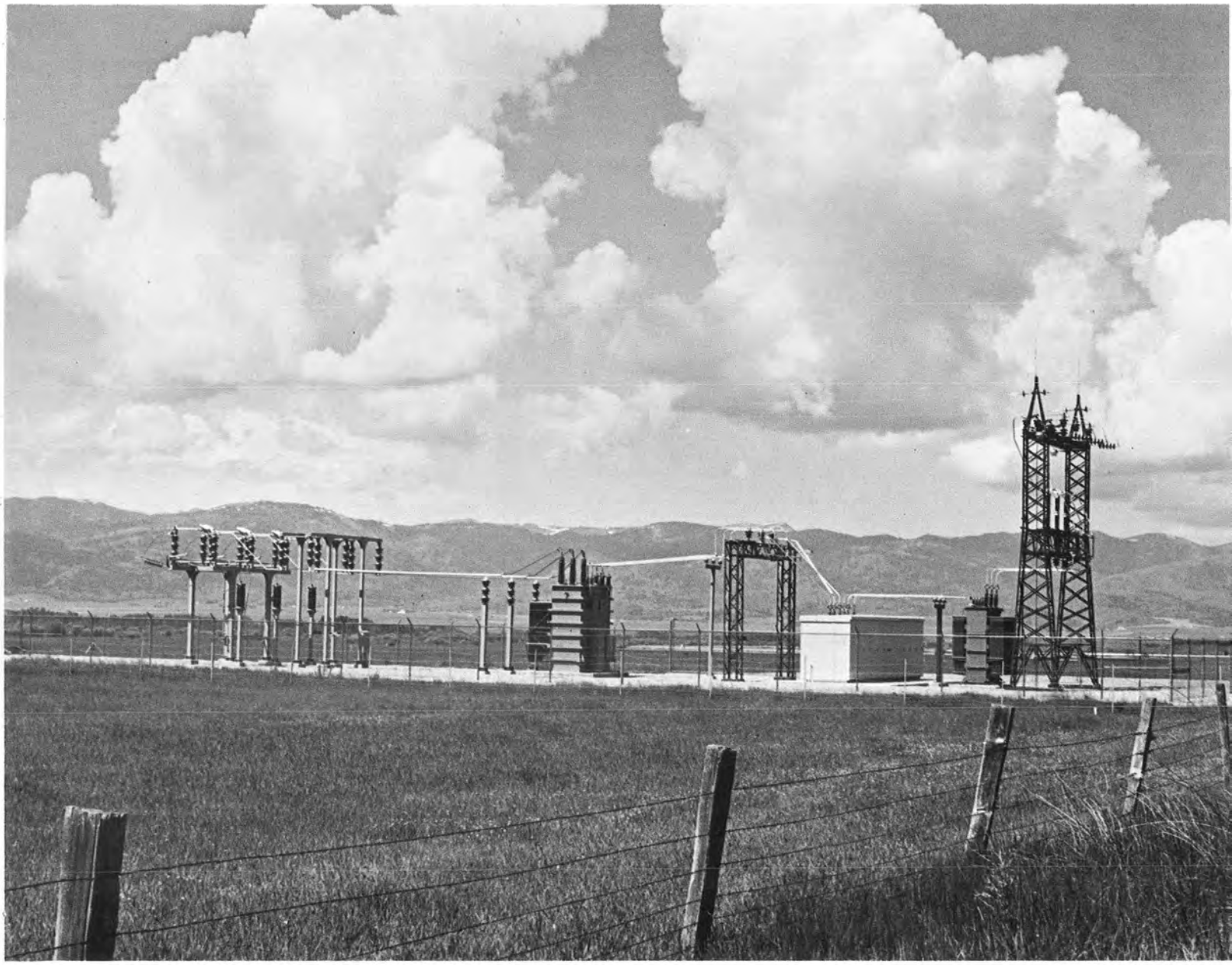
The Bonneville Project Act requires that public bodies and cooperatives be given preferential rights and priority to electric energy from the Federal System. When the rivers are low and the energy output limited, secondary energy deliveries to these customers are the last to be curtailed.

In August 1969, service of interruptible power to industry was dropped, and service of secondary energy to private utilities and public agencies was curtailed. Later in the same month, interruptible replacement energy was purchased from sources outside the Fed-

eral System under terms of a trust agreement between BPA and industrial customers. Under this agreement, our industrial customers can buy power through BPA from some other source when direct service of interruptible power has been curtailed. The industries are willing to pay higher rates for the power plus a wheeling charge to BPA rather than cut back on production during periods of curtailment.



Action to serve interruptible industrial loads which can be taken within the Federal System itself when secondary energy deliveries are curtailed includes the draft of reservoirs below rule curves on a provisional basis. The rule curve fixes at any given time the surface level below which a reservoir cannot be drafted without imperiling future firm load capability. Provisional energy is that energy made available to an industry under contracts which stipulate that the energy will be replaced by the industry through purchase from other sources or reduction in their firm load if, at a later date, the water released to deliver provisional energy is needed by BPA to fulfill other firm power commitments. These actions were taken during a low period in August 1970 and continued in effect through the fall months.



Targhee substation, southeastern Idaho

POWER SYSTEM CONTROL PROGRAM

Above left: Computer Center, BPA headquarters, Portland, Oregon
Above right: BPA power system control center, Portland, Oregon
Lower left: Microwave tower
Lower right: William A. Dittmer control center under construction at Vancouver, Washington

The Power System Control Program moved rapidly ahead in fiscal year 1970. The program, which when completed will be one of the most advanced in the nation, consists of a number of computerized control systems whose purpose is to control automatically the BPA transmission system. Manual control of a system as large and complex as the present and projected BPA system is no longer reasonable, and the present dispatch center in the Bonneville building in Portland has outgrown its space.

Construction started this year on the new Dittmer Control Center at Vancouver, Washington, after a groundbreaking ceremony on April 3, 1970. Building completion is scheduled for November 1971, and installation of electronic control and dispatch systems will begin as soon as the building is ready.

When the facility and systems are complete, information relative to system operation will feed into the control center to be handled on an automatic or semi-automatic basis. This will include hourly, daily and weekly information such as streamflow, available generation, predicted loads, and shutdowns for repair and maintenance. It will also include immediate information such as emergency outages of loads and generators. The computerized system will automatically react to and compensate for many emergency occurrences.

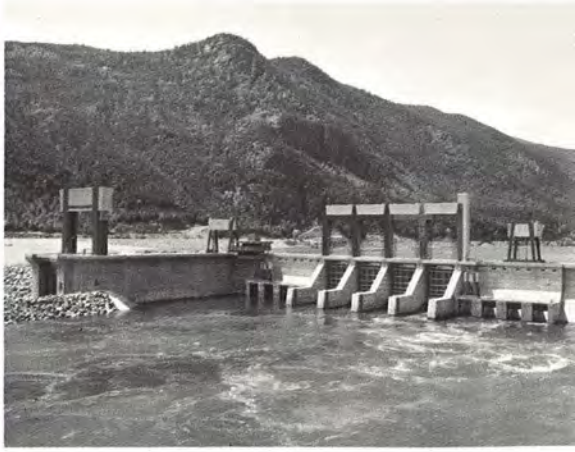
The PSCP will be no better than the communications network which is an integral part of it. BPA owns and operates a highly reliable microwave communication network which carries data from all parts of the transmission grid to the system control center and from the control center back to grid points. Slightly expanded, the microwave network will continue these functions for the Dittmer Control Center.

Congresswoman Julia Butler Hansen

"The William A. Dittmer BPA System Control Center will stand as a tribute, not only to the scientists and engineers who designed it, but most significantly to 20th Century Man who pioneered space travel and used his technology to provide a more dynamic environment for himself and his progeny here on earth."

COLUMBIA RIVER TREATY

Top: Duncan Dam
Middle: Mica Dam under construction
Right: Keenleyside Dam



The first two Canadian storage dams being built under the Columbia River Treaty with Canada, Keenleyside (formerly Arrow) and Duncan, have been operational for some time. The early completion of the Duncan and Keenleyside dams provided additional usable downstream power benefits in fiscal years 1968 and 1969. The additional power benefits achieved were shared equally by Canada and the United States in accordance with special Canadian and United States arrangements. During fiscal year 1970, both dams provided the predicted power and flood control benefits.

In addition, starting near the end of fiscal 1970, the reservoir behind Keenleyside was filled two feet above normal. Release of this water in late summer provided supplementary secondary energy at U.S. power plants amounting to nearly 195 million kilowatt-hours, a benefit not included in the Treaty arrangements. The benefits were shared equally with Canada,(which received nearly $195,000 in total payments.

Mica, the third Canadian project, and Libby, being constructed by the U.S. Army Corps of Engineers on the Kootenai River in the United States, are on schedule. Libby with a total live storage capacity of 5 million acre-feet will be available for partial filling in the spring of 1972 and a full reservoir available in 1973. Mica reservoir (7 million acre-feet committed under the Treaty) will be available for initial filling in 1973. Under average weather conditions these reservoirs will fill in 1973 to usable capacity.

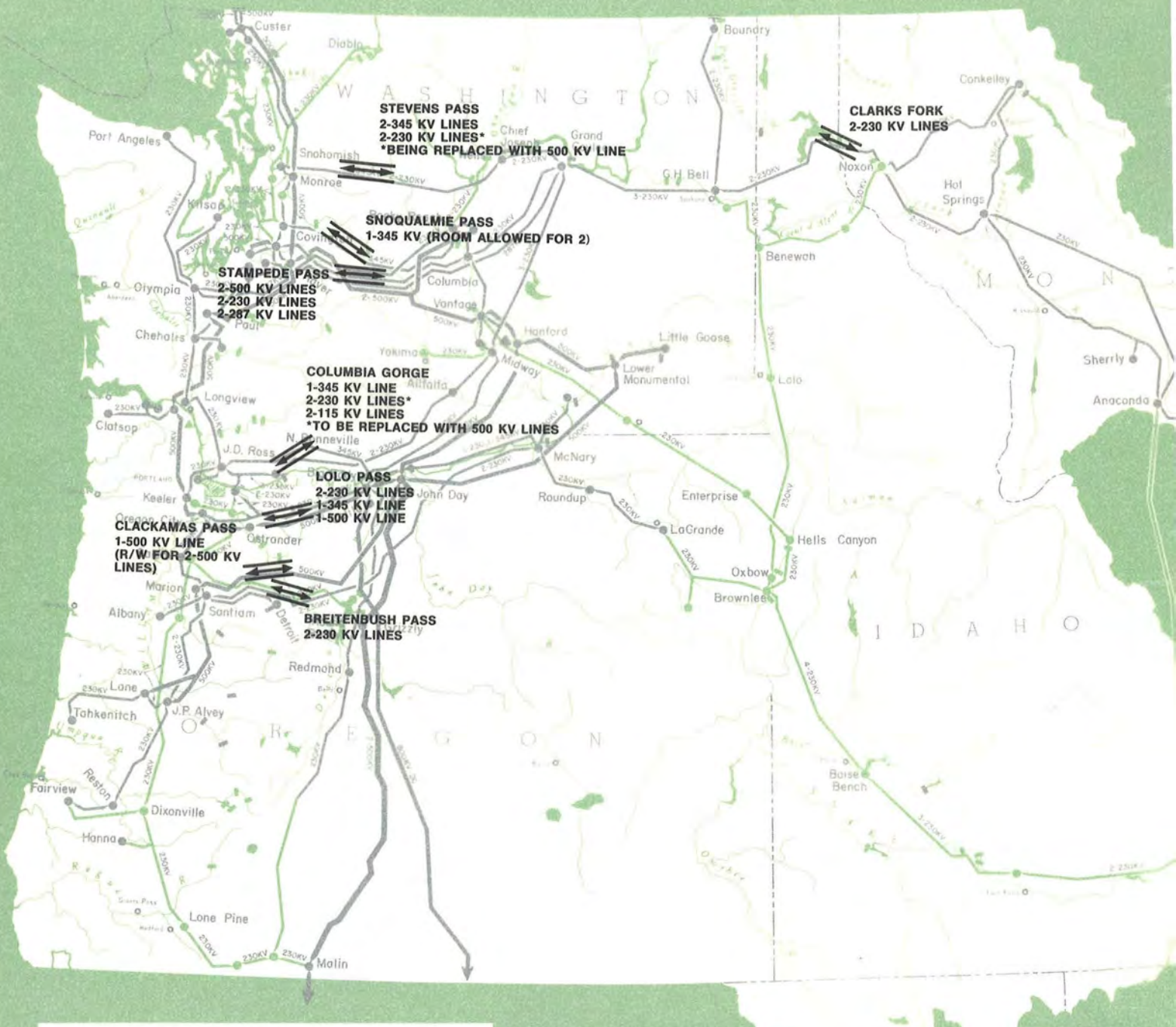
Recent studies indicate that the benefits achieved are very close to those anticipated at the time the Columbia River Treaty was negotiated.

