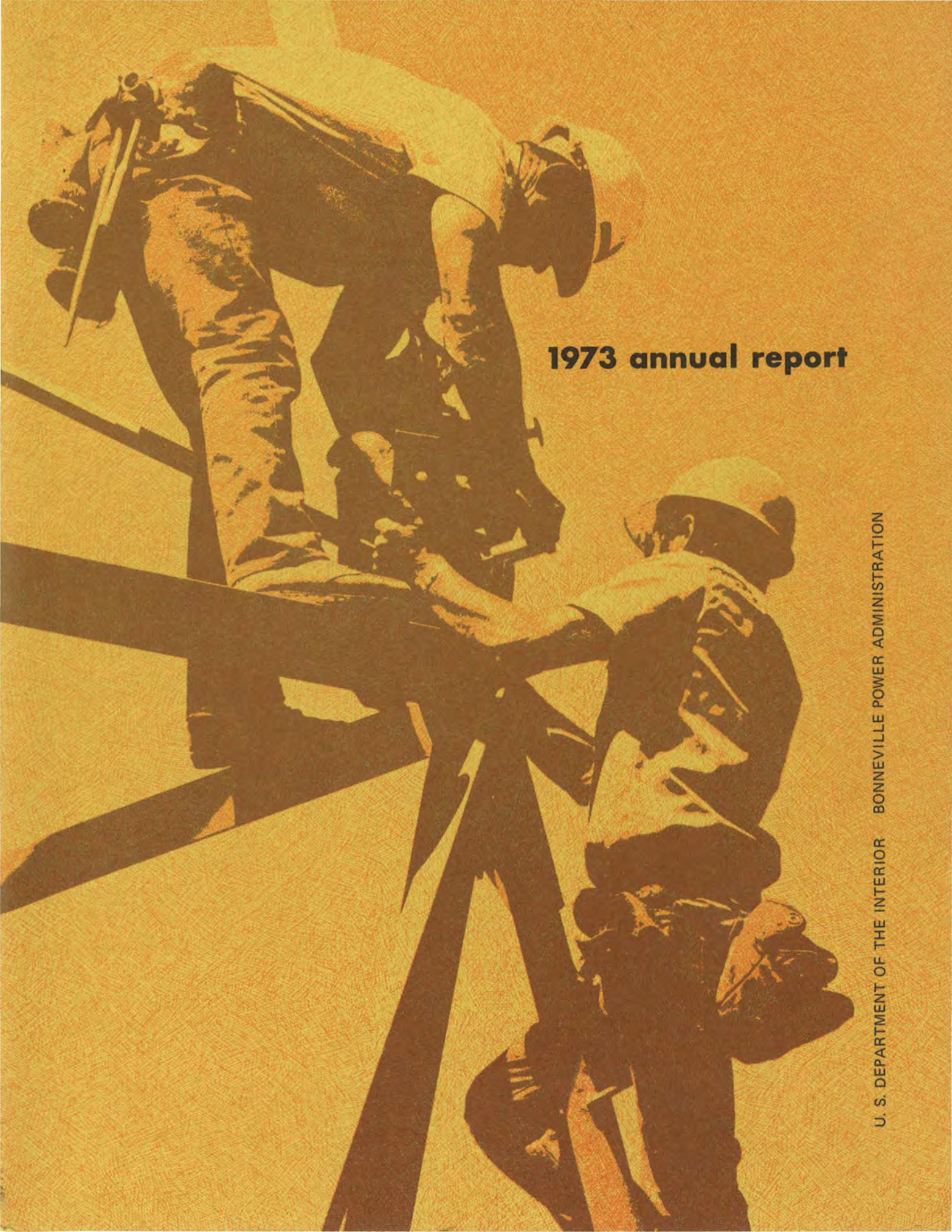


1973 annual report

U. S. DEPARTMENT OF THE INTERIOR BONNEVILLE POWER ADMINISTRATION

DECEMBER 31, 1973

FEDERAL COLUMBIA RIVER POWER SYSTEM

1973 annual report

U. S. DEPARTMENT OF THE INTERIOR
Rogers C. B. Morton, Secretary

BONNEVILLE POWER ADMINISTRATION
Donald Paul Hodel, Administrator

Contents

Letter to the Secretary 1

Introduction—The End of an Era 5

Status of the Hydro-Thermal Power Program 9

Expanding and Upgrading the Transmission Grid 15

The Operating Year 23

Power Sales for the Year 31

July – December 1973 35

The Financial Year 45

Financial Statements 50

Tables 62

BPA Structure and Administration 69

Outgoing Administrator H. R. Richmond congratulates successor Don Hodel at the latter's swearing-in ceremony.

Letter to the Secretary

December 31, 1973

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

Dear Mr. Secretary:

This is the Bonneville Power Administration's 36th Annual Report on the Federal Columbia River Power System. It covers events of Fiscal Year 1973 and significant developments since June 30. The latter are of such importance that a special chapter of this report has been devoted to them.

Fiscal Year 1973 can be considered a bench mark. It signaled the long-anticipated end of an era of cheap, abundant power for the people of the Pacific Northwest. The Columbia watershed, which has blessed this region with vast quantities of low-cost hydroelectric energy, is no longer capable of satisfying the growing demand. The region has now turned to the rapid development of thermal generation to meet its firm energy requirements.

During the past several years our annual reports have described the cooperative regional Hydro-Thermal Power Program, a unique arrangement whereby 108 utilities and the Federal Government have joined to plan and construct the hydro and thermal generation required through 1982. In submitting our last annual report to you, I said, "Unfortunately, it appears that the net-billing procedure adopted by Bonneville to help finance non-Federal thermal power plants will no longer be feasible after fiscal year 1982. Acceptable alternatives . . . 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 . . . ."

With your strong support and that of the Under Secretary, we and the Northwest utility industry have labored throughout the past year to produce such a plan for future power supply, as well as a plan which might permit BPA to use its receipts for its activities. Early last fall we reached consensus agreement on the latter proposal. I am also happy to report that in December 1973 all interested parties joined in drafting a second proposal for meeting the region's future power supply requirements on a cooperative basis.

Under this proposed power supply plan, the utilities and the Federal Government would expect to build approximately 7.5 million kilowatts of coal-fired and nuclear generation and 3.7 million kilowatts of peaking

capacity, to be added to the generation scheduled under the present Hydro-Thermal Power Program. If successful in these efforts, the region will be well on its way to assuring what President Nixon calls "self-sufficiency in energy" for the remainder of this century.

In addition to the challenge confronting the Pacific Northwest to develop long-range resources, calendar year 1973 presented the region with an immediate power crisis of potentially staggering dimensions. The Columbia Basin experienced one of its lowest water periods on record, and by the end of August reservoirs were at an all-time low. Continued poor streamflows could have resulted in a firm-power deficit of up to 30 percent by March 1974.

Reaction throughout the region was immediate and broad-based. The utilities and BPA launched a well publicized campaign to encourage voluntary energy conservation by all consumers. State and local governments joined the program. Your assistance was sought and readily given when, in mid-August, you authorized BPA " to purchase energy from anywhere, at any time, and at any price" to assure our ability to meet our commitments in the face of impending shortage. We did just that, and energy generated by all conceivable sources was purchased. These purchases amounted to more than 300 million kilowatt-hours at a cost in excess of $2 million.

To their great credit, the people in the region cooperated to make the conservation program a success. It is estimated that average savings in the use of electrical energy exceeded 6 percent, based upon load forecasts. Even the forces of nature which had dealt us severe blows earlier in the year responded to our needs. Heavy precipitation began in late October and continued throughout the remainder of 1973. It now appears that we will be able to meet our firm energy commitments at least through 1974.

I would be remiss if I failed to mention the tremendous assistance we received from the two Federal agencies which operate the hydroelectric projects in the Northwest — the North Pacific Division of the Army Corps of Engineers and the Pacific Northwest Region of the Bureau of Reclamation. Although faced with a multitude of pressures stemming from their other responsibilities on the rivers, these two agencies operated the Federal dams in such a manner as to optimize their power output. BPA and electricity users are indebted to them for their unstinting efforts.

