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1972
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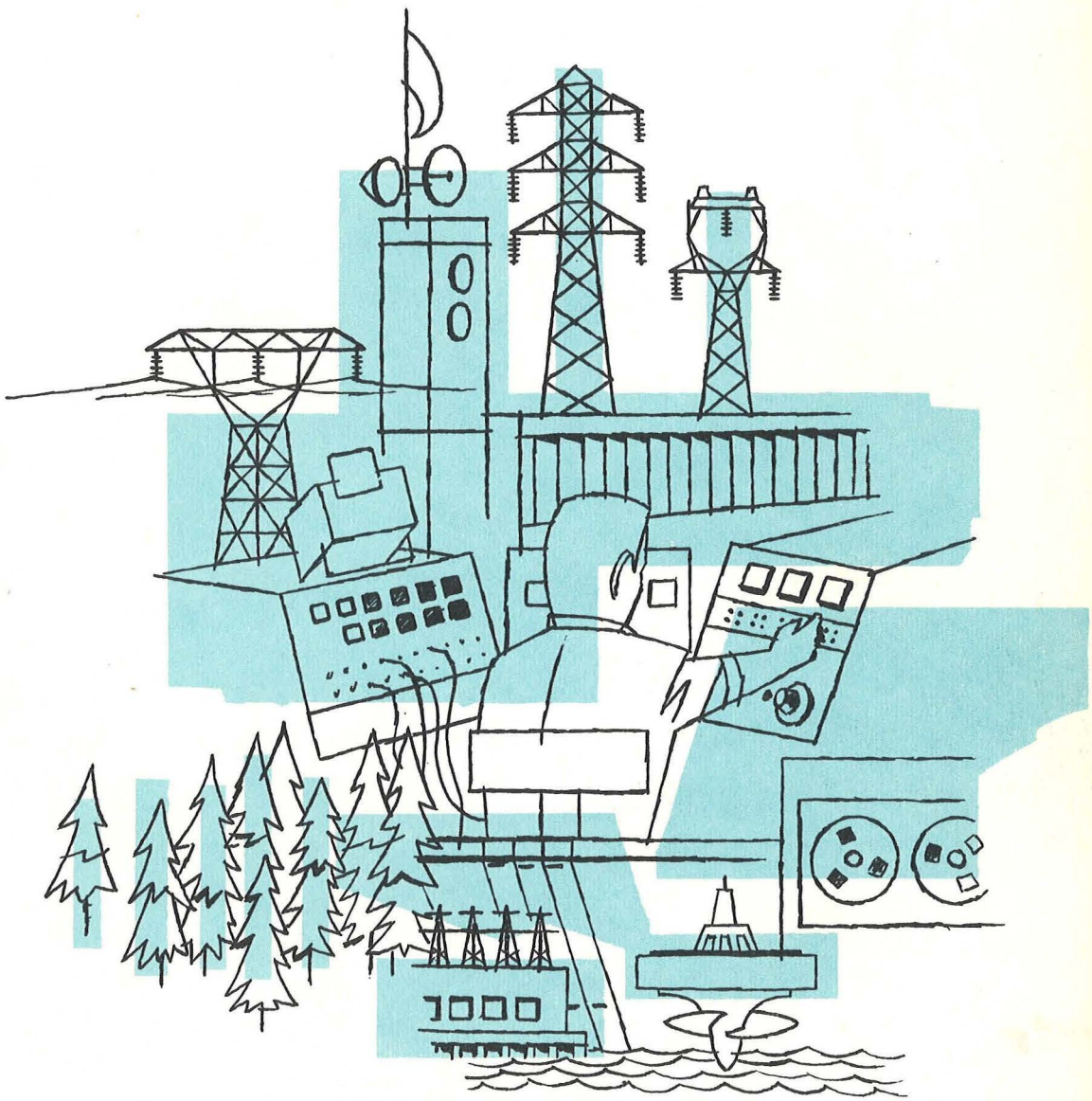


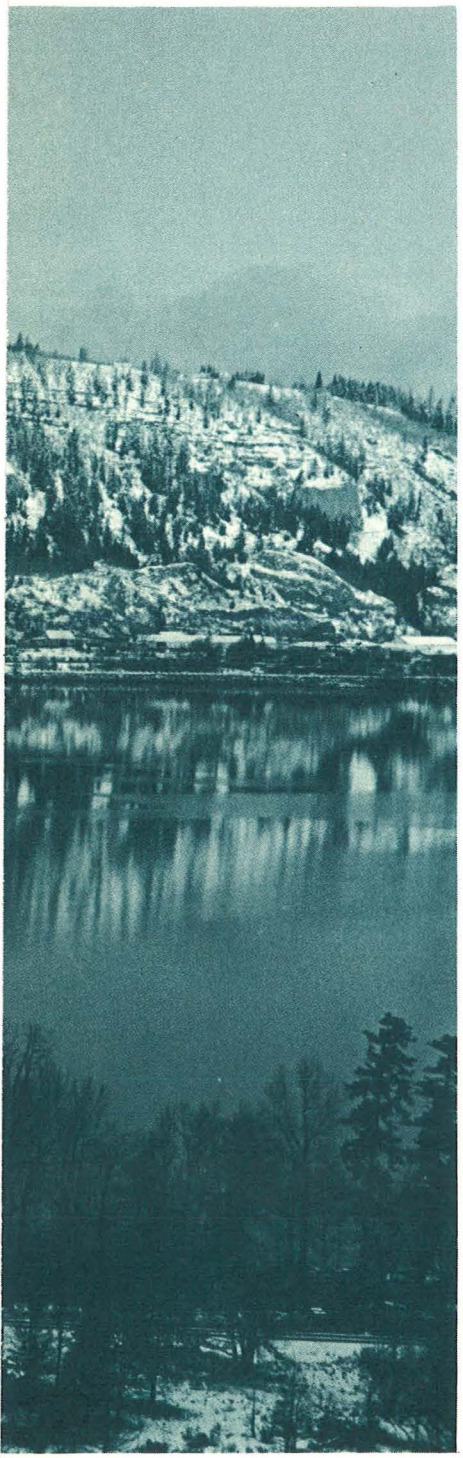
U. S. DEPARTMENT OF THE INTERIOR

BONNEVILLE POWER ADMINISTRATION

The Columbia River near Hood River, Oregon.

DECEMBER 31, 1972

FEDERAL COLUMBIA RIVER POWER SYSTEM



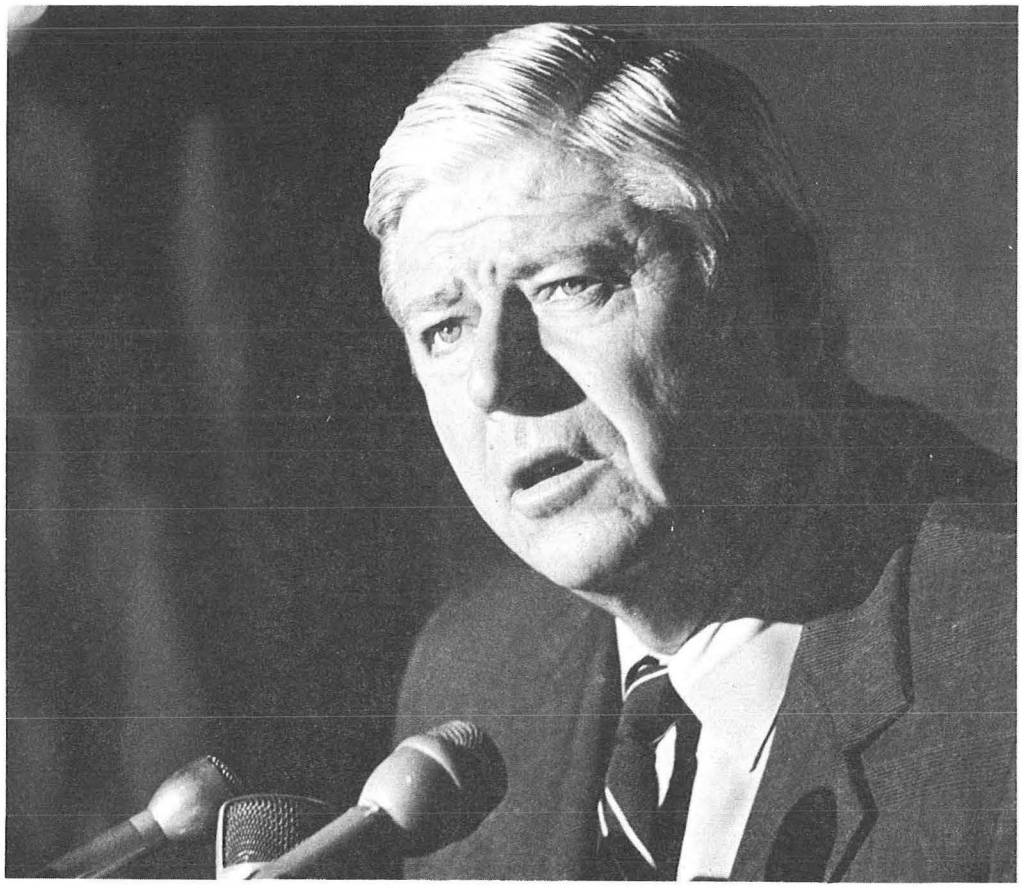
1972 ANNUAL REPORT

U. S. DEPARTMENT OF THE INTERIOR

ROGERS C. B. MORTON, SECRETARY

BONNEVILLE POWER ADMINISTRATION

DONALD PAUL HODEL, ADMINISTRATOR



Secretary Morton answers press query.

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LETTERS TO THE SECRETARY

November 30, 1972

Honorable Rogers C. B. Morton
Secretary of the Interior
Washington, D.C. 20240

Dear Mr. Secretary:

H. R. Richmond, Bonneville Administrator October 20, 1967- November 30, 1972

This is the Bonneville Power Administration's 35th Annual Report on the Federal Columbia River Power System and it is also my last report to you in my capacity as Bonneville Power Administrator. The report covers events of fiscal year 1972 and significant developments that have occurred since the fiscal year ended on June 30.

The keystone of BPA activity during the year, as during the past several years, was the Hydro-Thermal Power Program. This cooperative venture of 108 public and private utilities and the Bonneville Power Administration continued to apply itself to the goal of assuring the Pacific Northwest of an adequate supply of electric energy in the critical years ahead.

Since the Hydro-Thermal accord was reached in 1968, the public and privately owned systems have made commitments for a series of large thermal plants, which are scheduled to come into commercial operation through fiscal year 1982. The first plant constructed under the Hydro-Thermal Power Program is the coal-fired facility near Centralia, Washington. Its second 700-megawatt unit came on the line in August 1972. Problems with its pollution-abatement system have prevented this plant from achieving full output, but these are hopefully being resolved. The second plant under the program is the Trojan nuclear plant near Rainier, Oregon, which is scheduled for completion in September 1974. Coal fields in northern Wyoming will provide fuel for a plant there which is scheduled for completion there during the mid-1970's. To round out the package by 1982, utilities in the Pacific Northwest must construct three additional large nuclear steam plants and convert the Hanford N-Reactor to a more conventional nuclear plant.

Meeting the construction timetables for these thermal plants is but one side of the energy coin. While these facilities should keep pace with expanding base loads, we must still rely upon Federal hydroelectric generation to meet growing peak demands. This can only be done if we adhere to a tight construction schedule for increasing Federal generation.

During the period since the program was initiated, many Federal hydro projects have also gotten underway. Eight additional generating units at The Dalles are being installed and the first unit is scheduled to go on line in December 1972. On November 4, 1971, the first power from the 16th generator at

John Day Dam was transmitted. The dam now produces 2 million kilowatts and makes it currently the largest hydroelectric power project in the United States. The second three generators at Ice Harbor Dam will be available in the spring of 1975. Dworshak Dam has been completed and its reservoir filled for full operational use. Its powerplant, after a delay, is now scheduled for completion in 1973. Libby Dam, also nearing completion, will have four 105,000-kilowatt generating units with the first unit scheduled for service by July 1975. Work on the third powerplant at Grand Coulee Dam is about half completed and the first 600,000-kilowatt unit, the largest ever built, is scheduled to begin commercial operation in February 1975. A total of three such units should be available a year from that date. Several of these projects have suffered delays which have had a detrimental effect upon the load-resource balance in the Northwest. Their revised schedules must be maintained if the deficit situation between now and 1982 is not to be compounded.

Even with the scheduled addition of large amounts of peaking capacity and energy from Federal and non-Federal plants during the next 10 years, the area will experience peak deficits in each of the next 6 years, ranging from a low of 54 megawatts in 1976-77 to a high of 2,112 megawatts in 1974-75. The area will also experience energy deficits in 6 of the next 10 years, but not in the same 6 years. Such deficits will range from 26 average-megawatts in 1974-75 to 370 average-megawatts in 1979-80.

Gross revenues for the Federal Columbia River Power System increased from $155.7 million in fiscal year 1971 to $176 million during fiscal year 1972, an all-time high. However, the increase in revenues, although still leaving BPA in the black, is more than offset by rapidly rising expenses due in large part to the greater cost of energy from thermal plants, inflation factors, and higher interest rates paid by the Federal Government and the private sector. Thus, while gross revenues increased by $20 million, net revenues decreased by $10 million during the past fiscal year.

On a happier note, the W. A. Dittmer BPA System Control Center building is now completed. When fully operational in fiscal year 1974, it will be one of the most advanced power system control centers in the world. Also, the extra-high-voltage d-c intertie line, which went out of service when an earthquake caused major damage to its California terminus in early 1971, was restored to full commercial operation on September 5, 1972. It had been operating partially since March of 1972, by a special hookup developed jointly by BPA, the Los Angeles Department of Water and Power, and ASEA engineers. During the year Bonneville continued to extend its 500-kv grid with the addition of 233 circuit miles. A number

Assistant Secretary Smith speaks to BPA employees.

of 230-kv lines were also added, as were 12 new substations.

An interesting footnote is that in fiscal year 1972 the highest peak flow and the largest April-through-June runoff volume of the century would have occurred had the Corps of Engineers not been able to retard the flow through regulation of upstream reservoirs. In the absence of the dams and the large storage capacity of their reservoirs, the Lower Columbia would have experienced a more disastrous flood than that of 1948.

The Bonneville Power Administration continued its commitment to the preservation of the environmental quality of the Pacific Northwest. We are exploring better ways of constructing transmission lines and substations in order to minimize their environmental impact. Transmission line rights-of-way and access roads are being built and maintained in a manner which least impairs their natural surroundings. In furthering our environmental goals, we work in close cooperation with the Forest Service, the Bureau of Land Management, and Federal, State, and local environmental agencies. Our environmental impact statement is not completed until preliminary drafts have been widely circulated and reviewed in public meetings throughout the Pacific Northwest.

I take my leave of the Bonneville Power Administration confident that its mission will be carried out successfully by the capable and dedicated team of public servants which has developed over three and a half decades. This confidence is considerably enhanced by knowing that I am turning over the reins to Don Hodel, who, during his tenure as Deputy Administrator, has clearly demonstrated his ability to effect a smooth transition and to meet the challenges which lie ahead.

I wish to express my personal thanks and gratitude to you, to Assistant Secretary Smith, and to the members of your staff in the Department of the Interior who have been so understanding of our problems and so helpful in support of our program.

Sincerely,

H. R. Richmond

H. R. Richmond
Administrator

December 31, 1972

Honorable Rogers C. B. Morton
Secretary of the Interior
Washington, D.C. 20240

Dear Mr. Secretary:

Mr. Richmond's letter to you highlights our existing program and the salient events which occurred during fiscal year 1972. Since becoming Administrator on December 1, I have already encountered major power supply problems caused by severe weather conditions. As a result, BPA curtailed service to a record extent during nine days beginning on December 4, 1972. Our actual deficits were nearly double the shortages predicted for the winter of 1972-73, and underlined the seriousness of the power deficits anticipated in upcoming years.

Recognizing that we might be unable to serve our firm load by Thursday, December 7, I issued a public request on December 5 for voluntary curtailment on the part of the general public in the region to augment the BPA curtailment of industrial loads.

Unfortunately, the planning, financing and construction of additional generating facilities to alleviate these crises require leadtimes of five to ten years. It is therefore mandatory that we establish effective procedures for coping with the power shortages which face us during the next few years. We must also devise early solutions to the longer-range shortages we will confront.

Most importantly, the cooperative regional Hydro-Thermal Power Program must be continued. Because of the ever-lengthening leadtime required for construction of larger hydro and thermal powerplants, as well as for transmission increments, we must begin to plan immediately for continuation of that program from fiscal year 1983 through fiscal year 1993. We estimate that the Federal investment for hydroelectric generation and transmission facilities needed during this period will be $2.6 billion. During this same period, the investment for thermal powerplants and associated facilities, all of which must come from the public and private utilities in the area, will approximate $11.7 billion.

Unfortunately, it appears that the net-billing procedure adopted by Bonneville to help finance non-Federal thermal powerplants will no longer be feasible after fiscal year 1982. Acceptable alternatives for underwriting the plants and thereby avoiding an otherwise certain regional power shortage have not yet been identified. It is hoped that a solution will be found and found soon to keep the unique Hydro-Thermal Power Program viable, because the economic life and well-being of the entire region are at stake.

Russ Richmond announces his retirement.

As suggested by the fiscal outlook described in Mr. Richmond's letter to you, it is almost certain that our fiscal year 1973 financial statement will show a deficit.

The law requires that BPA set its rates at a level sufficient to recover the costs to the Federal Government of generating and transmitting electric power. Power revenues must also help to repay Federal irrigation construction costs beyond the water users' ability to repay. Thus the pressures upon our revenues can only be met by substantial increases in wholesale rates. We accordingly advised our preference customers on December 14, 1972 that our preliminary analyses indicate the need for raising firm power rates by 20 to 30 percent. If approved, the new rate structure will be in effect for the five-year period beginning on December 20, 1974, which is the earliest date that new rates can become effective. We expect that rates will be raised for each subsequent five-year period as permitted under our power sales contracts.

Energy conservation is an area that we have explored intensively this year and will continue to explore as long as the energy crisis is with us. Because the per capita consumption of electric energy in the Pacific Northwest has long exceeded that of the rest of the nation, we must take special pains to instill in the residents of the region a positive approach to conserving their use of this precious resource. It is the responsibility both of BPA and of the utilities in the region to make consumers aware of the consequences of wasting electric power. We must also convince the public that an expanding energy base and a clean environment can be compatible. As part of our rate structure review, we are considering proposals for pricing policies which will encourage energy conservation.

I am fully aware that the Bonneville Power Administration is charged with tremendous responsibilities. I consider myself extremely fortunate to have served under the able leadership of Russ Richmond. I assure you that I will devote all my energies to meeting the high standards which he has set.

Sincerely,

Donald Paul Hodel

Donald Paul Hodel
Administrator

500-kv line near Keeler Substation, Oregon.

INTRODUCTION - THE ENERGY CRISIS

Fiscal year 1972 may go down in history as the year in which "energy crisis" became a household phrase.

This was impressively demonstrated by the power emergency which later confronted the Pacific Northwest in December 1972. During the period December 4-13, temperatures dropped to as much as 30 degrees below normal for this time of the year. The effect upon the regional load/resource balance was aggravated by the prolonged duration of the cold spell, the continuing inability of the Centralia coal-fired plant to meet its anticipated output, and by the fact that the Hanford nuclear plant was closed down for scheduled refueling during this period.

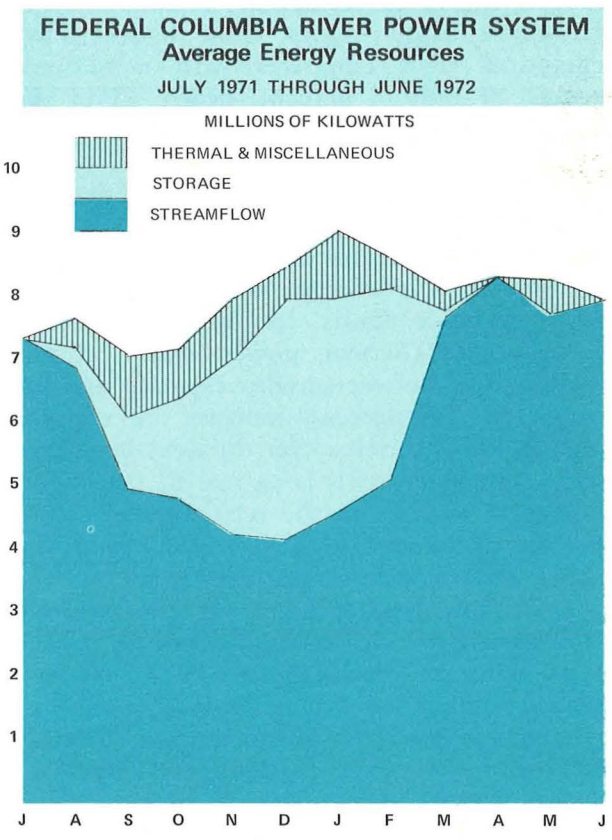
What ensued was a scramble to bridge the threatening load resource gap. BPA initiated curtailments of interruptible energy on December 4, and a record level of curtailment ensued during all but one of the following nine days. In all, the curtailments amounted to 34,000,000 kilowatt hours of interruptible energy. On December 11 alone, there were 15 hours of curtailment totalling 8,600,000 k w h.

During the period December 10-13, BPA also found it necessary to purchase over 11,400,000 kilowatt hours of energy from the Pacific Southwest at a total cost exceeding $100,000.

The prolonged series of interruptible power curtailments had a severe impact upon the industrial customers. Not only did they lose substantial production, but for a time they faced the possibility of having some of their potlines freeze, which would have been extremely disruptive and costly. To avoid this, they purchased some six million k w h of power from Southern California utilities and from B. C. Hydro at a cost of more than 12 mills per k w h.

During the cold spell, the ponds behind the dams declined because of the long, high peak power demands. Lower Columbia ponds fell to minimum levels, even interrupting some navigation. To alleviate this situation, water had to be released from the Arrow Lakes Reservoir to provide hydroelectric generation at Lower Columbia projects. This excessive spillage will have unfortunate consequences for the future, since most of this water was being stored for later firm power use. By the end of the cold period, Federal reservoirs were nearly 400 million k w h below firm operating plan levels for this time of year. Not only will this deficit make it necessary for BPA to purchase additional energy in the future, but regular direct-service deliveries of interruptible power to industrial customers may be delayed nearly two months beyond the anticipated winter curtailment period.

During the critical cold spell, BPA took an unprecedented step which could well be a harbinger for the future. The BPA Administrator issued a public appeal to all consumers to restrict voluntarily their consumption of elec-



Powerlines cross Mt. Hood's slopes.

tricity. The effect of such voluntary cutbacks cannot be ascertained, but hopefully they helped to alleviate further curtailments.

In the Pacific Northwest, 43 percent of the energy required for residential, commercial, and industrial usage comes from hydroelectric generation. This compares with a national average of only 4 percent, nearly all of the remainder being served by fossil fuel sources of energy.

Ninety-four percent of our regional demand for electricity is presently satisfied by hydroelectric power, but this ratio is bound to shrink. The plain fact is that we are fast approaching the feasibility limits for increasing hydro generation. Thermal power must fill the widening gap between hydro capacity and the projected 70 percent increase in regional demand for electricity over the next ten years.

So the energy crisis is as real in the Pacific Northwest as it is in the relatively rich fossil resource areas of the nation. The region can expect electric power shortages over the next six years. BPA load and resource forecasts indicate resource deficits for total peak load in each of the next six years (through 1977-78) and a resource deficit for firm peak load (excluding interruptible loads) in the winter of 1974-75. *The region has only a 10-percent chance of meeting firm peaks during that winter.*

Both load and resource forecasts for this region are extremely sensitive to weather conditions. Hydroelectric generation forecasts are based upon the lowest flows we can reasonably expect in the Columbia River system. These occur on an average of once every 20 or more years. Load forecasts are based upon relatively cold wintertime temperature conditions. A one-degree drop below this winter base level increases the region's peak power load by about 100,000 kilowatts. A five-degree drop requires the additional output of one Bonneville Dam.

The region will avoid the predicted deficits over the next six years only if most of the following things happen:

- Water and weather conditions are favorable.
- New sources of power are found outside the region which can be imported.
- Loads do not grow as rapidly as predicted.
- Adequate generation can be quickly added (that is, combustion turbines).

Because the region depends upon the Federal Columbia River Power System for a substantial portion of its total power supply, it is imperative that all scheduled Federal generation and transmission be funded and constructed in a timely manner. But even if new generation, both Federal hydro and non-Federal thermal, is installed as scheduled, the region will still experience power deficits in the next few years unless most of the aforementioned favorable conditions are also met.

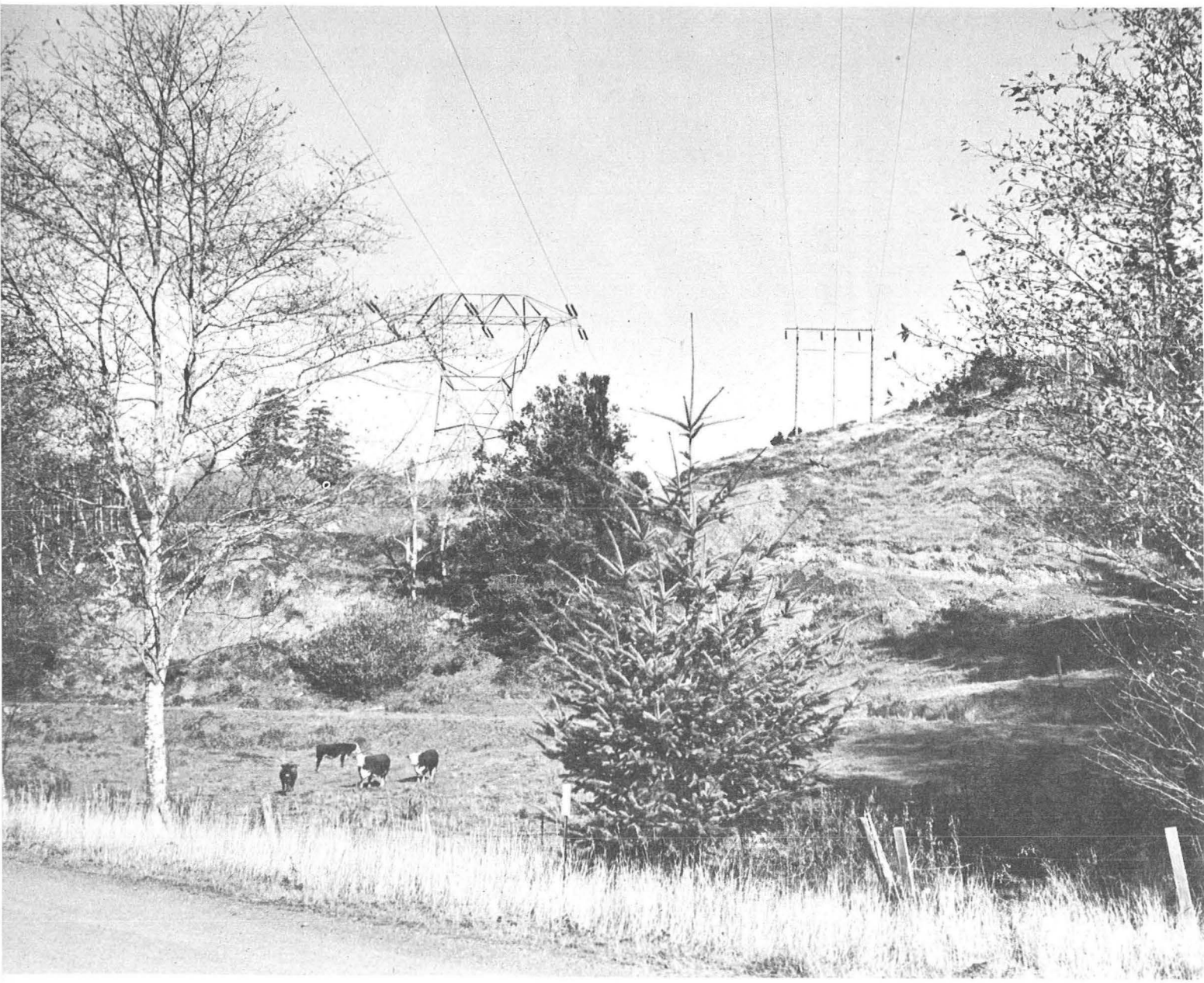
Assistant Secretary Smith gets briefing.