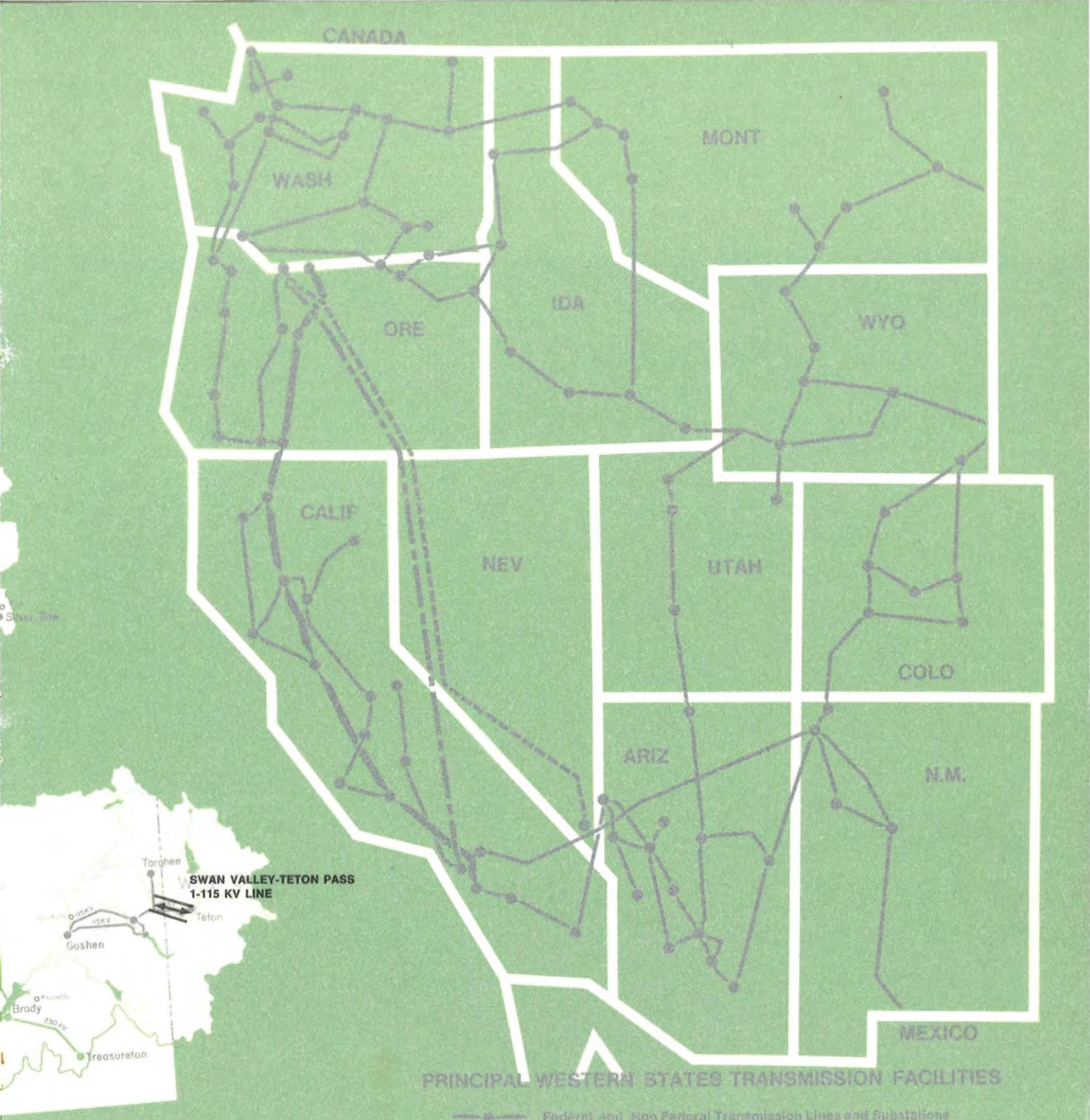
Libby Dam, Montana under construction

PACIFIC NORTHWEST POWER SYSTEM

MAJOR FACILITIES IN SERVICE
AS OF DECEMBER 31, 1970

MOUNTAIN PASSES OF THE PACIFIC NORTHWEST





PRINCIPAL WESTERN STATES TRANSMISSION FACILITIES

Federal and Non Federal Transmission Lines and Substations

500 KV a-c Intertie (2 circuits)

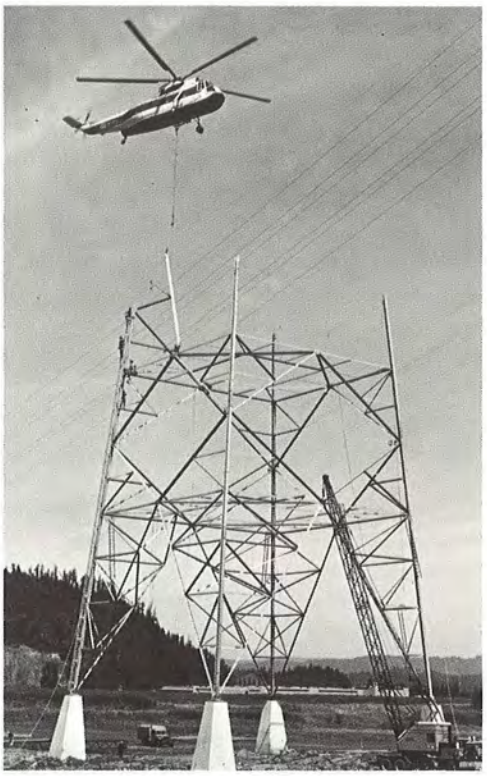
500 KV d-c Intertie

500 KV d-c Intertie (authorized but not yet under construction)

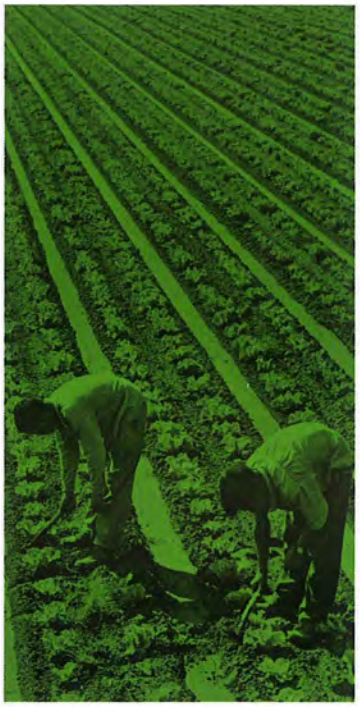
RIGHT-OF-WAY UTILIZATION

Increased utilization of existing transmission line rights-of-way is becoming of ever increasing importance to avoid the impact on the environment of adding new rights-of-way. BPA plans call for substantially increasing transmission capacity of existing rights-of-way by replacing lower voltage lines (230-kv and 345-kv) with 500-kv lines (and later with 735-kv lines). This is an especially significant factor with respect to the mountain passes, where space is severely limited, and which usually involve scenic and recreational areas. Planned reconstruction of trans-mountain lines will increase total east-west transmission capacity from its present 8 million kilowatts to a presently foreseeable potential of 55 million kilowatts without any significant increase in the right-of-way used.

FINANCIAL STATUS



Top: Night scene, Grand Coulee Third Powerplant construction
Bottom: Irrigated field, Columbia Basin Project, central Washington
Right: Helicopter construction, 500-kv Columbia River crossing near Longview, Washington



Gross revenues for the Federal Columbia River Power System operations during fiscal year 1970 reached $147,680,000—7.6 percent more than the previous year and another all-time record. Net revenues amounted to $24,712,000.

The Federal Power Commission approved the existing power rate level for the next five years. This was the result of submission of a repayment study which demonstrated that revenues continue to be sufficient to meet BPA's obligation to repay to the Treasury all costs of the power program.

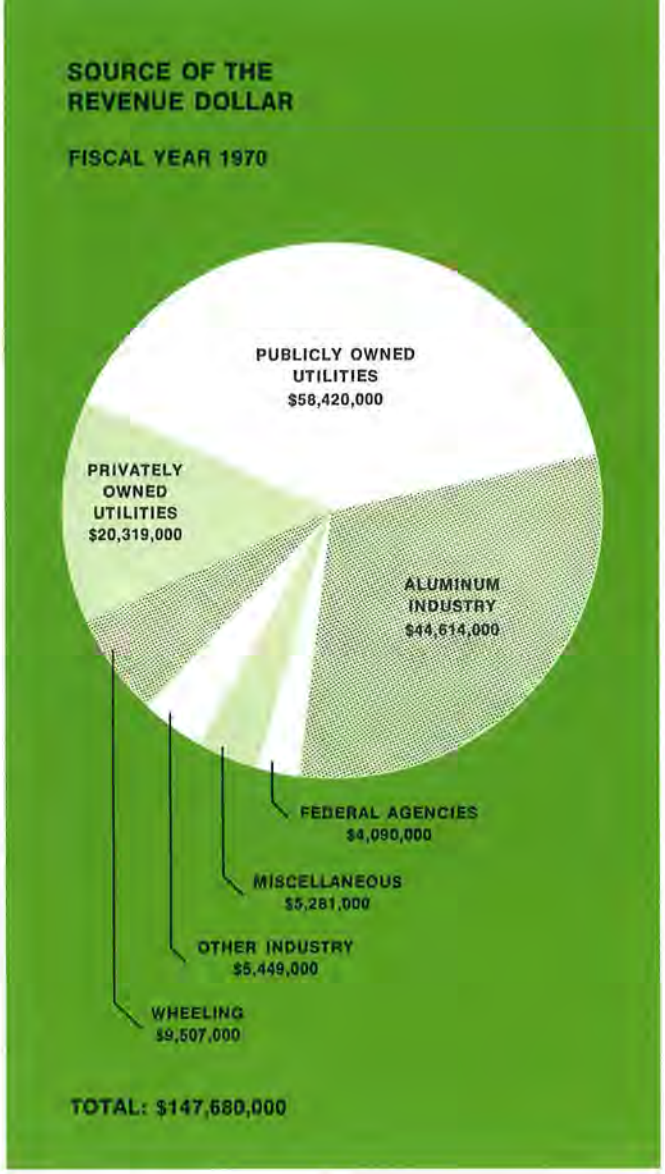
Events also occurred, however, which forecast less favorable financial results in future years. Among these are continued high interest rates on Treasury borrowing. This trend led to Secretary Hickel's approval of a new interest rate policy providing for the payment of interest rates on new power projects which more closely reflect the cost of borrowing by the Federal Government.

Higher costs on the new hydroelectric projects currently under construction are another indicator. Also in prospect are substantially higher costs for planned thermal plants from which BPA will acquire all or part of the output under the Hydro-Thermal Power Program.

These factors point toward the probability of increasing BPA's wholesale power rates on December 20, 1974, when the FPC approval of present rates expires.

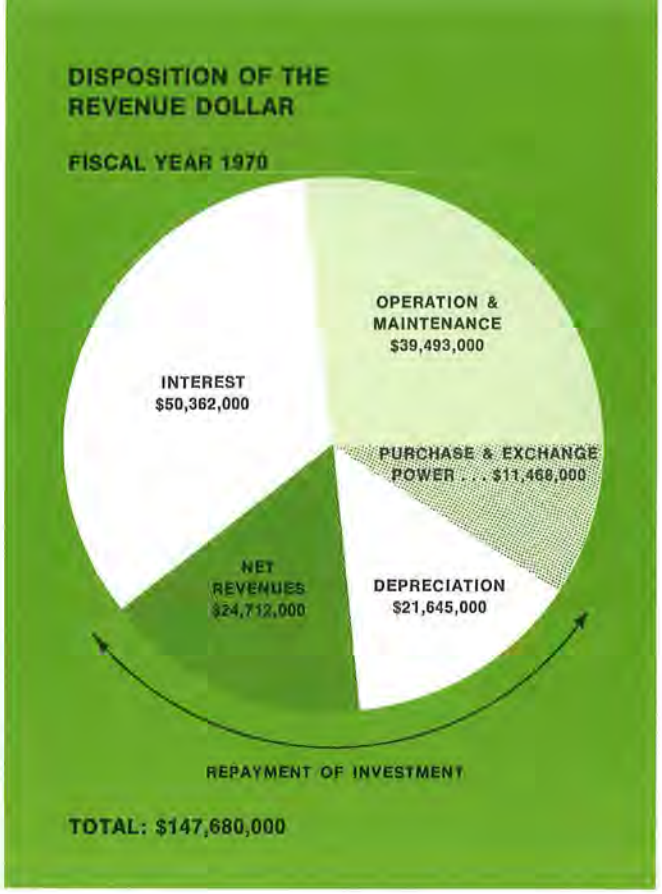
To comply fully with all of the various financial reporting categories required by law, BPA prepares two sets of financial reports. These are (1) cost accounting financial statements, which measure financial results on the traditional profit or loss basis used by business organizations, and which are audited by the Comptroller General; and (2) the repayment study financial statement, which forecasts future revenues and costs and which is required to determine the adequacy of power rate levels to repay the Federal investment in power facilities as required by Congress.

The cost accounting financial statements, together with the Comptroller General's opinion thereon, are included in this report starting on page 49. The repayment study is included in this report as Table 7 on pages 46 and 47.