Because of the power shortage in the Pacific Northwest, BPA had little surplus energy to transmit to California during Fiscal Year 1973. This loss in sales, coupled with rising costs, resulted in a record deficit of

$24 million on a cost accounting basis. Although the deficit was $2.7 million below that forecasted, we expect this deficit trend to become more pronounced in FY 1974. Revenues for FY 1973 were a record high $177.4 million, but $8.6 million less than forecasted.

As mentioned in our last annual report, we will seek an increase in our wholesale rates as well as a revision in our rate structure, effective December 20, 1974. The magnitude of the rate increase is expected to be in the 30 percent range. When the new rates have been developed, we will submit them for your approval and that of the Federal Power Commission.

The year 1973 was merely a harbinger of the future. Nationwide fossil fuel shortages, ever-lengthening leadtimes required for the construction of thermal plants, past slippages in the scheduled construction of Federal hydro generation, and spiraling inflation make the future look grim indeed. The Bonneville Power Administration faces a challenging task. But the heartening support we have already received from all segments of the Northwest community is a basis for renewed confidence. I believe that BPA will play an important role in proving that the United States can successfully meet one of the greatest tests in its history.

Sincerely,

Donald Paul Hodel

Donald Paul Hodel
Administrator

"It now becomes apparent that the Pacific Northwest faces the first real test of whether we as a nation can and will exercise the self-discipline to ward off the looming energy crisis. The contest begins right now, and the name of the game is energy conservation."

Statement by Interior Secretary Rogers C. B. Morton at an August 1973 news conference in Seattle, Washington.

8 ★★★ 4 M THE OREGONIAN, MONDAY, AUGUST 6, 1973

Utilities press for action to avoid NW energy crunch

SEATTLE (AP) — Industries, homeowners and institutions in Washington and Oregon will soon be asked to use less electricity to save power, a Seattle newspaper says.

The Post-Intelligencer, in its Thursday edition, reports the Bonneville Power Administration will issue the energy conservation call in the face of an impending winter power shortage.

A BPA spokesman in Portland said the agency is in the process of developing an energy conservation policy and program.

"It's still just an idea," said the spokesman. It would involve asking our customers to use less electricity."

The BPA, which serves more than 100 utilities in the three states, needs to save water for power generation this winter, the AP reports.

A Pacific Northwest drought has caused the Columbia River system, the BPA's main power source, to ebb to its lowest level since 1944, says Gordon Hildebrand, of the Army Corps of Engineers Portland, Ore., Reservoir Control Center. "We had a bad winter, meeting firm power commitments was touch and go."

For the first time in Grand Coulee Dam's history, said Hildebrand, the dam reservoir didn't fill completely following the spring runoff.

The lowest stream flows in 50 years are forcing dam managers to draw water out of reservoirs earlier than normal just to meet the region's day-to-day summer power needs, he says.

The resulting power shortage is estimated to be about 600,000 megawatts, enough to power Seattle for a year, says Gordon F. Vickery, Vickery, Seattle City Light superintendent, and BPA officials have already met with Seattle-area businesses to talk about energy conservation.

Save power, BPA urges

Columbia low

Outage plan considered in event of power crisis

Northwest facing critical situation

Joint power conservation drive begins

The Daily Chronicle

RICHARD LAFROMBOISE, PUBLISHER, 1966-1968

SATURDAY, AUGUST 11, 1973 JACK BRITTEN, PUBLISHER

Energy saving tip: Turn out the lights

Rationing of Power Near in Northwest

PUD emphasizes power shortages likely this winter

McCall declares energy emergency

THE SPOKESMAN-REVIEW

4 EDITORIAL PAGE. THURSDAY, AUGUST 9, 1973.

Preparations for the Power Pinch

Introduction — The End of an Era

Fiscal Year 1973 may well go down in BPA history as the last of the "years of plenty" for the power supply system in the Pacific Northwest. As it came to a close, the region confronted not only a decade or more of forecasted power deficits, but a near-term firm energy shortage without precedent in Northwest history.

The long-range dilemma stems from delays in planning, siting, financing and constructing sufficient hydroelectric and thermal generation to keep pace with a growing population and its burgeoning appetite for electrical energy. Despite the proven accuracy of BPA and utility load forecasting over many years, new generation is simply not coming on line in time to bridge the widening load/resource gap. The reasons are manifold — costlier and more complex financing, slippages in Federal and non-Federal construction, material and labor shortages, and the technological problems associated with developing a new family of thermal generation. Compounding these factors is the concern for the environment and the pyramiding of multigovernmental regulations which stretch out the leadtimes required to get new generation constructed and operating.

As a result, load/resource forecasts through the 1970's and well into the 1980's show a series of substantial deficits in both firm energy and peaking capacity relieved only occasionally by narrow surpluses. This outlook will worsen if projects now being planned or under construction fall behind schedule. Both in the Northwest and nationally, experience shows such slippages to be the rule rather than the exception.

This gloomy outlook for the future became an immediate reality as the Columbia Basin experienced one of its lowest water years on record. Snowpack throughout the Basin averaged only about 70 percent of normal last winter (1972-73), and the region experienced a severe drought through the ensuing spring and summer. By the end of August 1973, reservoirs in the region were at an all-time low. Translated into energy terms, they were short of normal operating level by 15 billion kilowatt-hours, roughly comparable to the annual output of three Bonneville Dams. This reservoir storage deficiency amounted to 7.5 percent of the firm energy requirements for the remainder of the 20-1/2-month critical period ending April 30, 1975.

Having already curtailed secondary energy deliveries to the maximum extent, BPA and the Northwest utilities immediately embarked upon a two-pronged effort to close the impending gap. First, they launched a strenuous campaign to encourage energy conservation through voluntary cutbacks on the part of all consumers. Second, they began canvassing every conceivable source of energy within the region, in surrounding states and in Western Canada. Such was the urgency of this quest that Secretary Morton, at a Seattle news conference on August 18, reported, " . . . I have authorized BPA to purchase energy from anywhere, at any time, and at any price."

BPA and the utilities in the region initiated the energy conservation program in August 1973. The success of this program and its level of sustained support by consumers may well determine whether or not the Pacific Northwest can weather the power shortages which loom in the future.

At the end of FY 1973, another BPA milestone was in sight — the submission of a proposal for its first major rate increase. Since its creation in 1937, the Bonneville Power Administration has imposed only one wholesale rate hike, and that in 1965 averaged only about 3 percent. Now BPA's

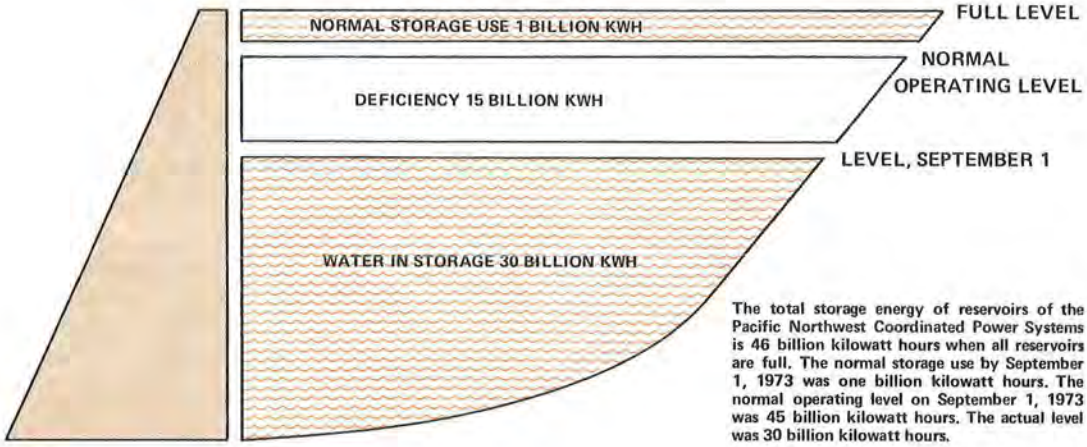
customers are facing a proposed increase in the order of 30 percent, to be submitted to the Federal Power Commission in July 1974 and to take effect in December 1974. Consumers of electricity in the Pacific Northwest have traditionally enjoyed low power rates. But increasing dependency upon high-cost thermal generation and other factors will be reflected in steeper rates for all users, in this region and nationally.