BPA has obtained some imported power for the winter of 1973-74, but it does not appear that additional amounts of surplus peak capacity can be imported on a firm basis during the entire six-year shortage period. BPA's partners in the Hydro-Thermal Power Program (which is discussed in a later chapter) are developing new short-leadtime sources of power. Schedules for major thermal plants have already been advanced as far as practicable through 1977. An additional 4,650,000 kilowatts of new thermal generation is scheduled to become available from 1978 through 1981. This means that BPA will be able to meet its preference customer requirements until July 1984, if current load estimates prove to be accurate.

Delays in both non-Federal and Federal generation have contributed to the deficit situation facing the region. Nearly 50 hydrogenerators have fallen behind the original installation schedules of the Hydro-Thermal Power Program and only five have been advanced. Continued postponements will increase resource deficits and increase the very real possibility of firm load curtailments. The crux of the Hydro-Thermal Program is that 108 utilities and the Federal Government have in essence agreed to plan and construct the region's power facilities as if they were under a single ownership. The alternative would be to return to individual utility planning with a resultant loss of the economy-of-size advantages inherent in the program. This would ultimately lead to even higher consumer power bills and less efficient use of national resources.

A major challenge facing BPA and the region's utilities is to implement the Hydro-Thermal Program and at the same time protect our natural environment. Some environmental crusaders want to halt all economic and technological progress and to stop the building of power facilities. Without additional energy to meet future demand, per capita consumption would inevitably shrink as our population expands. We would have to give up progressively more per capita industrial capability and energy conveniences. A significant growth in loads cannot be deterred without seriously compromising the future well-being of consumers and jobholders alike. Environmentalists must participate responsibly in the planning process. The National Environmental Policy Act puts them into the game. The voice given them by NEPA also gives them some responsibility for dealing with future growth in the region.

The following chapters of this report detail what has been accomplished since July 1, 1971, to help solve the region's energy problems and what must be accomplished to keep the region both economically and environmentally livable.



New Bandon-Gold Beach line at left.

THE OPERATING YEAR

Streamflows throughout the Federal Columbia River Power System receded rapidly in August 1971 from the high levels experienced during the runoff period. Thereafter, interruptible power, secondary energy, and sales of surplus energy to the Southwest were periodically curtailed to meet high load conditions and/or low waterflows. Such curtailments were imposed intermittently during the period mid-August 1971 through mid-February 1972 as follows:

Curtailment Period	*Type of Curtailment*
August 24 – September 19, 1971	All Non-firm Energy
August 24, 1971 – February 16, 1972	Surplus Energy to the Southwest
October 18 – 31, 1971	All Non-firm Energy
November 1 – 24, 1971	All Non-firm Energy except that to Public Agencies
December 28, 1971– January 12, 1972	All Non-firm Energy except that to Public Agencies

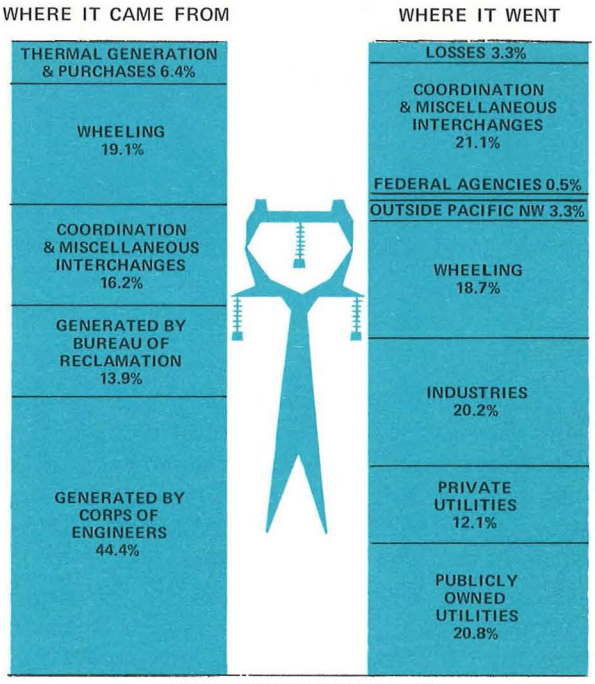
The only actual cut-off of power to industrial customers, and the only such cut-off since January 1969, occurred on the evening of December 28, 1971. The physical curtailment of power deliveries was neccessary during only the evening peak-load hours. Because of the short duration of this interruption, industrial operations were not seriously affected.

Interruptible load requirements were reduced in September 1971 for the remainder of the operating year because the aluminum industry was operating substantially below rated capacity.

Test operation of the first 700,000-kilowatt unit at the Centralia steamplant began August 13, 1971, with energy generated during test periods being delivered to BPA. Commercial operation was scheduled to begin September 1, 1971, but difficulty with the stack emission precipitators resulted in delays and reduced output from the plant. Average generation during the September-December period was only 155,000 kilowatts. The first unit was declared in commercial operation for a rating of 300,000 kilowatts on January 1, 1972. Principally because of continuing difficulty with the precipitators, average generation for the remainder of the year was about 260,000 kilowatts.

SOURCE AND DISPOSITION OF TOTAL ENERGY HANDLED BY BPA

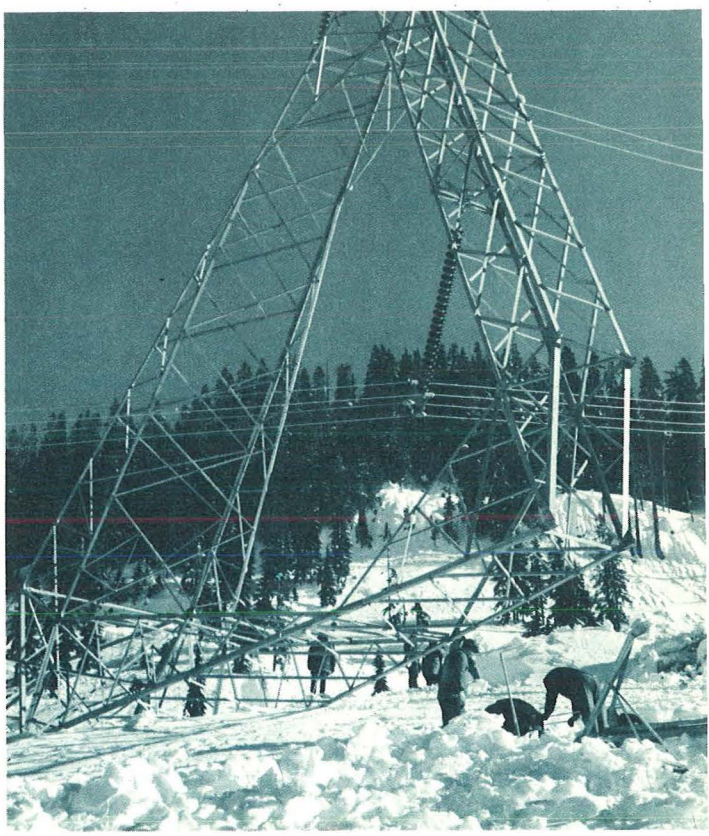
FISCAL YEAR 1972



TOTAL: 112.1 BILLION KWH

Streamflows of the Columbia River rose substantially during late January 1972 as a result of a warm Pacific storm throughout the basin. Some streams west of the Cascades experienced record-breaking floods. Power loads increased rapidly on the 21st because of the cold snowy weather that followed the wet storm, and at the same time, the capability of the Federal system

B.C. Hydro loses Peace River power.



Slide takes out B.C. Hydro line.

was reduced by more than two million kilowatts because of the flood control operation. Fortunately, with the Hanford thermal plant operating at full output over the high load period, the Federal system was able to meet all requirements with available generation.

What was a very wet storm in the United States proved to be a very icy storm in British Columbia. Shortly after 4 p.m. on January 20, the British Columbia Hydro and Power Authority lost its Peace River generation. The B. C. Hydro system immediately drew more than a million kilowatts from the BPA system, which caused a temporary frequency drop in the Pacific Northwest. Power was actually drawn over the interconnected systems from the Pacific Southwest (420,000 kilowatts), from Idaho and Montana (55,000 kilowatts), and from BPA and other Pacific Northwest utilities (550,000 kilowatts). B. C. Hydro requested that another 300,000 kilowatts of emergency power be scheduled. This was granted, but 20 minutes later another frequency excursion occurred and again power was drawn from the United States.

Subsequent reports showed that both of B. C. Hydro's 500,000-volt lines between Vancouver and Kelly Lake had gone down because of heavy icing. In addition, a 360-kv line and two 230-kv lines between Vancouver and the Bridge River generating plant, which has 550,000 kilowatts of generation, went out of service because of coincidental relay trouble. B. C. Hydro appealed to its commercial and residential customers to curtail power uses and to its industrial customers to shut down as much as possible. The shortage lasted for more than a week before lines were restored.

By mid-February, projections indicated sufficient storage energy to meet all Northwest needs for the remainder of the power year, and so BPA declared surplus energy available for sale to the Pacific Southwest. The Federal Power System remained on a surplus energy status from February 17 through August 21, 1972, and again from August 24 to 29. Because of above-median streamflows in August and September, the Federal system was able to meet all Northwest secondary energy demands through September 1972.

The spring flood control operation had little adverse effect on power operations and the refill operation was successful from a power point of view except at Hungry Horse. The delay of the Hungry Horse refill until August 24, 1972, caused some loss in surplus energy sales to the Pacific Southwest. The delayed refill was caused mainly by a volume inflow forecast that was over 300,000 acre-feet too high. The Water Management Group (a Federal-State interagency management entity) has agreed to re-

evaluate the seasonal runoff forecasting procedure and the refill strategy for Hungry Horse to reduce the possibility of the reservoir not refilling.

Power System Operations

The Federal system established a new 60-minute peak generation record of 11,513,000 kilowatts on December 13, 1972. A new 24-hour generation record of 248,681,000 kilowatt-hours had previously been set on January 27, 1972.

The year was highlighted by the return to service of the direct-current intertie to California which had been out of service since the earthquake severely damaged the d-c terminal at Sylmar, California, on February 9, 1971. Partial restoration of the Sylmar terminal in March 1972 permitted transmission of up to 360,000 kilowatts. In April, a third valve group was added, resulting in a total line carrying capability of 680,000 kilowatts. This was particularly timely because substantial surplus energy was then available in the Pacific Northwest and there was a high demand for energy by the Pacific Southwest. In fact, the intertie lines to California were loaded at 84 percent of available capacity for the fiscal year and nearly 100 percent during the last four months of the fiscal year. The direct-current intertie was restored to full operation on September 5, 1972.

On August 4, 1972, the interconnected power system of the West suffered a power loss of approximately 3.2 million kilowatts – three times that which triggered the East Coast blackout of November 1965 – but relatively few consumers were affected, thanks to the reliability of the system. This near-catastrophe occurred during the process of de-energizing approximately one mile of 230-kv transmission line with a motor-operated disconnect switch at the Celilo Converter Station. This switching operation had been performed successfully several times previously, but this time a protective rod gap flashed over at the Big Eddy Substation. Clearing this fault dropped the Celilo Converter Station, which was transmitting 1,035,000 kilowatts to Los Angeles Department of Water and Power. Loss of the d-c delivery initiated insertion of the series capacitors at Bakeoven and Fort Rock on the 500-kv a-c intertie lines to California. However, the swing initiated by the loss of the d-c line caused an operation of the relays at Malin Substation. This relay action interrupted both the 500-kv a-c Grizzly-Malin and Malin-Round Mountain intertie lines. The actual a-c flow south of Malin was 2,200,000 kilowatts. The loss of the a-c lines activated generator dropping in the Northwest and brought the Four Corners "islanding scheme" into play.

These actions separated the Western Systems Coordinating Council region into three areas: the Northwest – consisting of British Columbia, Washington, Oregon, Idaho, and western Montana; the Southwest – consisting of California, Nevada, Arizona, New Mexico, and a small portion of Texas; and the Eastern Area – consisting of Utah, Colorado, Wyoming, and eastern Montana.

In the Northwest Area, the frequency rose on the initial swing; in the Southwest Area, the frequency dropped; and in the Eastern Area, the frequency rose. These frequency excursions caused some loss of load throughout all of the Western States but power was generally restored in about 10 minutes and no area-wide power blackouts occurred.

The Western Systems Coordinating Council has made an intensive study of the above crisis. Based upon study recommendations, procedures will be strengthened and equipment will be modified to reinforce the reliability of the interconnected systems.

We have continued to experience serious loading and voltage difficulties in northern Idaho because of inadequate transmission into the area. Several improvements were made in fiscal year 1972 to support the area and to compensate for the delay in Libby Dam generation. Shunt capacitors were installed at Albeni

Recreation behind McNary Dam.

Falls, and an arrangement was made to hold the level of Pend Oreille Lake to two feet above normal to increase the generating capacity at Albeni Falls. Pacific Power & Light Company has also installed a 27,000 kilowatt gas-turbine generator at Libby to support the northern extremity of the area. The long-term correction of the problem will include service from a new substation near Newport, Washington.

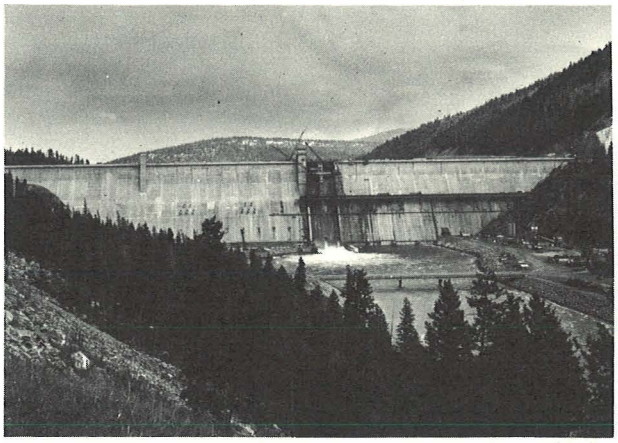
STORAGE DAMS PROVE THEIR WORTH

Of the three Columbia River Treaty storage projects, only Mica Dam remains to be completed. It is on schedule and will be ready for operation by April 1, 1973. Mica is also the only Canadian project which will include generation. Two units of 430,000 kilowatts each are scheduled for installation in 1976 and two additional units for 1977. In addition, with the completion of the Corps' Libby Dam, four 105,000-kilowatt generators are now scheduled for installation during fiscal year 1976.

More significant were the flood control benefits achieved during 1972 as a result of the reservoir capacity at Arrow Lakes and Duncan in Canada and the Libby reservoir in the United States.

Without regulation of upstream reservoirs, the 1972 high water season would have produced both the highest peak flow and the largest April-through-June runoff volume of the century as measured at The Dalles, Oregon. The computed unregulated peak discharge at The Dalles was 1,050,000 cubic feet per second (cfs) on June 12. The actual observed peak discharge was 618,000 cfs on June 20. By comparison, during the disastrous 1948 flood in the Pacific Northwest, observed peak discharge was 1,010,000 cfs. At Vancouver, Washington, the key gaging station for evaluating flooding on the lower Columbia River, the 1972 maximum stage was 21.5 feet instead of a computed unregulated stage of 31.5 feet. Major flood stage at Vancouver is 26 feet. Again, unregulated discharges at Bonners Ferry, Idaho, would have caused stages near 38 feet, a major flood. The operation of Libby reservoir held the observed maximum to 24 feet.

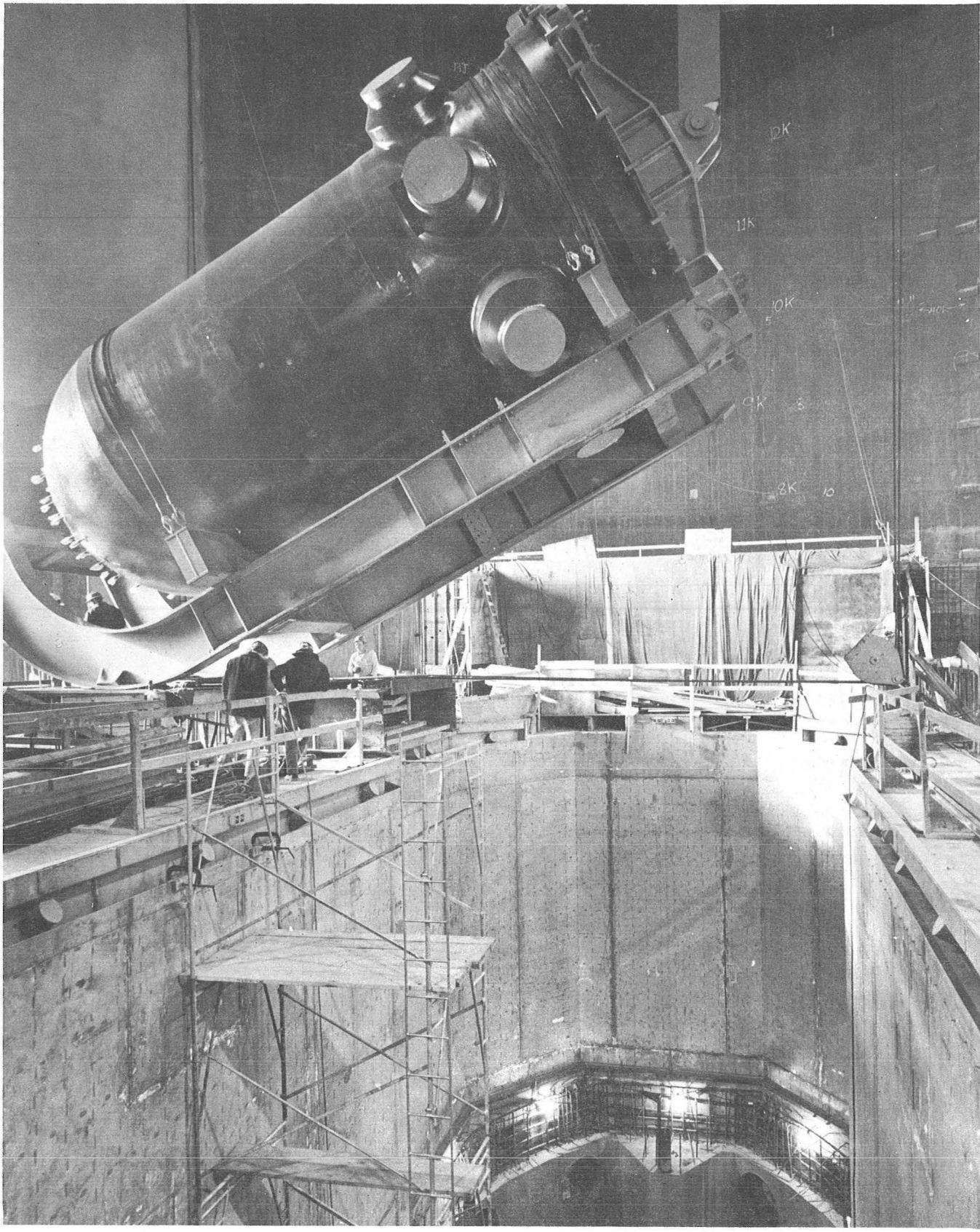
It is estimated that Libby, Duncan, and Arrow projects contributed about 31 percent of the total effective storage for flood control regulation of the lower Columbia River during the peak runoff month of June 1972. Approximately $213 million of potential flood damage along the lower Columbia River was avoided, thanks to the flood control capabilities of these three projects.



Libby Dam nears completion.

Mica – Canada's highest earthwork dam.

Vanport 1948 – It might have happened again.



Trojan reactor vessel being placed.

POWER FOR THE FUTURE

The Hydro-Thermal Power Program

Since publication of the last Annual Report, sponsors have been found for all of the large thermal plants scheduled under the Hydro-Thermal Power Program to come into commercial operation through fiscal year 1982.

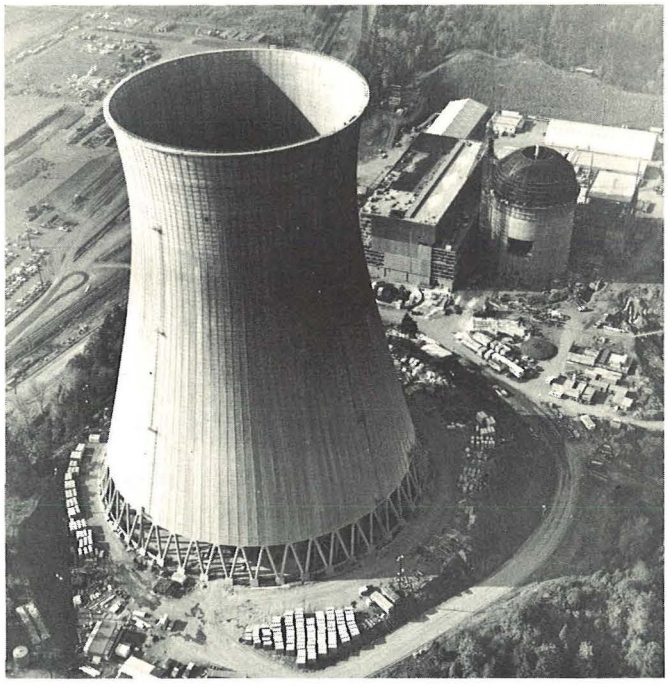
The first of these, the Centralia coal-fired steam plant, went into test operation with one 700,000 kilowatt unit in August 1971. The second unit came on line for testing in August 1972.

The Jim Bridger coal-fired plant located near Rock Springs, Wyoming, will include three 500,000-kilowatt units. Construction is on schedule. Water supply intake structural construction is underway and is to be completed in 1973.

PACIFIC NORTHWEST GENERATING CAPACITY
WEST GROUP AREA

	Millions of kw
Generating Capacity (Nameplate) In Service And Under Construction At June 30, 1968 – Immediately Prior To Initiation Of The Hydro-Thermal Power Program:	
Federal Hydro	15.4
Non-Federal Hydro	9.4
Thermal	2.7
Total	27.5
Generating Capacity (Nameplate) In Service, Under Construction And Committed For Construction Pursuant To The Hydro-Thermal Power Program Announced In October Of 1968 – (As Of October, 1972):	
Federal Hydro:	
Placed In Service[1]	3.1
Under Construction	6.2
Scheduled Through F.Y. 1982	2.8
Sub-total	12.1
Non-Federal Hydro:	
Placed In Service[1]	1.0
Under Construction	0.0
Scheduled Through F.Y. 1982	0.0
Sub-total	1.0
Thermal:	
Placed In Service[1]	1.4
Under Construction	4.1
Scheduled Through F.Y. 1982	4.6
Sub-total	10.1
Grand Total	23.2

[1] Amount placed in service after June 30, 1968



Trojan nuclear plant.

The Trojan nuclear plant, located on the Columbia River near Rainier, Oregon, was about 50 percent completed as of September 1, 1972. It will consist of one unit with a nameplate rating of 1,130 megawatts.

The Washington Public Power Supply System's Nuclear Project No. 2, located on the Hanford Reservation near Richland, Washington, will have a capacity of approximately 1,100 megawatts and is scheduled for commercial operation in September 1977. It was originally scheduled to come on line in March 1978, but this schedule was advanced to close the gap left by the loss of the proposed Eugene Water and Electric Board nuclear plant which was delayed four years by Eugene voters in the spring of 1970.

Dual-purpose operation of the Hanford NPR generator has been extended for an additional year to July 1, 1975, because of the critical power situation during the 1974-75 operating year. After a five-year construction shut-down, the converted plant – WPPSS Nuclear Project No. 1 – is scheduled to become operative in

INVESTMENT BY FEDERAL AND NON-FEDERAL UTILITIES IN GENERATION AND TRANSMISSION FACILITIES AS PART OF THE INITIAL PHASE OF THE PACIFIC NORTHWEST HYDRO-THERMAL POWER PROGRAM THROUGH F.Y. 1982

	Millions of $
Investment in Service and Under Construction As Of Initiation of Program:	
Federal—As of June 30, 1968:	
Hydro	1,962
Transmission	921
Total Federal	2,883
Non-Federal—As of December 31, 1968:	
Hydro	1,750
Thermal	174
Transmission	513
Distribution	1,500
Total Non-Federal	3,937
Total Federal and Non-Federal	6,820
Investment in Service, Under Construction and Scheduled through F.Y. 1982:	
Federal—As of June 30, 1972:	
Hydro—In Service	1,900
—Under Construction	870
—Scheduled through F.Y. 1982	1,100
Total Federal Hydro	3,870
Transmission—In Service	1,145
—Under Construction	169
—Scheduled through F.Y. 1982	1,321
Total Federal Transmission	2,635
Total Federal	6,505
Non-Federal—As of December 31, 1971:	
Hydro—In Service	1,922
—Under Construction	1
—Scheduled through F.Y. 1982	40
Total Non-Federal Hydro	1,963
Thermal—In Service	178
—Under Construction	808
—Scheduled through F.Y. 1982	2,913
Total Non-Federal Thermal	3,899
Transmission and Distribution—Placed in Service	2,439
—Under Construction	401
—Scheduled through F.Y. 1982	2,811
Total Non-Federal Transmission and Distribution	5,651
Total Non-Federal	11,513
Total Investment	18,018

1980. Current plans are to replace the present reactor with a modern nuclear steam supply system and to add a topping turbine which will increase the capacity of the plant from 800 megawatts to 1,200 megawatts.

Also scheduled for completion in 1980 is the nuclear plant to be built by Portland General Electric Company. A site near Boardman, Oregon, and two other locations are presently being considered for this 1,200-megawatt facility.

Siting studies are currently underway for the WPPSS Nuclear Project No. 3, which will have a 1,200-megawatt capacity when it comes on line in 1981.

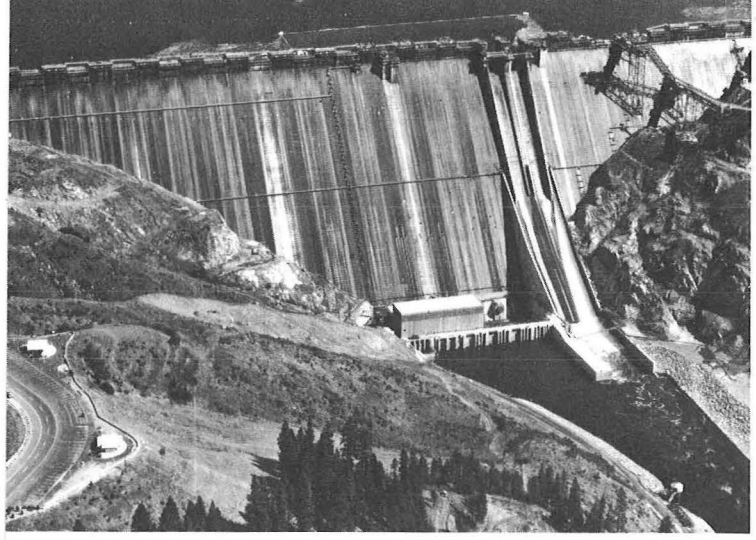
With the sponsorship of the above seven thermal plants now resolved, the next major challenge is to assure that they are completed on schedule. The ever-lengthening lead time for siting and developing new thermal plants, particularly nuclear facilities, has already caused severe delays throughout the nation. This makes it doubly imperative that construction of future thermal plants be given high priority if the energy needs of the Northwest in the 1980's are to be met.

Table 5 summarizes the current status and projected timetables — through 1982 — for the thermal plants now under construction or in the planning stage. They include those scheduled under the Hydro-Thermal Power Program and supplemental generating facilities.