Although the cost accounting statements do not reflect the financial requirements upon which power rates are based, they do provide useful indicators of current trends in revenues and costs. Analysis of these statements, for instance, reveals that gross revenues increased $10.4 million in fiscal year 1970 over the prior year, but net revenues decreased $3.4 million, pointing out the trend of costs increasing more rapidly than revenues. A large part of the cost increase is attributable to interest expense, which increased by $7 million or 16.2 percent compared to the prior year. Depreciation expense increased by $2.4 million or 12.6 percent. The increase in these two elements thus used up more than 90 percent of the increase in gross revenues.

The preceding chart illustrates the source of BPA revenues and how they were applied. The publicly owned utilities again furnished the largest percentage



of total revenues (39.5 percent). Interest was the largest cost element (34.1 percent of revenues).

To demonstrate the adequacy of the power rate level and to determine whether and to what extent power rate increases may be necessary, BPA is required by law to prepare annually and submit to the President and Congress a consolidated financial statement on the repayment basis (see Table 7, page 46).

For the rate level to be judged adequate, the repayment study must show that revenues will be sufficient to satisfy the following repayment criteria:

1. Pay all costs of operating and maintaining the power system.
2. Pay the cost of obtaining power through purchase and exchange agreements with other utilities.
3. Pay interest on the unamortized portion of the commercial power investment at the interest rates established for each project.
4. Repay the capital investment allocated to commercial power at the generating projects within 50 years after each project is completed.
5. Repay each increment of capital investment in the transmission system within the average service life of the transmission facilities (currently 45 years).
6. Repay the investment in each replacement of a facility at a generating project or on the transmission system within its service life.
7. Repay the portion of construction costs at Federal reclamation projects which is beyond the repayment ability of the water users, and which is assigned for repayment from commercial power revenues, within the same overall period available to the irrigation water users for making their payments. These periods range from 40 to 66 years with 60 years being applicable to most of the irrigation assistance.

The repayment study shows that cumulative BPA revenues through fiscal year 1970 totaled $1,771,000,000. These have been applied to pay interest costs of $601 million, purchase and exchange power costs of $63 million, and operation and maintenance costs of $486 million, with the remaining $621 million having been applied to amortization of the Government's capital investment in power facilities.

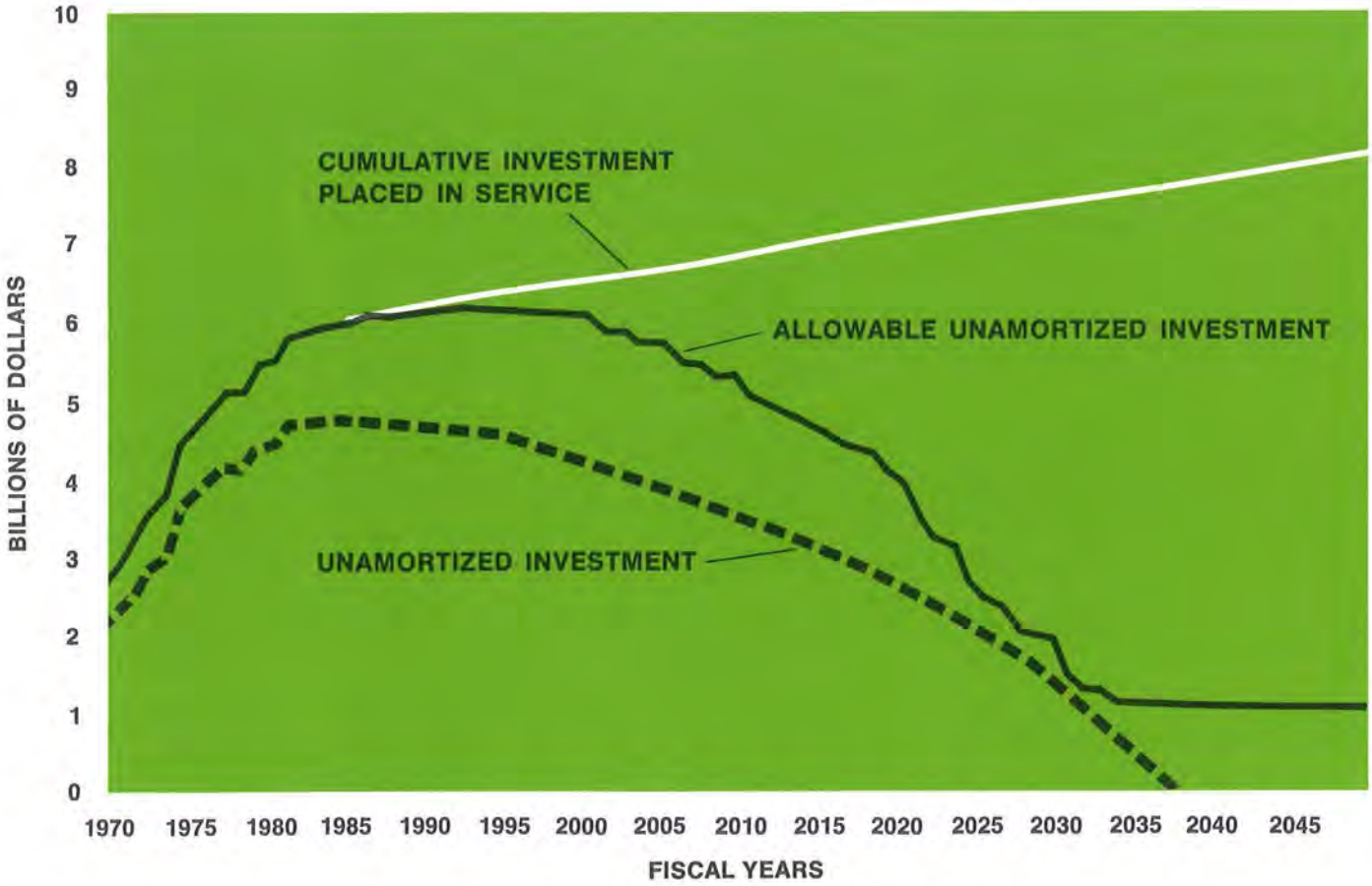
Starting with these cumulative results, the repayment study forecasts future revenues and costs over the balance of the repayment period for all projects included in the Federal Columbia River Power System. The study demonstrates the adequacy of power rates by showing that with the revenues indicated, the capital investment will be amortized within the allowable period. This is graphically illustrated on page 39.

As a further source of reference, Table 6 on page 45 shows in greater detail the financial results on the repayment basis for fiscal year 1970 as compared to fiscal year 1969.

The repayment study also reflects the new interest rate policy approved by the Secretary of the Interior on January 29, 1970. The policy states that unless otherwise provided by law, new Federal power projects, including transmission system additions, the construction of which is started subsequent to the date of the Order, shall bear interest at rates as provided in the Order.

REPAYMENT OF PLANT INVESTMENT ALLOCATED TO COMMERCIAL POWER

FEDERAL COLUMBIA RIVER POWER SYSTEM—AUTHORIZED PROJECTS AS OF JUNE 30, 1970



The Order established a base interest rate of 4⅞ percent for projects for which construction appropriations were first enacted during fiscal year 1970. A new rate is then established for each subsequent fiscal year based upon the average yield on long-term Treasury bonds over the preceding fiscal year. The rate cannot increase or decrease from year to year by more than ½ percentage point. Hence, as the yield on long-term Treasury bonds during fiscal year 1970 averaged 6.4 percent, the repayment rate for fiscal year 1971 increased to 5⅜ percent. Thus, new project construction for which appropriations are first enacted during fiscal year 1971 will bear interest at the 5⅜ percent interest rate. Interest rates for future years will be based upon the average yield on long-term Treasury bonds as modified by the ½ percentage point per year change limitation.

The guidelines issued by the Secretariat for the application of the interest rate order provide that the interest rate in effect for the current fiscal year, i.e., 5⅜ percent, shall be used for all future investment included in repayment studies prepared during that year. Thus, the repayment study included in this report charges 5⅜ percent interest on future construction. Should the average yield on long-term Treasury bonds continue at its present level (about 6½ percent), the repayment rate will be increased in future years' studies and can thus be expected to have a significant impact on the determination of the adequacy of the power rate level.

TABLES

TABLE 1

SALES OF ELECTRIC ENERGY

FISCAL YEAR 1970

Customer	Energy Delivered for Year (000) KWH	Revenue from Sales of Energy
NORTHWEST AREA		
Publicly Owned Utilities		
Municipalities		
Albion, Idaho	2,091	$ 6,872
Bandon, Oregon	36,158	124,953
Blaine, Washington	19,861	68,676
Bonners Ferry, Idaho	12,779	65,149
Burley Idaho	61,077	195,019
Canby, Oregon	38,320	147,987
Cascade Locks, Oregon	18,355	50,133
Centralia, Washington	31,411	194,970
Cheney, Washington	63,198	214,669
Consolidated Irrigation District, Wash.	1,027	4,108
Coulee Dam, Washington	22,194	92,603
Declo, Idaho	1,601	5,269
Drain, Oregon	23,171	78,093
Ellensburg, Washington	119,168	380,396
Eugene, Oregon	926,763	2,156,286
Forest Grove, Oregon	97,596	335,847
Heyburn, Idaho	54,972	161,219
Idaho Falls, Idaho	172,688	538,898
McCleary, Washington	25,058	87,790
McMinnville, Oregon	149,502	526,749
Milton-Freewater, Oregon	77,619	262,360
Minidoka, Idaho	652	2,224
Monmouth, Oregon	45,885	161,060
Port Angeles, Washington	378,303	1,017,068
Richland, Washington	283,960	983,646
Rupert, Idaho	36,639	115,770
Seattle, Washington	845,603	1,790,347
Springfield, Oregon	182,183	571,947
Sumas, Washington	4,379	15,580
Tacoma, Washington	948,529	2,009,837
Vera Irrigation District #15, Wash.	69,496	237,707
Washington Public Power Supply System	10,835	27,091
Total Municipalities (32)	4,761,073	$ 12,630,323
Public Utility Districts		
Benton Co. PUD No. 1	558,278	$ 1,718,439
Central Lincoln PUD	741,924	2,237,709
Chelan Co. PUD No. 1	330,896	842,279
Clallam Co. PUD No. 1	181,074	578,441
Clark Co. PUD No. 1	1,410,401	4,635,523
Clatskanie PUD	633,866	1,589,644
Cowlitz Co. PUD No. 1	1,780,122	4,449,686
Douglas Co. PUD No. 1	279,888	792,974
Ferry Co. PUD No. 1	29,952	94,064
Franklin Co. PUD No. 1	286,451	938,874
Grant Co. PUD No. 2	423,315	1,413,187
Grays Harbor PUD No. 1	796,938	2,585,488
Kittitas Co. PUD No. 1	24,758	81,998
Klickitat Co. PUD No. 1	122,939	391,190
Lewis Co. PUD No. 1	313,561	981,671
Mason Co. PUD No. 1	25,919	89,184
Mason Co. PUD No. 3	210,153	674,741
Northern Wasco Co. PUD	51,048	183,721
Okanogan Co. PUD No. 1	265,091	807,436
Pacific Co. PUD No. 2	160,252	547,759
Pend Oreille Co. PUD No. 1	142	356
Skamania Co. PUD No. 1	60,643	208,017
Snohomish Co. PUD No. 1	2,972,925	8,948,739
Tillamook PUD	229,065	788,452
Wahkiakum Co. PUD No. 1	31,057	109,390
Whatcom Co. PUD No. 1	91,312	211,170
Total Public Utility Districts (26)	12,013,970	$ 35,900,132
Cooperatives		
Benton Rural Elec. Assn.	102,683	$ 325,064
Big Bend Electric Coop.	195,241	524,146
Blachly-Lane Co. Coop.	68,998	237,997
Central Electric Coop.	72,944	210,097
Clearwater Power Co.	93,621	312,928
Columbia Basin Electric Coop.	69,627	217,605
Columbia Power Coop. Assn.	27,669	98,241
Columbia Rural Electric Assn.	80,775	228,566
Consumers Power	176,569	585,273
Coos-Curry Electric Coop.	180,803	638,343
Douglas Electric Coop.	73,143	249,228
East End Mutual Electric Co.	4,046	13,538
Fall River Electric Coop.	42,310	137,466
Farmers Electric Co.	2,909	9,637
Flathead Electric Coop.	49,664	152,570
Harney Electric Coop.	74,086	200,973
Hood River Electric Coop.	56,251	183,875
Idaho Co. L&P Coop. Assn.	24,448	84,082
Inland Power & Light Co.	212,087	724,624
Kootenai Electric Coop.	50,895	163,664
Lane Co. Electric Coop.	183,728	623,647
Lincoln Electric Coop.—Montana	36,065	124,033
Lincoln Electric Coop.—Washington	72,700	206,032
Lost River Electric Coop.	16,834	47,763
Lower Valley Power & Light	79,131	261,486
Midstate Electric Coop.	58,242	173,018
Missoula Electric Coop.	37,150	114,441
Nespelem Valley Electric Coop.	20,473	69,256
Northern Lights	67,315	228,211
Okanogan Co. Electric Coop.	14,468	49,767
Orcas Power & Light Co.	50,048	170,132
Prairie Power Coop.	2,294	8,156
Raft River Electric Coop.	93,866	237,249
Ravalli Co. Electric Coop.	36,218	119,167
Riverside Electric Co.	3,151	10,521
Rural Electric Co.	26,753	87,425
Salem Electric	140,152	466,260
Salmon River Electric Coop.	16,483	46,152
South Side Electric Lines	8,376	25,612
Surprise Valley Electric Corp.	37,732	117,957
Tanner Electric	7,713	27,389
Umatilla Electric Coop. Assn.	107,127	313,729
Unity Light & Power Co.	20,865	66,487
Vigilante Electric Coop.	32,113	96,559
Wasco Electric Coop.	53,549	184,362
West Oregon Electric Coop.	39,478	134,195
Total Cooperatives (46)	2,920,793	$ 9,306,923
Total Publicly Owned Utilities (104)	19,695,836	$ 57,837,378
Federal Agencies (9)	1,178,781	3,515,140
Privately Owned Utilities		
California-Pacific Utilities Co.	29,371	$ 74,646
Idaho Power Co.	196,507	491,268
Montana Power Co.	882,720	2,003,628
Pacific Power & Light Co.	3,305,381	7,452,514
Portland General Electric Co.	3,652,758	7,684,636
Puget Sound Power & Light Co.	122,623	275,457
Utah Power Co.	0	
Washington Water Power Co.	593,659	1,378,351
Total Privately Owned Utilities (8)	8,783,019	$ 19,560,500
Aluminum Industries		
Aluminum Co. of America		
Vancouver Plant	2,087,430	$ 4,314,516
Wenatchee Plant	1,466,395	3,031,200
Anaconda Aluminum Co.	3,203,334	6,104,353
Harvey Aluminum Co.	1,593,133	2,730,057
Intalco Aluminum Co.	3,424,276	7,169,509
Kaiser Aluminum & Chemical Corp.		
Spokane Reduction Plant	3,776,865	7,754,408
Spokane Rolling Mill	400,901	1,000,435
Tacoma Reduction Plant	1,301,171	2,670,315
Reynolds Metals Co.		
Longview Plant	3,359,292	6,867,485
Troutdale Plant	1,455,558	2,957,224
Other Industries		
Carborundum Co.	212,081	453,290
Cominco American Inc.	0	
Crown Zellerbach Corp. (2 plants)	95,420	212,225
Port Angeles Plant		
Port Townsend Plant		
Foote Mineral Co.—Kemco Operation	114,341	248,104
Georgia-Pacific Corp.	197,525	431,169
Hanna Nickel Smelting Co.	705,524	1,573,469
ITT Rayonier, Inc.	42,941	94,881
Oregon Metallurgical Corp.	1,637	5,719
Pacific Carbide & Alloys Co.	54,520	126,814
Pennwalt Chemical Corp.	364,389	757,976
Stauffer Chemical Corp.	507,035	1,155,265
Stewart Elsner	47	277
Union Carbide Corp. M&M Div.	172,387	390,357
Total Industries (24)	24,536,202	$ 50,049,048
OUTSIDE NORTHWEST AREA		
British Columbia Hydro & Power Authority	2,753	$ 6,214
Burbank Public Service Dept.	26,639	53,278
Glendale Public Service Dept.	33,393	66,786
Los Angeles Dept. of Water & Power	343,213	809,714
Sacramento Municipal Utility Dist.	41,312	82,624
U.S.B.R.—Central Valley Authority	291,318	582,636
State of California— Dept. of Water Resources	39,011	78,022
Pacific Gas & Electric Co.	5,889	11,778
San Diego Gas & Electric Co.	65,573	131,146
Southern California Edison Co.	569,538	1,139,076
Total Outside Northwest Area (10)	1,418,639	$ 2,961,274
Total Sales of Electric Energy (155)	55,612,477	$133,923,340[1]