Another important development in FY 1973 was the full recognition of the fact that the Hydro-Thermal Power Program cannot be continued in its present form. The method employed by BPA to acquire power from projects constructed prior to 1982 to meet the load growth is no longer useable. A new program must be developed to deal with the period beyond 1981.

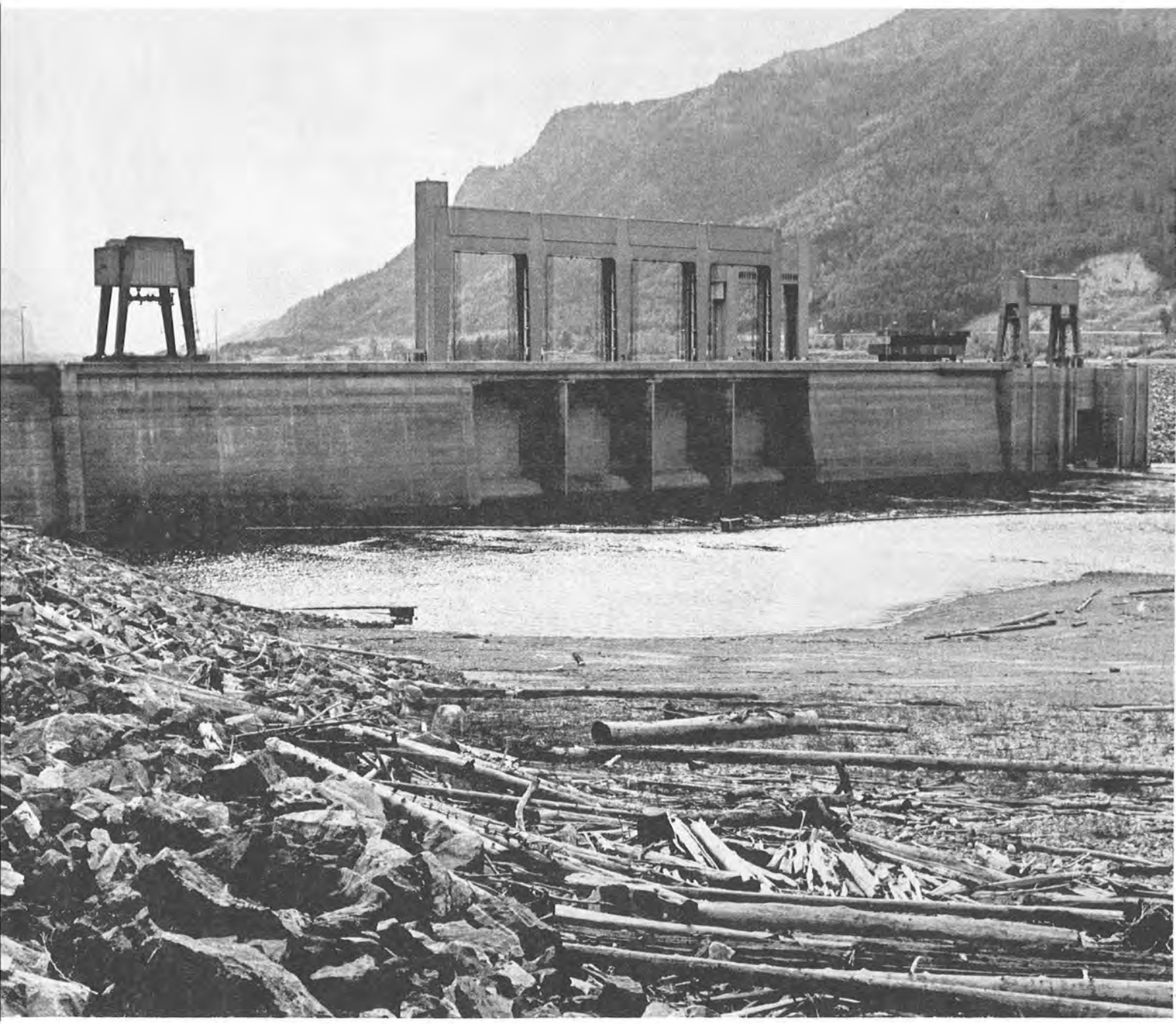
Upon instructions from the Department of the Interior, the BPA Administrator initiated a series of intensive discussions with the utilities in the region to explore alternatives for continuing the Hydro-Thermal Power Program through 1994. On September 15, 1973, a BPA long-range power supply plan was submitted to the Department, but it was clearly stipulated that this proposal did not reflect a consensus agreement on the part of the region as a whole. Continuing negotiations resulted in general concurrence as to some features of the plan. It also served as a point of departure for exploring alternative approaches during late 1973. These culminated in a December announcement by BPA, its major industrial customers and 108 regional utilities outlining a draft program for meeting Pacific Northwest power supply requirements through at least 1986.