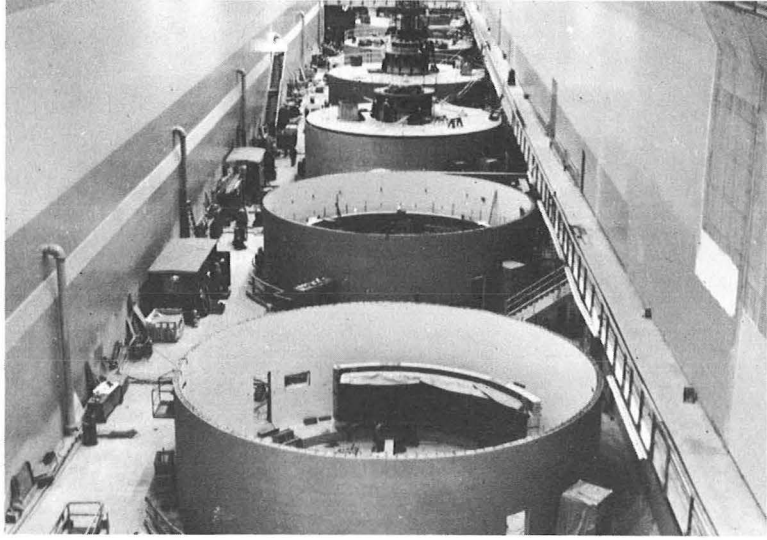
Adhering to the critical timetables for those facilities scheduled through 1982 poses grave problems due to factors already described. The construction of additional thermal plants to serve public agency loads beyond that date faces yet another major problem.

The BPA net billing procedure cannot continue to be used for acquiring power from plants to be constructed after 1982 because, from a planning viewpoint, the total annual costs of all the plants would exceed the amount which can be offset against BPA billings to public agencies.

This jeopardizes the ability to finance thermal energy needed by BPA for blending with Federal hydroelectric power — the very keystone of the Hydro-Thermal Power Program. If this program and its attendant advantages of cooperative regional planning and construction



Dworshak Dam tops out.



Generators under construction at The Dalles Dam.

of generation and transmission facilities are to be preserved, this financing problem must be resolved. The Northwest utilities are now exploring various solutions to this problem.

Bonneville Dam Modifications

Work is underway on several aspects of Bonneville Dam's function in handling the peaking discharges from upstream plants. This entails a sequence of functions at Bonneville which are:

- Re-regulation of the added generating capability at The Dalles with present Bonneville normal pool elevation at 74.0 feet, with increased normal pool elevation of 76.5 feet,
- Bonneville Second Powerplant completed and in operation.

The starting date of each function depends upon progress in solving the problems which have been encountered. The major controlling factors are (1) availability of eight units now being added at The Dalles, (2) construction for raising the Bonneville pool, (3) provision of right-of-way for the higher pool, and (4) development and approval of new operating criteria. The operating criteria will be influenced strongly by the need for coordinating with non-power river uses – sport, commercial and Indian fishing, navigation, irrigation, flood control and recreation.

The Dalles Dam Additional Units

Construction of the eight additional generating units at The Dalles has continued so that the first went on line in December 1972. The last one is now scheduled for August 1973, as compared to the previous date of May 1974. This provides some relief from power peaking shortages, but full use of the units is inhibited by the operating limitations at Bonneville.

John Day Dam

Power from the 16th generator at John Day Dam was initiated onto the BPA system lines November 4, 1971.

John Day is one of the largest hydroelectric power projects in the world and, until Grand Coulee's first 600,000-kilowatt unit comes on line, it will be the largest such producer outside the Soviet Union. With all 16 of the initial turbine-generator units operating, it can produce more than two million kilowatts. There is space in the powerhouse for four more generating units. When they are constructed, the project will provide 3.1 million kilowatts.

Ice Harbor Dam Additional Units

The second three generators at Ice Harbor Dam will raise the project capacity to 603,000 kilowatts. They are scheduled to be available in early 1975.

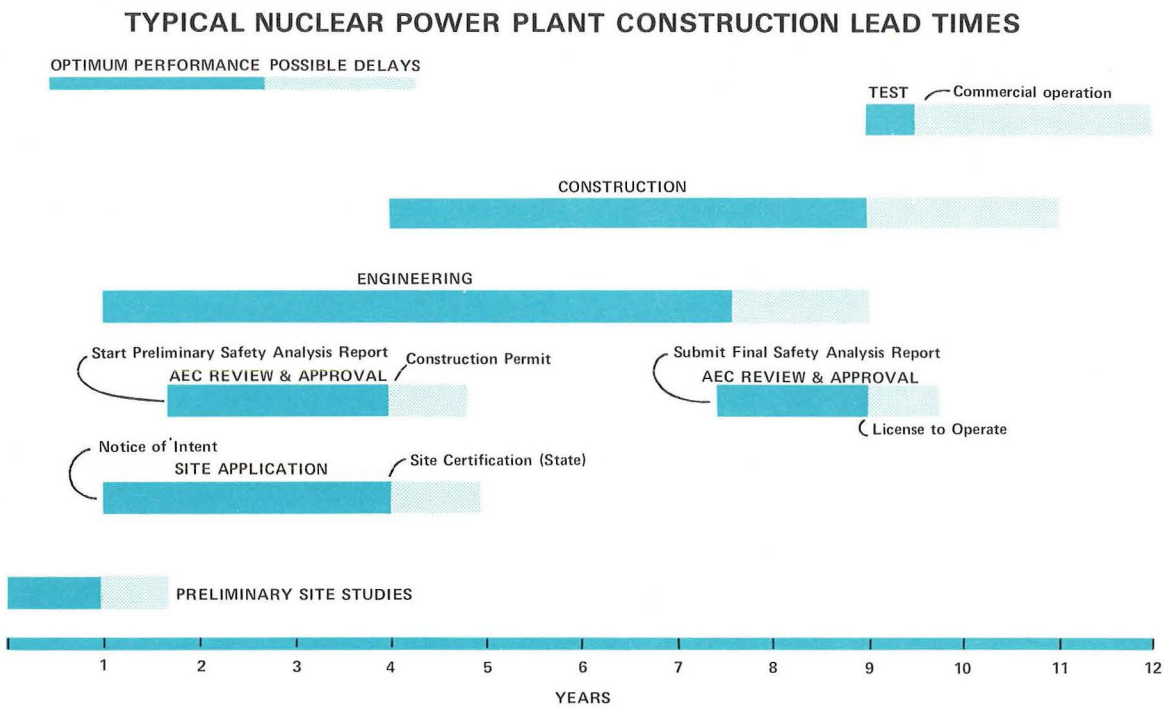
Lower Granite Dam

The Lower Granite Project, which will complete the navigation stairway from the Pacific to Lewiston, Idaho, will have three generators with 405,000 kilowatts of capacity by 1975. This installation will ultimately be doubled by installation of three additional units.

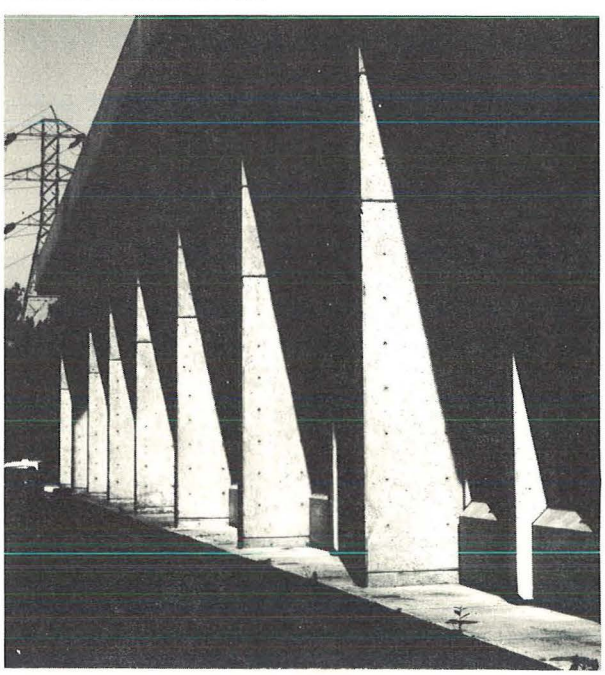
Dworshak Dam

Dworshak Dam was completed and the reservoir filled for the first time in the 1972-73 storage release year. The reservoir provides nearly two million acre-feet of storage for flood control and power generation.

The powerplant at Dworshak was begun in April 1970 and is now scheduled for comple-



Dittmer Control Center.



tion in the spring of 1973. This is a delay from the initial generation scheduled for November 1972. Because of this delay, the peak deficit in 1972-73 is increased by the capacity of the first unit.

Libby Dam

Construction of Libby Dam is nearly completed. The reservoir filled to elevation 2,405 feet this year. It is currently being drafted to an elevation of 2,230 feet to permit construction of a rockfill buttress on the left bank upstream from the dam. The buttress will insure against landslides which might occur because of reservoir fluctuations. The buttress will be built to a height sufficient to permit storage to full pool elevation of 2,459 feet. Thereafter, draft to 2,287 feet will provide live storage of 4.9 million acre-feet.

Powerhouse construction is underway to provide four 105,000-kilowatt generating units, the

Third Powerhouse at Grand Coulee Dam.

first to be in service by July 1975. Four additional units can be installed later but will necessitate construction of an authorized re-regulating reservoir.

Grand Coulee Dam Third Powerplant

Work on the Third Powerplant at Grand Coulee Dam is about half completed. The first unit of 600,000 kilowatts capacity, an unprecedented size, should begin commercial operation in February 1975. Two more such units will be on line by February 1976. These dates are a full year behind those originally scheduled. The second group of three units is tentatively scheduled to follow the first three with only a six-month interval between the completion of the first bank and start of installation of the second. This should shorten the total installation schedule by nearly two years from that originally planned.

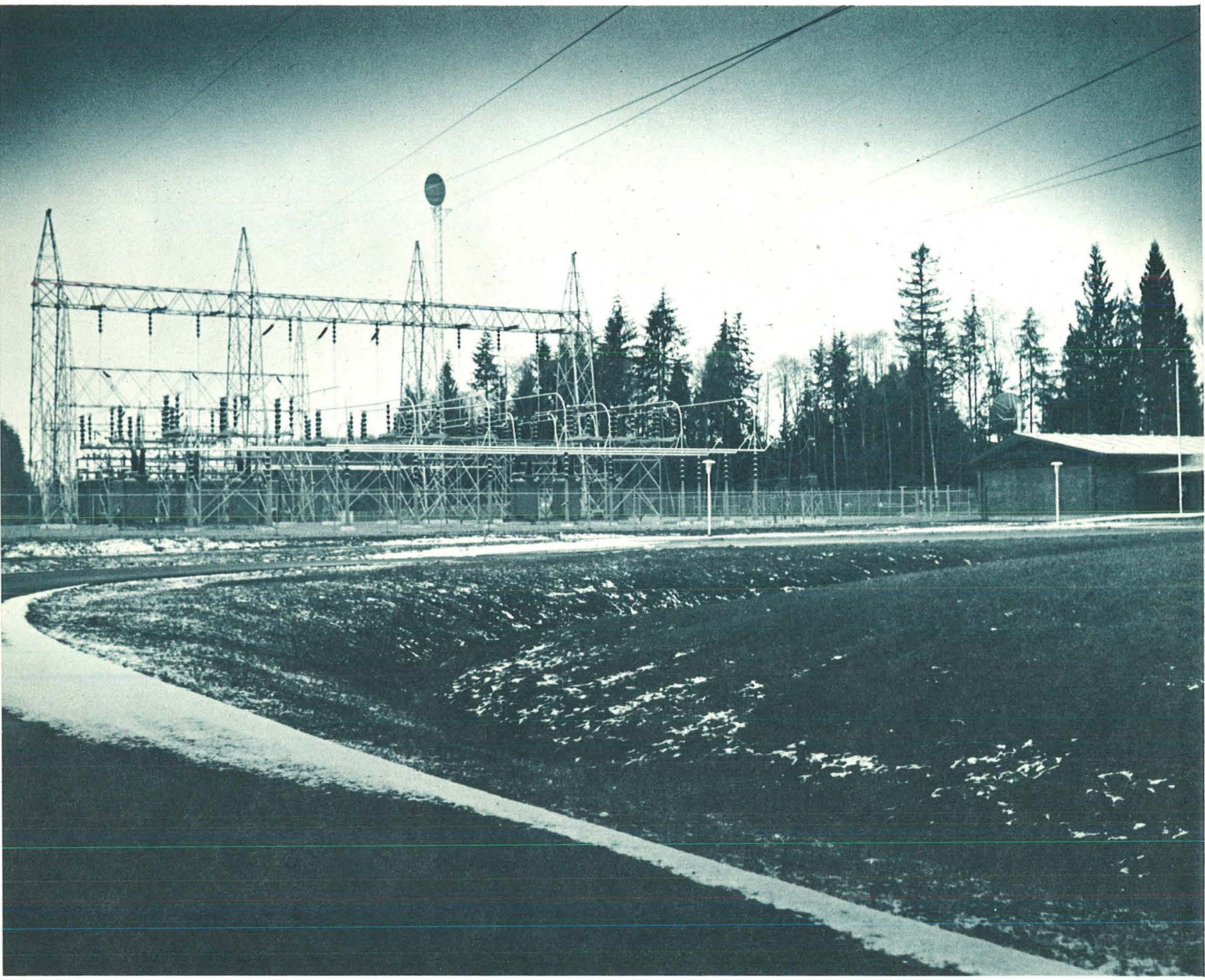
Completion of forebay and penstock has been delayed to the point that removal of cofferdam and bridge plus channel inlet excavation will not be possible in 1973 as previously scheduled. Deep drawdown of the Coulee reservoir will therefore be postponed from 1973 to 1974.

The seventh and eighth irrigation pumps being constructed at Grand Coulee are of a pump-turbine design. These units, each with a generating capacity of 50,000 kilowatts and scheduled by June 1973, will provide power capability during daily peak periods in addition to irrigation pumping.

Non-Federal Hydro Projects

Four units with 119,000 kilowatts of new peaking capacity from each unit were completed at the Rocky Reach plant during the year. The last unit came into commercial operation in December 1971. This increased the peaking capacity of that plant from 815,000 kilowatts to 1,291,000 kilowatts.

There were no non-Federal hydroelectric projects under construction in 1972. Additional generator installation at Rock Island project has been under study and may soon be initiated. Construction of large pumped storage plants has been under investigation at several sites. Delay or elimination of Federal peaking units collectively would improve the feasibility of pumped storage to an earlier date.



Murray Substation near Arlington, Wash.

BUILDING THE TRANSMISSION SYSTEM

Although BPA has assumed a leadership role in the Hydro-Thermal Program, its principal mission remains the construction and operation of a major transmission grid for marketing power. BPA continues to build to meet the demands of the region.

Transmission Construction

Fiscal year 1972 saw the extension of the 500-kv grid by 233 circuit-miles. This included 33 miles of transmission line from Grand Coulee to Chief Joseph and 122 miles from Chief Joseph to Monroe. The latter transmission line replaces two 230-kv circuits and carries four times as much power on the same right-of-way. The higher capacity lines are necessary to carry power generated at the Grand Coulee and Chief Joseph Dams to the Puget Sound area in western Washington.

Other 500-kv lines added were the 45-mile Chief Joseph-Sickler line, the Paul-Olympia No. 1 line which runs 20 miles from the new Paul Substation at the Centralia steam plant to Olympia, Washington, and the 13-mile Sno-King Tap to the Monroe-Sammamish No. 1 line.

A number of 230-kv lines were also added. The 107-mile Olympia-Port Angeles line is the major addition. The total system mileage on July 1, 1972, stood at 11,766 circuit-miles, a net increase of 284 miles over last year. By the end of fiscal year 1973, the system will have more than 12,000 circuit-miles of high-voltage transmission.

Efforts to update existing lines wherever possible is reflected in the fact that 86 circuit-miles of lower voltage lines were retired from service during this fiscal year. The 135-mile-230-kv North Bonneville-Midway No. 1 line has been deenergized to permit the right-of-way to be used for the 500-kv Hanford-Ostrander line.

New BPA substations completed during fiscal year 1972 were Murray, Boardman, Colville and Mesa.

The 500-kv Dworshak-Hot Springs line, tying the Dworshak Dam and Lower Snake generation to Montana, was completed in mid-November 1972.

Other projects underway, but not yet completed, are the Lower Snake 500-kv lines and terminals; the Hanford-Ostrander 500-kv line; the Paul-Allston No. 2 line and terminals; the Ostrander-Troutdale 500-kv line with a 500-kv transformer bank at Troutdale; the Toledo-Wendson 230-kv line with terminals and transformer banks at both ends.

Helicopter places concrete on Lewiston Grade.

Sky-crane picks up tower bridge.

W. A. Dittmer BPA System Control Center.

Special techniques were used to build 12.5 miles of the Lower Granite-Hatwai 500-kv line across the face of the scenic Lewiston Grade in Idaho. Tools and materials for tower footings were hauled in by horseback and the rest of the construction work from concrete placing to conductor stringing was done with helicopters to avoid scarring the hillside with access oads. These techniques added about one-third to the cost of construction for the line.

A major system addition was the laying of a third San Juan cable. This 35,000-volt cable was laid in two sections between Lopez and Decatur Islands and Decatur and Fidalgo Islands in August 1972 and energized in November. The first San Juan cable (previously damaged and since out-of-service) was declared surplus during the year and salvaged by the Orcas Power and Light Company, which was able to use sections of it between other Islands in the system. A second cable operating at 25,000-volts remains in service.

Control and Dispatch

The Control and Dispatch System is nearing completion. The W. A. Dittmer BPA System Control Center building at Vancouver, Washington, was completed in December 1971, and a $5 million computer system, termed a "Real Time Operations Dispatch and Scheduling (RODS) System," has been installed in the center and is undergoing acceptance tests.

Other key subsystems already installed at Dittmer include an 800-kw Gas Turbine Emergency Generator System, a solid-state Uninterruptible Power Supply (UPS) System, and five microwave system terminals relocated from Portland. To date, 34 Supervisory Control and Data Acquisition Terminals have been installed at certain substations, and 16 other systems presently are being installed or are scheduled for installation.

When fully operational in fiscal year 1974, this control center will be one of the most advanced power system control centers in the world.

Design work got underway in fiscal year 1972 for the Eastern Control Center at Moses Lake, Washington. This facility, which will be energized in early 1976, will provide control and dispatch for the subtransmission system east of the Cascade Mountains. It will also provide emergency backup control for the main grid in the event that Dittmer control center is rendered inoperative by natural or other disasters.

Intertie

The high-voltage direct-current Intertie was restored to full commercial operation on September 5, 1972. Partial operation had been in effect since March 1972. A special circuit arrangement known as monopolar metallic return, developed jointly by BPA, the Los Angeles Department of Water and Power, and ASEA engineers, was a major factor in this early restoration.

Related to the BPA pioneering effort in high-voltage direct-current transmission is a contract with a noted consultant for earthquake studies. This includes provision for the establishment of criteria for corrective measures to protect BPA facilities at susceptible locations from future earthquake damage. Specification criteria for the procurement of new equipment with seismic resistance and a program for installation of strong-motion accelerograph stations are included.

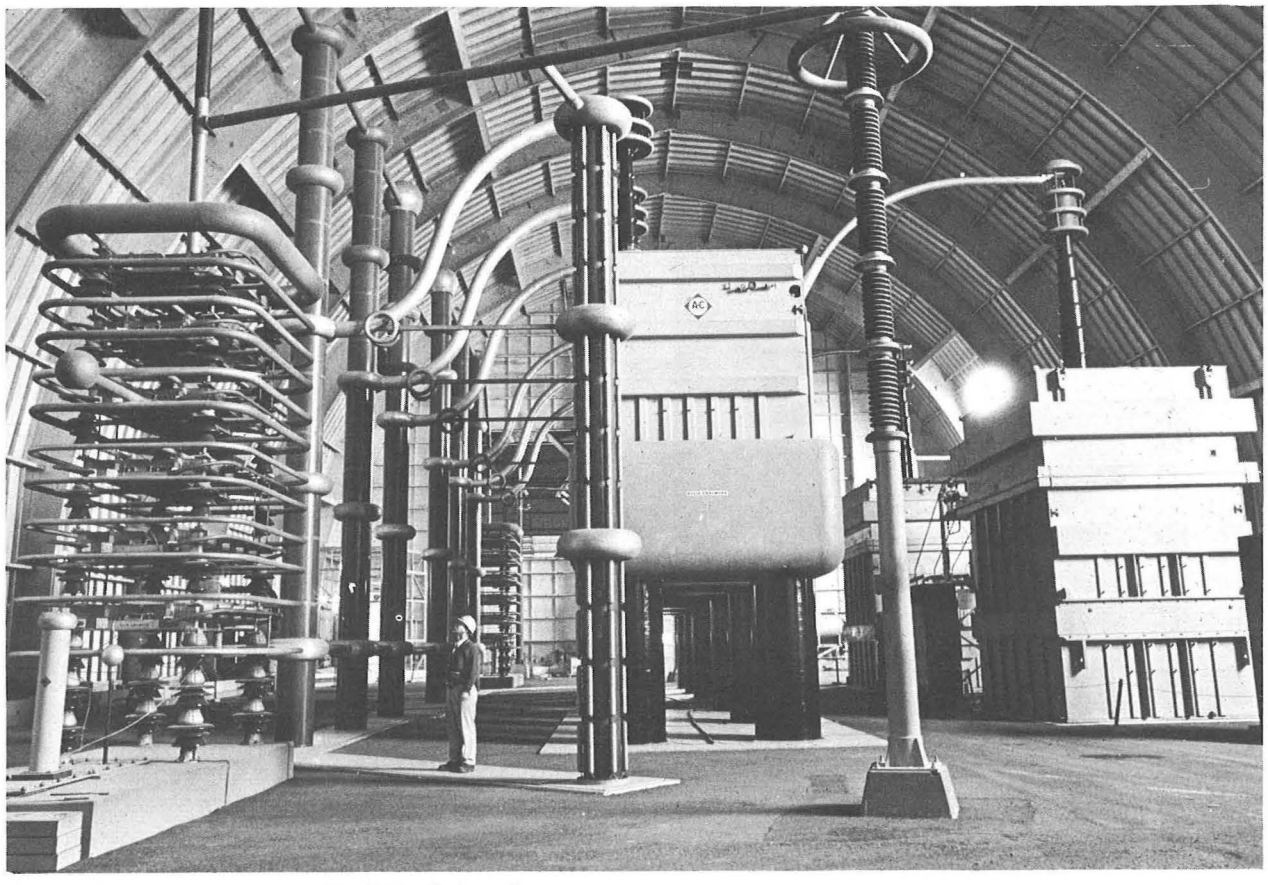
Realtime Operation, Dispatch and Scheduling Computer—Dittmer.

Console of RODS Computer—Dittmer.

Research for the Future

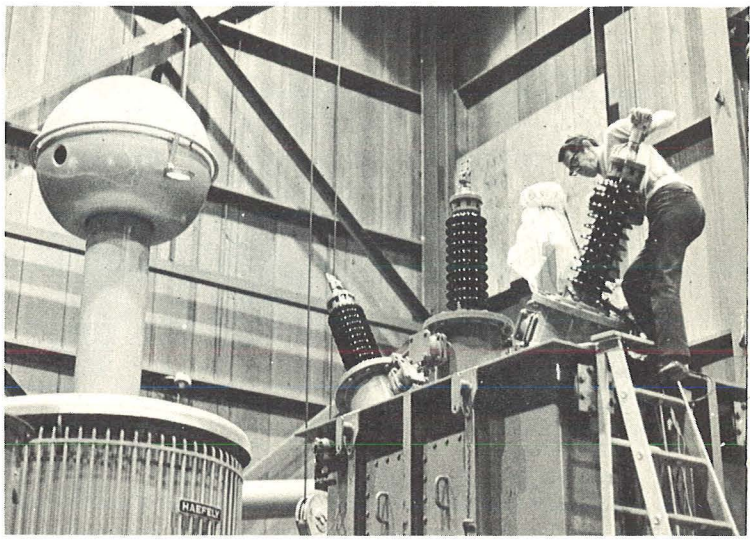
More and more emphasis has been placed on research and development as BPA anticipates the needs of the future.

At the HVDC Test Center at The Dalles, a joint three-year research and development project with the Edison Electric Institute is progressing. This project will provide operating information on HVDC up to ± 600 kv. During the project's first year, the power supply has been upgraded from 550 to 600-kv bipolar and from 825 to 900-kv monopolar, the building and associated equipment have had their test capabilities increased accordingly, and a new fog test chamber has been built. Utilizing these revised facilities, line and fog chamber tests began during the fall of 1972.



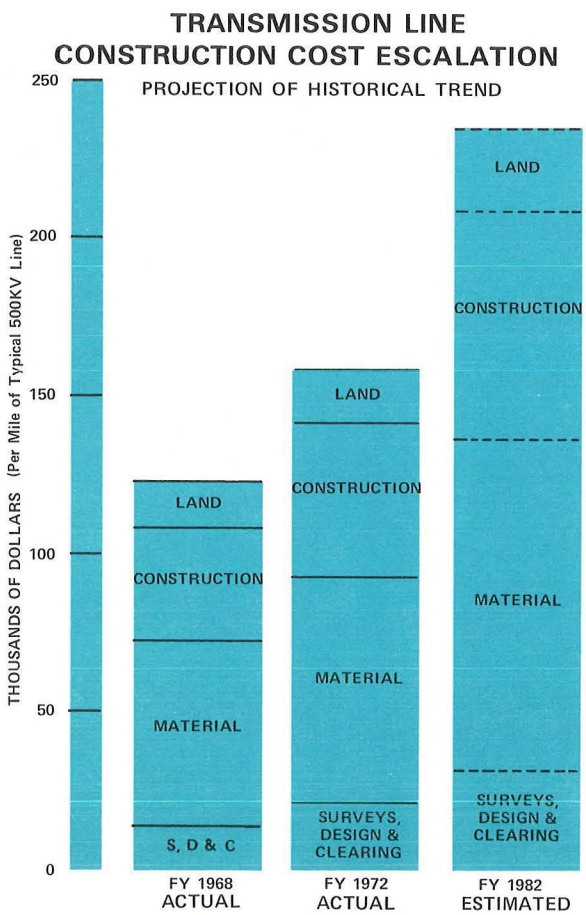
Direct Current Test Center—Big Eddy Substation.

New San Juan cable goes ashore.



Extra High Voltage Laboratory—Ross Substation.

Design of a series of double-circuit towers for 500-kv high capacity lines has recently been completed. Three of these tower types will undergo full-scale loading tests this winter at the National Tower Testing Station near Bristol, England.

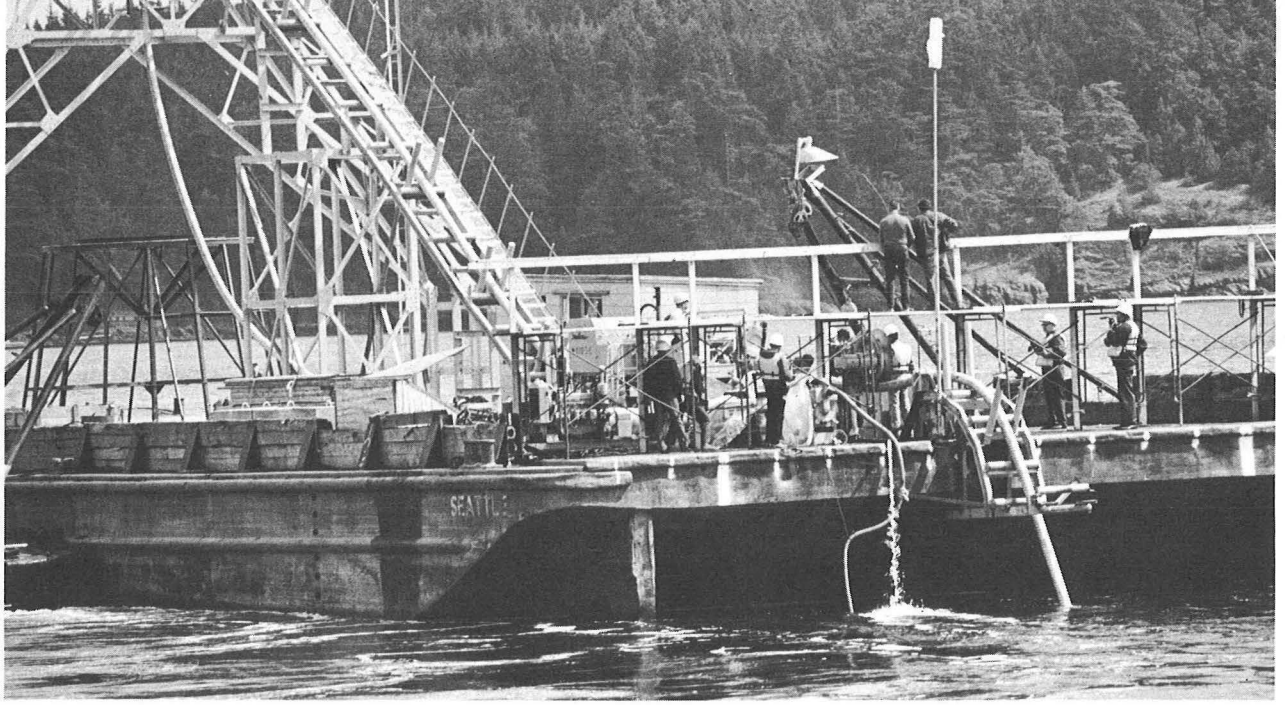


Towers being fabricated in Japan for the Hanford-Ostrander 500-kv crossing of the Columbia River at Bradford Island, near Bonneville Dam, are designed for eventual upgrading to 765-kv.