[1] Differs from the $132,892,000 shown on Table 6 because of statistical adjustments.

TABLE 2

FEDERAL COLUMBIA RIVER POWER SYSTEM

General Specifications, Projects Existing, Under Construction and Authorized
Nameplate Rating of Installations as of June 30, 1970

				Existing			Under Construction		Authorized		Other Potential		Total	
Project	Operating Agency[1]	Location	Stream	Initial Date in Service	Number of Units	Total Capacity Kilowatts	Number of Units	Total Capacity Kilowatts	Number of Units	Total Capacity Kilowatts	Number of Units	Total Capacity Kilowatts	Number of Units	Total Capacity Kilowatts
Bonneville	CE	Ore.-Wash.	Columbia	June 1938	10	518,400	—	—	6	324,000	—	—	16	842,400
Grand Coulee	BR	Washington	Columbia	Sept. 1941	18	2,042,000[2]	6	3,838,000[3]	—	—)	6	3,600,000)	36	9,771,000
Grand Coulee (Pump Turbines)		Washington	Columbia		—	—	2	97,000	4	194,000)	—	—)		
Hungry Horse	BR	Montana	S. Fk. Flathead	Oct. 1952	4	285,000	—	—	—	—	—	—	4	285,000
Detroit	CE	Oregon	North Santiam	July 1953	2	100,000	—	—	—	—	—	—	2	100,000
McNary	CE	Ore.-Wash.	Columbia	Nov. 1953	14	980,000	—	—	—	—	6	420,000	20	1,400,000
Big Cliff	CE	Oregon	North Santiam	June 1954	1	18,000	—	—	—	—	—	—	1	18,000
Lookout Point	CE	Oregon	M. Fk. Willamette	Dec. 1954	3	120,000	—	—	—	—	—	—	3	120,000
Albeni Falls	CE	Idaho	Pend Oreille	Mar. 1955	3	42,600	—	—	—	—	—	—	3	42,600
Dexter	CE	Oregon	M. Fk. Wilamette	May 1955	1	15,000	—	—	—	—	—	—	1	15,000
Chief Joseph	CE	Washington	Columbia	Aug. 1955	16	1,024,000	—	—	11	1,045,000	13	1,573,000	40	3,642,000
Chandler	BR	Washington	Yakima	Feb. 1956	2	12,000	—	—	—	—	—	—	2	12,000
The Dalles	CE	Ore.-Wash.	Columbia	May 1957	16	1,119,000	8	688,000	—	—	—	—	24	1,807,000
Roza	BR	Washington	Yakima	Aug. 1958	1	11,250	—	—	—	—	—	—	1	11,250
Ice Harbor	CE	Washington	Snake	Dec. 1961	3	270,000	—	—	3	332,880	—	—	6	602,880
Hills Creek	CE	Oregon	M. Fk. Willamette	May 1962	2	30,000	—	—	—	—	—	—	2	30,000
Minidoka	BR	Idaho	Snake	May 1909	7	13,400	—	—	—	—	—	—	7	13,400
Boise Diversion	BR	Idaho	Boise	May 1912	3	1,500	—	—	—	—	—	—	3	1,500
Black Canyon	BR	Idaho	Payette	Dec. 1925	2	8,000	—	—	—	—	—	—	2	8,000
Anderson Ranch	BR	Idaho	S. Fk. Boise	Dec. 1950	2	27,000	—	—	1	13,500	—	—	3	40,500
Palisades	BR	Idaho	Snake	Feb. 1957	4	114,000	—	—	—	—	2	135,000	6	249,000
Cougar	CE	Oregon	S. Fk. McKenzie	Feb. 1964	2	25,000	—	—	1	35,000	—	—	3	60,000
Green Peter	CE	Oregon	Middle Santiam	June 1967	2	80,000	—	—	—	—	—	—	2	80,000
Foster	CE	Oregon	South Santiam	Aug. 1968	2	20,000	—	—	—	—	—	—	2	20,000
John Day	CE	Ore.-Wash.	Columbia	July 1968	12	1,620,000	4	540,000	4	540,000	—	—	20	2,700,000
Lower Monumental	CE	Washington	Snake	May 1969	3	405,000	—		3	405,000	—	—	6	810,000
Little Goose	CE	Washington	Snake	Mar. 1970	1	135,000	2	270,000	3	405,000	—	—	6	810,000
Lower Granite	CE	Washington	Snake		—	—	3	405,000	3	405,000	—	—	6	810,000
Teton	BR	Idaho	Teton		—	—	2	16,000	—	—	—	—	2	16,000
Lost Creek	CE	Oregon	Rogue		—	—	2	49,000	—	—	—	—	2	49,000
Dworshak	CE	Idaho	N. Fk. Clearwater		—	—	3	400,000	3	660,000	—	—	6	1,060,000
Strube	CE	Oregon	S. Fk. McKenzie		—	—	—	—	1	4,500	—	—	1	4,500
Libby	CE	Montana	Kootenai		—	—	4	420,000	4	420,000	—	—	8	840,000
Asotin	CE	Wash.-Ida.	Snake		—	—	—	—	4	540,000	—	—	4	540,000
Total installed capacity						9,036,150		6,723,000		5,323,880		5,728,000		26,811,030
Total number of projects						26		5		2		0		33

[1] CE—Corps of Engineers; BR—Bureau of Reclamation.
[2] Includes three service units and increase of 17,000 kw each for four rewound main units.
[3] Includes an increase of 17,000 kw each for 14 units to be rewound and six 600,000 kw units being installed at the Third Powerplant.

TABLE 3

PACIFIC NORTHWEST GENERATION

Nameplate Rating of Plants Existing, Under Construction, and Authorized or Licensed
Kilowatts

June 30, 1970

Ownership	Existing		Under Construction		Authorized or Licensed		Total	
	No. of Plants	Nameplate Rating	No. of Plants	Nameplate Rating	No. of Plants	Nameplate Rating	No. of Plants	Nameplate Rating
Federal Columbia River Power System								
Hydro	26	9,036,150	5	6,723,000[1]	2	5,323,880[1]	33	21,083,030
Publicly Owned Agencies								
Hydro	43	5,512,331	0	501,600[1]	3	2,095,850[1]	46	8,109,781
Thermal	16	982,591	0	0	1	1,100,000[2]	17	2,082,591
Total Publicly Owned Agencies	59	6,494,922	0	501,600	4	3,195,850	63	10,192,372
Privately Owned Agencies								
Hydro	92	3,925,998	0	0	1	836,520[1]	93	4,762,518
Thermal	12	254,018	3	3,006,000	0	500,000[2]	15	3,760,018
Total Privately Owned Agencies	104	4,180,016	3	3,006,000	1	1,336,520	108	8,522,536
Pacific Northwest Agencies								
Hydro	161	18,474,479	5	7,224,600[1]	6	8,256,250[1]	172	33,955,329
Thermal	28	1,236,609	3	3,006,000	1	1,600,000[2]	32	5,842,609
Other Thermal[3]	0	0	0	0	3	3,300,000[3]	3	3,300,000
Total Pacific Northwest Agencies	189	19,711,088	8	10,230,600	10	13,156,250	207	43,097,938

[1] Includes additions to projects existing or under construction.
[2] Includes projects not presently licensed, but are scheduled as part of the Pacific Northwest Hydro-Thermal Power Program.
[3] Includes three additional thermal plants planned by Pacific Northwest Joint Power Planning Council.

TABLE 4

ELECTRIC ENERGY ACCOUNT FOR FISCAL YEAR 1970

Energy Received (millions of kilowatt-hours)	
Energy Generated for BPA	
Bureau of Reclamation	16,893
Corps of Engineers	41,441
Washington Public Power Supply System	3,305
Power interchanged in	35,717
Total received	97,356
Energy Delivered (millions of kilowatt-hours)	
Sales	55,612
Power interchanged out	38,005
Used by the Administration	61
Total delivered	93,678
Energy losses in transmission and transformation	3,678
Total (kilowatt-hours)	97,356
Losses in percent of total received	3.8%
Maximum demand on Federal plants (kilowatts) December 2, 1969, 5-6 p.m.	9,351,000
Load factor in percent of total generated for BPA	75.2%

TABLE 5

GENERATION BY THE PRINCIPAL ELECTRIC UTILITY SYSTEMS OF THE PACIFIC NORTHWEST[1]

Fiscal Year 1970

Utility	Kilowatt-hours (Billions)	Of Total Generation (Percent)
Publicly Owned:		
Federal Columbia River Power System[2]	61.6	53.8
Grant County PUD	9.6	8.4
Chelan County PUD	6.8	6.0
Seattle City Light	5.6	4.9
Douglas County PUD	3.7	3.2
Tacoma City Light	2.5	2.2
Eugene Water & Electric Board	0.4	0.3
Pend Oreille County PUD	0.4	0.3
Total Publicly Owned	90.6	79.1
Privately Owned:		
Idaho Power Company	7.8	6.8
Montana Power Company	4.6	4.0
Pacific Power & Light	4.4	3.9
Washington Water Power Co.	3.4	3.0
Portland General Electric Co.	2.4	2.1
Puget Sound Power & Light Co.	1.3	1.1
Total Privately Owned	23.9	20.9
Total Generation	114.5	100.0

[1] Generation shown is for members of the Pacific Northwest Power Pool plus Pend Oreille County PUD and Washington Public Power Supply System. Utah Power & Light Co., British Columbia Hydro and Power Authority and West Kootenay Power & Light, who are members of the Power Pool, are not included because their service area lies outside the Pacific Northwest.

[2] Includes generation from the Washington Public Power Supply System's Hanford steamplant (NPR).