STATUS OF PNW STORAGE RESERVOIRS

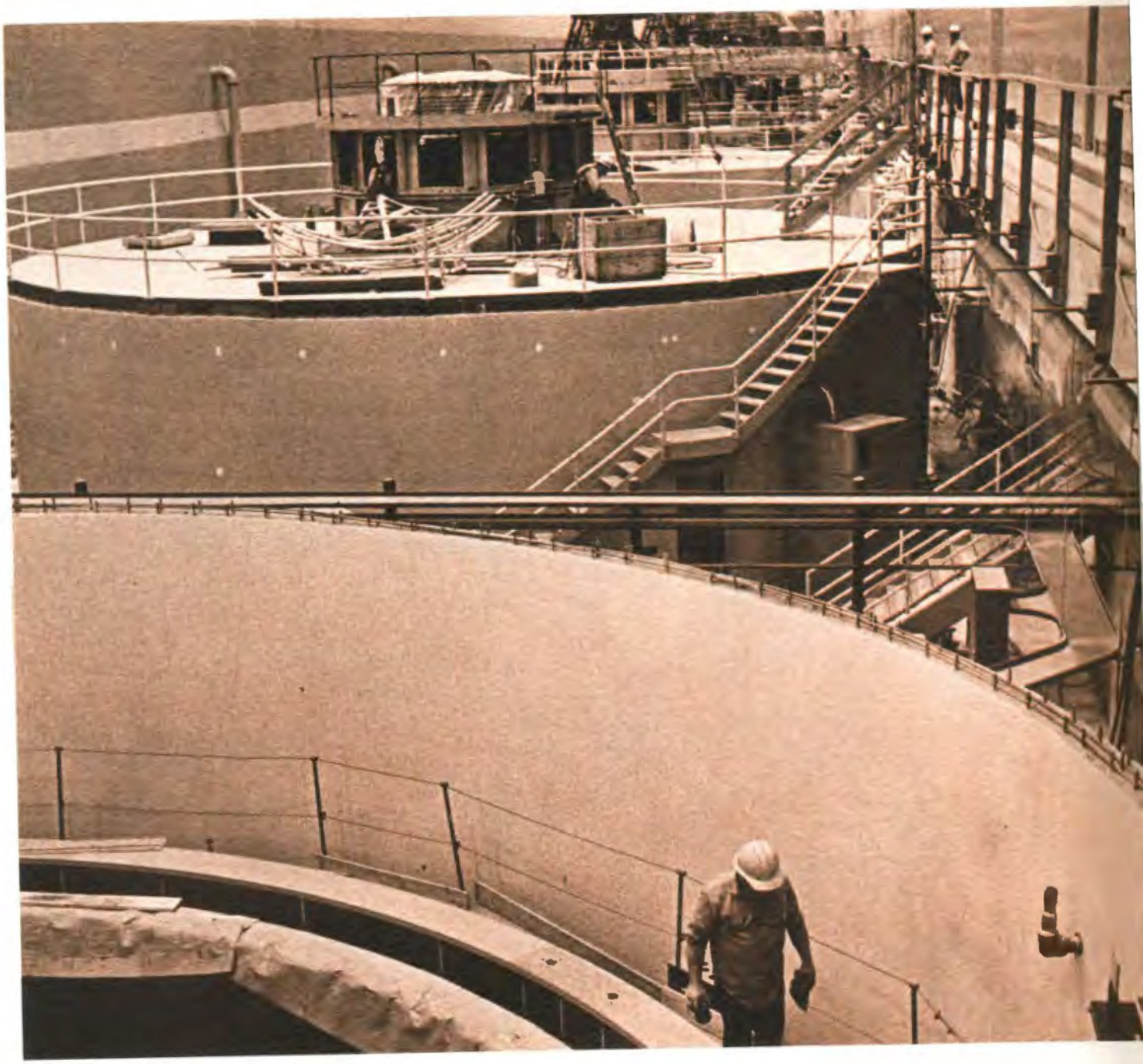
AS OF SEPTEMBER 1, 1973



The total storage energy of reservoirs of the Pacific Northwest Coordinated Power Systems is 46 billion kilowatt hours when all reservoirs are full. The normal storage use by September 1, 1973 was one billion kilowatt hours. The normal operating level on September 1, 1973 was 45 billion kilowatt hours. The actual level was 30 billion kilowatt hours.



Dramatic evidence of low water conditions behind Keenleyside Dam in British Columbia, August 1973.



Installing giant new generators at The Dalles Dam.

Status of the Hydro-Thermal Power Program

Fiscal Year 1973 was one of generally good progress for the region's Hydro-Thermal Power Program, although some significant setbacks occurred. One of these was the announcement by Portland General Electric Company in January 1973 that completion of its Trojan nuclear plant would suffer a 10-month delay from September 1974 to July 1975. Slippages also were reported by the Washington Public Power Supply System with regard to its WPPSS Nuclear Projects No. 1 and 2. Full commercial operation of each of these plants is expected by 1981 and 1978 respectively.

PACIFIC NORTHWEST GENERATING CAPACITY

	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, 1973):	
Federal Hydro:	
Placed In Service[1]	3.7
Under Construction	6.7
Scheduled Through F.Y. 1983	2.2
Sub-total	12.6
Non-Federal Hydro:	
Placed In Service[1]	1.1
Under Construction	0.0
Scheduled Through F.Y. 1983	0.6
Sub-total	1.7
Thermal:	
Placed In Service[1]	1.5
Under Construction	4.4
Scheduled Through F.Y. 1983	4.2
Sub-total	10.1
Grand Total	24.4

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

Both financial and technical problems continue to plague the scheduled installation of additional generating units at several Federal hydroelectric projects. Funding for the installation of facilities at Little Goose, Lower Monumental and Lower Granite Dams was delayed for nearly a year. Also, 22 turbines recently installed at other Federal projects developed operating problems and are being withdrawn from service on a rotating basis for overhaul and maintenance. The Corps of Engineers is adhering to a tight schedule for performing this work in order to minimize the power loss during the current shortage period.

THERMAL CAPABILITY CONTINUES TO GROW

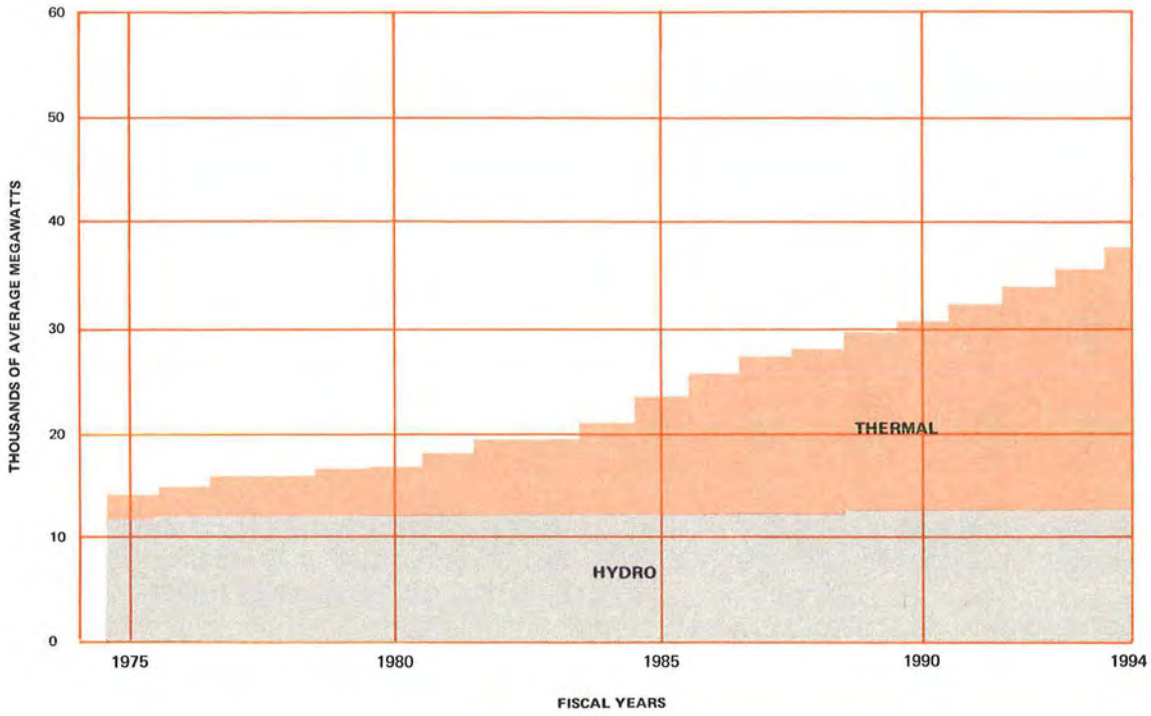
The second unit of the 1,400-megawatt Centralia coal-fired steam plant began test operation in August 1972. Following additional modifications to their precipitators, both units were declared to be in commercial operation, the first in July 1973 and the second in September. The Centralia plant has since operated with output levels up to 1,230 megawatts, but its tested capability within air quality standards remains at 1,000 megawatts. A temporary variance from these standards for operation at higher output levels was granted during the critical power shortage in late 1973.

The Trojan nuclear plant under construction near Rainier, Oregon, was 75 percent completed as of late December 1973. The Northwest's first nuclear plant designed exclusively for power generation will have a nameplate rating of 1,130 megawatts and is scheduled for commercial operation in July 1975.