In addition to these projects, the Boeing Company recently completed a contract with BPA for developing a computerized mathematical technique whereby transmission line configurations can be analyzed for potential subconductor oscillation. This program will be useful in predicting problems, establishing performance specifications for spacer dampers and minimizing the need for field testing. Some further research and testing will be required to validate certain of the mathematical models developed for the program.

BPA is also working on design and construction of a braking resistor, a new concept in power engineering. By damping power surges, this device serves to stabilize the system, thus making it possible to increase the load on the transmission network without sacrificing reliability.

Other engineering research carried out or contracted by BPA includes projects geared to the solution of electrical and mechanical problems on ultra-high-voltage systems. These include such items as a long-term design development project for ultra-high-voltage systems; radio and audible noise and interference phenomena



Laying new San Juan cable.

and their mitigation; structural analysis of bundle conductors; and development of higher speed fault clearing devices such as a one-cycle breaker – in other words, one that will operate in 1/60th of a second. Environmental data related to power system performance are being collected. Included are studies of wind and wind forces on high towers and measurement of earth currents which influence d-c operations.

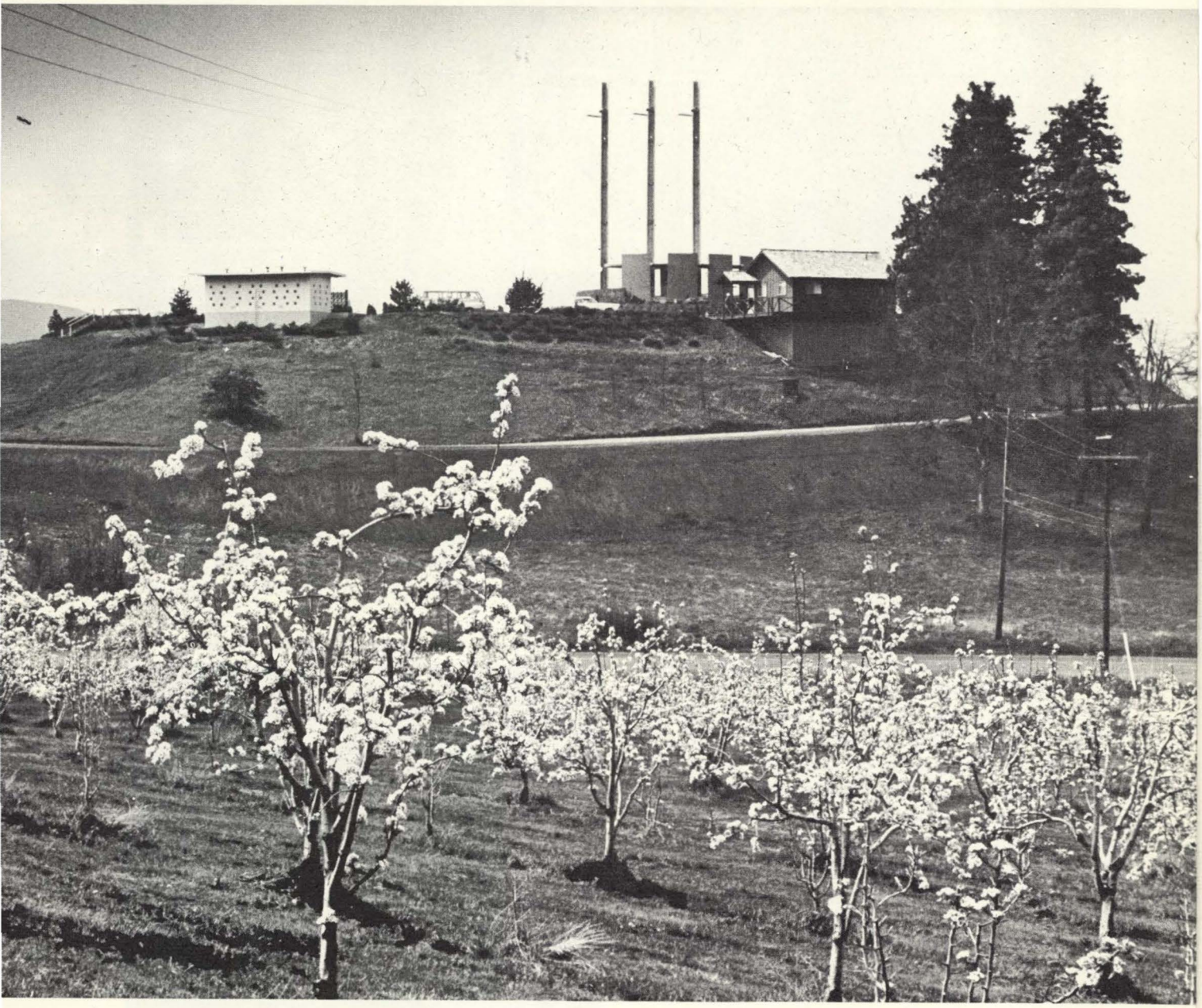
Research in control systems proceeds in many directions. Two projects are devoted to mitigating the effects of system transients. Short circuits and other transient disturbances can cause a power system to "break up" if these effects are not minimized.

Computer-oriented studies are underway to anticipate system problems and to determine what reaction will be most effective in maintaining a stable system.

Other control projects involve collection of hydrometeorological data from many geographical points. A new inexpensive radio system, which uses ion trails left in the atmosphere by meteors to bounce radio signals from point to point, has been successfully tested and is ready for use in the hydrometeorological network.

Use of a technique called multiplexing (similar to stereo-FM radio) is proving successful in transmitting information within a substation. By using a single cable and multiple frequencies, many miles of communication cable may be eliminated. The cable can also be heavily protected against electromagnetic interference. A test installation at Chief Joseph has proved successful and the multiplexing technique will be used for control of the Hatwai Substation.

Sky-crane places tower steel on Lewiston Grade.



Blossoms at Panorama Point, Oregon.

CONCERN FOR THE ENVIRONMENT

In the three years since passage of the National Environmental Policy Act, the intense public concern for the quality of the environment shows no sign of lessening.

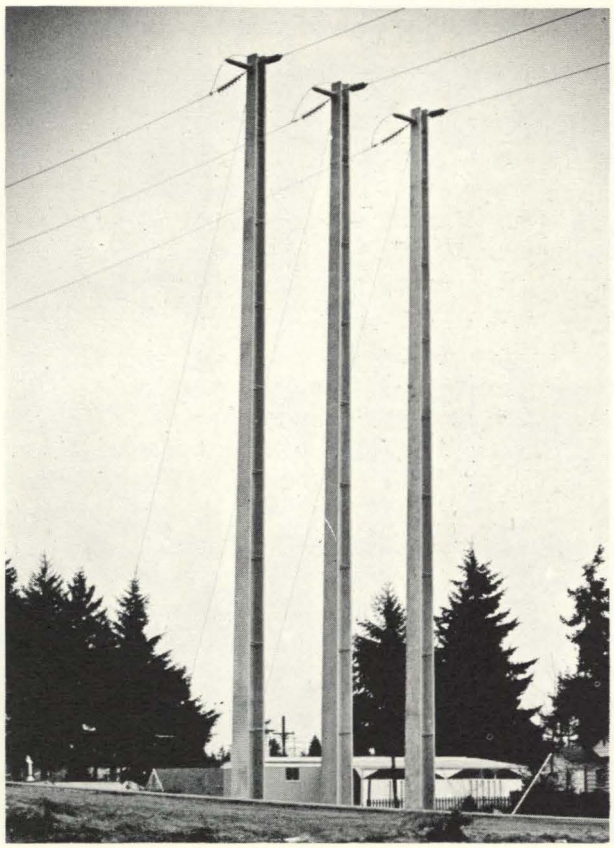
BPA's response to this concern and to the Act itself has involved long-term efforts and new technological developments. Both have made a significant contribution to efforts to minimize the impact on the environment that results from building and maintaining transmission facilities to serve the people of the Pacific Northwest.

One of the salient means of achieving BPA's environmental goals is the maximum use of existing transmission corridors. This technique has been used by BPA for many years. It involves rebuilding existing lines to higher capacity on the same or slightly larger right-of-way. Where this is not possible, BPA builds new lines parallel to existing ones, allowing some sharing of right-of-way. Thus the new transmission lines required to meet increased demand can be built with only slight additional right-of-way, which substantially reduces the environmental impact.

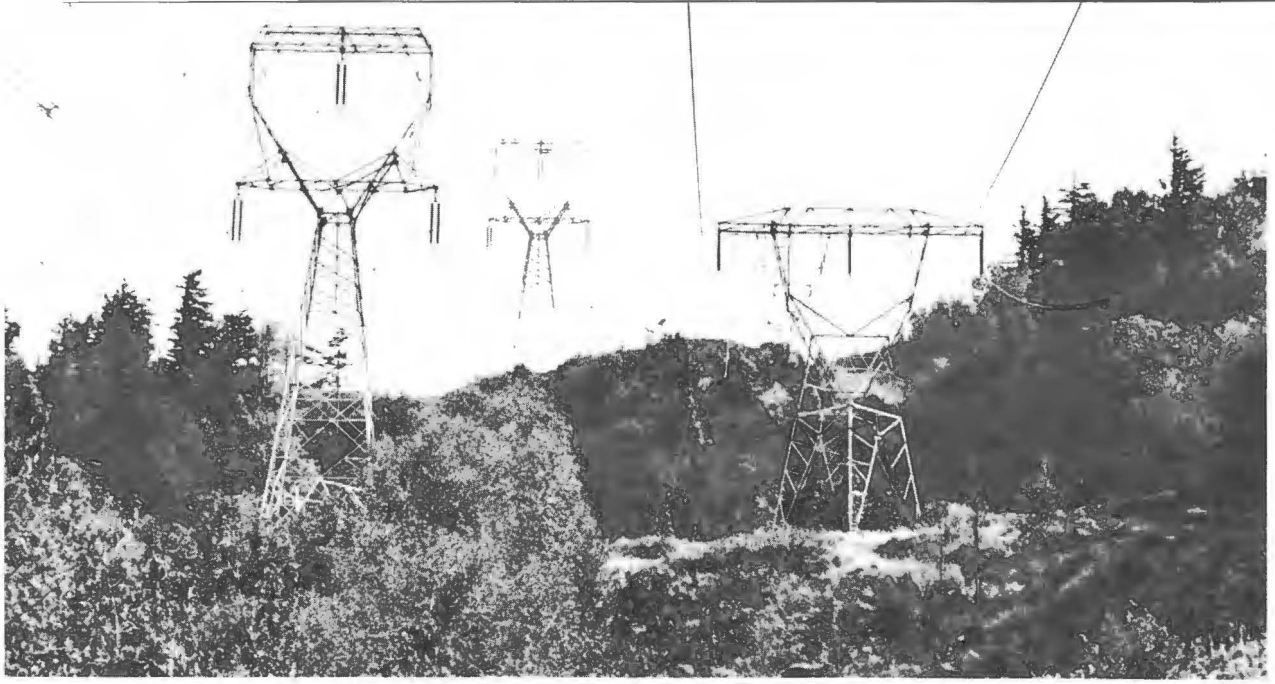
Despite this policy of building on existing rights-of-way, the rapid growth in demand requires the construction of some lines in new areas. BPA traditionally has exercised care in locating its new transmission facilities to minimize particularly the disruption of existing land use. The placement of lines and individual towers is given careful study. Where a new transmission line must cross a farm tract, for example, locating lines and towers along fence rows does much to reduce their impact on farming.

Recently, BPA has become aware that new techniques for locating corridors give promise of significantly improving the ability to locate new transmission corridors so to minimize the impact on the environment. These techniques utilize a formal inventory of regional environmental resources and their evaluation as to environmental compatibility with transmission facilities. To refine these techniques, BPA has entered into a study contract with a noted land use planning firm. The first phase of this study was completed in July 1972. Its results look promising, and BPA expects to adapt these new techniques to its facility location procedure.

BPA also recognizes the importance of public participation in planning. A major requirement of the National Environmental Policy Act of 1969 is that an environmental impact statement be developed covering any proposed major Federal activity, such as BPA's annual construction and maintenance programs. In drafting its first Environmental Statement in 1970, BPA decided to use the statement procedure to involve the public in its planning process. Eight public meetings were held in cities throughout the region to explain the FY 1972 program and to obtain public comment. While this public



Environmentally designed towers.



The new 500-kv (left); the old 230-kv (right).

sounding-board goes beyond the NEPA requirements, it has served to heighten BPA awareness of environmental impacts.

Based upon this first year's experience, the second Environmental Statement prepared in the fall of 1971 involved 18 public meetings. This increase allowed the meetings to be held close to the facilities proposed for FY 1973 and to the people directly involved.

This technique proved valuable. In the meetings held during fiscal year 1972, comments from the public resulted in a number of changes in plans for specific transmission facilities. BPA has followed a similar procedure in preparation of the fiscal year 1974 program Environmental Statement. During the months of October and November 1972, 20 public meetings on the proposed program and the fiscal 1974 draft statement were held.

The Environmental Statement serves other purposes as well. In recognition of the value of resource analysis techniques being developed by the BPA consultant, our Environmental Statements now contain maps displaying the environmental resources and constraints in the area of proposed new facilities. These maps and accompanying narrative help to define the potential impact of BPA proposals, serve as vehicles for more effective public and agency comment, and provide input into the planning process itself. The Environmental Statement on the fiscal year 1973 proposed program, filed with the Council on Environmental Quality on April 6, 1972, contains more than 150 resource maps covering 26 facilities.

Careful attention to locating new facilities is but one facet of environmental concern. In addition, much can and is being done in the design and construction of the facilities to further reduce impacts. The use of screening vegetation where transmission lines cross roads, the use of special improved appearance designs where appropriate, and steps taken during construction to minimize disturbance of natural vegetation all play a part in BPA's efforts to reduce environmental impact.

Other considerations come into play in minimizing the impact of proposed new facilities upon the physical environment. Transmission line locations and designs consider the potential effect of construction on wind and water erosion. To minimize pollution from disposal of slash created during clearing of transmission line rights-of-way, special burning techniques are being used in sensitive areas. High temperature, controlled-burning techniques were employed in constructing the Paul-Allston No. 2 line during the past year. These techniques substantially reduce emissions into the atmosphere and their use on additional lines in the future can be expected. BPA's concern with the environment is not limited to the location, design, and construction of new transmission facilities. Low-growing shrubs and grasses are carefully maintained in rights-of-way, and access roads are seeded to improve their appearance and to minimize water erosion.

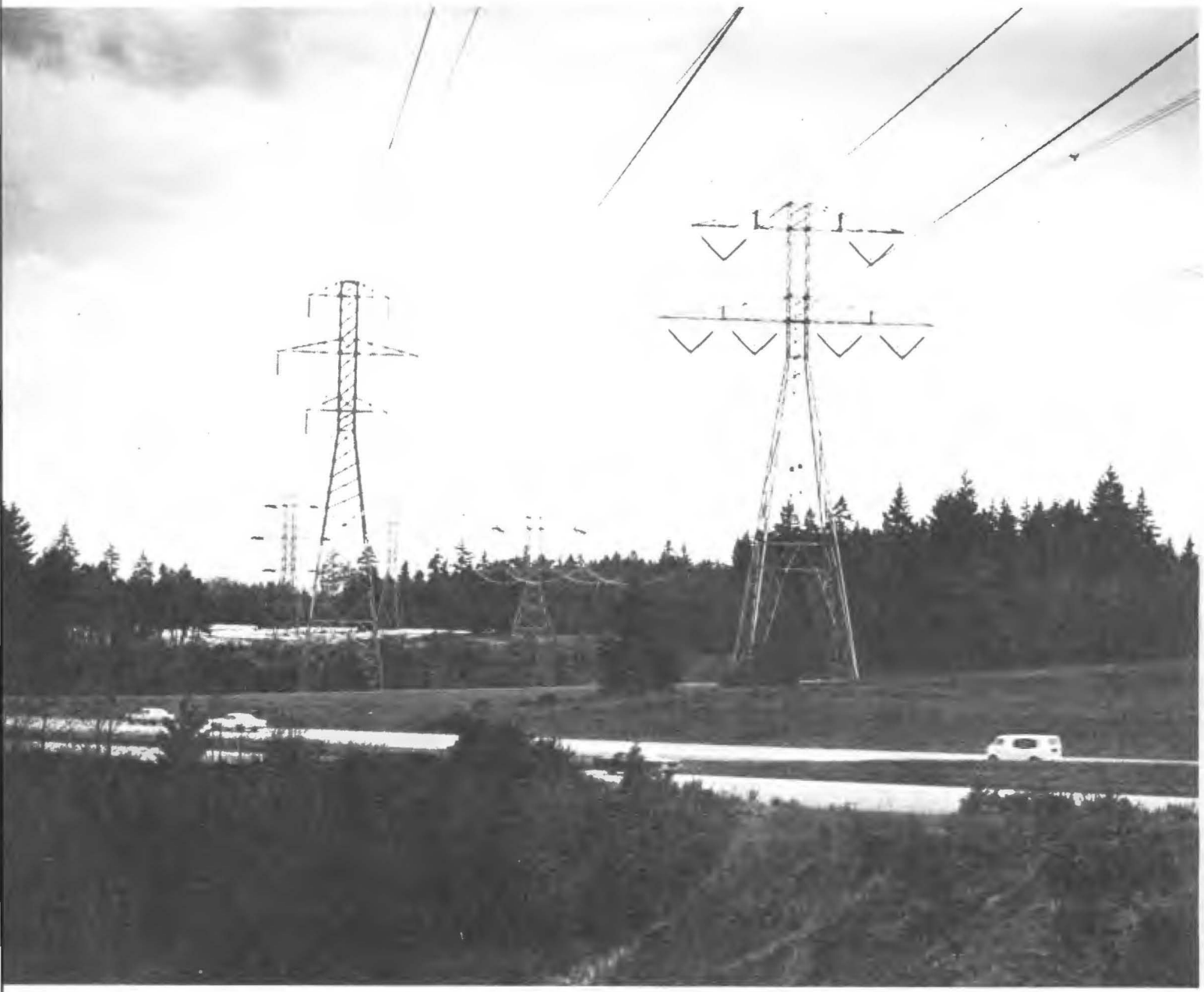
A key element in all BPA environmental efforts is the continuing development and adaptation of new technology. For example, BPA's

efforts to perfect and utilize higher voltages in its transmission lines are fundamental to upgrading existing lines and permitting maximum use of existing rights-of-way. Special techniques using photogrammetry minimize the amount of timber which must be cleared for new transmission lines. These procedures also provide a more natural "scalloped" appearance to rights-of-way. Photogrammetric techniques have been applied to all transmission lines designed during fiscal year 1972. Also, multiple-bundle conductors have been adopted as standard designs for high-voltage lines to minimize audible and radio noise.

These efforts to improve the ecological technology continue. The study contract to develop new location techniques described above is a key component of this regard. As new techniques are developed and perfected, they are incorporated into BPA's basic designs and procedures.

Some of the efforts which have been made to protect the environment cost little – that is, they were achieved simply through an awareness on the part of BPA staff, from the location engineer to the construction inspector, of environmental quality goals and objectives. In many cases, however, significant gains can be achieved only through a substantial commitment of funds and manpower. Although evaluation of environmental costs is difficult because they are so closely intertwined with its basic program, BPA estimates that it spent approximately $3.5 million in fiscal year 1972 to meet its environmental obligations. We can expect BPA's annual investment in environmental protection to grow in response to the nation's concern for the quality of the environment.

Radio interference testing equipment trailer.



Double circuit lines near Federal Way, Wash.

POWER SALES FOR THE YEAR

During fiscal year 1972, BPA sold 63.7 billion kilowatt-hours of electric energy – an increase of 10.6 percent over fiscal year 1971 sales.

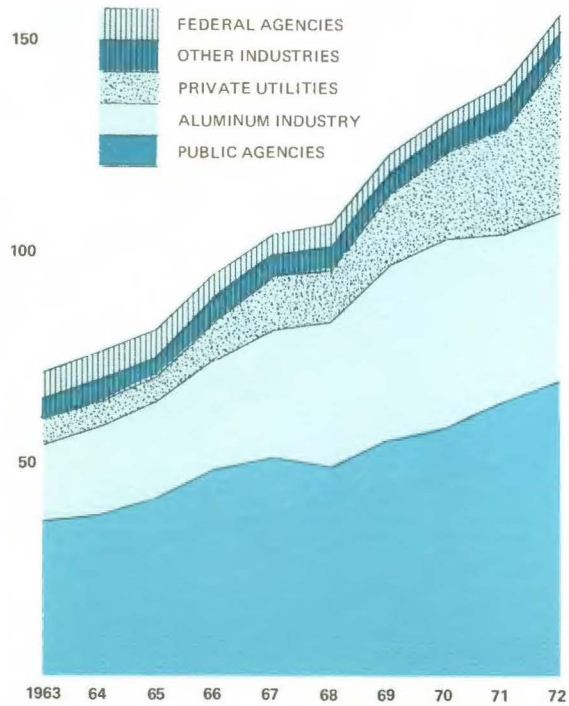
The average revenue realized from the sale of energy to all of its customers was 2.39 mills per kilowatt-hour excluding sales of capacity and revenues from other services.

There was a 39.8 percent increase in the sale of capacity over fiscal year 1971 sales. The Central Valley Project accounted for one-half of the increase and the Pacific Northwest public agency and investor-owned utilities accounted for the remainder.

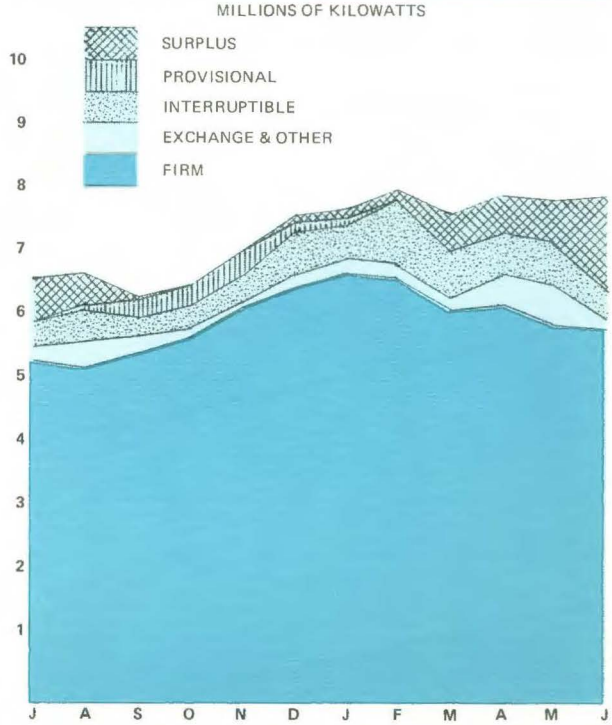
Public and Peoples Utility Districts, Cooperatives, and Municipal Systems purchased a total of 23.2 billion kilowatt-hours of energy during fiscal year 1972. Snohomish PUD was the largest purchaser among the public agencies with 3.2 billion kilowatt-hours. Public agency customers purchased 36.4 percent of the energy sold by BPA during the fiscal period, a slightly lower proportion than last year, but a 7.2 percent increase over fiscal year 1971 energy sales. No one customer was primarily responsible for this increase. Growth in public agency energy sales from FY 1971 to 1972 (7.2 percent) declined from the 9.7 percent growth rate experienced from FY 1970 to FY 1971.