TABLE 6

FEDERAL COLUMBIA RIVER POWER SYSTEM

Operating Results on the Repayment Basis

Fiscal Years 1970 and 1969

(In thousands of dollars)

	F.Y. 1970	F.Y. 1969	Increase (Decrease) Amount	Increase (Decrease) Percent
REVENUES				
Bonneville Power Administration				
Sales of electric energy:				
Publicly owned utilities	58,420	55,752	2,668	4.8
Privately owned utilities	20,319	16,967	3,352	19.8
Federal agencies	4,090	4,662	(572)	(12.3)
Aluminum industry	44,614	40,871	3,743	9.2
Other industry	5,449	5,333	116	2.2
Total	132,892	123,585	9,307	7.5
Other operating revenues:				
Wheeling revenues	9,507	9,160	347	3.8
Other revenues	2,370	1,574	796	50.6
Total	11,877	10,734	1,143	10.6
Total Bonneville Power Administration Revenues	144,769	134,319	10,450	7.8
Associated Projects				
Other operating revenues	2,911	2,958	(47)	(1.6)
Total power system operating revenues	147,680	137,277	10,403	7.6
EXPENSES				
Purchase and exchange power	11,468	12,526	(1,058)	(8.4)
Operating expenses	26,022	23,473	2,549	10.9
Maintenance and other expenses	13,471	10,612	2,859	26.9
Total power system expenses	50,961	46,611	4,350	9.3
INTEREST				
Interest on Federal investment	57,258	49,005	8,253	16.8
Less interest charged to construction	6,896	5,681	1,215	21.4
Total power system interest	50,362	43,324	7,038	16.2
Total power system expenses and interest	101,323	89,935	11,388	12.7
BALANCE AVAILABLE FOR REPAYMENT OF POWER SYSTEM INVESTMENT	46,357	47,342	(985)	(2.1)

TABLE 7

FEDERAL COLUMBIA RIVER POWER SYSTEM
REPAYMENT STUDY FOR F.Y. 1970
AUTHORIZED PROJECTS
(All Amounts in $1,000)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
					Investment Placed in Service			Plant Allocated to Commercial Power: Cumulative Investment Placed in Service			Allowable Unamortized Investment					Irrigation Assistance				
Fiscal Year Ending June 30	Revenues	Operation and Maintenance Expense	Purchase and Exchange Power	Interest Expense	Initial Project	Replace-ments	Total	Initial Project	Replace-ments	Total	Amorti-zation	Unamortized Investment	Initial Project	Replace-ments	Total	Cumulative Amount in Service	Amorti-zation	Unamor-tized Amount	Allowable Unamor-tized Amount	Cumulative Surplus Revenues
Cumulative to 6-30-70	1,770,780	486,432	62,931	600,929	2,788,466		2,788,466	2,788,466		2,788,466	620,488	2,167,978	2,788,466		2,788,466	391,325		391,325	391,325	
1971	160,300	41,461	12,024	61,716	208,574	3,018	211,592	2,997,040	3,018	3,000,058	45,099	2,334,471	2,997,040	6,250	3,003,290	415,124		415,124	415,124	
1972	178,100	44,734	29,771	67,350	184,367	3,468	187,835	3,181,407	6,486	3,187,893	36,245	2,486,061	3,181,407	9,718	3,191,125	415,124		415,124	415,124	
1973	201,700	49,245	53,294	76,607	385,292	3,767	389,059	3,566,699	10,253	3,576,952	22,554	2,852,566	3,566,699	13,485	3,580,184	415,124		415,124	415,124	
1974	212,800	51,484	33,244	84,509	171,182	4,238	175,420	3,737,881	14,491	3,752,372	43,563	2,984,423	3,737,881	17,723	3,755,604	442,538		442,538	442,538	
1975	221,300	54,620	25,717	100,657	693,208	9,482	702,690	4,431,089	23,973	4,455,062	40,306	3,646,807	4,431,089	27,186	4,458,275	495,088		495,088	495,088	
1976	225,200	57,190	26,876	112,686	182,697	5,316	188,013	4,613,786	29,289	4,643,075	28,448	3,806,372	4,613,786	32,499	4,646,285	502,811		502,811	502,811	
1977	239,200	58,742	26,002	117,617	232,014	7,910	239,924	4,845,800	37,199	4,882,999	36,839	4,009,457	4,845,800	40,420	4,886,220	524,101		524,101	524,101	
1978	257,900	61,690	25,135	123,892	220,089	5,978	226,067	5,065,889	43,177	5,109,066	47,183	4,188,341	5,065,889	46,388	5,112,277	537,393		537,393	537,393	
1979	258,400	62,892	24,907	129,420		8,000	8,000	5,065,889	51,177	5,117,066	41,181	4,155,160	5,065,889	54,381	5,120,270	554,003		554,003	554,003	
1980	267,600	64,370	24,905	128,394	301,805	11,895	313,700	5,367,694	63,072	5,430,766	49,931	4,418,929	5,367,694	66,166	5,433,860	582,418		582,418	582,418	
1981	287,500	66,350	25,114	148,476	122,403	8,100	130,503	5,490,097	71,172	5,561,269	47,560	4,501,872	5,490,097	64,252	5,554,349	611,411		611,411	611,411	
1982	295,200	67,983	25,045	151,263	251,888	9,456	261,344	5,741,985	80,628	5,822,613	50,909	4,712,307	5,741,985	83,701	5,825,686	633,918		633,918	633,918	
1983	301,800	69,349	25,018	158,334	33,453	10,695	44,148	5,775,438	91,323	5,866,761	49,099	4,707,356	5,775,438	94,379	5,869,817	651,261		651,261	651,261	
1984	306,800	70,442	25,018	158,167	94,243	11,780	106,023	5,869,681	103,103	5,972,784	53,173	4,760,206	5,868,134	106,595	5,974,729	666,607		666,607	666,607	
1985	314,100	71,173	25,018	159,943	36,643	13,555	50,198	5,906,324	116,658	6,022,982	57,966	4,752,438	5,901,093	119,212	6,020,305	677,903		677,903	677,903	
1986	314,800	71,206	25,018	167,761		15,431	15,431	5,906,324	132,089	6,038,413	50,815	4,717,054	5,888,756	134,630	6,023,386	700,968		700,968	700,968	
1987	315,900	71,531	25,018	166,512	59,452	13,467	72,919	5,965,776	145,556	6,111,332	52,839	4,737,134	5,938,003	147,912	6,085,915	727,600		727,600	727,600	
1988	317,000	71,837	25,018	167,221		17,113	17,113	5,965,776	162,669	6,128,445	52,924	4,701,323	5,932,998	164,957	6,097,955	733,719		733,719	733,719	
1989	321,100	72,459	25,018	165,957	71,580	14,815	86,395	6,037,356	177,484	6,214,840	57,666	4,730,052	5,970,972	179,701	6,150,673	759,270		759,270	759,270	
1990	321,700	73,154	25,018	166,971	17,800	25,001	42,801	6,055,156	202,485	6,257,641	56,557	4,716,296	5,978,230	217,321	6,195,551	777,407		777,407	777,407	
1991	321,700	73,154	25,018	168,843		19,781	19,781	6,055,156	222,266	6,277,422	54,685	4,681,392	5,971,476	237,332	6,208,808	784,556		784,556	784,556	
1992	322,200	73,154	25,018	167,594		30,495	30,495	6,055,156	252,761	6,307,917	56,434	4,655,453	5,963,402	267,206	6,230,608	806,003		806,003	806,003	
1993	322,900	73,154	25,018	166,665		19,724	19,724	6,055,156	272,485	6,327,641	58,063	4,617,114	5,950,736	288,042	6,238,778	833,937		833,937	833,937	
1994	323,600	73,154	25,018	165,293		29,075	29,075	6,055,156	301,560	6,356,716	60,135	4,586,054	5,877,498	315,642	6,193,140	865,313		865,313	865,313	
1995	324,200	73,154	25,018	164,181		34,605	34,605	6,055,156	336,165	6,391,321	61,847	4,558,812	5,842,585	336,248	6,178,833	879,611		879,611	879,611	
1996	324,900	73,154	25,018	163,205		22,048	22,048	6,055,156	358,213	6,413,369	63,523	4,517,337	5,818,039	358,352	6,176,391	894,968		894,968	894,968	
1997	325,700	73,154	7,381	161,721		30,584	30,584	6,055,156	388,797	6,443,953	72,439	4,475,482	5,786,883	391,399	6,178,282	916,680	11,005	905,675	905,675	
1998	324,500	73,154	3,854	160,222		23,374	23,374	6,055,156	412,171	6,467,327	87,270	4,411,586	5,731,829	414,711	6,146,540	938,392		927,387	927,387	
1999	324,500	73,154	3,854	157,935		30,172	30,172	6,055,156	442,343	6,497,499	89,557	4,352,201	5,686,808	441,687	6,128,495	957,986		946,981	946,981	
2000	327,400	73,154	3,854	155,809		34,994	34,994	6,055,156	477,337	6,532,493	94,583	4,292,612	5,651,781	477,271	6,129,052	985,788		974,783	974,783	
2001	327,400	73,154	3,854	153,676		26,917	26,917	6,055,156	504,254	6,559,410	86,784	4,232,745	5,611,259	502,556	6,113,815	1,004,455	9,932	983,518	983,518	
2002	327,600	73,154	3,854	151,532		26,662	26,662	6,055,156	530,916	6,586,072	99,060	4,160,347	5,395,091	526,104	5,921,195	1,022,725		1,001,788	1,001,788	
2003	327,700	73,154	3,854	148,940		27,138	27,138	6,055,156	558,054	6,613,210	101,752	4,085,733	5,362,798	548,964	5,911,762	1,047,879		1,026,942	1,026,942	
2004	331,500	73,154	3,854	146,269		24,724	24,724	6,055,156	582,778	6,637,934	107,442	4,003,015	5,223,361	570,921	5,794,282	1,076,475	781	1,054,757	1,054,757	
2005	331,500	73,154	3,854	143,308		29,050	29,050	6,055,156	611,828	6,666,984	111,184	3,920,881	5,168,668	595,046	5,763,714	1,094,215		1,072,497	1,072,497	
2006	331,500	73,154	3,854	140,368		31,451	31,451	6,055,156	643,279	6,698,435	114,124	3,838,208	5,112,116	621,438	5,733,554	1,126,518		1,104,800	1,104,800	
2007	331,500	73,154	3,854	137,408		29,526	29,526	6,055,156	672,805	6,727,961	117,084	3,750,650	4,818,885	645,576	5,464,461	1,141,213		1,119,495	1,119,495	
2008	331,500	73,154	3,854	134,273		47,134	47,134	6,055,156	719,939	6,775,095	117,373	3,680,411	4,790,778	674,381	5,465,159	1,156,173	2,846	1,134,609	1,134,609	
2009	331,500	73,154	3,854	131,759		36,013	36,013	6,055,156	755,952	6,811,108	116,457	3,599,967	4,618,077	697,605	5,315,682	1,169,011	6,276	1,138,171	1,138,171	
2010	331,500	73,154	3,854	128,879		57,639	57,639	6,055,156	813,591	6,868,747	125,613	3,531,993	4,584,872	752,623	5,337,495	1,181,849		1,151,009	1,151,009	
2011	331,500	73,154	3,854	126,445		31,992	31,992	6,055,156	845,583	6,900,739	128,047	3,435,938	4,326,046	777,198	5,103,244	1,193,364		1,162,524	1,162,524	
2012	331,500	73,154	3,854	123,007		27,786	27,786	6,055,156	873,369	6,928,525	130,939	3,332,785	4,172,766	799,736	4,972,502	1,193,364	546	1,161,978	1,161,978	
2013	331,500	73,154	3,854	119,314		48,427	48,427	6,055,156	921,796	6,976,952	99,162	3,282,050	4,056,379	848,185	4,904,564	1,193,364	36,016	1,125,962	1,125,962	
2014	331,500	73,154	3,854	117,497		32,394	32,394	6,055,156	954,190	7,009,346	99,133	3,215,311	3,926,199	864,472	4,790,671	1,193,364	37,862	1,088,100	1,088,100	
2015	331,500	73,154	3,854	115,108		41,327	41,327	6,055,156	995,517	7,050,673	103,046	3,153,592	3,776,980	899,672	4,676,652	1,193,364	36,338	1,051,762	1,051,762	
2016	331,500	73,154	3,854	112,899		34,226	34,226	6,055,156	1,029,743	7,084,899	94,992	3,092,826	3,687,980	924,166	4,612,146	1,193,364	46,601	1,005,161	1,005,161	
2017	331,500	73,154	3,854	110,723		30,729	30,729	6,055,156	1,060,472	7,115,628	106,001	3,017,554	3,501,085	943,354	4,444,439	1,193,364	37,768	967,393	967,393	
2018	331,500	73,154	3,854	108,028		33,235	33,235	6,055,156	1,093,707	7,148,863	127,337	2,923,452	3,411,085	956,920	4,368,005	1,193,364	19,127	948,266	948,266	
2019	331,500	73,154	3,854	104,660		27,985	27,985	6,055,156	1,121,692	7,176,848	98,000	2,853,437	3,327,085	971,129	4,298,214	1,193,364	51,832	896,434	896,434	
2020	331,500	73,154	3,854	102,153		36,025	36,025	6,055,156	1,157,717	7,212,873	130,898	2,758,564	3,087,112	991,891	4,079,003	1,193,364	21,441	874,993	874,993	
2021	331,550	73,154	3,854	98,757		33,155	33,155	6,055,156	1,190,872	7,246,028	144,823	2,646,896	2,947,678	1,007,754	3,955,432	1,193,364	10,912	864,081	864,081	
2022	331,500	73,154	3,854	94,759		34,494	34,494	6,055,156	1,225,366	7,280,522	148,680	2,532,710	2,479,749	1,011,327	3,491,076	1,193,364	11,053	853,028	853,028	
2023	331,500	73,154	3,854	90,671		32,500	32,500	6,055,156	1,257,866	7,313,022	157,675	2,407,535	2,176,457	1,034,078	3,210,535	1,193,364	6,146	846,882	846,882	
2024	331,500	73,154	3,854	86,190		32,408	32,408	6,055,156	1,290,274	7,345,430	155,304	2,284,639	2,108,677	1,046,999	3,155,676	1,193,364	12,998	833,884	833,884	
2025	331,500	73,154	3,854	81,790		34,779	34,779	6,055,156	1,325,053	7,380,209	147,611	2,171,807	1,608,926	1,063,120	2,672,048	1,193,364	25,091	808,793	808,793	
2026	331,500	73,154	3,854	77,751		26,827	26,827	6,055,156	1,351,880	7,407,036	161,270	2,037,364	1,376,966	1,069,104	2,446,070	1,193,364	15,471	793,322	793,322	
2027	331,500	73,154	3,854	72,938		36,975	36,975	6,055,156	1,388,855	7,444,011	179,278	1,895,061	1,307,966	1,073,466	2,381,432	1,193,364	2,276	791,046	791,046	
2028	331,500	73,154	3,854	67,843		28,922	28,922	6,055,156	1,417,777	7,472,933	169,587	1,754,396	978,474	1,076,947	2,055,421	1,193,364	17,062	773,984	773,984	
2029	331,500	73,154	3,854	62,807		35,175	35,175	6,055,156	1,452,952	7,508,108	187,063	1,602,508	917,474	1,082,161	1,999,635	1,193,364	4,622	769,362	769,362	
2030	331,500	73,154	3,854	57,370		41,542	41,542	6,055,156	1,494,494	7,549,650	188,590	1,455,460	890,474	1,084,926	1,975,400	1,193,364	8,532	760,830	760,830	
2031	331,500	73,154	3,854	52,105		31,484	31,484	6,055,156	1,525,978	7,581,134	199,781	1,287,163	420,059	1,089,843	1,509,902	1,193,364	2,606	758,224	758,224	
2032	331,500	73,154	3,854	46,080		28,563	28,563	6,055,156	1,554,541	7,609,697	208,412	1,107,314	206,171	1,091,571	1,297,742	1,193,364		758,224	758,224	
2033	331,500	73,154	3,854	39,642		25,897	25,897	6,055,156	1,580,438	7,635,594	214,850	918,361	206,171	1,092,066	1,298,237	1,193,364		758,224	758,224	
2034	331,500	73,154	3,854	32,877		24,752	24,752	6,055,156	1,605,190	7,660,346	213,809	729,304	114,475	1,092,486	1,206,961	1,193,364	7,806	750,418	750,418	
2035	331,500	73,154	3,854	26,109		29,532	29,532	6,055,156	1,634,722	7,689,878	215,219	543,617	63,832	1,093,061	1,156,893	1,193,364	13,164	737,254	737,254	
2036	331,500	73,154	3,854	19,461		26,462	26,462	6,055,156	1,661,184	7,716,340	185,246	384,833	63,832	1,092,543	1,156,375	1,193,364	49,785	687,469	687,469	
2037	331,500	73,154	3,854	13,777		31,697	31,697	6,055,156	1,692,881	7,748,037	231,719	184,811	35,380	1,092,063	1,127,443	1,193,364	8,996	678,473	678,473	
2038	331,500	73,154	3,854	6,616		24,704	24,704	6,055,156	1,717,585	7,772,741	209,515		35,380	1,091,261	1,126,641	1,193,364	13,313	665,160	665,160	25,048
2039	331,500	73,154	3,854			28,996	28,996	6,055,156	1,746,581	7,801,737	28,996		3,800	1,090,486	1,094,286	1,193,364	16,252	648,908	648,908	234,292
2040	331,500	73,154	3,854			26,496	26,496	6,055,156	1,773,077	7,828,233	26,496			1,089,534	1,089,534	1,193,364	28,415	620,493	620,493	433,873
2041	331,500	73,154	3,854			29,552	29,552	6,055,156	1,802,629	7,857,785	29,552			1,088,564	1,088,564	1,193,364	33,066	587,427	587,427	625,747
2042	331,500	73,154	3,854			27,459	27,459	6,055,156	1,830,088	7,885,244	27,459			1,087,607	1,087,607	1,193,364	22,507	564,920	564,920	830,273
2043	331,500	73,154	3,854			46,271	46,271	6,055,156	1,876,359	7,931,515	46,271			1,086,694	1,086,694	1,193,364	22,817	542,103	542,103	1,015,677
2044	331,500	73,154	3,854			35,619	35,619	6,055,156	1,911,978	7,967,134	35,619			1,085,849	1,085,849	1,193,364	15,346	526,757	526,757	1,219,204
2045	331,500	73,154	3,854			49,306	49,306	6,055,156	1,961,284	8,016,440	49,306			1,085,089	1,085,089	1,193,364	11,296	515,461	515,461	1,413,094
2046	331,500	73,154	3,854			27,957	27,957	6,055,156	1,989,241	8,044,397	27,957			1,084,424	1,084,424	1,193,364	23,065	492,396	492,396	1,616,564
2047	331,500	73,154	3,854			24,517	24,517	6,055,156	2,013,758	8,068,914	24,517			1,084,015	1,084,015	1,193,364	26,632	465,764	465,764	1,819,907
2048	331,500	73,154	3,854			29,619	29,619	6,055,156	2,043,377	8,098,533	29,619			1,083,695	1,083,695	1,193,364	6,119	459,645	459,645	2,038,661
2049	331,500	73,154	3,854			25,446	25,446	6,055,156	2,068,823	8,123,979	25,446			1,083,460	1,083,460	1,193,364	25,551	434,094	434,094	2,242,156
2050	331,500	73,154	3,854			30,930	30,930	6,055,156	2,099,753	8,154,909	30,930			1,083,297	1,083,297	1,193,364	18,137	415,957	415,957	2,447,581
TOTALS	26,893,980	6,127,584	956,860	8,429,639	6,055,156	2,099,753	8,154,909				8,154,909						777,407			