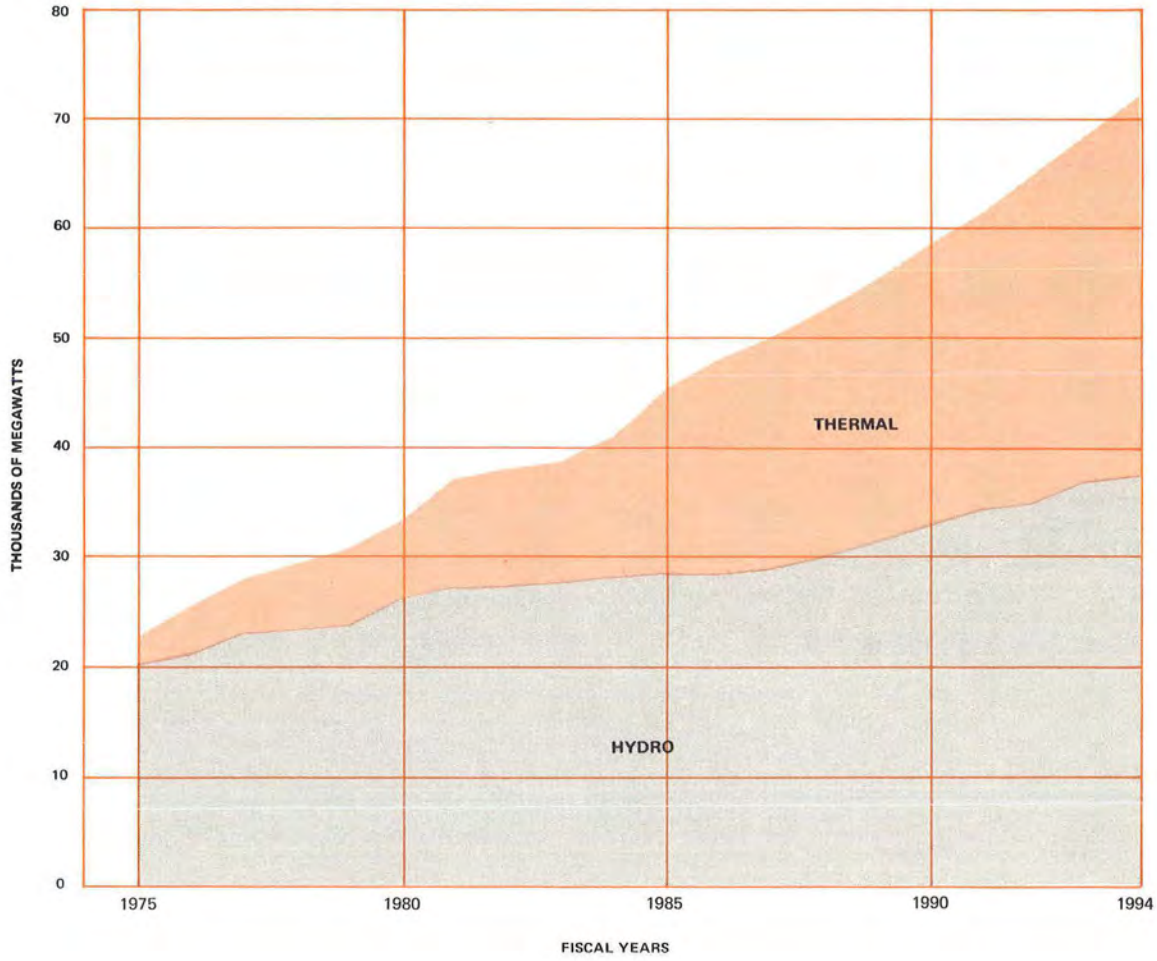
WPPSS Nuclear Project No. 1 will consist of a new nuclear steam supply system and high-

HYDRO-THERMAL POWER PROGRAM (Extended)

FIRM ENERGY RESOURCES



FIRM PEAK CAPACITY RESOURCES



pressure topping turbine plus the existing Hanford No. 1 low-pressure turbine generators. When completed in 1981, the project will have an output of approximately 1,220 megawatts including the existing generator capacity of 840 megawatts. Close-down for modification of the Hanford No. 1 generating plant has been delayed to November 1977 in order to alleviate predicted power deficits in the mid-1970's.

Under construction also on the Hanford Reservation near Richland, Washington, is WPPSS Nuclear Project No. 2. Full commercial operation of this 1,100-megawatt facility is expected to commence in September 1978.

Since the last annual report, a site near Satsop, Washington, has been selected for WPPSS Nuclear Project No. 3. Slated for commercial operation in September 1981, the plant will have a 1,300-megawatt capacity.

Planning is still underway to construct a 1,260-megawatt nuclear facility near Boardman, Oregon, but siting problems have been encountered by its sponsor, Portland General Electric Company. Construction of the proposed facility at the Carty Reservoir site was approved by the Atomic Energy Commission in October 1973, but has been rejected by the Oregon Nuclear and Thermal Energy Council. The ONTEC rejection was based upon the accident threat posed by U.S. Navy aircraft which utilize a nearby tract for mock bombing practice. Efforts are being made to relocate the Navy bombing range so that planning can proceed and the plant can adhere to its scheduled operational date of September 1980.

The coal-fired Jim Bridger plant near Rock Springs, Wyoming, is proceeding approximately on schedule. The first of its 500-megawatt units was delayed from June to September 1974, with the second and third units scheduled for commercial operation in September 1975 and September 1976. Upon completion of the project, the Pacific Northwest power supply system will utilize two-thirds of the total project output, with the remainder going to Idaho Power Company.

Construction of reactor housing at the Trojan nuclear plant near Rainier, Oregon.

Since the last Annual Report, the sponsors of a coal-fired facility located near Colstrip, Montana, (The Montana Power Company and Puget Sound Power and Light Company) have announced their decision to proceed with Units No. 3 and No. 4 of this project and to share with other Northwest utilities the ownership of these units. This plant, while not considered as one of the first seven plants included in the 10-year Hydro-Thermal Power Program, will add to the Pacific Northwest power supply, and consideration may be given to expanding the BPA transmission grid ahead of schedule to handle part of its output. The first two Colstrip units of 350 megawatts each are under construction and scheduled for completion in 1975 and 1976. When siting approval has been obtained, units No. 3 and No. 4 will get underway. Each of these will have a capacity of 700 megawatts, and they are scheduled to come on line in 1978 and 1979.

FEDERAL HYDROELECTRIC UNITS COME ON LINE

Dworshak Dam was essentially completed during FY 1973 and its dedication was held in June. Although the project was scheduled to be in commercial operation by October 1973, generator problems have delayed this date and contributed to the near-term power shortage. Dworshak's two 90-MW generators and its 220-MW unit are producing some power, but are operating below their nameplate capacity.

At Grand Coulee Dam, construction of the second three units of the third powerhouse has been accelerated, but installation of the first three units is still 6 months behind schedule. The first unit is now scheduled to come on line in August 1975, followed by the other two at 6-month intervals. The second three units are scheduled for completion in 1977 and 1978. The capacity of each of the latter is being increased from 600 MW to 700 MW, which will give Grand Coulee a total capacity of 6,180 MW. In addition, the powerhouse and intake can be extended to accommodate six additional units. The installation of the first two 50-MW reversible pump-turbine units to lift water from the Columbia River to Banks Lake was completed in late 1973.

Deep drawdown of Grand Coulee got underway in mid-December 1973 in order to remove the cofferdam and complete the excavation of the channel inlet for the third powerhouse forebay. Present plans are to draft Roosevelt Lake to elevation 1,160 feet, with refilling to commence in May 1974.

The first of eight additional generating units at The Dalles Dam became operational in December 1972, with the others coming on line a few months later than scheduled. The last unit was installed in October 1973, for a total of 22 units with a combined nameplate capacity of 1,807 megawatts.