BPA sold 13.6 billion kilowatt-hours to *Northwest investor-owned utilities* for resale during FY 1972, a 28.7 percent increase over FY 1971. These utilities accounted for 21.3 percent of BPA's total energy sales for the year,

BPA SALES OF ELECTRIC ENERGY
FISCAL YEARS 1963 – 1972
MILLIONS OF DOLLARS



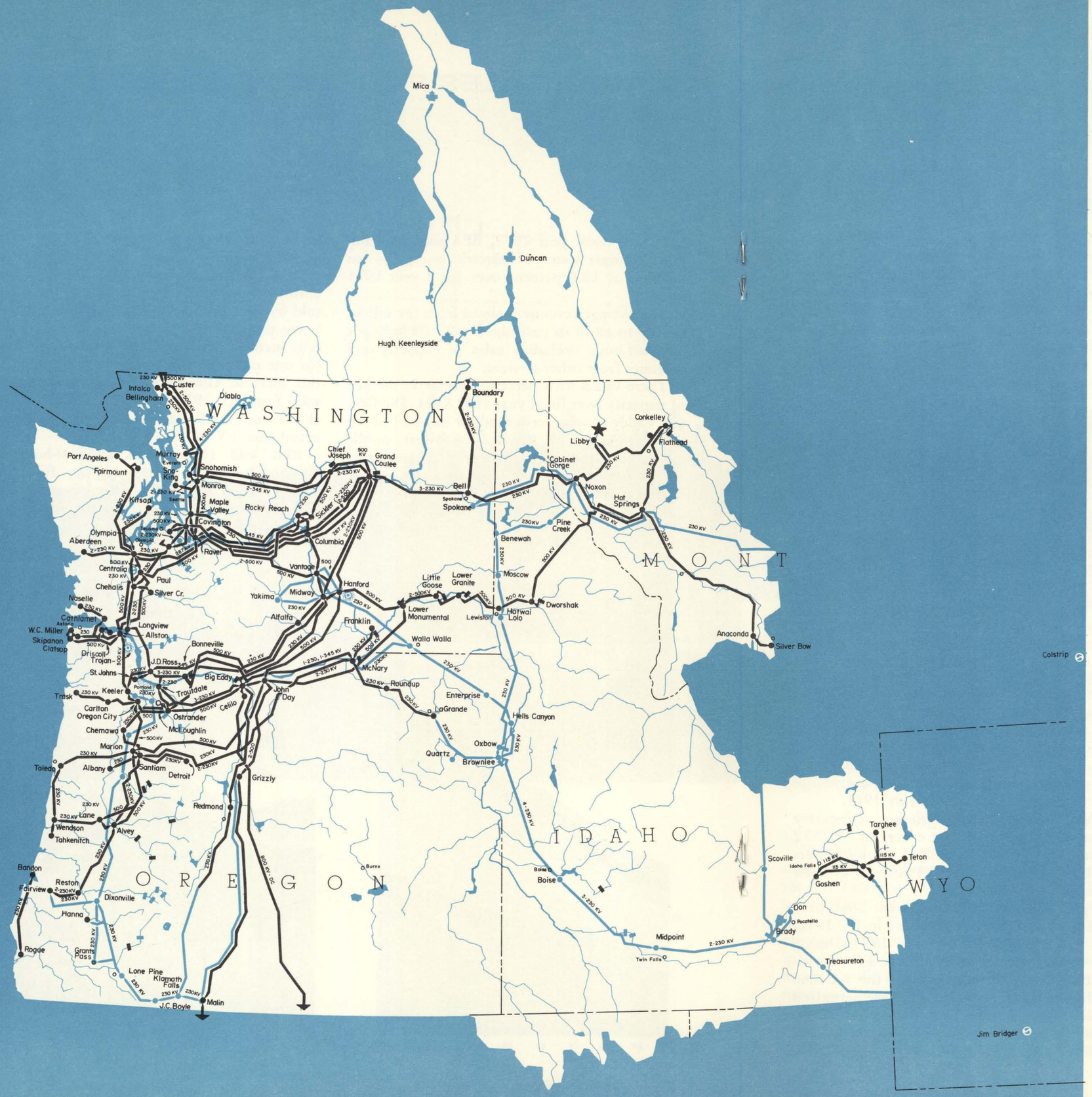
FEDERAL COLUMBIA RIVER POWER SYSTEM
Average Energy Sales
JULY 1971 THROUGH JUNE 1972
MILLIONS OF KILOWATTS



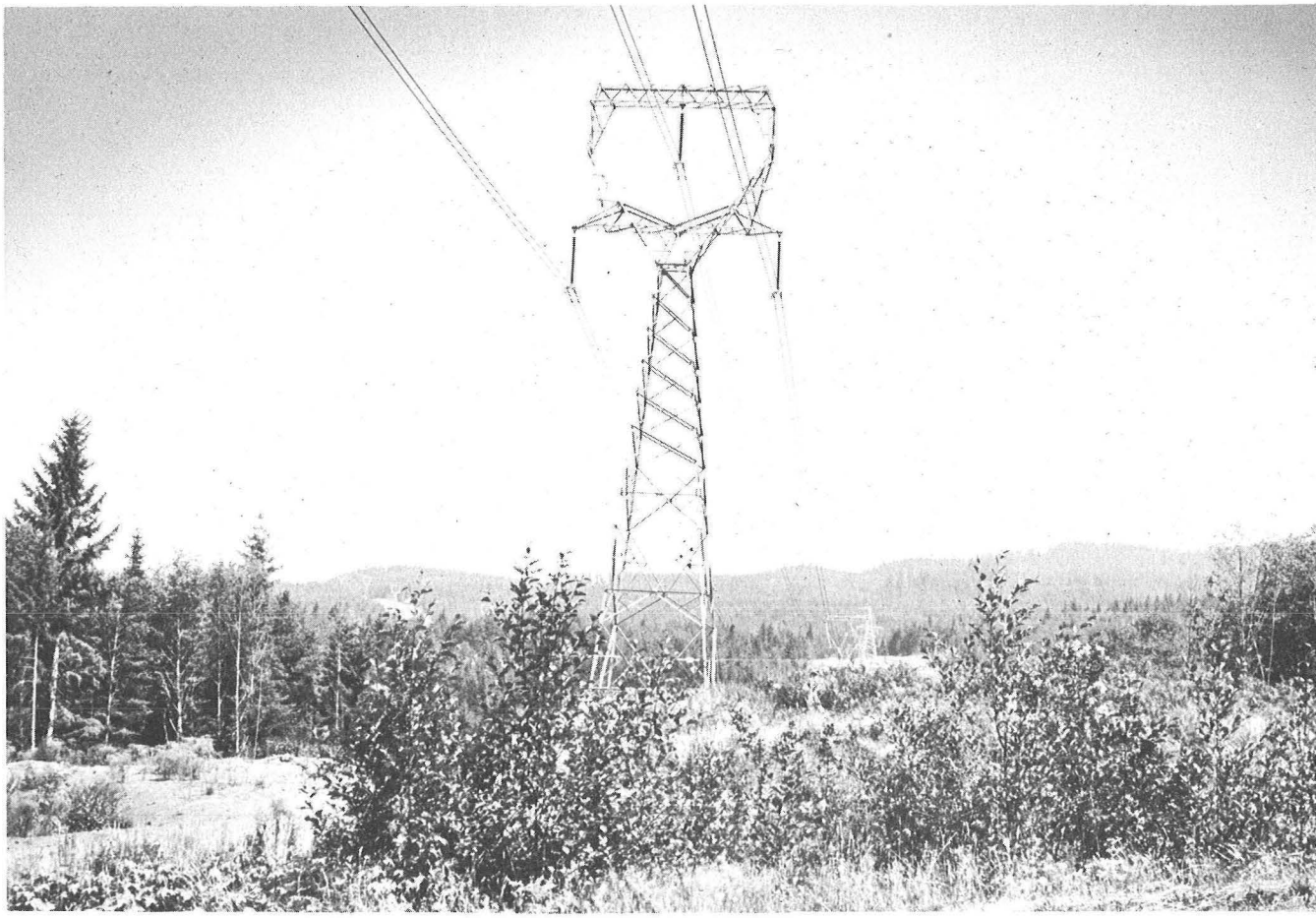
PACIFIC NORTHWEST POWER SYSTEM

Major Facilities Existing and Under Construction

AS OF DECEMBER 31, 1972



- BPA Transmission Lines and Substations
- Non Federal Transmission Lines and Substations
- Federal Hydroelectric Project
- Non Federal Hydroelectric Project
- Nuclear Generating Plant
- Fossil Fuel Powerplant
- Treaty Dam, Canada
- Treaty Dam, United States



"Banjo" tower on 500-kv line.

and they used 25 percent more BPA firm power than in FY 1971. In order to supplement their own nonfirm power resources, they purchased 2.0 billion kilowatt-hours (17.7 percent) of the nonfirm energy sold by BPA.

Sales to Federal agencies in the Pacific Northwest continued to decline in FY 1972, amounting to just 1 percent of the BPA total. The purchase of 607 million kilowatt-hours was a decrease of 17.7 percent from FY 1971 purchases. Curtailment of operations at the Atomic Energy Commission's Hanford Works was principally responsible for the decrease.

In FY 1972, sales to the *aluminum industry* increased 1.5 percent over FY 1971 and amounted to 20.1 billion kilowatt-hours or 31.6 percent of BPA's total sales. Although some curtailments of interruptible power were required, the industries were able to obtain replacement sources by arrangement through BPA.

As of June 30, 1972, nine of the 45 potlines in the Northwest were shut down. Reynolds Metals Company temporarily closed its plant in Troutdale, Oregon, in November 1971, but has since restarted it. Present indications are that most of the other lines will be reopened during fiscal year 1973. Martin-Marietta (formerly Harvey Aluminum) began taking low-cost at-site power from John Day Dam in July 1971.

Industries other than the aluminum industry purchased 2.4 percent more energy in FY 1972 than in FY 1971. The 2.5 billion kilowatt-hours used by these plants was 3.8 percent of total BPA sales.

Surplus energy sales to the *Pacific Southwest* reached 3.7 billion kilowatt-hours in FY 1972, a 5.3 percent increase over FY 1971. During much of the period, while the d-c line was inoperative or in limited service, the a-c line capacity limits were increased. This permitted BPA to deliver 5.9 percent of its total energy sales to the Pacific Southwest to displace expensive steam generation there.

THE FINANCIAL YEAR

Gross revenues for the Federal Columbia River Power System continued their upward trend during fiscal year 1972, the $176 million total setting another all-time record. This reflects a $20 million, or 13 percent increase over the preceding year. The revenue increase was more than offset, however, by rapidly rising expenses which left net revenues of only $4 million, a decrease of $10 million from fiscal year 1971.

BASIS OF FINANCIAL REPORTING

To comply fully with all legal requirements, BPA prepares (1) cost accounting financial statements (found with the Comptroller General's opinion on pages 50 through 61), which present historical financial results similar to the statements used by business organizations to measure their profit or loss; and (2) the repayment study (found on page 48), which begins with cumulative historical results through June 30, 1972, and forecasts future revenues and costs for the purpose of determining the adequacy of power rate levels to repay the Federal investment in power facilities as required by Congress.

This report, for the first time, contains a correlation between the two types of statements. Schedule B, page 58, shows cumulative revenues and costs to June 30, 1972. These figures can be found on the first line of the repayment study, Table 6.

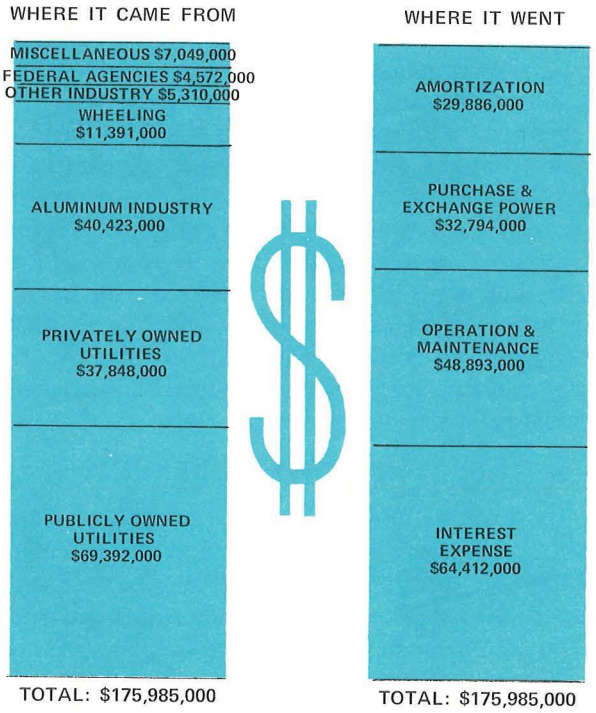
COST ACCOUNTING RESULTS

Exhibit I on page 51 shows that gross revenues of $176 million were $7 million more than the $169 million estimated for fiscal year 1972 in the fiscal year 1971 Annual Report repayment study. This increase is basically attributable to having a better water year than anticipated, and a timely demand for surplus power in the Pacific Southwest. Sales to publicly and privately owned utilities accounted for essentially all of the increase. Sales increased over the preceding year to privately owned utilities by 50.7 percent, and to publicly owned utilities by 8.3 percent. The high percentage increase in sales to the privately owned utilities, however, was due in part to the proportionately lower starting base.

Publicly owned utilities and the aluminum industry continue to be the largest revenue producers. As shown on the chart below, publicly owned utilities contributed 39.4 percent of gross revenues, and the aluminum industry 23.0 percent. The BPA Sales of Electric Energy chart on page 33 shows ten year trends of revenues by class of customer. This chart shows that the most striking increases have been in sales to the privately owned utilities. In fiscal year 1972 the privately owned utilities contributed 21.5 percent of gross revenues, as compared with 16.1 percent the year before.

SOURCE AND DISPOSITION OF THE REVENUE DOLLAR

FISCAL YEAR 1972



Total expenses for fiscal year 1972 amounted to $172 million, an increase of $30.8 million over fiscal year 1971. A $20 million increase in purchase and exchange power accounts for most of this total, and is due to the increased payments to the Atomic Energy Commission pursuant to the agreement negotiated with the AEC to keep the Hanford No. 1 nuclear plant operating through June 30, 1975. Other noteworthy increases were in interest expense which went up $5 million, and in operation and maintenance expense, up $4 million. These increases were due to the continued expansion of the power system, which increases the investment base for interest and provides more facilities which must be operated and maintained, as well as to higher interest rates on new investment and generally higher price levels. The disposition of the revenue dollar is shown graphically on page 37.

As pointed out in previous annual reports, revenues have been increasing at a substantial rate, about 9.4 percent per year on the average over the past five fiscal years. Expenses, however, have been increasing at an even more rapid rate, thus drastically reducing net revenues. This is illustrated by the graph on page 39. Both revenues and expenses are expected to continue this trend as the power system continues to expand and as larger amounts of higher cost thermal power are acquired under the Hydro-Thermal Power Program. This trend most likely will lead to a deficit on the cost accounting basis for fiscal year 1973, possibly as much as $26 million, and to the need to increase the BPA power rate level in the future as discussed in the following section.

REPAYMENT STUDY RESULTS

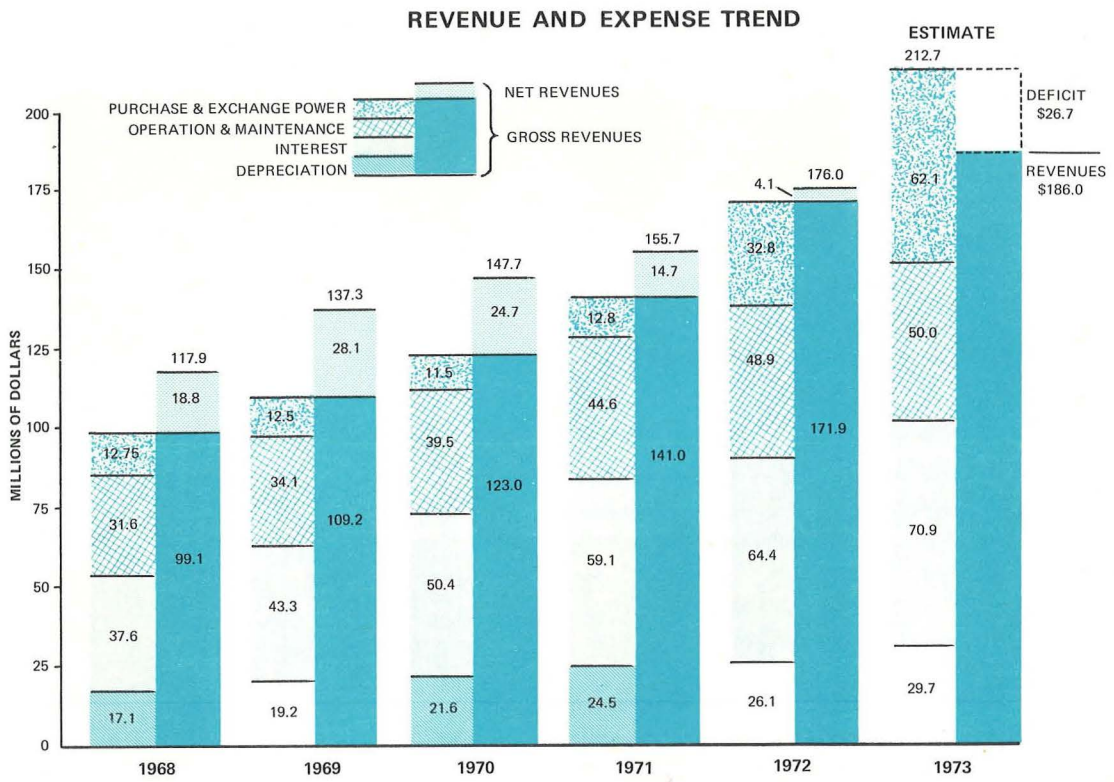
To test the adequacy of the power rate level, BPA is required by law to prepare annually and submit to the President and Congress a consolidated financial statement on the repayment basis (see table 6, page 48).

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 the cost 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 generating project and for each annual increment of investment in the BPA transmission system.
4. Repay:
   a. each increment of the power investment at the generating projects within fifty years after it becomes revenue producing,
   b. each annual increment of the capital investment in the transmission system, including replacements, within the average service life of the transmission facilities (currently forty years), and
   c. the investment in each replacement of a facility at a generating project within its service life.

   In accomplishing such repayment, the investment bearing the highest interest rate will be amortized first, to the extent possible, while still completing repayment of each increment of investment within its prescribed repayment period.
5. Repay the portion of construction costs at Federal reclamation projects which is beyond the ability of the irrigation water users, and which is assigned for repayment from commercial power revenues, within the same overall period available to the water users for making their payments. These periods range from 40 to 66 years with 60 years being applicable to most of the irrigation repayment assistance.

The repayment criteria were modified in several respects during fiscal year 1972 by the Office of the Assistant Secretary of the Interior for Water and Power Resources to provide greater uniformity in the repayment practices

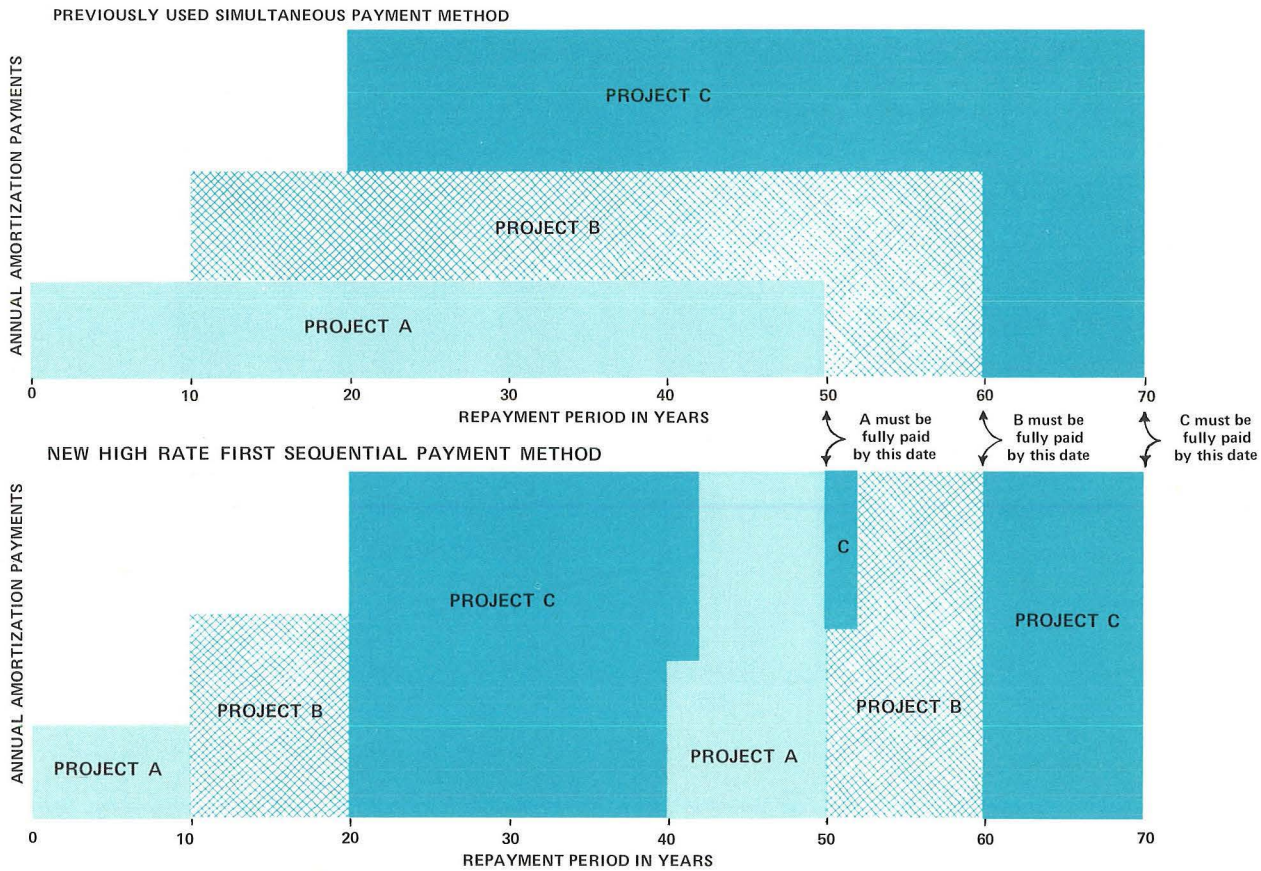


of BPA and the other Interior Department power marketing agencies. These changes provide that the repayment period for the generating projects shall commence with the first fiscal year following the time at which a project becomes revenue producing, whereas in previous FCRPS repayment studies, the practice was for the repayment period to commence with the first fiscal year following a project's completion. This is a very minor change, however, and affects only a relatively few projects in the system.

Of greater significance is the amended policy provision that, to the extent possible, the highest interest-bearing investment will be amortized first, provided that each increment of investment will be fully repaid within its prescribed repayment period. BPA implemented this policy during fiscal year 1972 by applying substantially all available receipts, i.e., those remaining after covering operation and maintenance expense, interest, and purchase and exchange power expense, plus a small contingency allowance, to the amortization of the fiscal year 1972 new investment in the BPA transmission system, which, at 5-3/8 percent, bears the highest interest rate of any block of investment in the Federal Columbia River Power System. This method of amortization is expected to save substantial amounts of interest expense over the full repayment period, thus offsetting to a small degree the aforementioned trends of continuously increasing expenses.

The "high rate first" method of amortization is illustrated by the graph on page 40 which shows a simplified amortization schedule for a hypothetical system consisting of three projects having different interest rates and repayment

OLD AND NEW AMORTIZATION METHODS



Project A bears 2-1/2% interest, Project B 3% and Project C 5-1/2%. Each project must be fully amortized within 50 years. This is accomplished by both methods. The new High Rate First method saves interest expense, however, by reducing the unpaid balance on the higher interest bearing investment at an earlier date.

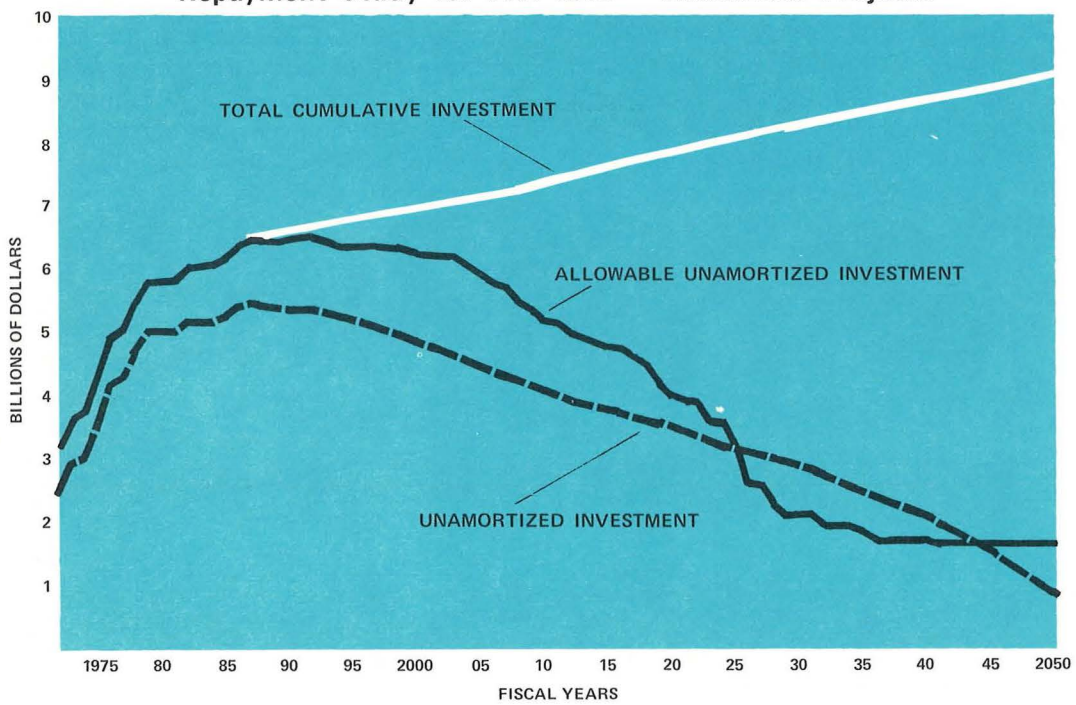
periods. As can be seen from the graph, the primary difference is in the sequence in which the project investments are amortized. In the method previously employed by BPA, the investment in the different projects was amortized concurrently, i.e., some payments were made on amortization for all of the projects each year until the end of their respective repayment periods. Under the "high rate first" concept, the various blocks of investment will be amortized sequentially, i.e., all receipts available for amortization will be applied each year to the investment bearing the highest interest rate provided that such sequential amortization will still fully repay each block of investment within its prescribed repayment period. This optimization of the amortization scheduling is accomplished through a newly developed computer program. Interest expense is thus reduced by repaying at an earlier date the amount of investment which bears the highest rate of interest.

Another change of significance implemented by BPA was the adoption of new depreciation lives for BPA transmission facilities effective as of July 1, 1972. The new lives are shorter than those previously used, and reflect more recent experience with the transmission system, which shows that a larger number of facilities will be retired at an earlier date than previously anticipated for the purpose of replacing them with larger capacity facilities to conserve scarce rights-of-way. The new depreciation lives for the various facilities average 40 years for the transmission system as a whole. The previous average life was 45 years. As the average depreciation life of the transmission facilities is used as the repayment period for the transmission system investment, the repayment period for the transmission investment is accordingly reduced from 45 to 40 years.

The fiscal year 1972 repayment study (Table 6) shows that cumulative revenues through June 30, 1972, totaled $2.1 billion. These have been applied to pay interest costs of $726 million, purchase and exchange power costs of $108 million, and operation and maintenance costs of $581 million, with the remaining $688 million applied to amortization of the 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. The study includes all Federal hydroelectric projects existing and under construction as well as those which are both authorized and under active consideration for construction by the constructing agency. The study also includes the expense for the present acquisition of thermal power through purchase and exchange

FEDERAL COLUMBIA RIVER POWER SYSTEM
Repayment Study for F.Y. 1972 — Authorized Projects



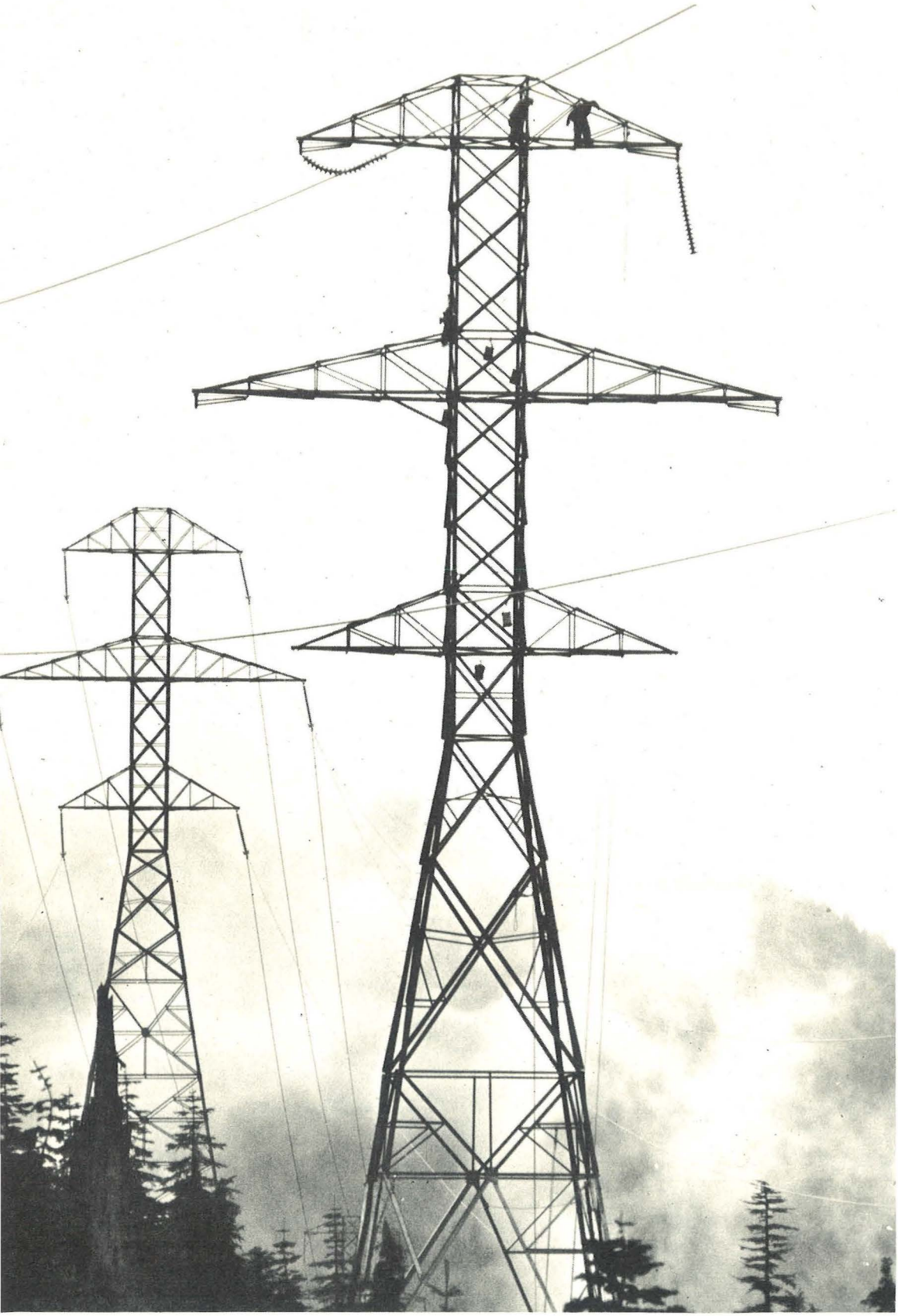
agreements for the Hanford No. 1 and Centralia projects. The fiscal year 1972 study, however, does not include the costs of future thermal power acquisitions under the Hydro-Thermal Power Program, as this study seeks only to measure the adequacy of the power rate level as of fiscal year 1972. Future repayment studies will include the costs of the forthcoming thermal power acquisitions as they come into effect.