FINANCIAL STATEMENTS

COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

B-114858

December 21, 1970

Dear Mr. Secretary:

The General Accounting Office has examined the accompanying financial statements prepared by the Bonneville Power Administration, Department of the Interior, for the Federal Columbia River Power System for fiscal year 1970. Our examination was made pursuant to the Budget and Accounting Act, 1921 (31 U.S.C. 53), and the Accounting and Auditing Act of 1950 (31 U.S.C. 67).

The designation "Federal Columbia River Power System" (System) is used to describe the integrated Federal power system in the Pacific Northwest comprising the (1) power generating facilities of the Corps of Engineers (Civil Functions), Department of the Army, and of the Bureau of Reclamation, Department of the Interior, and (2) transmission facilities of the Bonneville Power Administration. The Bonneville Power Administration markets the power generated by the integrated System.

The statements present the financial results of operations and the source and application of funds in the generating, transmitting, and marketing of electric power for fiscal year 1970 and the financial position of the System at June 30, 1970.

Our examination of the financial statements was made in accordance with generally accepted auditing standards and included tests of the accounting records of the Corps of Engineers, the Bureau of Reclamation, and the Bonneville Power Administration and such other auditing procedures as we considered necessary in the circumstances. Our preceding examination of financial statements of the System was made for fiscal year 1969.

The accompanying financial statements for the System were prepared on a cost-accounting basis. They do not present the financial results on a basis designed to show whether power rates are adequate to repay the Federal investment in the System, either for the fiscal year or cumulatively. (See note 2 to the financial statements.) A separate analysis is prepared by the Bonneville Power Administration for the System for repayment purposes. The period over which fixed assets are depreciated for cost-accounting purposes is based on an average composite life of 64 years for the entire System whereas a period of 50 years for the generating projects and 45 years for the transmission system is used for repayment purposes. Wholesale power rates are based upon this repayment analysis rather than the cost-based statements.

Our report for fiscal year 1969 stated that the Department of the Interior had announced in a press release on October 27, 1969, that interest rates applicable to the Government's investment in new Federal power projects would be increased from 3-1/4 to 4-7/8 percent in fiscal year 1970 and that, in subsequent years, the rate would be based on the average yields on long-term obligations of the U.S. Treasury but would be adjusted by not more than one half of 1 percent each July 1. The press release stated that the new rate would apply to projects where the interest rate is subject to administrative determination and would result in interest costs more nearly comparable to the Government's financing costs for new projects.

On January 29, 1970, Secretarial Order 2929 was issued directing the change in the interest rate. Subsequent guidelines for implementing the Secretarial Order provided for an interest rate of 4-7/8 percent for a reservoir project, or unit, the construction of which is initiated after January 29, 1970. Also the guidelines provided that new investment in system transmission facilities each year be treated as a separate stage of development and that the 4-7/8 percent interest rate apply beginning in fiscal year 1971. The Bonneville Power Administration, therefore, will first use the new interest rate in fiscal year 1971.

The accounts and financial statements are subject to retroactive adjustment, because firm allocations of the cost of joint-use facilities to power and other purposes have not been made for four of the 20 generating projects in service as of June 30, 1970. (See note 3 to the financial statements.) Such changes in allocations have sometimes resulted in significant adjustments to plant investment allocated to power and to accumulated net revenues. For example, during fiscal year

1970 firm allocations recorded for the Palisades and Detroit-Big Cliff Projects resulted in the allocations of plant investment to power for the two projects being decreased $1,828,000 and the accumulated net revenues being increased $1,205,000.

Our fiscal year 1968 and 1969 reports commented on the need for firm cost allocations for the Chief Joseph and Palisades Projects which had been in service for more than 10 years. The Bureau of Reclamation has now firmed up the cost allocations for the two projects. Required action to arrive at a firm allocation of the cost for the Chief Joseph Project was not taken until July 1970, and the revised cost allocation will be recorded in the fiscal year 1971 accounts and financial statements as disclosed in note 3.

Other matters, as discussed in the notes to the financial statements, remain to be resolved for improved disclosure of the financial position and results of operations of the integrated power system. These other matters include inconsistencies (1) in computing interest expense on the Federal investment and in capitalizing interest costs during construction, (2) in reporting accrued annual leave as a liability, and (3) in capitalizing preliminary survey and investigation costs.

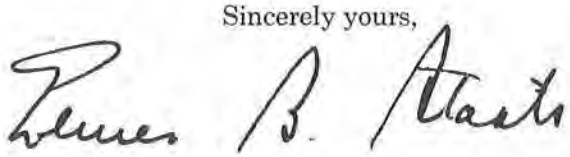
The General Accounting Office has reviewed some of these matters and has recommended to the Secretary of the Interior or to the Commissioner of Reclamation that the Bureau of Reclamation (1) capitalize interest costs during construction as part of the Federal investment for all power projects constructed prior to 1956 and compute the accumulated annual interest expense on the basis of such noncapitalized costs, (2) compute interest expense on net additions to the Federal investment during each year and make a retroactive adjustment for such interest expense that was not recorded in past years, and (3) provide that such noncapitalized interest costs and interest expense be repaid to the Treasury from power revenues.

The General Accounting Office has also recommended to the Chief of Engineers that preliminary survey and investigation costs incurred prior to congressional authorization of a project be recorded and recovered from power revenues. These recommendations have not been adopted. We are following up on them with the Bureau and the Corps.

Subject to the financial effects of future adjustments related to adoption of firm cost allocations and of the resolution of the other matters described above, the accompanying financial statements, in our opinion, present fairly the assets and liabilities of the Federal Columbia River Power System at June 30, 1970, the financial results of its power operations, and the source and application of its funds for the year then ended, in conformity with accounting principles and standards prescribed for executive agencies of the Federal Government by the Comptroller General of the United States. These accounting principles and standards were applied on a basis consistent with that of the preceding period, except for the change, with which we agree, in the treatment of trust fund assets and liabilities explained in note 10 of the financial statements.

Copies of this report are being sent to the Director, Office of Management and Budget; the Administrator, Bonneville Power Administration; the Commissioner of Reclamation; the Secretary of the Army; and the Chief of Engineers.