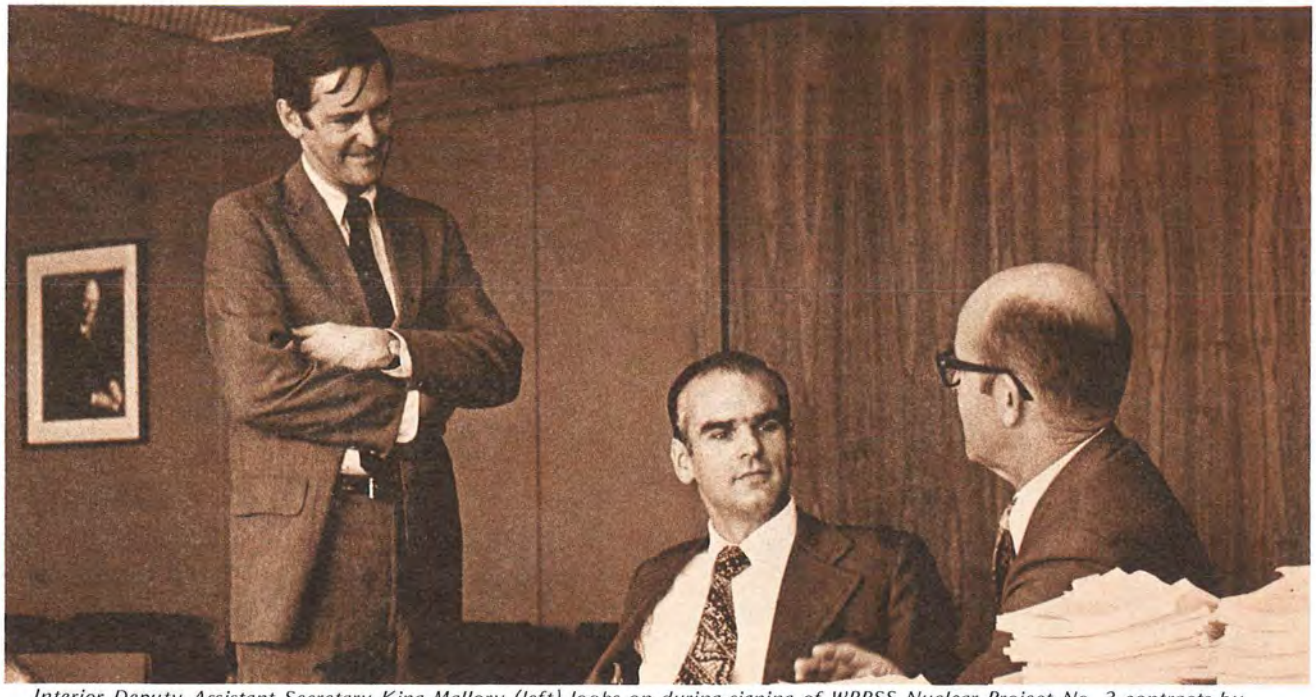
Artist's rendering of WPPSS Nuclear Project No. 3 near Satsop, Washington. The containment vessel for the reactor rises from the center of the complex, with cooling tower on right.

With the availability of the new units at The Dalles, construction of the second powerhouse at Bonneville Dam is being accelerated. Fund allocations may make it possible to complete the second powerhouse in 1981, which would be well ahead of the previous schedule.

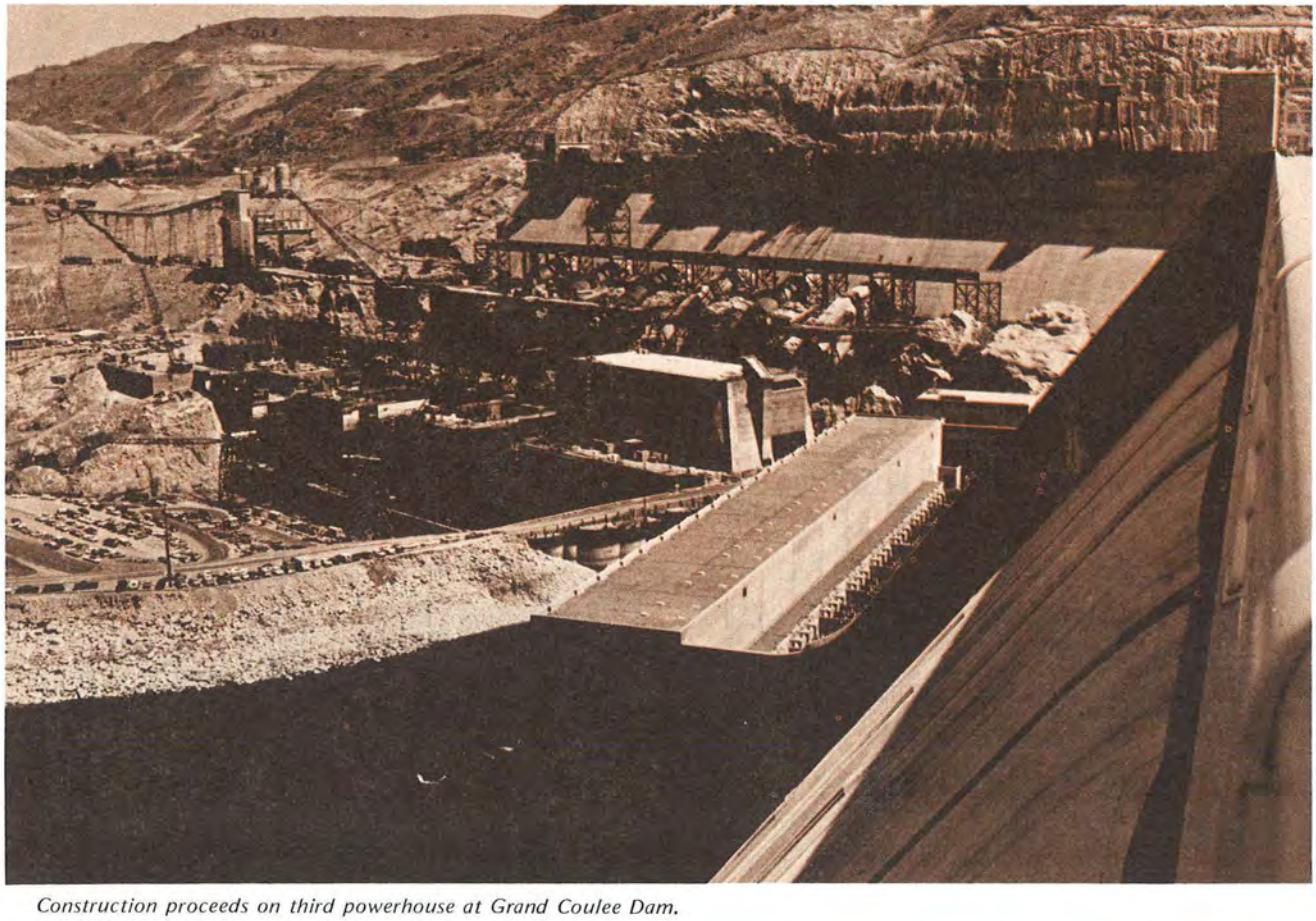
In response to low water conditions, the U.S. Army Corps of Engineers has modified its operating procedures at Bonneville Dam to maximize the generating capability of the dam during the winter of 1973-74. These procedures and less frequent generator maintenance at Bonneville and upstream dams by the Corps of Engineers will help to alleviate the immediate energy shortage.

The full 5-million acre-feet of storage space at Libby Dam was completed during the fiscal year, and its first four generators are scheduled for installation by 1976. They will give Libby a capacity of 420 megawatts, with an additional 420 MW authorized and scheduled to come on line in 1982-83, together with a reregulating reservoir downstream.

At the end of FY 1973, there were 26 Federal Columbia River Power System projects in commercial operation with a total capacity of 10,486 megawatts.



Interior Deputy Assistant Secretary King Mallory (left) looks on during signing of WPPSS Nuclear Project No. 3 contracts by Administrator Hodel and WPPSS Managing Director Jack J. Stein.



Construction proceeds on third powerhouse at Grand Coulee Dam.

Expanding and Upgrading the Transmission Grid

To meet the growing demand for power in the region, BPA added a net 284 circuit miles of high-voltage transmission line to its system during Fiscal Year 1973. Again the emphasis was upon expanding the 500-kV grid, which grew to 2,295 miles by the end of the year. This represents nearly 20 percent of the total system of 12,050 circuit miles.

A major segment of the new construction was the 143-mile Dworshak-Hot Springs line in Idaho and Montana, which was energized in March 1973. This line, along with the 94-mile Little Goose-Dworshak line between Washington and Idaho, is BPA's first 500-kV transmission into Idaho and Montana. Its major use will be to reliably serve electrical loads in western Montana, particularly during those periods when Hungry Horse Dam is storing water and not generating power. This construction and other lower voltage transmission lines from Hot Springs to Spokane and back to Grand Coulee close the BPA loop through western Montana. The 500-kV lines also integrate generation from Lower Monumental, Little Goose and Dworshak Dams, and they will eventually transmit power from Lower Granite Dam as well.