The repayment study tests the adequacy of the current rate level by comparing the forecasted unamortized investment (column 13) with the allowable unamortized investment (column 16). To meet the repayment criteria, the amount in column 13 must be lower than the amount in column 16 for each corresponding year of the study.

For the first time since BPA increased its power rates in 1965, this year's repayment study shows that all of the power investment is not repaid within the allowable repayment period, i.e., the amount in column 13 exceeds the amount in column 16 from fiscal year 2026 through fiscal year 2043, thus indicating that the current power rate level is no longer sufficient. This result is graphically illustrated by the chart on page 41.

Under the conditions assumed in the repayment study, a revenue increase of approximately 2 percent would increase amortization payments sufficiently to meet the repayment criteria.

The law requires that whenever the repayment study shows a deficiency, the BPA power rates must be increased at the earliest opportunity by an amount sufficient to assure the coverage of all repayment requirements. As previously noted, the earliest this can be accomplished is December 20, 1974, at which time FPC approval of the present rates expires and BPA's power sales contracts permit the rates to be adjusted. Although the fiscal year 1972 study indicates the need for a revenue increase of only about 2 percent, a substantially higher increase is anticipated in 1974. This is because the 1974 rate adjustment studies will have to consider the costs of a large amount of additional thermal power acquisition which will take effect during the 1974 through 1979 rate period, plus any escalation of hydro generation and transmission costs which may occur between now and 1974.



Double circuit towers in Stevens Pass, Wash.

TABLE 1

SALES OF ELECTRIC ENERGY

FISCAL YEAR 1972

Customer	Energy Delivered for Year (000) KWH	Revenue from Sales of Energy
NORTHWEST AREA		
Publicly Owned Utilities		
Municipalities		
Albion, Idaho	2,887	$ 9,375
Bandon, Oregon	43,374	147,651
Blaine, Washington	25,873	85,703
Bonners Ferry, Idaho	18,200	86,697
Burley, Idaho	69,606	219,465
Canby, Oregon	49,262	173,872
Cascade Locks, Oregon	21,798	58,837
Centralia, Washington	49,115	254,637
Cheney, Washington	88,069	290,825
Consolidated Irrigation District, Wash.	1,158	4,580
Coulee Dam, Washington	26,383	92,289
Declo, Idaho	1,779	5,791
Drain, Oregon	25,203	86,186
Ellensburg, Washington	142,529	459,815
Eugene, Oregon	1,328,540	3,351,646
Forest Grove, Oregon	118,368	400,615
Heyburn, Idaho	55,453	170,102
Idaho Falls, Idaho	216,508	703,749[1]
McCleary, Washington	31,114	102,947
McMinnville, Oregon	193,760	700,789
Milton-Freewater, Oregon	87,277	283,256
Minidoka, Idaho	678	2,331
Monmouth, Oregon	55,489	191,025
Port Angeles, Washington	373,320	1,072,838
Richland, Washington	329,054	1,062,783
Rupert, Idaho	43,160	135,771
Seattle, Washington	1,273,680	2,703,600
Springfield, Oregon	206,779	642,494
Sumas, Washington	5,211	18,211
Tacoma, Washington	1,010,932	2,533,104
Vera Irrigation District, Wash.	85,580	274,381
Wash. Public Power Supply System	8,063	20,160
Total Municipalities (32)	5,988,202	$16,345,525
Public Utility Districts		
Benton County PUD No. 1	651,281	$ 1,884,529
Central Lincoln PUD	858,768	2,626,002
Chelan County PUD No. 1	336,185	751,341
Clallam County PUD No. 1	238,561	769,795
Clark County PUD No. 1	1,712,850	5,544,093
Clatskanie PUD	674,626	1,629,443
Cowlitz County PUD No. 1	1,910,066	4,649,527[1]
Douglas County PUD No. 1	295,623	838,552
Ferry County PUD No. 1	35,225	109,065
Franklin County PUD No. 1	333,645	1,032,920
Grant County PUD No. 2	502,527	1,575,912[1]
Grays Harbor County PUD No. 1	933,131	2,808,606
Kittitas County PUD No. 1	31,833	104,884
Klickitat County PUD No. 1	154,337	480,342
Lewis County PUD No. 1	379,600	1,181,705
Mason County PUD No. 1	32,716	105,693
Mason County PUD No. 3	284,422	896,167
Northern Wasco County PUD	59,418	194,284
Okanogan County PUD No. 1	314,603	957,924
Pacific County PUD No. 2	201,388	667,743
Pend Oreille County PUD No. 1	1,547	3,866
Skamania County PUD No. 1	72,889	249,162
Snohomish County PUD No. 1	3,226,939	10,037,810
Tillamook PUD	279,699	948,895
Wahkiakum County PUD No. 1	37,536	126,268
Whatcom County PUD No. 1	85,919	231,038
Total Public Utility Districts (26)	13,645,334	$40,405,566
Cooperatives		
Benton Rural Elec. Assn.	117,068	$ 352,706
Big Bend Elec. Coop.	214,371	570,214
Blachly-Lane County Coop.	91,277	303,217
Central Elec. Coop.	100,101	296,179
Clearwater Power Co.	112,293	369,150
Columbia Basin Elec. Coop.	90,853	264,166
Columbia Power Coop. Assn.	31,024	107,269
Columbia Rural Elec. Assn.	95,883	265,180
Consumers Power	203,738	659,822
Coos-Curry Elec. Coop.	221,598	757,540
Douglas Elec. Coop.	92,603	310,645
East End Mutual Elec. Co. Ltd.	5,415	17,625
Fall River Elec. Coop.	54,982	172,407
Farmers Elec. Co.	4,234	14,056
Flathead Elec. Coop.	58,672	179,290
Harney Elec. Coop.	71,787	191,476
Hood River Elec. Coop.	63,864	206,301
Idaho Co. L&P Coop. Assn.	25,816	81,469
Inland Power & Light Co.	248,707	787,474
Kootenai Elec. Coop.	73,419	232,328
Lane Co. Elec. Coop.	221,453	724,822
Lincoln Elec. Coop.–Montana	44,123	149,474
Lincoln Elec. Coop.–Washington	85,400	235,815
Lost River Elec. Coop.	21,439	61,104
Lower Valley Power & Light, Inc.	111,054	351,701
Midstate Elec. Coop.	81,152	241,198
Missoula Elec. Coop.	49,693	149,666
Nespelem Valley Elec. Coop.	26,182	82,211
Northern Lights	86,037	271,192
Okanogan Co. Elec. Coop.	17,024	54,035
Orcas Power & Light Co.	67,836	219,687
Prairie Power Coop.	2,636	8,747
Raft River Elec. Coop.	109,159	280,958
Ravalli Co. Elec. Coop.	46,262	148,937
Riverside Elec. Co.	3,900	12,861
Rural Elec. Co.	37,088	117,726
Salem Electric	167,054	545,596
Salmon River Elec. Coop.	18,985	53,554
South Side Elec. Lines	11,931	37,106
Surprise Valley Elec. Corp.	43,447	136,481
Tanner Electric	9,930	33,220
Umatilla Elec. Coop. Assn.	145,970	426,015
Unity Light & Power Co.	25,680	83,008
Vigilante Elec. Coop.	39,488	116,601
Wasco Elec. Coop.	58,188	193,290
West Oregon Elec. Coop.	47,367	154,756
Total Cooperatives (46)	3,556,183	$ 11,028,275
Total Publicly Owned Utilities (104)	23,189,719	$ 67,779,366
Federal & State Agencies (19)	607,127	1,743,914
Privately Owned Utilities		
California-Pacific Utilities Co.	34,481	$ 86,445
Idaho Power Co.	29,550	59,100
Montana Power Co.	1,139,784	2,545,082[1]
Pacific Power & Light Co.	5,468,060	12,088,494[1]
Portland General Elec. Co.	4,925,951	11,200,324[1]
Puget Sound Power & Light Co.	1,483,253	3,202,597
Utah Power Co.	0	0
Washington Water Power Co.	474,493	1,072,761
Total Privately Owned Utilities (8)	13,555,572	$ 30,254,803
Aluminum Industries		
Aluminum Co. of America		
Vancouver Plant	1,924,209	$ 4,028,755
Wenatchee Plant	984,623	2,105,209
Anaconda Aluminum Co.	3,137,314	5,900,970
Intalco Aluminum Co.	3,516,243	7,204,051
Kaiser Aluminum & Chemical Corp.		
Spokane Reduction Plant	2,923,998	6,000,187
Spokane Rolling Mill	400,757	984,740
Tacoma Reduction Plant	1,261,862	2,590,718
Martin-Marietta Aluminum Inc.		
The Dalles Plant	1,558,657	2,666,716
Goldendale Plant	1,178,649	2,051,494
Reynolds Metals Co.		
Longview Plant	2,887,960	5,960,596
Troutdale Plant	372,911	934,674
Other Industries		
Carborundum Co.	202,789	425,409
Cominco American Inc.	0	0
Crown Zellerbach Corp.		
Port Angeles Plant	6,689	16,511
Port Townsend Plant	92,089	200,257
Foote Mineral Co.	98,719	215,470
Georgia-Pacific Corp.	205,013	441,526
Hanna Nickel Smelting Co.	742,544	1,657,399
ITT Rayonier, Inc.	38,124	89,159
Oregon Metallurgical Corp.	6,978	17,904
Pacific Carbide & Alloys	56,416	127,798
Pennwalt Corporation	353,648	747,927
Stauffer Chemical Works	487,733	1,071,817
Stewart Elsner	40	273
Union Carbide Corp.	160,987	345,772
Total Industries (19)	22,598,952	$ 45,785,332
OUTSIDE NORTHWEST AREA		
British Columbia Hydro & Power Authority	12,423	$ 27,284
Burbank, Calif.	31,451	68,596
Glendale, Calif.	48,031	96,062
Los Angeles, Calif.	138,960	438,463
Pasadena, Calif.	28,725	75,527
Sacramento, Calif.	40,992	81,984
U.S.B.R.–Central Valley Proj.	1,044,070	3,259,404[1]
U.S.B.R.–Region 3	0	3,315
State of California–Dept. of Natural Resources	50,956	101,912
Pacific Gas & Electric Co.	309,069	618,138
San Diego Gas & Electric Co.	201,770	403,540
Southern California Edison Co.	1,849,612	4,346,223
Total Outside Northwest Area (12)	3,756,059	$ 9,520,448
Total Sales of Electric Energy (149)	63,707,429	155,083,863[2]

[1] Includes capacity sales.
[2] Includes 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, 1972

Project	Operating Agency[1]	Location	Stream	Existing			Under Construction		Authorized		Other Potential		Total	
				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	–	–	8	544,000	–	–	18	1,062,400
Grand Coulee	BR	Washington	Columbia	Sept. 1941	18-3	2,127,000[2]	6	3,753,000[3]	–	–	6	3,600,000	36-3	9,780,000
Grand Coulee (Pump-Generator)		Washington	Columbia		–	–	2	100,000	4	200,000	–	–		
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. Willamette	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	14-2	1,119,000[4]	8	688,000	–	–	–	–	22-2	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[5]	BR	Idaho	Snake	May 1909	7	13,400	–	–	–	–	–	–	7	13,400
Boise Diversion[5]	BR	Idaho	Boise	May 1912	3	1,500	–	–	–	–	–	–	3	1,500
Black Canyon[5]	BR	Idaho	Payette	Dec. 1925	2	8,000	–	–	–	–	–	–	2	8,000
Anderson Ranch[5]	BR	Idaho	S. Fk. Boise	Dec. 1950	2	27,000	–	–	–	–	1	13,500	3	40,500
Palisades[5]	BR	Idaho	Snake	Feb. 1957	4	118,750	–	–	–	–	2	135,000	6	253,750
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	16	2,160,000	–	–	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	May 1970	3	405,000	–	–	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	20,000	1	10,000	–	–	3	30,000
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[6]	CE	Wash.-Ida.	Snake		–	–	–	–	4	540,000	–	–	4	540,000
Total installed capacity						9,935,900		6,167,880		5,213,500		5,741,500		27,058,780
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 nine rewound main units.
[3] Includes an increase of 17,000 kw each for nine units to be rewound and six 600,000 kw units being installed at the Third Powerplant.
[4] Includes two fishway units of 13,500 kw each at The Dalles plant.
[5] U.S. Bureau of Reclamation project incorporated into the Federal Columbia River Power System, effective July 1, 1963.
[6] Not being actively considered for construction.

Joint Power Planning Council deliberates.

TABLE 3

ELECTRIC ENERGY ACCOUNT FOR FISCAL YEAR 1972

Energy Received (millions of kilowatt-hours)	
Energy Generated for BPA	
Bureau of Reclamation	15,559
Corps of Engineers	49,719
Washington Public Power Supply System	2,775
Centralia Thermal Project	1,615
Power Interchanged In	42,475
Total Received	112,143
Energy Delivered (millions of kilowatt-hours)	
Sales	63,707
Power Interchanged Out	44,688
Used by the Administration	70
Total Delivered	108,465
Energy losses in transmission and transformation	3,678
Total	112,143
Losses in percent of total received	3.3
Maximum demand on Federal plants (kilowatts) (Date and Time)	11,024,000
Load factor in percent of total generated for BPA	71.9

TABLE 4

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

Fiscal Year 1972

Utility	Kilowatt-Hours (Billions)	Of Total Generation (Percent)
Publicly Owned:		
Federal Columbia River Power System[2]	69.7	54.4
Grant County PUD	10.1	7.9
Chelan County PUD	6.8	5.3
Seattle City Light	5.9	4.6
Douglas County PUD	3.8	3.0
Tacoma City Light	3.4	2.6
Eugene Water & Electric Board	0.5	0.4
Pend Oreille County PUD	0.4	0.3
Total Publicly Owned	100.6	78.5
Privately Owned:		
Idaho Power Company	9.1	7.1
Pacific Power & Light Co.	5.4	4.2
Montana Power Company	4.9	3.8
Washington Water Power Co.	3.7	2.9
Portland General Electric Co.	2.9	2.3
Puget Sound Power & Light Co.	1.5	1.2
Total Privately Owned	27.5	21.5
Total Generation	128.1	100.0

[1] Generation shown is for members of the 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 and 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) and the Centralia steamplant.

TABLE 5

INSTALLATION SCHEDULE FOR THERMAL POWER PROJECTS

(as of December 31, 1972)

Fiscal Year 1972 Through Fiscal Year 1982

Project	Status[7]	Type of Fuel	Nameplate Rating MW	Commercial Operation Date	Principal Sponsor[1]	Approximate % Private	Ownership % Public
Centralia #1	O	Coal	700	Sept. 1971	PP&L/WWP	72	28
#2	O	Coal	700	Sept. 1972			
Combustion Turbine (Libby, Mont.)	O	Oil	26	Oct. 1972	PP&L	100[5]	—
Combustion Turbines (Salem, Ore.) #1&2	UC	Oil/Gas	65 ea.[2]	Sept. 1973	PGE	100	—
(Portland, Ore.) #3-6	UC	Oil/Gas	65 ea.[2]	Sept. 1973	PGE	100	—
Combustion Turbine (Puget Sound Area)	UC	Oil	27	Sept. 1973	PSP&L	100	—
Trojan	UC	Nuclear	1,130	Sept. 1974	PGE	70	30
Colstrip #1	UC	Coal	175[3]	July 1975	PSP&L	100	—
#2	UC	Coal	175[3]	July 1976			
Jim Bridger #2[4]	UC	Coal	500	Sept. 1975	PP&L	100	—
#3			500	Sept. 1976			
Combustion Turbine (Puget Sound Area)	C	Oil	27	July 1977	PSP&L	100	—
WPPSS Nuclear Project #2 (Hanford)	UC	Nuclear	1,100	Sept. 1977	WPPSS	—	100
Colstrip #3	T	Coal	525[3]	Sept. 1978	PSP&L	100	—
#4			525[3]	Sept. 1979			
Boardman	C	Nuclear	1,200	Sept. 1980	PGE	90	10
WPPSS Nuclear Project #1 (Hanford)	C	Nuclear	1,200	Sept. 1980	WPPSS	—	100[6]
WPPSS Nuclear Project #3 (State of Wash.)	C	Nuclear	1,200	Sept. 1981	WPPSS	30	70
		Total	10,100				

[1] Abbreviations are: PP&L—Pacific Power & Light Co.; PGE—Portland General Electric Co.; PSP&L—Puget Sound Power & Light Co.; WPPSS—Washington Public Power Supply System; WWP—Washington Water Power Co.

[2] Nominal rating 65 mw at 25° F. - 50 mw at 80° F.

[3] Colstrip Units #1 and #2 are rated 350 mw each; one-half of each unit will be used by West Group Area. Colstrip Units #3 and #4 are rated 700 mw each; three-fourths of each unit will be used by West Group Area.

[4] Jim Bridger Unit #1 is scheduled outside the Hydro-Thermal Power Program.

[5] Output available to BPA for exchange energy through June 1975.

[6] Private utilities will receive 400 mw at 85% load factor 1980-96.

[7] Status on 12-1-72; O—Operating or available for operation; UC—Under construction; C—Committed; T—Tentatively scheduled.

TABLE 6

FEDERAL COLUMBIA RIVER POWER SYSTEM
REPAYMENT STUDY FOR F.Y. 1972
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	22
								Plant Allocated to Commercial Power								Irrigation Assistance					
					Investment Placed in Service			Cumulative Investment Placed in Service					Allowable Unamortized Investment								
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	Unamortized Amount	Allowable Unamortized Amount	Cumulative Surplus Revenues	Fiscal Year Ending June 30
Cumulative to 6-30-72	2,103,333	581,109	108,538	725,664	3,131,054		3,131,054	3,131,054		3,131,054	688,022	2,443,032	3,130,298		3,130,298	415,548		415,548	415,548		
1973	186,000	54,684	52,464	81,912	456,921	4,699	461,620	3,587,975	4,699	3,592,674	(3,060)	2,907,712	3,587,219	4,699	3,591,918	493,935		493,935	493,935		1973
1974	192,100	58,155	22,764	88,084	122,039	5,330	127,369	3,710,014	10,029	3,720,043	23,097	3,011,984	3,709,258	10,029	3,719,287	493,935		493,935	493,935		1974
1975	204,500	60,335	26,686	103,303	502,939	10,749	513,688	4,212,953	20,778	4,233,731	14,176	3,511,496	4,211,099	20,778	4,231,877	501,586		501,586	501,586		1975
1976	212,900	63,925	12,933	122,797	632,345	6,775	639,120	4,845,298	27,553	4,872,851	13,245	4,137,371	4,843,444	27,553	4,870,997	501,586		501,586	501,586		1976
1977	224,200	67,473	8,809	130,349	148,188	9,569	157,757	4,993,486	37,122	5,030,608	17,569	4,277,559	4,991,357	37,122	5,028,479	513,027		513,027	513,027		1977
1978	233,000	70,266	8,908	146,903	443,495	7,834	451,329	5,436,981	44,956	5,481,937	6,923	4,721,965	5,434,852	44,956	5,479,808	530,959		530,959	530,959		1978
1979	258,600	73,176	9,167	161,574	292,815	10,071	302,886	5,729,796	55,027	5,784,823	14,683	5,010,168	5,726,736	55,027	5,781,763	569,461		569,461	569,461		1979
1980	272,000	73,985	9,252	164,592	1,807	14,165	15,972	5,731,603	69,192	5,800,795	24,171	5,001,969	5,723,978	69,173	5,793,151	598,935		598,935	598,935		1980
1981	282,300	74,050	8,410	164,473	31,356	10,566	41,922	5,762,959	79,758	5,842,717	35,367	5,008,524	5,736,972	79,728	5,816,700	613,870		613,870	613,870		1981
1982	286,700	74,515	8,149	170,537	188,142	12,125	200,267	5,951,101	91,883	6,042,984	33,499	5,175,292	5,918,549	91,853	6,010,402	629,871		629,871	629,871		1982
1983	294,000	74,820	7,959	173,295	31,356	13,347	44,703	5,982,457	105,230	6,087,687	37,926	5,182,069	5,933,260	105,197	6,038,457	660,363		660,363	660,363		1983
1984	293,500	74,945	7,984	172,609	10,890	14,806	25,696	5,993,347	120,036	6,113,383	37,962	5,169,803	5,943,505	120,000	6,063,505	680,864		680,864	680,864		1984
1985	296,500	75,399	8,003	175,341	108,445	15,626	124,071	6,101,792	135,662	6,237,454	37,757	5,256,117	6,046,565	135,559	6,182,124	714,988		714,988	714,988		1985
1986	302,200	76,321	7,921	182,087	169,682	18,267	187,949	6,271,474	153,929	6,425,403	35,871	5,408,195	6,213,943	153,816	6,367,759	743,323		743,323	743,323		1986
1987	307,900	77,442	7,919	186,225	72,517	17,042	89,559	6,343,991	170,971	6,514,962	36,314	5,461,440	6,283,303	170,818	6,454,121	751,413		751,413	751,413		1987
1988	313,300	77,782	7,937	186,011		20,819	20,819	6,343,991	191,790	6,535,781	41,570	5,440,689	6,268,762	191,614	6,460,376	773,247		773,247	773,247		1988
1989	323,800	77,782	7,800	184,117		18,768	18,768	6,343,991	210,558	6,554,549	54,101	5,405,356	6,254,072	210,166	6,464,238	796,081		796,081	796,081		1989
1990	323,600	77,782	9,143	182,158		26,271	26,271	6,343,991	236,829	6,580,820	54,517	5,377,110	6,229,418	236,109	6,465,527	823,415		823,415	823,415		1990
1991	323,600	77,911	8,411	181,868	43,343	26,296	69,639	6,387,334	263,125	6,650,459	55,410	5,391,339	6,241,427	262,396	6,503,823	850,416		850,416	850,416		1991
1992	324,300	77,911	3,700	180,779		35,132	35,132	6,387,334	298,257	6,685,591	61,910	5,364,561	6,202,933	296,865	6,499,798	868,848		868,848	868,848		1992
1993	342,200	77,911	3,700	178,137		25,747	25,747	6,387,334	324,004	6,711,338	82,452	5,307,856	6,108,142	322,539	6,430,681	885,515		885,515	885,515		1993
1994	342,800	77,911	3,700	175,200		32,985	32,985	6,387,334	356,989	6,744,323	85,989	5,254,852	6,016,582	355,422	6,372,004	907,181		907,181	907,181		1994
1995	343,700	77,911	3,700	172,512		40,237	40,237	6,387,334	397,226	6,784,560	89,577	5,205,512	5,995,059	395,378	6,390,437	925,016		925,016	925,016		1995
1996	344,200	77,911	3,700	168,887		30,494	30,494	6,387,334	427,720	6,815,054	93,702	5,142,304	5,948,845	425,799	6,374,644	943,017		943,017	943,017		1996
1997	344,700	77,911	3,700	165,982		36,424	36,424	6,387,334	464,144	6,851,478	86,402	5,092,326	5,922,512	461,916	6,384,428	952,018	10,705	941,313	941,313		1997
1998	345,000	77,911	3,700	163,310		30,016	30,016	6,387,334	494,160	6,881,494	100,079	5,022,263	5,858,754	491,818	6,350,572	979,352		968,647	968,647		1998
1999	345,700	77,911	3,700	159,980		34,726	34,726	6,387,334	528,886	6,916,220	104,109	4,952,880	5,825,441	526,136	6,351,577	998,685		987,980	987,980		1999
2000	347,800	77,911	3,700	156,449		40,615	40,615	6,387,334	569,501	6,956,835	109,740	4,883,755	5,720,183	565,301	6,285,484	1,030,852		1,020,147	1,020,147		2000
2001	347,900	77,911	3,700	154,137		35,613	35,613	6,387,334	605,114	6,992,448	102,160	4,817,208	5,651,198	600,316	6,251,514	1,055,519	9,992	1,034,822	1,034,822		2001
2002	348,300	77,911	3,700	150,902		34,680	34,680	6,387,334	639,794	7,027,128	115,787	4,736,101	5,603,206	634,579	6,237,785	1,074,852		1,054,155	1,054,155		2002
2003	348,300	77,911	3,700	147,048		35,628	35,628	6,387,334	675,422	7,062,756	119,641	4,652,088	5,548,134	669,354	6,217,488	1,091,519		1,070,822	1,070,822		2003
2004	348,300	77,911	3,700	143,765		33,820	33,820	6,387,334	709,242	7,096,576	122,143	4,563,765	5,380,206	702,954	6,083,160	1,109,854	781	1,088,376	1,088,376		2004
2005	348,300	77,911	3,700	142,758		41,133	41,133	6,387,334	750,375	7,137,709	123,931	4,480,967	5,202,327	742,991	5,945,318	1,126,521		1,105,043	1,105,043		2005
2006	348,300	77,911	3,700	142,219		39,959	39,959	6,387,334	790,334	7,177,668	124,470	4,396,456	5,042,988	781,714	5,824,702	1,150,023		1,128,545	1,128,545		2006
2007	348,300	77,911	3,700	141,483		39,841	39,841	6,387,334	830,175	7,217,509	125,206	4,311,091	4,926,946	820,695	5,747,641	1,173,024		1,151,546	1,151,546		2007
2008	348,300	77,911	3,700	140,943		50,843	50,843	6,387,334	881,018	7,268,352	122,878	4,239,056	4,645,269	871,467	5,516,736	1,204,691	2,868	1,180,345	1,180,345		2008
2009	348,300	77,911	3,700	141,016		47,168	47,168	6,387,334	928,186	7,315,520	119,397	4,166,827	4,472,456	917,566	5,390,022	1,227,024	6,276	1,196,402	1,196,402		2009
2010	348,300	77,911	3,700	141,014		53,358	53,358	6,387,334	981,544	7,368,878	125,675	4,094,510	4,244,390	965,711	5,210,101	1,247,692		1,217,070	1,217,070		2010
2011	348,300	77,911	3,700	141,119		59,062	59,062	6,387,334	1,040,606	7,427,940	125,570	4,028,002	4,142,131	1,024,196	5,166,327	1,267,692		1,237,070	1,237,070		2011
2012	348,300	77,911	3,700	137,317		39,747	39,747	6,387,334	1,080,353	7,467,687	128,826	3,938,923	3,949,041	1,062,045	5,011,086	1,286,193	546	1,255,025	1,255,025		2012
2013	348,300	77,911	3,700	135,867		53,777	53,777	6,387,334	1,134,130	7,521,464	94,806	3,897,894	3,829,041	1,110,705	4,939,746	1,305,027	36,016	1,237,843	1,237,843		2013
2014	348,300	77,911	3,700	132,807		61,374	61,374	6,387,334	1,195,504	7,582,838	96,020	3,863,248	3,696,138	1,165,658	4,861,796	1,319,386	37,862	1,214,340	1,214,340		2014
2015	348,300	77,911	3,700	130,100		42,812	42,812	6,387,334	1,238,316	7,625,650	100,251	3,805,809	3,591,138	1,201,125	4,792,263	1,330,243	36,338	1,188,859	1,188,859		2015
2016	348,300	77,911	3,700	130,365		54,167	54,167	6,387,334	1,292,483	7,679,817	89,723	3,770,253	3,516,138	1,248,056	4,764,194	1,341,100	46,601	1,153,115	1,153,115		2016
2017	348,300	77,911	3,700	130,636		37,606	37,606	6,387,334	1,330,089	7,717,423	98,292	3,709,567	3,365,890	1,278,208	4,644,098	1,351,957	37,761	1,126,211	1,126,211		2017
2018	348,300	77,911	3,700	131,053		43,915	43,915	6,387,334	1,374,004	7,761,338	116,289	3,637,193	3,208,077	1,312,166	4,520,243	1,362,814	19,347	1,117,721	1,117,721		2018
2019	348,300	77,911	3,700	132,333		47,587	47,587	6,387,334	1,421,591	7,808,925	82,798	3,601,982	2,883,970	1,349,475	4,233,445	1,378,208	51,558	1,081,557	1,081,557		2019
2020	348,300	77,911	3,700	134,576		46,856	46,856	6,387,334	1,468,447	7,855,781	110,714	3,538,124	2,657,971	1,381,061	4,039,032	1,378,208	21,399	1,060,158	1,060,158		2020
2021	348,300	77,911	3,700	136,658		48,540	48,540	6,387,334	1,516,987	7,904,321	119,120	3,467,544	2,535,289	1,415,615	3,950,904	1,378,208	10,911	1,049,247	1,049,247		2021
2022	348,300	77,911	3,700	138,210		41,999	41,999	6,387,334	1,558,986	7,946,320	117,426	3,392,117	2,483,280	1,443,718	3,926,998	1,378,208	11,053	1,038,194	1,038,194		2022
2023	348,300	77,911	3,700	140,170		42,487	42,487	6,387,334	1,601,473	7,988,807	120,373	3,314,231	2,145,359	1,471,709	3,617,068	1,378,208	6,146	1,032,048	1,032,048		2023
2024	348,300	77,911	3,700	142,670		39,838	39,838	6,387,334	1,641,311	8,028,645	110,710	3,243,359	2,131,320	1,497,403	3,628,723	1,378,208	13,309	1,018,739	1,018,739		2024
2025	348,300	77,911	3,700	145,289		42,098	42,098	6,387,334	1,683,409	8,070,743	113,241	3,172,216	1,707,381	1,521,305	3,228,686	1,378,208	8,159	1,010,580	1,010,580		2025
2026	348,300	77,911	3,700	150,218		48,023	48,023	6,387,334	1,731,432	8,118,766	98,201	3,122,038	1,110,036	1,549,138	2,659,174	1,378,208	18,270	992,310	992,310		2026
2027	348,300	77,911	3,700	154,536		48,524	48,524	6,387,334	1,779,956	8,167,290	87,727	3,082,835	1,038,848	1,570,201	2,609,049	1,378,208	24,426	967,884	967,884		2027
2028	348,300	77,911	3,700	151,333		36,739	36,739	6,387,334	1,816,695	8,204,029	98,304	3,021,270	743,353	1,587,777	2,331,130	1,378,208	17,052	950,832	950,832		2028
2029	348,300	77,911	3,700	155,788		47,382	47,382	6,387,334	1,864,077	8,251,411	104,815	2,963,837	542,538	1,608,006	2,150,544	1,378,208	6,086	944,746	944,746		2029
2030	348,300	77,911	3,700	156,998		48,024	48,024	6,387,334	1,912,101	8,299,435	109,691	2,902,170	540,731	1,622,099	2,162,830	1,378,208		944,746	944,746		2030
2031	348,300	77,911	3,700	153,347		38,615	38,615	6,387,334	1,950,716	8,338,050	103,457	2,837,328	509,375	1,637,204	2,146,579	1,378,208	9,885	934,861	934,861		2031
2032	348,300	77,911	3,700	149,732		36,823	36,823	6,387,334	1,987,539	8,374,873	116,957	2,757,194	327,233	1,648,620	1,975,853	1,378,208		934,861	934,861		2032
2033	348,300	77,911	3,700	145,297		35,846	35,846	6,387,334	2,023,385	8,410,719	121,392	2,671,648	296,877	1,658,609	1,955,486	1,378,208		934,861	934,861		2033
2034	348,300	77,911	3,700	140,518		33,157	33,157	6,387,334	2,056,542	8,443,876	126,171	2,578,634	292,987	1,667,291	1,960,278	1,378,208		934,861	934,861		2034
2035	348,300	77,911	3,700	135,532		37,876	37,876	6,387,334	2,094,418	8,481,752	123,506	2,493,004	210,542	1,675,330	1,885,872	1,378,208	7,651	927,210	927,210		2035
2036	348,300	77,911	3,700	130,840		38,489	38,489	6,387,334	2,132,907	8,520,241	107,800	2,423,693	80,860	1,682,137	1,762,997	1,378,208	28,049	899,161	899,161		2036
2037	348,300	77,911	3,700	127,072		40,120	40,120	6,387,334	2,173,027	8,560,361	119,268	2,344,545	42,343	1,688,146	1,730,489	1,378,208	20,349	878,812	878,812		2037
2038	348,300	77,911	3,700	122,524		33,037	33,037	6,387,334	2,206,064	8,593,398	128,064	2,249,518	42,343	1,692,193	1,734,536	1,378,208	16,101	862,711	862,711		2038
2039	348,300	77,911	3,700	117,438		38,126	38,126	6,387,334	2,244,190	8,631,524	127,706	2,159,938	42,343	1,695,276	1,737,619	1,378,208	21,545	841,166	841,166		2039
2040	348,300	77,911	3,700	112,768		47,476	47,476	6,387,334	2,291,666	8,679,000	109,704	2,097,710	42,343	1,699,265	1,741,608	1,378,208	44,217	796,949	796,949		2040
2041	348,300	77,911	3,700	109,015		35,444	35,444	6,387,334	2,327,110	8,714,444	138,895	1,994,259		1,700,882	1,700,882	1,378,208	18,779	778,170	778,170		2041
2042	348,300	77,911	3,700	103,326		35,464	35,464	6,387,334	2,362,574	8,749,908	143,183	1,886,540		1,701,552	1,701,552	1,378,208	20,180	757,990	757,990		2042
2043	348,300	77,911	3,700	97,724		47,210	47,210	6,387,334	2,409,784	8,797,118	134,294	1,799,456		1,701,552	1,701,552	1,378,208	34,671	723,319	723,319		2043
2044	348,300	77,911	3,700	92,759		40,838	40,838	6,387,334	2,450,622	8,837,956	153,429	1,686,865		1,700,942	1,700,942	1,378,208	20,501	702,818	702,818		2044
2045	348,300	77,911	3,700	86,679		44,918	44,918	6,387,334	2,495,540	8,882,874	140,412	1,591,371		1,699,774	1,699,774	1,378,208	39,598	663,220	663,220		2045
2046	348,300	77,911	3,700	81,684		54,281	54,281	6,387,334	2,549,821	8,937,155	156,670	1,488,982		1,698,131	1,698,131	1,378,208	28,335	634,885	634,885		2046
2047	348,300	77,911	3,700	75,536		35,483	35,483	6,387,334	2,585,304	8,972,638	183,063	1,341,402		1,696,080	1,696,080	1,378,208	8,090	626,795	626,795		2047
2048	348,300	77,911	3,700	67,540		39,892	39,892	6,387,334	2,625,196	9,012,530	177,315	1,203,979		1,693,702	1,693,702	1,378,208	21,834	604,961	604,961		2048
2049	348,300	77,911	3,700	60,360		53,629	53,629	6,387,334	2,678,825	9,066,159	183,495	1,074,113		1,691,051	1,691,051	1,378,208	22,834	582,127	582,127		2049
2050	348,300	77,911	3,700	52,779		37,694	37,694	6,387,334	2,716,519	9,103,853	186,576	925,231		1,688,173	1,688,173	1,378,208	27,334	554,793	554,793		2050
TOTALS	27,729,033	6,538,606	567,457	11,620,933	6,387,334	2,716,519	9,103,853				8,178,622						823,415				