Sincerely yours,



Comptroller General
of the United States

Enclosures

The Honorable
The Secretary of the Interior

EXHIBIT 1

UNITED STATES OF AMERICA
FEDERAL COLUMBIA RIVER POWER SYSTEM

STATEMENT OF COMMERCIAL POWER REVENUES AND EXPENSES
FOR THE FISCAL YEARS ENDED JUNE 30, 1970 AND JUNE 30, 1969
(NOTES 1 AND 2)

(In thousands)

	Fiscal Year 1970	Fiscal Year 1969
OPERATING REVENUES:		
Sales of electric energy by Bonneville Power Administration:		
Publicly owned utilities	$ 58,420	$ 55,752
Privately owned utilities	20,319	16,967
Federal agencies	4,090	4,662
Aluminum industry	44,614	40,871
Other industry	5,449	5,333
Total	132,892	123,585
Other operating revenues:		
Wheeling revenues	9,507	9,160
Other revenues	5,281	4,532
Total	14,788	13,692
Total operating revenues	147,680	137,277
OPERATING EXPENSES:		
Purchase and exchange power	11,468	12,526
Operation	26,022	23,473
Maintenance	13,373	11,053
Depreciation	21,645	19,228
Total operating expenses	72,508	66,280
Net operating revenues	75,172	70,997
INTEREST AND OTHER DEDUCTIONS: (Notes 4 & 5)		
Interest on Federal investment	57,258	49,005
Interest charged to construction	6,896*	5,681*
Miscellaneous income deductions, net	98	441*
Net interest and other deductions	50,460	42,883
NET REVENUES	$ 24,712	$ 28,114
ACCUMULATED NET REVENUES:		
Balance at beginning of year	$322,584	$296,557
Net revenues—current year	24,712	28,114
Prior years adjustments (Note 11)	908*	2,087*
Balance at end of year	$346,388	$322,584

*Denotes deduction

"Notes to the financial statements" are an integral part of this statement.

UNITED STATES OF AMERICA
FEDERAL COLUMBIA RIVER POWER SYSTEM

STATEMENT OF ASSETS AND LIABILITIES OF THE COMMERCIAL POWER PROGRAM AS OF JUNE 30, 1970 AND JUNE 30, 1969 (NOTES 1 AND 2)
(In thousands)

ASSETS

	June 30	
	1970	1969
FIXED ASSETS:		
Completed plant (Schedule A)	$2,749,012	$2,362,822
Retirement work in progress	28,235	11,861
	2,777,247	2,374,683
Less accumulated depreciation	235,997	217,401
	2,541,250	2,157,282
Construction work in progress (Schedule A) (Note 9)	673,421	803,190
Total fixed assets	3,214,671	2,960,472
CURRENT ASSETS:		
Unexpended funds	112,242	141,784
Special funds	2,202	3,314
Accounts receivable	23,897	21,856
Materials and supplies	17,582	13,942
Total current assets	155,923	180,896
DEFERRED CHARGE FOR PAYMENT OF IRRIGATION ASSISTANCE (Schedule A) (Note 6)	390,466	386,943
OTHER ASSETS AND DEFERRED CHARGES:		
Trust funds (Note 10)	6,099	1,092
Other assets and deferred charges (Note 9)	4,303	13,586
Total other assets and deferred charges	10,402	14,678
TOTAL ASSETS	$3,771,462	$3,542,989

*Denotes deduction

"Notes to the financial statements" are an integral part of this statement.

LIABILITIES

	June 30 1970	June 30 1969
INVESTMENT OF U.S. GOVERNMENT:		
Congressional appropriations	$3,846,213	$3,587,005
Revenues transferred to continuing fund	4,033	3,909
Transfers from other Federal agencies, net	27,764	23,799
Interest on Federal investment (Notes 4 and 5)	776,287	705,432
Gross Federal investment	4,654,297	4,320,145
Less funds returned to U.S. Treasury	1,690,018	1,557,948
Net investment of U.S. Government	2,964,279	2,762,197
ACCUMULATED NET REVENUES:		
Balance at beginning of year	322,584	296,557
Net revenues current year (Exhibit 1)	24,712	28,114
Prior years adjustments (Note 11)	908*	2,087*
Balance at end of year	346,388	322,584
CURRENT LIABILITIES:		
Accounts payable	55,832	61,352
Employees accrued leave (Note 5)	4,336	3,937
Total current liabilities	60,168	65,289
LIABILITY OF U.S. GOVERNMENT FOR PAYMENT OF IRRIGATION ASSISTANCE (Schedule A) (Note 6)	390,466	386,943
OTHER LIABILITIES AND DEFERRED CREDITS:		
Trust fund advances (Note 10)	6,099	1,156
Other deferred credits	4,062	4,820
Total other liabilities and deferred credits	10,161	5,976
TOTAL LIABILITIES	$3,771,462	$3,542,989

EXHIBIT 3

UNITED STATES OF AMERICA
FEDERAL COLUMBIA RIVER POWER SYSTEM

STATEMENT OF SOURCE AND APPLICATION OF FUNDS OF COMMERCIAL POWER PROGRAM FOR FISCAL YEAR ENDING JUNE 30, 1970 (NOTES 1 AND 2)

(In thousands)

SOURCE OF FUNDS:		
Congressional appropriations	$259,208	
Transfers from other Federal agencies	3,965	
Gross investment		$263,173
Revenue from sale of electric energy	132,892	
Other operating revenue	14,788	
Total revenues		147,680
Total source of funds		$410,853
APPLICATION OF FUNDS:		
Operation and maintenance expense (includes cost of purchased power, miscellaneous income deductions and adjustments for prior years of $1,500)		$ 52,461
Investment in electric utility plant (Does not include capitalized interest of $21,065)		254,759
Return of funds to U.S. Treasury for:		
Operation and maintenance expense	$ 52,461	
Interest on Federal investment, including adjustment for prior years of $572	49,790	
Repayment of capital investment	29,819	
Total funds returned to U.S. Treasury		132,070
Decrease in current assets and liabilities, net		19,852*
Decrease in other assets and deferred charges, net of other liabilities and deferred credits (excluding irrigation assistance)		8,461*
Funds transferred to the continuing fund		124*
Total application of funds		$410,853

*Denotes deduction

"Notes to the financial statements" are an integral part of this statement.

Bernard Goldhammer, BPA Power Manager; Dr. Alan Carlin, Chairman of Los Angeles Chapter of Sierra Club; and Charles F. Luce, Chairman and Chief Executive Officer, Consolidated Edison Company, New York, at Bonneville Regional Advisory Council meeting.

UNITED STATES OF AMERICA

FEDERAL COLUMBIA RIVER POWER SYSTEM

AMOUNT AND ALLOCATION OF PLANT INVESTMENT
AS OF JUNE 30, 1970 (NOTES 1 AND 3)
PROJECTS IN SERVICE AND UNDER CONSTRUCTION

(In thousands)

Project	Total	COMMERCIAL POWER: Completed Plant (Notes 1 and 2)	COMMERCIAL POWER: Construction Work in Progress	COMMERCIAL POWER: Total	ALLOCATED TO: IRRIGATION: Returnable from Commercial Power Revenues	IRRIGATION: Returnable from Other Sources (Note 6)	IRRIGATION: Total Irrigation	NONREIMBURSABLE: Navigation	NONREIMBURSABLE: Flood Control	NONREIMBURSABLE: Fish and Wildlife	NONREIMBURSABLE: Recreation	NONREIMBURSABLE: Other	Percent of Total Returnable from Commercial Power Revenues
Projects in Service													
Transmission facilities (BPA)	$1,128,567	$1,013,473	$115,094	$1,128,567									100.0
Albeni Falls (CE)	32,794	31,903		31,903				$ 134	$ 173		$ 584		97.3
Boise (BR)	65,606	4,893	7	4,900	$ 11,002	$ 34,744	$ 45,746		14,960				24.2
Bonneville (CE)	92,292	61,681	2,158	63,839				28,301			152		69.2
Chief Joseph (CE) (d)	157,249	155,592	1,465	157,057							192		99.9
Columbia Basin (BR)	684,678	182,184	62,732 (a)	244,916	327,339	67,773	395,112	1,000	43,110			$ 540	83.6
Cougar (CE)	57,205	17,667	1	17,668		3,081	3,081	513	35,943				30.9
Detroit-Big Cliff (CE)	66,370	40,363	1	40,364		5,026	5,026	219	20,761				60.8
Green Peter-Foster (CE) (d)	86,787	46,894	6	46,900		6,433	6,433	358	31,094		332	1,670	54.0
Hills Creek (CE)	48,761	17,302		17,302		4,583	4,583	625	26,251				35.5
Hungry Horse (BR)	102,154	77,477	12	77,489					24,665				75.9
Ice Harbor (CE)	138,936	93,563	779	94,342				43,661			933		67.9
John Day (CE) (d)	476,303	286,189	65,670	351,859				81,742	13,957		3,735	25,010 (b)	73.9
Little Goose (CE) (d)	153,672	37,228	68,333	105,561				44,168			360	3,583 (b)	68.7
Lookout Point-Dexter (CE)	94,582	45,565	95	45,660		1,412	1,412	706	46,607		197		48.3
Lower Monumental (CE) (d)	186,205	139,973	1	139,974				45,621			610		75.2
McNary (CE)	305,750	256,559	37	256,596				48,465			689		83.9
Minidoka (BR)	37,033	2,554	41	2,595		34,116	34,116				28	294	7.0
Palisades (BR)	59,846	10,724		10,724	9,985	9,348	19,333		29,645		144		34.6
The Dalles (CE)	276,414	222,647	11,274	233,921				41,792			679	22	84.6
Yakima (BR)	63,466	4,581	1	4,582	9,913	47,819	57,732			$1,152			22.8
Projects under Construction													
Dworshak (CE)	152,604		138,251	138,251				5,114	8,181		1,058		90.6
Libby (CE)	219,173		167,340	167,340					41,310			10,523 (b)	76.4
Lost Creek (CE)	7,895		904	904		132	132		3,213	1,409	1,743	494	11.5
Lower Granite (CE)	44,925		38,983	38,983				5,847			56	39 (b)	86.8
Teton (BR)	2,371		236	236	1,316	394	1,710		396		29		65.5
Irrigation assistance at 11 projects having no power generation	30,052				30,052		30,052						100.0
Subtotal plant investment	4,771,690	2,749,012	673,421	3,422,433	389,607	214,861	604,468	348,266	340,266	2,561	11,521	42,175	79.9
Repayment obligation retained by Columbia Basin Project (c)	2,211	1,352		1,352	859		859						100.0
Total	$4,773,901	$2,750,364	$673,421	$3,423,785	$390,466	$214,861	$605,327	$348,266	$340,266	$2,561	$11,521	$42,175	79.9

BPA—Bonneville Power Administration
CE—Corps of Engineers Project
BR—Bureau of Reclamation Project

(a) Includes $60,089 construction costs of the third power plant.
(b) Nonreimbursable road costs.
(c) Joint facilities transferred to Bureau of Sport Fisheries and Wildlife. Power portion is included in the Balance Sheet as a Deferred Item.
(d) Projects in service that have tentative cost allocations at June 30, 1970. Projects under construction have tentative cost allocations. (Note 3)

"Notes to the financial statements" are an integral part of this statement.

UNITED STATES OF AMERICA

FEDERAL COLUMBIA RIVER POWER SYSTEM

NOTES TO THE FINANCIAL STATEMENTS

Note 1. Composition of the Federal Columbia River Power System

The Federal Columbia River Power System (FCRPS) is the name applied to the facilities and operations of the Bonneville Power Administration (BPA) and the hydroelectric generating plants constructed and operated by the Corps of Engineers (Corps) or the Bureau of Reclamation (Bureau) for which BPA transmits and markets the power. The projects in service and under construction at June 30, 1970, are listed in Schedule A.

The three agencies are separately managed and financed, and each has its own accounting system. However, the facilities are operated as an integrated power system, and the financial statements for the three agencies are consolidated under the name Federal Columbia River Power System.

Note 2. Basis of Financial Reporting

The accompanying financial statements are prepared on the cost accounting basis which includes depreciation by the compound interest method as one element of cost. The statements do not show financial results on a repayment basis either for the fiscal year or cumulatively.

The average depreciation life of fixed assets allocated to power is about 85 years for the generating projects and 46 years for the transmission system. The average composite life for the entire system is about 64 years. A separate repayment analysis is prepared for the FCRPS based upon repayment periods of 50 years for the generating projects and 45 years for the transmission system. As a result of the difference between depreciation and repayment periods, depreciation charges accumulated during the repayment periods will be much less than repayment requirements for the same periods. Wholesale power rates are based upon the repayment analysis rather than these cost based statements.

Note 3. Cost Allocations

The term "cost allocation" is used to describe the process of assigning the costs of a multipurpose project to the individual purposes it serves. In such a process, joint-use costs of plant and operations are allocated among the purposes served such as power, irrigation, navigation, and flood control. The portion of total project costs allocated to power is included in the FCRPS financial statements.

Cost allocations are designated as tentative or firm. A tentative allocation of costs among purposes may be adjusted retroactively when it is replaced with a firm allocation. A firm allocation may be adjusted, if conditions warrant, but only on a prospective basis.

Firm allocations have been adopted for all but four of the 20 projects in service as shown in Schedule A. The cost of joint-use facilities at these projects is $480,894,000 of which $343,654,000 is tentatively allocated to power. As firm allocations are adopted retroactive adjustments will be made for any differences.

On July 17, 1970, the Bureau of Reclamation finalized the suballocation of commercial power to irrigation pumping power for the Chief Joseph Project. Prior to that date the Corps had considered the allocation firm but the Department of the Interior considered it tentative pending a final decision on the suballocation. The final suballocation to irrigation pumping power reduces plant costs allocated to power $772,000 and increases Accumulated Net Revenues at June 30, 1970 by about $480,000. Retroactive adjustments will be made in fiscal year 1971.