A 230-kV line from Toledo to Wendson along the Oregon coast was completed in January 1973, thereby closing the Santiam-Toledo-Wendson-Eugene area loop. This grid addition will improve the reliability of service to coastal communities and help to meet their increasing loads. Completion of the loop also safeguards against overloads on the transmission lines from the Willamette Valley to the coast.

In southwest Washington, the 500-kV Paul-Allston No. 2 line was completed in April 1973. This link provides more reliable integration of the output of the Centralia coal-fired steam plant into the overall transmission system.

Replacing existing low-voltage transmission with higher capacity lines enables BPA to move larger blocks of power over proportionately less right-of-way. This significantly reduces the environmental impact of a growing power supply system. One example of this practice was the recent retirement of the 102-mile, 230-kV Midway-Grand Coulee No. 2 line. A major portion of the new Grand Coulee-Hanford 500-kV line is being constructed on this right-of-way.

Construction and modification of 51 substations progressed during the year, and five new substations were energized. These facilities, the Lapine, Brush College, Wendson, Bayshore and Dworshak Substations, bring the total number in the BPA system to 330 as of the end of the fiscal year.

HELICOPTERS UTILIZED IN SCENIC GORGE CONSTRUCTION

Of particular interest because of its environmental and scenic implications was the construction of that portion of the 500-kV Hanford-Ostrander line which crosses the Columbia River at North Bonneville. This is in the middle of the spectacular Columbia River Gorge, and painstaking efforts were taken to minimize the impact upon the terrain.

The erection of towers at the river crossing was partially accomplished by helicopter as was the construction of about 4 miles of line along Tanner Creek Valley in Oregon.

In addition to this watershed's scenic value, Tanner Creek supplies water to operate the fish hatchery adjacent to Bonneville Dam. It was recognized at the outset that special right-of-way clearing and construction methods would have to be employed to assure the purity of the water and minimum impact upon the terrain. A decision was

therefore made to use helicopters for clearing as well as construction, the first time such right-of-way preparation had been performed by BPA.

All clearing operations were accomplished by hand, with the saleable timber being hauled out by helicopter. The same was done with the logging debris, since burning it would have been too hazardous without fire control access roads. The debris was collected and lifted from the right-of-way by a helicopter equipped with rope slings and nets. It was then delivered to burning sites some distance from the Tanner Creek Valley.

During the installation of the tower footings, large crib walls were erected to prevent soil and debris from slipping down the steep canyon into Tanner Creek. All of the towers along the creek were erected by helicopter, and the pulling lines for stringing the conductor were also installed from the air.

The pains taken in constructing this section of transmission line met BPA's environmental commitment and helped to preserve the scenic beauty of the Columbia/Tanner Creek watersheds and their surrounding terrain. It is worth noting, however, that the total costs associated with the river crossing and Tanner Creek Valley construction are in the order of $2.5 million for an 8-mile segment of line, or more than twice the cost of normal construction in this type of terrain.

NEW SYSTEM CONTROL CENTER NEARS COMPLETION

By the end of FY 1973, the W. A. Dittmer BPA System Control Center was 85 percent completed. Its progress has been impeded by contractor delays, but it is anticipated that the new facility will be operational by mid-1974.

The major tasks to be performed by the control center are:

Testing circuitry in the highly computerized Dittmer Control Center.

1. Monitoring and supervising transmission facilities to achieve greatest reliability and efficiency.
2. Controlling generation at Federal dams to obtain the best power use of available water consistent with navigation, fish and wildlife, flood control, water quality, and recreational requirements of the rivers.
3. Confining trouble when it does occur within the smallest possible bounds and providing rapid shifting of loads and employment of backup resources to meet emergency situations.

When completed and in operation, the Dittmer Control Center will be one of the most advanced facilities of its kind in the world. The $20 million total installation employs much of the space age technology developed by NASA at its Manned Spacecraft Center in Houston, Texas.

Eastern Control Center

A major step in the development of the new BPA Eastern Control Center near Moses Lake, Washington, was the May 1973 award of a contract to provide a computer-directed supervisory

control and data acquisition system (SCADA II). The system will connect a master station at the Eastern Control Center with 35 remote units located at substations throughout the eastern segment of the BPA service area. These substations serve all of the major subtransmission east of the Cascade Mountains. The SCADA II System will provide remote control of substation equipment, telemetering of voltage, power and reactive data, and split-second reporting of trouble or impending trouble on the subtransmission grid.

View of Dispatch Room at Dittmer Control Center shows monitoring consoles and schematic boards.

Hungry Horse Automatic Control System

To meet the varied requirements of both Automatic Generation Control (AGC) and local plant control of generation at Hungry Horse Dam, a newly developed closed loop automatic generation control system has been installed. This regulator system is a joint development of BPA, the Boeing Company and the Bureau of Reclamation which operates the dam. A digital computer located at Hungry Horse provides local control as well as responding to digital commands for power output relayed through the BPA control system. The latter's headquarters is presently located in the BPA Portland Dispatch Center, but will eventually be transferred to the Dittmer Control Center.

BPA and the U.S. Army Corps of Engineers are considering the installation of similar generation controls at the Corps' projects in the Columbia Basin.

ENVIRONMENTAL RESPONSIBILITIES INCREASE

Bonneville Power Administration maintained its strong commitment to the environmental ethic during FY 1973, based upon the thesis that preserving the environment — like safety and reliability of service — is part of the cost of doing business. Since the impact of BPA's activities upon the environment involves all phases of its design, construction, operating and maintenance activities, BPA is following a formalized set of guidelines, standards and procedures for incorporating environmental concern into every phase of these programs.

A wide range of BPA organizational units were involved in the preparation of the FY 1974 Environmental Statement. In its final form, this statement contains nearly 250 pages of text and 160 resource maps covering the individual facilities in the planning stage and under construction. Projects within the FY 1972 and FY 1973 programs were also covered, and all projects were reviewed in accordance with established guidelines by 145 Federal, state and local agencies. This formal review was supplemented by 19 public meetings held throughout the region.

The accumulation of complex data to incorporate environmental factors in decisions has, however, demonstrated certain gaps in authoritative information relating to transmission facility siting and how it correlates with various types of

terrain. As a result, BPA last year entered into a contract with a noted planning, landscape-architectural firm to develop a comprehensive system for compiling such information and incorporating it into the planning and decision-making process. The major components of the system have been identified, and BPA and the contractor are presently engaged in the implementation phase.

The methodology, known as "PERMITS" (Process of Energy Routing to Minimize Impact from Transmission Systems), includes the following:

1. Identification of the availability of land resource and other environmental data bearing on the facility location process in the BPA service area.
2. Developing alternate land resource-based systems analysis location techniques.
3. Selecting those techniques which best suit BPA program needs and incorporating them into the overall planning process.

Interagency Agreements Updated

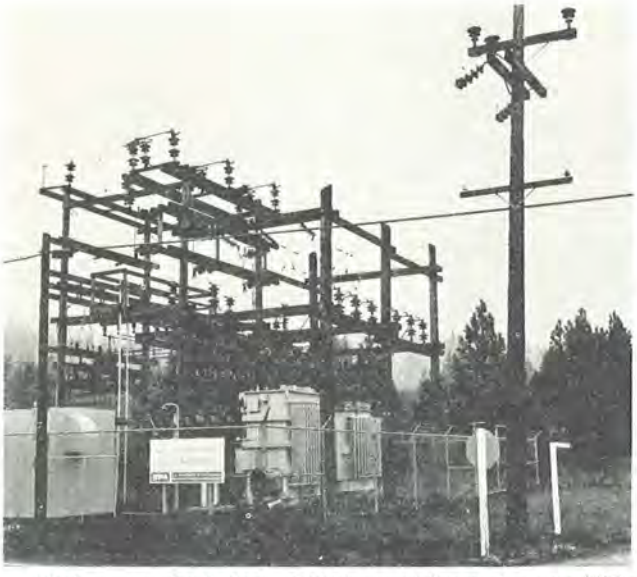
Because a substantial portion of the total land within the BPA service area is managed by the U.S. Forest Service and the Bureau of Land Management, BPA negotiated Memoranda of Understanding with these agencies in the mid-1960's. These memoranda provide for early consultation among all concerned parties on proposed transmission corridors and specific rights-of-way proposed by BPA in expanding or upgrading its transmission grid. They cover all phases of the planning, construction and maintenance activities with an emphasis upon minimizing their impact both as to the environment and its recreational usage.