FINANCIAL STATEMENTS

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

B-114858

December 15, 1972

Dear Mr. Secretary:

We have examined the Statement of Assets and Liabilities of the Federal Columbia River Power System (see note 1 to the financial statements) as of June 30, 1972, and the related Statements of Revenues and Expenses and of Changes in Financial Position for fiscal year 1972. Our examination 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.

The accompanying financial statements were prepared on a cost-accounting basis which included depreciation. The statements 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 1 to the financial statements.)

Subject to the financial effects of future adjustments related to the adoption of firm cost allocations as explained in note 2 and of the resolution of the matters involving interest credit and irrigation assistance as explained in notes 3 and 4, the accompanying financial statements, in our opinion, present fairly the assets and liabilities of the Federal Columbia River Power System at June 30, 1972, the financial results of its power operations, and the changes in financial position 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 year.

Copies of this report are being sent to the Director, Office of Management and Budget; the Chairman, Federal Power Commission; 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 – 5

The Honorable
The Secretary of the Interior

FEDERAL COLUMBIA RIVER POWER SYSTEM

STATEMENT OF REVENUES AND EXPENSES
FOR THE FISCAL YEARS ENDED JUNE 30, 1972 AND JUNE 30, 1971

(In thousands)

	1972	1971
OPERATING REVENUES:		
Bonneville Power Administration		
Sales of electric energy:		
Publicly owned utilities	$ 69,392	$ 64,078
Privately owned utilities	37,848	25,121
Federal agencies	4,572	5,403
Aluminum industry	40,423	40,058
Other industry	5,310	5,361
Total	157,545	140,021
Other operating revenues:		
Wheeling revenues	11,391	10,386
Other revenues	4,014	2,321
Total	15,405	12,707
Total Bonneville Power Administration revenues	172,950	152,728
Association projects		
Other operating revenues	3,035	2,950
Total power system operating revenues	175,985	155,678
OPERATING EXPENSES OTHER THAN DEPRECIATION:		
Purchase and exchange power (Note 8)	32,794	12,813
Operation and maintenance expense:		
Operation expense	31,558	29,680
Maintenance expense	17,335	14,907
Total operation and maintenance expense	48,893	44,587
Total operating expenses other than depreciation	81,687	57,400
Net operating revenues	94,298	98,278
INTEREST EXPENSE:		
Interest on Federal investment (projects in service)	74,612	67,742
Related interest charged to construction	10,200*	8,603*
Net interest expense	64,412	59,139
NET REVENUES AVAILABLE FOR REPAYMENT	29,886	39,139
LESS DEPRECIATION	25,788	24,512
NET REVENUES (Schedule B)	$ 4,098	$ 14,627

*Denotes deduction

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

FEDERAL COLUMBIA RIVER POWER SYSTEM

STATEMENT OF ASSETS AND LIABILITIES
AS OF JUNE 30, 1972 AND JUNE 30, 1971

(In thousands)

ASSETS

	June 30	
	1972	1971
FIXED ASSETS:		
Completed plant (Schedule A)	$3,045,072	$2,927,283
Retirement work in progress	26,253	20,049
	3,071,325	2,947,332
Less accumulated depreciation	275,489	253,375
	2,795,836	2,693,957
Construction work in progress (Schedule A)	1,031,977	826,497
Total fixed assets	3,827,813	3,520,454
CURRENT ASSETS:		
Unexpended funds	137,572	89,094
Special funds	7,033	6,500
Accounts receivable	26,259	29,182
Materials and supplies	14,968	17,056
Total current assets	185,832	141,832
DEFERRED CHARGE FOR PAYMENT OF IRRIGATION ASSISTANCE (Schedule A) (Note 4)	415,548	401,440
OTHER ASSETS AND DEFERRED CHARGES:		
Trust funds	5,912	6,218
Other assets and deferred charges	10,443	4,663
Total other assets and deferred charges	16,355	10,881
TOTAL ASSETS	$4,445,548	$4,074,607

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

LIABILITIES

	June 30	
	1972	1971
PROPRIETARY CAPITAL:		
Investment of U.S. Government:		
Congressional appropriations	$4,575,475	$4,181,368
Revenues transferred to continuing fund	4,287	4,033
Transfers from other Federal agencies, net	31,274	27,983
Interest on Federal investment (Note 7)	948,597	857,647
Gross Federal investment	5,559,633	5,071,031
Less funds returned to U.S. Treasury	1,957,148	1,822,167
Net investment of U.S. Government	3,602,485	3,248,864
Accumulated net revenues (Schedule B)	354,155	351,592
Total proprietary capital	3,956,640	3,600,456
COMMITMENTS (Note 5)		
CURRENT LIABILITIES:		
Accounts payable	57,742	57,153
Employees accrued leave	4,639	4,890
Total current liabilities	62,381	62,043
LIABILITY OF U.S. GOVERNMENT FOR PAYMENT OF IRRIGATION ASSISTANCE (Schedule A) (Note 4)	415,548	401,440
OTHER LIABILITIES AND DEFERRED CREDITS:		
Trust fund advances	5,912	6,218
Other deferred credits	5,067	4,450
Total other liabilities and deferred credits	10,979	10,668
TOTAL LIABILITIES	$4,445,548	$4,074,607

FEDERAL COLUMBIA RIVER POWER SYSTEM

STATEMENT OF CHANGES IN FINANCIAL POSITION
FOR THE FISCAL YEARS ENDED JUNE 30, 1972 AND JUNE 30, 1971

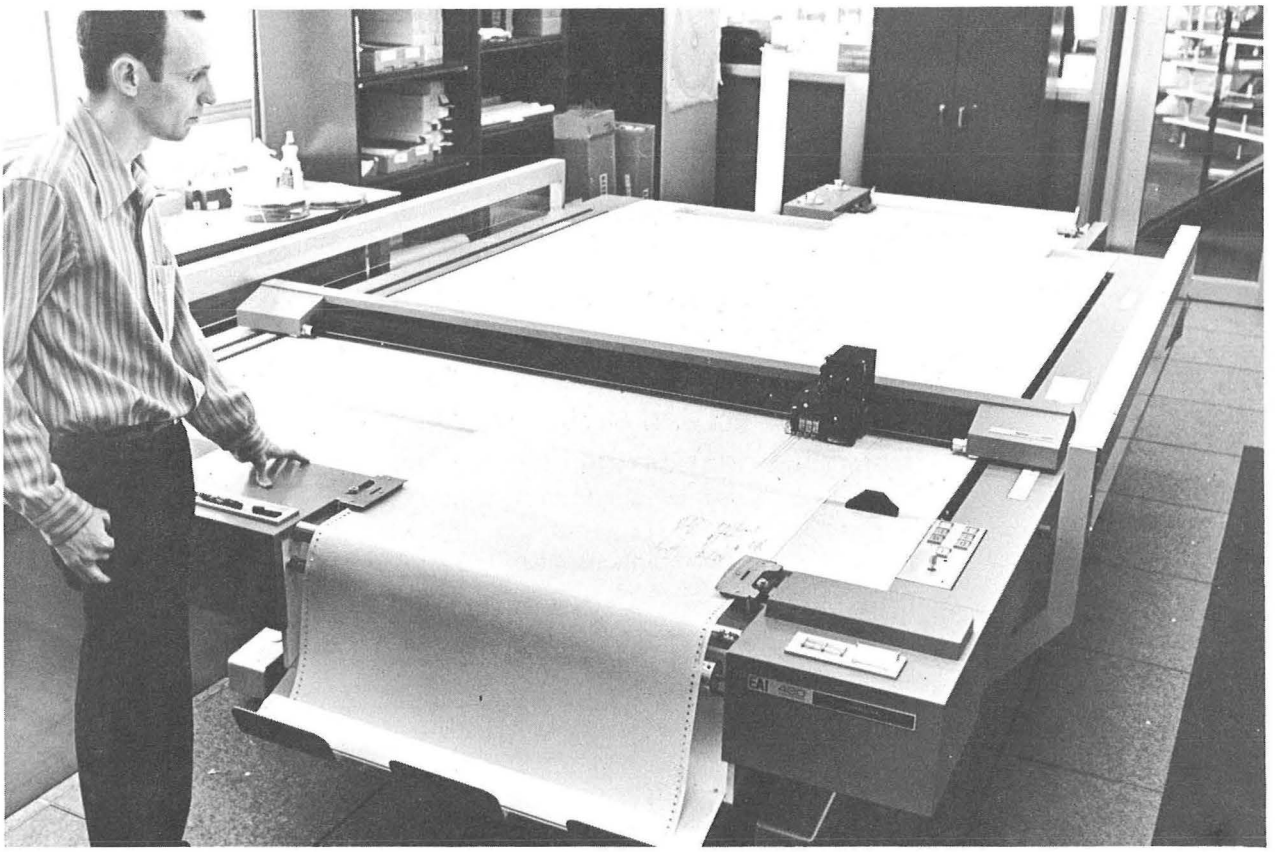
(In thousands)

	1972	1971
SOURCE OF FUNDS:		
Net revenues (Exhibit 1)	$ 4,098	$ 14,627
Add non-fund provision for depreciation	25,788	24,512
Prior years adjustments	1,535*	9,423*
Net funds from operations	28,351	29,716
Federal investment:		
Congressional appropriations	394,107	335,155
Transfers from other Federal agencies, net	3,291	219
Interest on Federal investment	90,950(a)	81,360
Transfers to continuing fund	254	
Total funds from Federal investment	488,602	416,734
Total source of funds	$516,953	$446,450
APPLICATION OF FUNDS:		
Investment in electric utility plant and facilities, net	$333,147(a)	$330,295
Funds returned to U.S. Treasury	134,981	132,149
Increase in current assets net of current liabilities	43,662	15,966*
Increase in other assets net of other liabilities	5,163	28*
Total application of funds	$516,953	$446,450

(a) Includes capitalized interest of $10,200 on projects in service and $16,338 on projects under construction.

*Denotes deduction

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



Computer controlled plotting (drafting) table.

Russian visitors visit Celilo Converter Station.

TABLE 6

FEDERAL COLUMBIA RIVER POWER SYSTEM
REPAYMENT STUDY FOR F.Y. 1972
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	22
								Plant Allocated to Commercial Power								Irrigation Assistance					
					Investment Placed in Service			Cumulative Investment Placed in Service					Allowable Unamortized Investment								
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	Unamortized Amount	Allowable Unamortized Amount	Cumulative Surplus Revenues	Fiscal Year Ending June 30
Cumulative to 6-30-72	2,103,333	581,109	108,538	725,664	3,131,054		3,131,054	3,131,054		3,131,054	688,022	2,443,032	3,130,298		3,130,298	415,548		415,548	415,548		
1973	186,000	54,684	52,464	81,912	456,921	4,699	461,620	3,587,975	4,699	3,592,674	(3,060)	2,907,712	3,587,219	4,699	3,591,918	493,935		493,935	493,935		1973
1974	192,100	58,155	22,764	88,084	122,039	5,330	127,369	3,710,014	10,029	3,720,043	23,097	3,011,984	3,709,258	10,029	3,719,287	493,935		493,935	493,935		1974
1975	204,500	60,335	26,686	103,303	502,939	10,749	513,688	4,212,953	20,778	4,233,731	14,176	3,511,496	4,211,099	20,778	4,231,877	501,586		501,586	501,586		1975
1976	212,900	63,925	12,933	122,797	632,345	6,775	639,120	4,845,298	27,553	4,872,851	13,245	4,137,371	4,843,444	27,553	4,870,997	501,586		501,586	501,586		1976
1977	224,200	67,473	8,809	130,349	148,188	9,569	157,757	4,993,486	37,122	5,030,608	17,569	4,277,559	4,991,357	37,122	5,028,479	513,027		513,027	513,027		1977
1978	233,000	70,266	8,908	146,903	443,495	7,834	451,329	5,436,981	44,956	5,481,937	6,923	4,721,965	5,434,852	44,956	5,479,808	530,959		530,959	530,959		1978
1979	258,600	73,176	9,167	161,574	292,815	10,071	302,886	5,729,796	55,027	5,784,823	14,683	5,010,168	5,726,736	55,027	5,781,763	569,461		569,461	569,461		1979
1980	272,000	73,985	9,252	164,592	1,807	14,165	15,972	5,731,603	69,192	5,800,795	24,171	5,001,969	5,723,978	69,173	5,793,151	598,935		598,935	598,935		1980
1981	282,300	74,050	8,410	164,473	31,356	10,566	41,922	5,762,959	79,758	5,842,717	35,367	5,008,524	5,736,972	79,728	5,816,700	613,870		613,870	613,870		1981
1982	286,700	74,515	8,149	170,537	188,142	12,125	200,267	5,951,101	91,883	6,042,984	33,499	5,175,292	5,918,549	91,853	6,010,402	629,871		629,871	629,871		1982
1983	294,000	74,820	7,959	173,295	31,356	13,347	44,703	5,982,457	105,230	6,087,687	37,926	5,182,069	5,933,260	105,197	6,038,457	660,363		660,363	660,363		1983
1984	293,500	74,945	7,984	172,609	10,890	14,806	25,696	5,993,347	120,036	6,113,383	37,962	5,169,803	5,943,505	120,000	6,063,505	680,864		680,864	680,864		1984
1985	296,500	75,399	8,003	175,341	108,445	15,626	124,071	6,101,792	135,662	6,237,454	37,757	5,256,117	6,046,565	135,559	6,182,124	714,988		714,988	714,988		1985
1986	302,200	76,321	7,921	182,087	169,682	18,267	187,949	6,271,474	153,929	6,425,403	35,871	5,408,195	6,213,943	153,816	6,367,759	743,323		743,323	743,323		1986
1987	307,900	77,442	7,919	186,225	72,517	17,042	89,559	6,343,991	170,971	6,514,962	36,314	5,461,440	6,283,303	170,818	6,454,121	751,413		751,413	751,413		1987
1988	313,300	77,782	7,937	186,011		20,819	20,819	6,343,991	191,790	6,535,781	41,570	5,440,689	6,268,762	191,614	6,460,376	773,247		773,247	773,247		1988
1989	323,800	77,782	7,800	184,117		18,768	18,768	6,343,991	210,558	6,554,549	54,101	5,405,356	6,254,072	210,166	6,464,238	796,081		796,081	796,081		1989
1990	323,600	77,782	9,143	182,158		26,271	26,271	6,343,991	236,829	6,580,820	54,517	5,377,110	6,229,418	236,109	6,465,527	823,415		823,415	823,415		1990
1991	323,600	77,911	8,411	181,868	43,343	26,296	69,639	6,387,334	263,125	6,650,459	55,410	5,391,339	6,241,427	262,396	6,503,823	850,416		850,416	850,416		1991
1992	324,300	77,911	3,700	180,779		35,132	35,132	6,387,334	298,257	6,685,591	61,910	5,364,561	6,202,933	296,865	6,499,798	868,848		868,848	868,848		1992
1993	342,200	77,911	3,700	178,137		25,747	25,747	6,387,334	324,004	6,711,338	82,452	5,307,856	6,108,142	322,539	6,430,681	885,515		885,515	885,515		1993
1994	342,800	77,911	3,700	175,200		32,985	32,985	6,387,334	356,989	6,744,323	85,989	5,254,852	6,016,582	355,422	6,372,004	907,181		907,181	907,181		1994
1995	343,700	77,911	3,700	172,512		40,237	40,237	6,387,334	397,226	6,784,560	89,577	5,205,512	5,995,059	395,378	6,390,437	925,016		925,016	925,016		1995
1996	344,200	77,911	3,700	168,887		30,494	30,494	6,387,334	427,720	6,815,054	93,702	5,142,304	5,948,845	425,799	6,374,644	943,017		943,017	943,017		1996
1997	344,700	77,911	3,700	165,982		36,424	36,424	6,387,334	464,144	6,851,478	86,402	5,092,326	5,922,512	461,916	6,384,428	952,018	10,705	941,313	941,313		1997
1998	345,000	77,911	3,700	163,310		30,016	30,016	6,387,334	494,160	6,881,494	100,079	5,022,263	5,858,754	491,818	6,350,572	979,352		968,647	968,647		1998
1999	345,700	77,911	3,700	159,980		34,726	34,726	6,387,334	528,886	6,916,220	104,109	4,952,880	5,825,441	526,136	6,351,577	998,685		987,980	987,980		1999
2000	347,800	77,911	3,700	156,449		40,615	40,615	6,387,334	569,501	6,956,835	109,740	4,883,755	5,720,183	565,301	6,285,484	1,030,852		1,020,147	1,020,147		2000
2001	347,900	77,911	3,700	154,137		35,613	35,613	6,387,334	605,114	6,992,448	102,160	4,817,208	5,651,198	600,316	6,251,514	1,055,519	9,992	1,034,822	1,034,822		2001
2002	348,300	77,911	3,700	150,902		34,680	34,680	6,387,334	639,794	7,027,128	115,787	4,736,101	5,603,206	634,579	6,237,785	1,074,852		1,054,155	1,054,155		2002
2003	348,300	77,911	3,700	147,048		35,628	35,628	6,387,334	675,422	7,062,756	119,641	4,652,088	5,548,134	669,354	6,217,488	1,091,519		1,070,822	1,070,822		2003
2004	348,300	77,911	3,700	143,765		33,820	33,820	6,387,334	709,242	7,096,576	122,143	4,563,765	5,380,206	702,954	6,083,160	1,109,854	781	1,088,376	1,088,376		2004
2005	348,300	77,911	3,700	142,758		41,133	41,133	6,387,334	750,375	7,137,709	123,931	4,480,967	5,202,327	742,991	5,945,318	1,126,521		1,105,043	1,105,043		2005
2006	348,300	77,911	3,700	142,219		39,959	39,959	6,387,334	790,334	7,177,668	124,470	4,396,456	5,042,988	781,714	5,824,702	1,150,023		1,128,545	1,128,545		2006
2007	348,300	77,911	3,700	141,483		39,841	39,841	6,387,334	830,175	7,217,509	125,206	4,311,091	4,926,946	820,695	5,747,641	1,173,024		1,151,546	1,151,546		2007
2008	348,300	77,911	3,700	140,943		50,843	50,843	6,387,334	881,018	7,268,352	122,878	4,239,056	4,645,269	871,467	5,516,736	1,204,691	2,868	1,180,345	1,180,345		2008
2009	348,300	77,911	3,700	141,016		47,168	47,168	6,387,334	928,186	7,315,520	119,397	4,166,827	4,472,456	917,566	5,390,022	1,227,024	6,276	1,196,402	1,196,402		2009
2010	348,300	77,911	3,700	141,014		53,358	53,358	6,387,334	981,544	7,368,878	125,675	4,094,510	4,244,390	965,711	5,210,101	1,247,692		1,217,070	1,217,070		2010
2011	348,300	77,911	3,700	141,119		59,062	59,062	6,387,334	1,040,606	7,427,940	125,570	4,028,002	4,142,131	1,024,196	5,166,327	1,267,692		1,237,070	1,237,070		2011
2012	348,300	77,911	3,700	137,317		39,747	39,747	6,387,334	1,080,353	7,467,687	128,826	3,938,923	3,949,041	1,062,045	5,011,086	1,286,193	546	1,255,025	1,255,025		2012
2013	348,300	77,911	3,700	135,867		53,777	53,777	6,387,334	1,134,130	7,521,464	94,806	3,897,894	3,829,041	1,110,705	4,939,746	1,305,027	36,016	1,237,843	1,237,843		2013
2014	348,300	77,911	3,700	132,807		61,374	61,374	6,387,334	1,195,504	7,582,838	96,020	3,863,248	3,696,138	1,165,658	4,861,796	1,319,386	37,862	1,214,340	1,214,340		2014
2015	348,300	77,911	3,700	130,100		42,812	42,812	6,387,334	1,238,316	7,625,650	100,251	3,805,809	3,591,138	1,201,125	4,792,263	1,330,243	36,338	1,188,859	1,188,859		2015
2016	348,300	77,911	3,700	130,365		54,167	54,167	6,387,334	1,292,483	7,679,817	89,723	3,770,253	3,516,138	1,248,056	4,764,194	1,341,100	46,601	1,153,115	1,153,115		2016
2017	348,300	77,911	3,700	130,636		37,606	37,606	6,387,334	1,330,089	7,717,423	98,292	3,709,567	3,365,890	1,278,208	4,644,098	1,351,957	37,761	1,126,211	1,126,211		2017
2018	348,300	77,911	3,700	131,053		43,915	43,915	6,387,334	1,374,004	7,761,338	116,289	3,637,193	3,208,077	1,312,166	4,520,243	1,362,814	19,347	1,117,721	1,117,721		2018
2019	348,300	77,911	3,700	132,333		47,587	47,587	6,387,334	1,421,591	7,808,925	82,798	3,601,982	2,883,970	1,349,475	4,233,445	1,378,208	51,558	1,081,557	1,081,557		2019
2020	348,300	77,911	3,700	134,576		46,856	46,856	6,387,334	1,468,447	7,855,781	110,714	3,538,124	2,657,971	1,381,061	4,039,032	1,378,208	21,399	1,060,158	1,060,158		2020
2021	348,300	77,911	3,700	136,658		48,540	48,540	6,387,334	1,516,987	7,904,321	119,120	3,467,544	2,535,289	1,415,615	3,950,904	1,378,208	10,911	1,049,247	1,049,247		2021
2022	348,300	77,911	3,700	138,210		41,999	41,999	6,387,334	1,558,986	7,946,320	117,426	3,392,117	2,483,280	1,443,718	3,926,998	1,378,208	11,053	1,038,194	1,038,194		2022
2023	348,300	77,911	3,700	140,170		42,487	42,487	6,387,334	1,601,473	7,988,807	120,373	3,314,231	2,145,359	1,471,709	3,617,068	1,378,208	6,146	1,032,048	1,032,048		2023
2024	348,300	77,911	3,700	142,670		39,838	39,838	6,387,334	1,641,311	8,028,645	110,710	3,243,359	2,131,320	1,497,403	3,628,723	1,378,208	13,309	1,018,739	1,018,739		2024
2025	348,300	77,911	3,700	145,289		42,098	42,098	6,387,334	1,683,409	8,070,743	113,241	3,172,216	1,707,381	1,521,305	3,228,686	1,378,208	8,159	1,010,580	1,010,580		2025
2026	348,300	77,911	3,700	150,218		48,023	48,023	6,387,334	1,731,432	8,118,766	98,201	3,122,038	1,110,036	1,549,138	2,659,174	1,378,208	18,270	992,310	992,310		2026
2027	348,300	77,911	3,700	154,536		48,524	48,524	6,387,334	1,779,956	8,167,290	87,727	3,082,835	1,038,848	1,570,201	2,609,049	1,378,208	24,426	967,884	967,884		2027
2028	348,300	77,911	3,700	151,333		36,739	36,739	6,387,334	1,816,695	8,204,029	98,304	3,021,270	743,353	1,587,777	2,331,130	1,378,208	17,052	950,832	950,832		2028
2029	348,300	77,911	3,700	155,788		47,382	47,382	6,387,334	1,864,077	8,251,411	104,815	2,963,837	542,538	1,608,006	2,150,544	1,378,208	6,086	944,746	944,746		2029
2030	348,300	77,911	3,700	156,998		48,024	48,024	6,387,334	1,912,101	8,299,435	109,691	2,902,170	540,731	1,622,099	2,162,830	1,378,208		944,746	944,746		2030
2031	348,300	77,911	3,700	153,347		38,615	38,615	6,387,334	1,950,716	8,338,050	103,457	2,837,328	509,375	1,637,204	2,146,579	1,378,208	9,885	934,861	934,861		2031
2032	348,300	77,911	3,700	149,732		36,823	36,823	6,387,334	1,987,539	8,374,873	116,957	2,757,194	327,233	1,648,620	1,975,853	1,378,208		934,861	934,861		2032
2033	348,300	77,911	3,700	145,297		35,846	35,846	6,387,334	2,023,385	8,410,719	121,392	2,671,648	296,877	1,658,609	1,955,486	1,378,208		934,861	934,861		2033
2034	348,300	77,911	3,700	140,518		33,157	33,157	6,387,334	2,056,542	8,443,876	126,171	2,578,634	292,987	1,667,291	1,960,278	1,378,208		934,861	934,861		2034
2035	348,300	77,911	3,700	135,532		37,876	37,876	6,387,334	2,094,418	8,481,752	123,506	2,493,004	210,542	1,675,330	1,885,872	1,378,208	7,651	927,210	927,210		2035
2036	348,300	77,911	3,700	130,840		38,489	38,489	6,387,334	2,132,907	8,520,241	107,800	2,423,693	80,860	1,682,137	1,762,997	1,378,208	28,049	899,161	899,161		2036
2037	348,300	77,911	3,700	127,072		40,120	40,120	6,387,334	2,173,027	8,560,361	119,268	2,344,545	42,343	1,688,146	1,730,489	1,378,208	20,349	878,812	878,812		2037
2038	348,300	77,911	3,700	122,524		33,037	33,037	6,387,334	2,206,064	8,593,398	128,064	2,249,518	42,343	1,692,193	1,734,536	1,378,208	16,101	862,711	862,711		2038
2039	348,300	77,911	3,700	117,438		38,126	38,126	6,387,334	2,244,190	8,631,524	127,706	2,159,938	42,343	1,695,276	1,737,619	1,378,208	21,545	841,166	841,166		2039
2040	348,300	77,911	3,700	112,768		47,476	47,476	6,387,334	2,291,666	8,679,000	109,704	2,097,710	42,343	1,699,265	1,741,608	1,378,208	44,217	796,949	796,949		2040
2041	348,300	77,911	3,700	109,015		35,444	35,444	6,387,334	2,327,110	8,714,444	138,895	1,994,259		1,700,882	1,700,882	1,378,208	18,779	778,170	778,170		2041
2042	348,300	77,911	3,700	103,326		35,464	35,464	6,387,334	2,362,574	8,749,908	143,183	1,886,540		1,701,552	1,701,552	1,378,208	20,180	757,990	757,990		2042
2043	348,300	77,911	3,700	97,724		47,210	47,210	6,387,334	2,409,784	8,797,118	134,294	1,799,456		1,701,552	1,701,552	1,378,208	34,671	723,319	723,319		2043
2044	348,300	77,911	3,700	92,759		40,838	40,838	6,387,334	2,450,622	8,837,956	153,429	1,686,865		1,700,942	1,700,942	1,378,208	20,501	702,818	702,818		2044
2045	348,300	77,911	3,700	86,679		44,918	44,918	6,387,334	2,495,540	8,882,874	140,412	1,591,371		1,699,774	1,699,774	1,378,208	39,598	663,220	663,220		2045
2046	348,300	77,911	3,700	81,684		54,281	54,281	6,387,334	2,549,821	8,937,155	156,670	1,488,982		1,698,131	1,698,131	1,378,208	28,335	634,885	634,885		2046
2047	348,300	77,911	3,700	75,536		35,483	35,483	6,387,334	2,585,304	8,972,638	183,063	1,341,402		1,696,080	1,696,080	1,378,208	8,090	626,795	626,795		2047
2048	348,300	77,911	3,700	67,540		39,892	39,892	6,387,334	2,625,196	9,012,530	177,315	1,203,979		1,693,702	1,693,702	1,378,208	21,834	604,961	604,961		2048
2049	348,300	77,911	3,700	60,360		53,629	53,629	6,387,334	2,678,825	9,066,159	183,495	1,074,113		1,691,051	1,691,051	1,378,208	22,834	582,127	582,127		2049
2050	348,300	77,911	3,700	52,779		37,694	37,694	6,387,334	2,716,519	9,103,853	186,576	925,231		1,688,173	1,688,173	1,378,208	27,334	554,793	554,793		2050
TOTALS	27,729,033	6,538,606	567,457	11,620,933	6,387,334	2,716,519	9,103,853				8,178,622						823,415				