Note 4. Interest Rates

An interest rate of 2½% is applied to the unpaid Federal investment for the majority of the projects. The projects which use a rate higher than 2½% are as follows: Bureau projects in service, all using

a 3% rate, are: Boise, Columbia Basin, Hungry Horse, Minidoka, Palisades, and Yakima-Roza Division. The Bureau's Grand Coulee Third Powerplant, which is under construction, carries a 3⅛% rate, and the Teton Project carries a 3.342% rate. Corps projects which are under construction and which use rates higher than 2½% are:

Dworshak	2⅝%
Libby	3⅛%
Lost Creek	3⅛%

BPA used the 2½% rate through fiscal year 1963. Subsequently, the following rates were used:

Fiscal Year 1964	2⅞%
Fiscal Year 1965	3%
Fiscal Years 1966 through 1968	3⅛%
Fiscal Years 1969 and 1970	3¼%

The Secretary of the Interior issued an order dated January 29, 1970, establishing a new interest rate policy for repayment of the Federal investment in power projects. The initial rate under the new policy is 4⅞%. The order is applicable to new construction initiated by the Corps or Bureau after January 29, 1970, and to BPA's Federal investment beginning in fiscal year 1971. The 4⅞% rate will be adjusted by not more than one-half of one percent each year until the rate equals the then current average yield rate on long-term U.S. Treasury obligations. The rate is 6⅜% at June 30, 1970.

Note 5. Variations in Practices Among Reporting Entities

The entities of FCRPS each maintain a separate accounting system designed to meet its particular requirements, and variations in reporting practices exist among the entities. However, cooperation among the entities in prior years has led to the adoption of standard practices such as use of the compound interest method of depreciation. The unresolved variations existing during fiscal year 1970 are as follows:

a. The Corps and BPA include interest during construction and other items such as working capital in the base for computation of interest expense. The Bureau does not include in its base interest during construction for four projects and one division of a fifth, and it also excludes other items such as working capital. In addition, the Bureau's interest base does not include interest from the period of initial allocation to fiscal year 1963 on plant costs of the Columbia Basin Project allocated to future downstream river regulation.

   The Bureau excluded these elements based on its interpretation of Federal reclamation law. However, had the Bureau included these elements in its interest base and computed interest at the rate of 2½% for the Columbia Basin and Hungry Horse Projects (the two principal projects involved) accumulated net revenues at June 30, 1970 would be reduced about $22,681,000.

b. All entities currently capitalize interest during construction. However, the Bureau was not required to include capitalized interest for four projects and one division of a fifth. Had the Bureau capitalized interest during construction at a rate of 2½% for the Columbia Basin and Hungry Horse Projects, plant costs, net of depreciation, would be increased by about $11,660,000 at June 30, 1970. The Bureau computed interest expense at a rate of 3% upon completion of these projects. At that time the Corps and BPA used a 2½% interest rate.

c. The Bureau includes in the costs of its projects, general investigation and development costs which are incurred prior to project authorization. It is the policy of the Corps not to include for FCRPS purposes such costs which are incurred prior to project authorization. The Corps has excluded about $2,115,000 of such costs at June 30, 1970.

d. The accounts of the Corps and BPA reflect the liability for accrued but unused annual leave. However, the accounts of the Bureau projects do not include an amount for unused annual leave, estimated to be $770,000 as of June 30, 1970.

Note 6. Repayment Responsibility for Irrigation Costs

Pursuant to legislation, revenues of the FCRPS must repay to the United States Treasury that portion of the cost of irrigation facilities in the Pacific Northwest which the Bureau has determined that benefiting water users are unable to repay. At June 30, 1970, this amount is $390,466,000.

Joint project costs of $20,668,000 for the Cougar, Detroit-Big Cliff, Hills Creek, Lookout Point-Dexter, Green Peter-Foster and Lost Creek Projects have been allocated to irrigation pursuant to project authorizations. A determination of water users' repayment ability will be made at the time the irrigation facilities are proposed for authorization and development. If water users' repayment ability is insufficient to meet the repayment requirements, irrigation assistance may be required from power revenues, if authorized by Congress. These costs are not included in the accompanying statements because a final determination as to potential repayment from power revenues has not been made.

Note 7. Commitments to Exchange Power and Acquire Project Capability

a. Hanford Steam Plant

BPA, the Washington Public Power Supply System (WPPSS), and the 76 utility participants have executed agreements under which BPA receives the electric power generated by the 860 megawatt Hanford Steam Plant which was constructed by WPPSS. In return BPA furnishes the participants an amount of power equal in value, at BPA rates, to the annual costs of operating the steam plant and retiring the bonds issued in 1963 to construct the plant. At June 30, 1970, $83,020,000 of the bonds are outstanding and due to be fully retired by 1996. The agreements call for payments to WPPSS by each participant for its portion of the costs of the project based on the Annual Operating Budget. For the year ending June 30, 1970, the participants' shares of the Annual Operating Budget totaled $8,990,000. BPA will be required to make the required power deliveries until 1996 even if the Hanford Steam Plant becomes inoperable. However, the Government may acquire ownership of the plant, subject to Congressional approval. Ownership may be acquired after 1996 without cost, with the assumption of all project assets and liabilities. BPA engineers have estimated that by 1996 the plant will have only a net salvage value.

b. Columbia Storage Power Exchange (CSPE)

BPA has entered into agreements with 41 utilities to exchange an agreed amount of power for their rights to the Canadian Entitlement, which is one-half of the additional power benefits realized at U.S. generating plants as the result of construction of three Canadian Treaty storage dams. The Canadian Entitlement was purchased by the utilities, for a period of thirty years, from Columbia Storage Power Exchange, a non-profit corporation. The transaction was handled through a $314.1 million bond issue which the utilities are repaying through CSPE.

BPA's commitment to the 41 utilities was unconditional and not contingent upon the actual extra generation realized. However, two of the Canadian dams were completed ahead of schedule, and the third is on schedule for completion in 1973. As a result of operating the Canadian dams, benefits to BPA have been very close to the amounts originally estimated.

c. Centralia Coal-Fired Steam Plant

BPA has entered into an agreement with eight utilities to acquire varying portions of project capability ranging from 273 megawatts to 973 megawatts from the in-service dates (scheduled to be September 1, 1971 for Unit I and September 1, 1972 for Unit II) to April 1, 1974. This project capability is being acquired to meet BPA firm power commitments during this period. The greater-than-anticipated load growth of public agency customers, coupled with a delay in completion of Lower Granite, made BPA's resources deficient in meeting its anticipated load. BPA's portion of total project costs for the total period is estimated at $59,000,000. After each unit is commercially operable, BPA's commitment will remain whether or not full capability can be achieved. The plant is under construction at June 30, 1970.

d. Trojan Nuclear Plant

BPA entered into agreements on October 5, 1970, to acquire a share of project capability beginning September 1974, the estimated date of commercial operation. BPA's share is 30% of the capability of the 1,100 megawatt project until at least July 1, 1984, at which time certain withdrawal options may be exercised. For the ten-year period this share of project capability will cost BPA about $113,000,000, based on the estimated annual costs of the project. BPA is committed to 30% of annual costs regardless of the actual generating plant output. Portland General Electric has begun preliminary construction, and expects to receive the AEC construction permit.

Note 8. Contingent Liabilities

Contingent liabilities applicable to commercial power at June 30, 1970, total approximately $20,500,000; $10,869,000 representing claims under the Federal Tort Claims Act (of which $9,700,000 is a claim against the Bonneville Dam by the Yakima Tribe of Indians); and $9,630,000 representing various contractor claims.

Note 9. Constructive Receipts

Beginning in Fiscal Year 1969, BPA recorded as an asset and liability the cost of "constructively received" materials as required by BOB 68-10. The asset balance of $9,531,000 was included in Other Assets and Deferred Charges at June 30, 1969. Beginning with Fiscal Year 1970, the asset balance has been recorded in Construction Work in Progress, which parallels the treatment of the Corps and the Bureau. The amount of Construction Work in Progress "constructively received" by BPA at June 30, 1970 is $11,705,000.

Note 10. Trust Funds

Beginning with fiscal year 1970, BPA adopted the practice of including for FCRPS purposes the cost of work in progress under trust agreements. This amount at June 30, 1970 is about $4,656,000. Prior to fiscal year 1970, only unexpended trust fund balances were included.

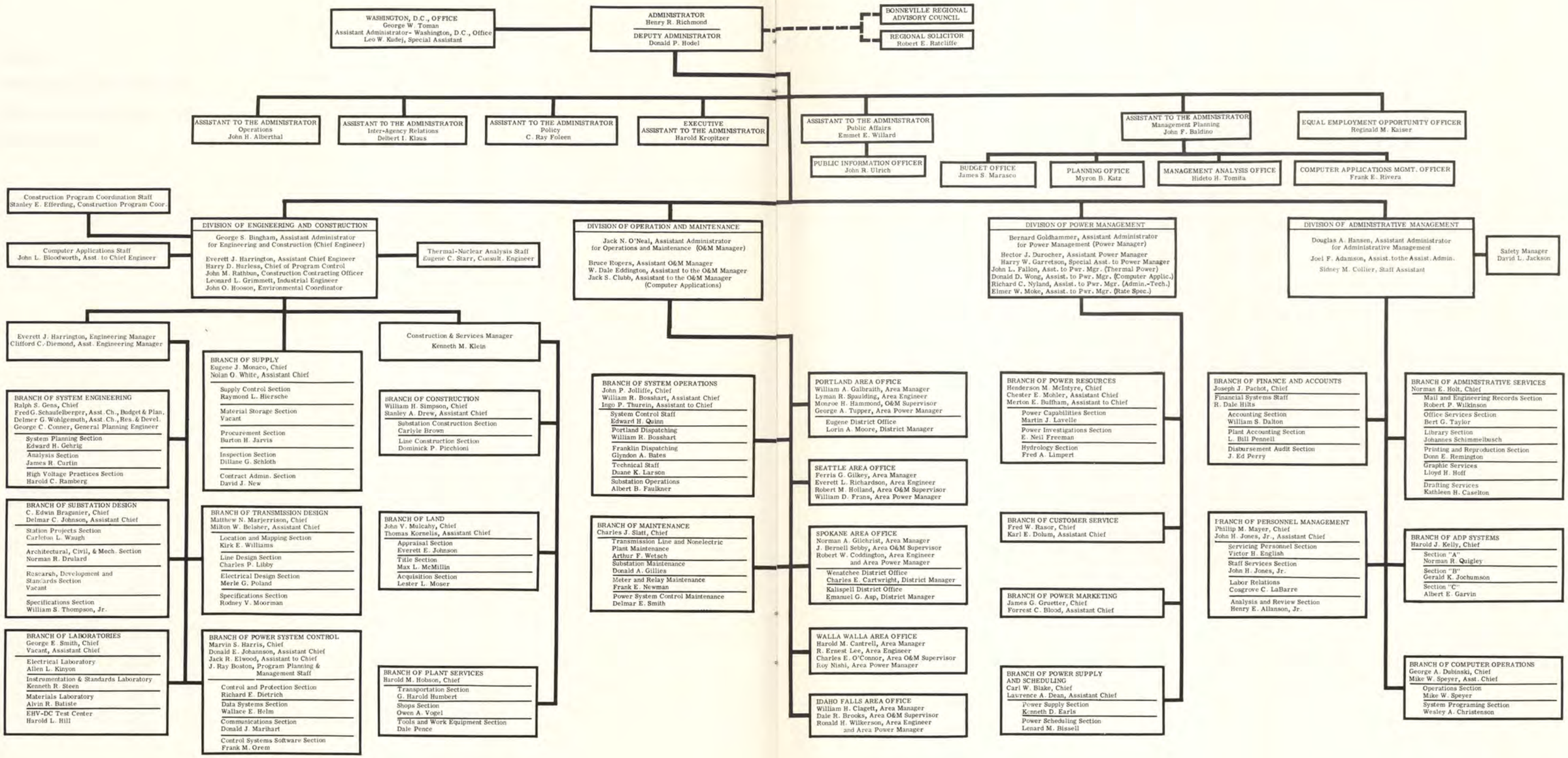
Note 11. Adjustments to Accumulated Net Revenues

The following table explains the adjustments which have caused the net decrease in Accumulated Net Revenues of $908,000 shown on Exhibits 1 and 2:

	In Thousands
1. Correction of BPA's interest expense for prior years because of incorrect allocation of the unpaid investment between varying interest rates	$ (394)
2. Adjustment to write off expired option ($750,000) and abandoned projects ($963,000)	(1,713)
3. Reduction of prior years expenses (net) for Detroit-Big Cliff and Palisades Projects due to adoption of firm cost allocations in Fiscal Year 1970	1,205
4. Miscellaneous minor adjustments	(6)
	$ (908)

BPA MANAGEMENT & ASSOCIATED GROUPS

BPA ORGANIZATION CHART



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Priest Rapids Dam, power giant on the middle Columbia River

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.

Back cover: Aerial view of Celilo Converter Station, The Dalles, Oregon