SCHEDULE B

FEDERAL COLUMBIA RIVER POWER SYSTEM

CHANGES IN ACCUMULATED NET REVENUES
FOR THE FISCAL YEAR ENDED JUNE 30, 1972

(In thousands)

	Cumulative Balance June 30, 1971	Fiscal Year 1972	Prior Years Adjustments (Note 9)	Cumulative Balance June 30, 1972
OPERATING REVENUES	$1,927,348	$175,985		$2,103,333
EXPENSES:				
Purchase and exchange power	75,744	32,794		108,538
Operation and maintenance expense	530,981	48,893	$1,235	581,109
Interest expense	661,252	64,412		725,664
Total	1,267,977	146,099	1,235	1,415,311
NET REVENUES AVAILABLE FOR REPAYMENT	659,371	29,886	1,235*	688,022
LESS DEPRECIATION	307,779	25,788	300	333,867
ACCUMULATED NET REVENUES (Exhibit 2)	$ 351,592	$ 4,098	$1,535*	$ 354,155

*Denotes deduction

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

FEDERAL COLUMBIA RIVER POWER SYSTEM

NOTES TO THE FINANCIAL STATEMENTS

Note 1. Major Accounting Considerations

The Federal Columbia River Power System (FCRPS) consists of the Bonneville Power Administration (BPA) and the generating facilities of the Corps of Engineers (Corps) and the Bureau of Reclamation (Bureau) for which BPA is the power marketing agent. Each entity is separately managed and financed but the facilities are operated as an integrated power system with the financial results consolidated under the FCRPS name.

These financial statements are prepared on a cost accounting basis including compound interest depreciation and interest on the unpaid Federal investment.

Costs of multi-purpose Corps and Bureau projects are assigned to the individual purposes through a cost allocation process. The portion of total project costs allocated to power is included in these statements.

These statements are not used to establish BPA's wholesale power rates. A separate repayment analysis is prepared for that purpose. In the accompanying statements, the depreciation life for fixed assets allocated to power averages about 64 years. However, the repayment periods used to establish power rates are 50 years for the generating projects and 40 years for the transmission system. Schedule A lists the projects included in FCRPS and the allocation of plant investment to the various purposes.

Changes in the format of the accompanying statements include revision of the Statement of Revenues and Expenses (Exhibit 1), and the Statement of Changes in Financial Position (Exhibit 3). In effecting these changes, Fiscal Year 1971 data were conformed to the new formats. Also, for the first time, a schedule of Changes in Accumulated Net Revenues (Schedule B) is included. This schedule provides a correlation between the accompanying cost based statements and cumulative totals shown in the first line of the separate repayment analysis.

Note 2. Tentative Cost Allocations

Plant and operation and maintenance expenses based on tentative allocations between power and non-power purposes are included for eight of the projects listed in Schedule A. In the past, adjustments have been made to plant and accumulated net revenues when firm allocations were adopted. At June 30, 1972, total joint plant costs for these eight projects are about $1.5 billion of which $1.1 billion are tentatively allocated to power and subject to retroactive adjustment. The amount of adjustments that may be necessary when the allocations become firm are not determinable at this time.

Note 3. Interest Credit

BPA's method of reducing interest expense to recognize an interest credit on current year receipts deposited with the U.S. Treasury has been questioned by the U.S. General Accounting Office (GAO). The method recommended by GAO is currently being considered by the Department of the Interior. It is not known at this time if BPA's current method will be changed. If GAO's method is adopted, interest expense for Fiscal Years 1971 and 1972 would be increased in total for the two years by about $4.1 million.

Note 4. Repayment Responsibility for Irrigation Costs

Legislation requires that FCRPS net revenues will provide financial assistance to return to the U.S. Treasury the cost of Bureau irrigation facilities which benefiting water users are unable to repay. Investment made through June 30, 1972 results in estimated irrigation assistance of $416 million. FCRPS repayment studies show that the first payment for the assistance will be made in 1997. Congress may also authorize additional assistance of up to $20 million for investment allocated to irrigation at six Corps projects.

The method of reflecting this repayment requirement in the accompanying statements is currently under study. The GAO has questioned the current practice and BPA agrees that all ramifications of the question should be explored in depth, including classification and amortization. However, a decision has not been reached at the time of statement preparation, and efforts will be made for resolution for the June 30, 1973 statements. These efforts will consider both legal requirements and generally accepted accounting principles and will involve consideration by GAO and the Department of the Interior, including all of its power marketing entities which are involved in irrigation assistance.

Note 5. Commitments to Exchange Power and Acquire Project Capability

a. Hanford Plant No. 1

BPA has made agreements with the Washington Public Power Supply System (WPPSS) and 76 participating utilities, to provide power at BPA rates in an amount equal to the annual operating and debt service costs of the Hanford Plant No. 1, whether or not the plant is operating. In return, BPA receives the plant output. At June 30, 1972, about $73 million of bonds remain outstanding and are due to be fully retired by 1996.

b. Columbia Storage Power Exchange

BPA has entered into unconditional agreements to provide to 41 utilities amounts of power which vary annually over a 30 year period and which have a value of $314.1 million evaluated at current BPA rates. In exchange, BPA receives from the Columbia Storage Power Exchange, Canada's share of the additional power generated in the United States as a result of operating the three Canadian Treaty storage dams.

c. Centralia Coal Fired Steam Plant

BPA has entered into agreements with eight utilities to acquire a portion of the capability of the Centralia Coal Fired Steam Plant. BPA's commitment begins when the plant begins operation and continues until April 1, 1974 whether or not full capability is maintained. At June 30, 1972 the plant had not achieved full capability. BPA's commitment through April 1, 1974 is estimated at $27.8 million.

d. Trojan Nuclear Plant

BPA has entered into agreements to acquire throughout the life of the Project, beginning approximately September 1, 1974 the Eugene Water and Electric Board's 30% ownership share of Project capability of the Trojan Nuclear Plant. BPA's costs are estimated to be $12.1 million per year for a 35 year period. BPA is committed to 30% of annual costs whether or not the plant is completed, operable, or operating. By giving notice prior to July 1977, Eugene may withdraw Project capability beginning July 1, 1984 for its own use, and BPA payments would be reduced proportionally to any such withdrawal.

e. WPPSS Nuclear Project No. 2

BPA has entered into agreements to acquire the capability of the WPPSS Nuclear Project No. 2 which will be constructed and operated by WPPSS on the AEC Hanford reservation. The plant is scheduled for commercial operation beginning approximately September 1, 1977.

During the estimated 35 year life of the project, BPA's total costs are estimated to be $1.5 billion. BPA is obligated under the agreements to pay the annual costs whether or not the project is completed, operable, or operating.

Note 6. Contingent Liabilities

Contingent liabilities total approximately $64.0 million of which $61.6 million represent various contractor claims and $2.4 million represent claims under the Federal Tort Claims Act. Included in the contractor claims is $54.7 million for work at Libby Dam Project. The activities which gave rise to these claims occurred prior to June 30, 1972, but part of the claims were filed subsequent to that date.

Note 7. Interest Rates

Rates of interest applied to unpaid Federal Investment are:

Generating Projects

Albeni Falls	2-1/2%	Lost Creek	3-1/8%
Boise	3%	Lower Granite	2-1/2%
Bonneville	2-1/2%	Lower Monumental	2-1/2%
Bonneville Second Power House and Peaking Modifications	3-1/4%	McNary	2-1/2%
Chief Joseph	2-1/2%	Minidoka	3%
Chief Joseph Additional Units	3-1/4%	Palisades	3%
Columbia Basin	3%	Teton	3.342%
Columbia Basin Third Power Plant	3-1/8%	The Dalles	2-1/2%
Cougar	2-1/2%	The Dalles Additional Units	3-1/8%
Detroit-Big Cliff	2-1/2%	Yakima – Rosa Division	3%
Dworshak	2-5/8%	Yakima – Kennewick Division	2-1/2%
Green Peter-Foster	2-1/2%		
Hills Creek	2-1/2%	Transmission Facilities – BPA	
Hungry Horse	3%	Through Fiscal Year 1963	2-1/2%
Ice Harbor	2-1/2%	Fiscal Year 1964	2-7/8%
John Day	2-1/2%	Fiscal Year 1965	3%
Libby	3-1/8%	Fiscal Year 1966 through 1968	3-1/8%
Little Goose	2-1/2%	Fiscal Years 1969 and 1970	3-1/4%
Lookout Point-Dexter	2-1/2%	Fiscal Year 1971	4-7/8%
		Fiscal Year 1972	5-3/8%

Note 8. Purchase and Exchange Power

The current year increase in this expense is primarily the result of new steam purchase agreements for operation of the Hanford Plant No. 1. The new agreements apply to Fiscal Years 1972 through 1975. The amount of the increase in Fiscal Year 1972 for operation of Hanford Plant No. 1 was $14.9 million.

Note 9. Adjustments to Accumulated Net Revenues

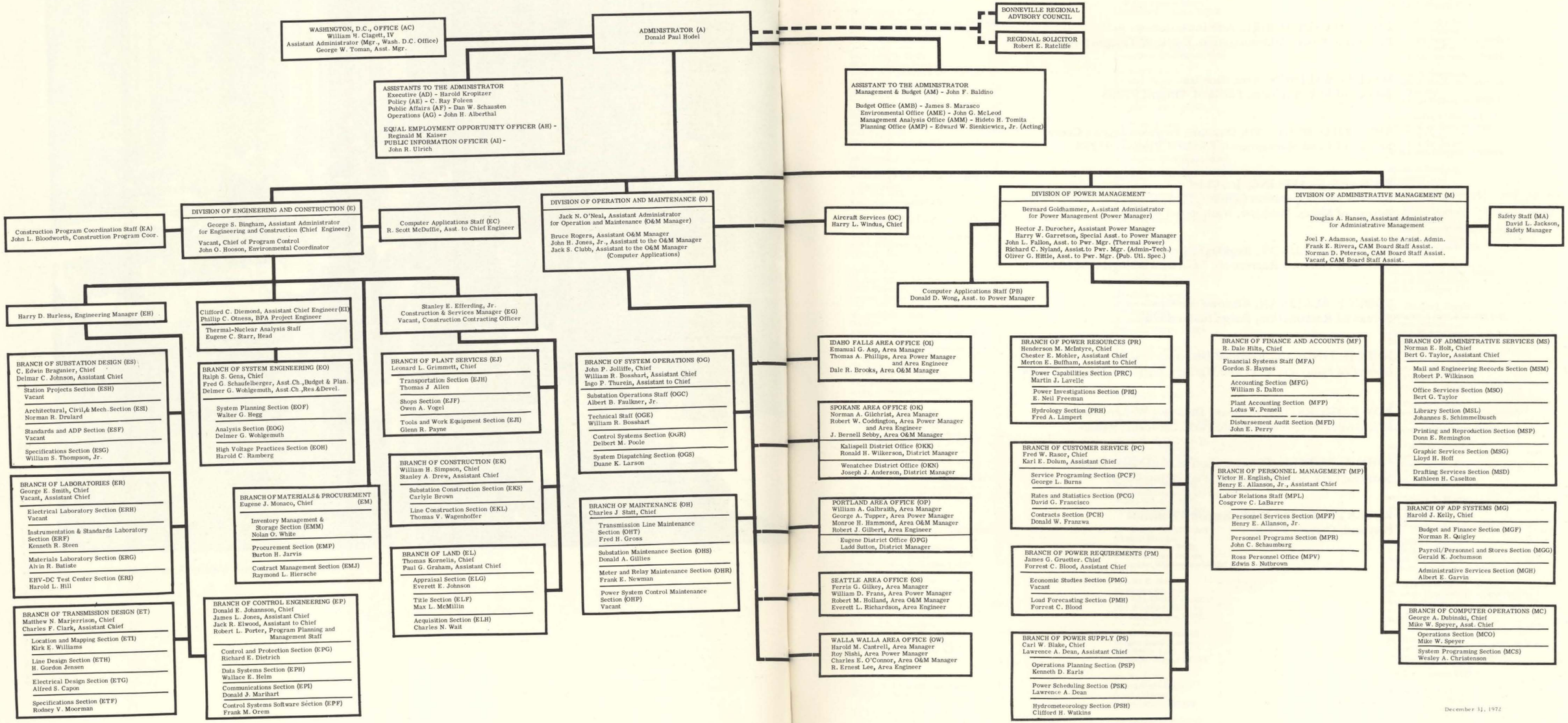
The following table lists the adjustments which have caused the net decrease in Accumulated Net Revenues of $1,535,000 shown in Exhibit 3 and Schedule B.

	In Thousands
1. Write-off of surplus and obsolete materials and supplies at BPA	$(1,157)
2. Extraordinary retirements caused by construction of third power plant at Columbia Basin Project	(256)
3. Correction of adjustment to expenses at Chief Joseph Project due to adoption of sub-allocation to irrigation pumping power	(124)
4. Minor adjustment at Albeni Falls Project	2
	$(1,535)

Bonneville Regional Advisory Council in session.

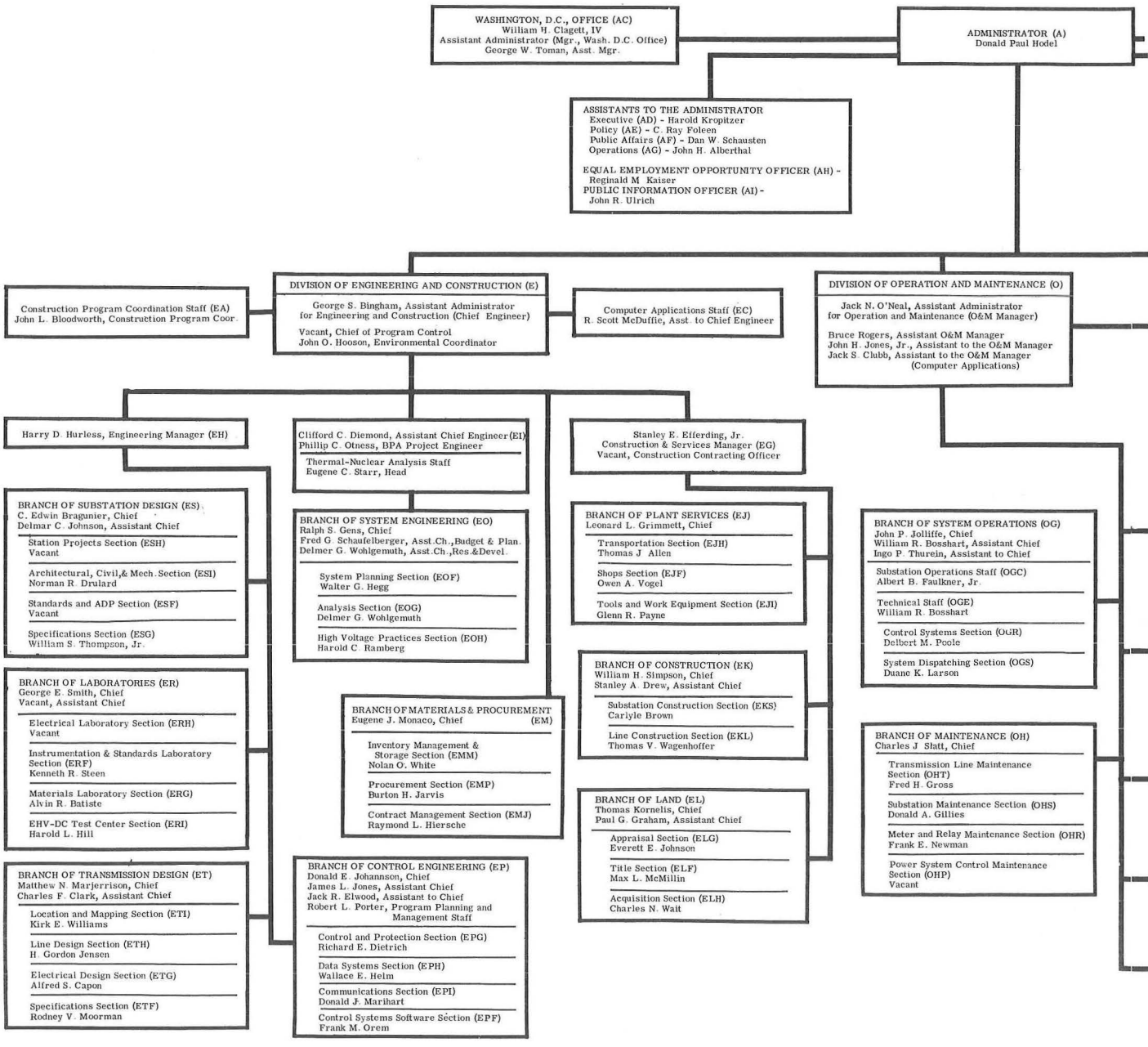
BPA MANAGEMENT & ASSOCIATED GROUPS

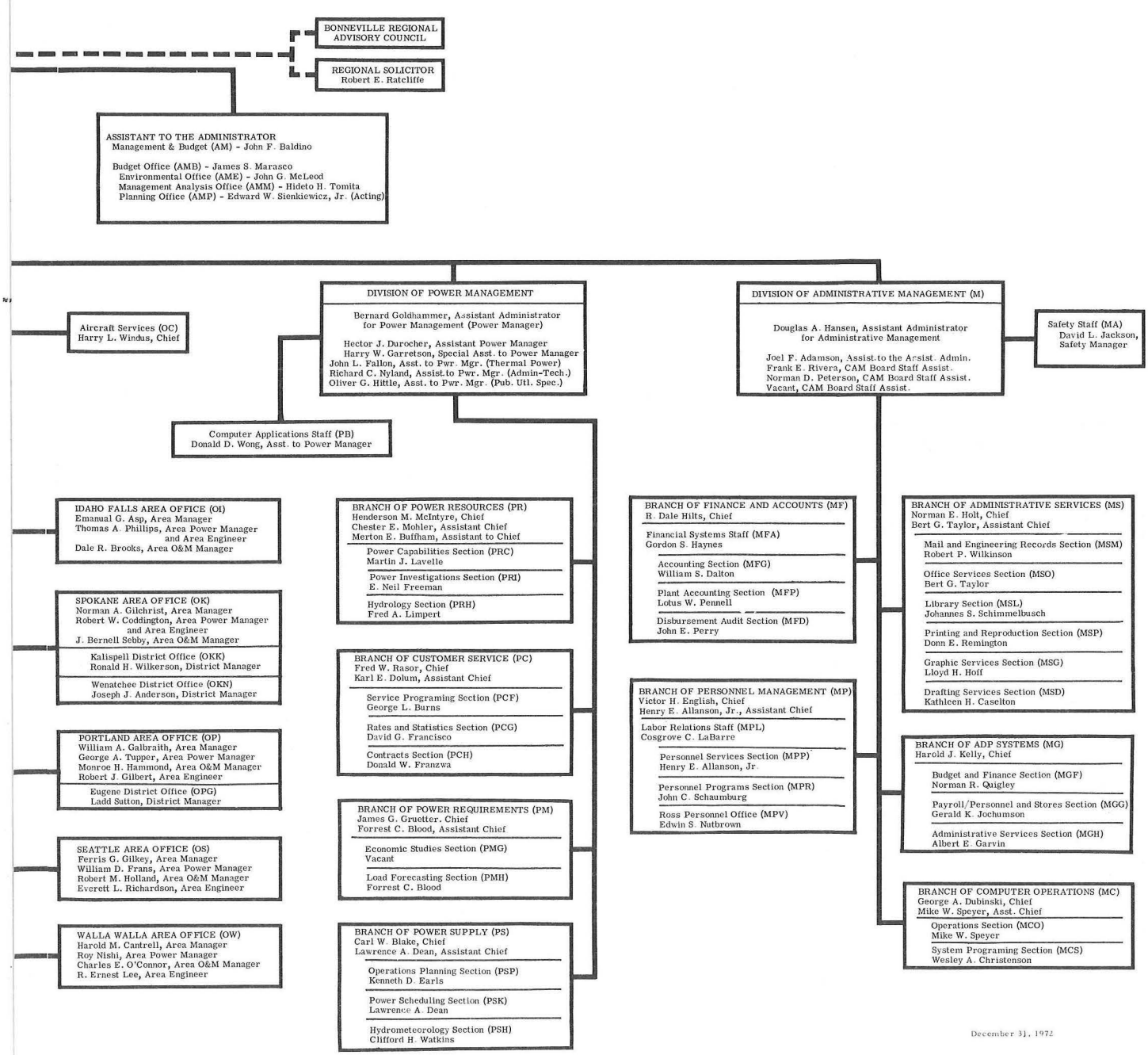
BPA ORGANIZATION CHART



December 31, 1972

BPA ORGANIZATION CHART





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