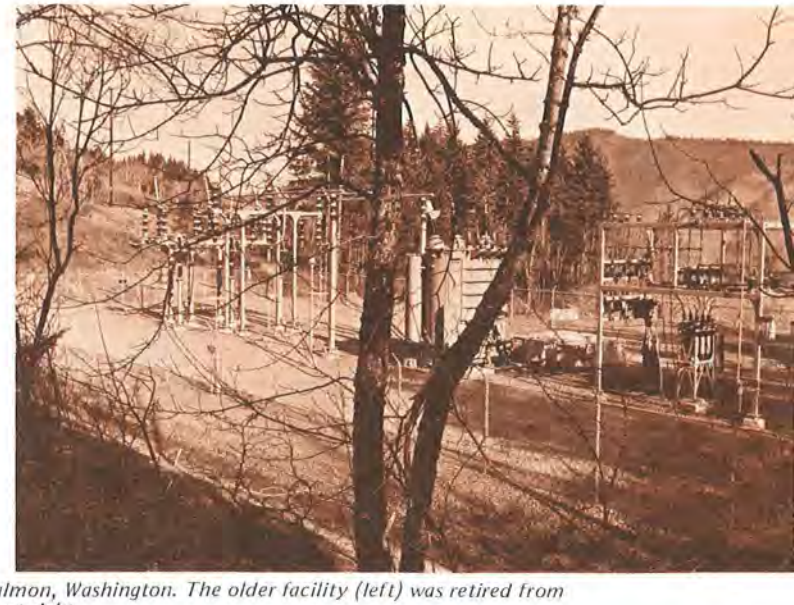
Starting in March 1973, representatives of BPA and the Forest Service initiated a series of meetings to review and update their 1969 Memorandum of Understanding. This agreement specifies 18 separate points within the design and construction process where notification must be made, information exchanged and agreements negotiated. These points are carefully being reviewed and revised in accordance with new environmental tools and philosophies. Some work remains, but the bulk of the earlier Memorandum of Understanding has been revised to the mutual satisfaction of both agencies. Similar negotiations with the Bureau of Land Management are currently underway.

New right-of-way practices permit foliage to remain growing between transmission towers.

Environmental Litigation

Since preparing its first environmental statement in FY 1970, BPA has greatly expanded its environmental program and the scope of both the technological and ecological factors which must be incorporated into the review process. There still remain, however, many divergent opinions concerning the content of an adequate environmental statement. Because of these divergent viewpoints, BPA construction projects have encountered resistance on the part of landowners,





"Before and after" views of Underwood Substation near White Salmon, Washington. The older facility (left) was retired from service and replaced by low-profile, carefully landscaped substation at right.

various governmental bodies and other interested parties who have questioned the adequacy of BPA environmental statements. The filing of an injunction and its subsequent litigation delayed one project nearly 7 months and added more than $1 million to its cost.

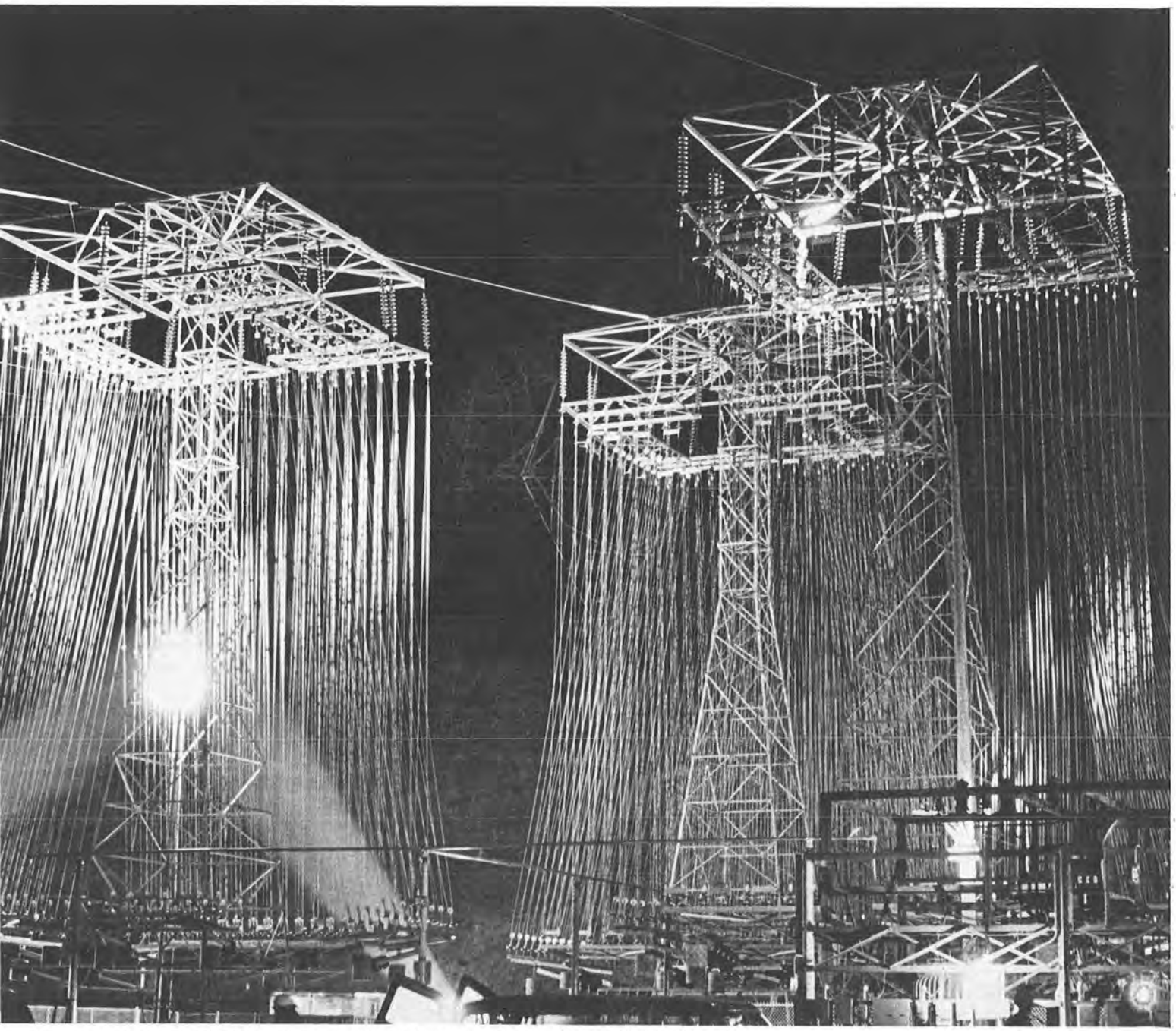
During the past year, three legal actions were brought in Federal courts against BPA, two of them by landowners and the third by the Washington State Game Commission. The first two focused upon the proposed routes for 500-kV transmission lines, and charged that their selection was not adequately justified in the written statements prepared for the FY 1972 and FY 1974 construction programs. In both cases, the court ruled in favor of BPA, temporary injunctions were withdrawn and construction work proceeded.

In the third case, it was determined by BPA that the optimum routing of a portion of the 115-kV Winthrop-Tap line would span only 6,600 feet of a wildlife recreation area in northcentral Washington. Because of time constraints and the inordinate cost involved, BPA could not comply with the Game Commission's demand for underground transmission. The matter was taken to court in September 1973, and a preliminary injunction halting the construction work was issued. On December 17 the court ruled that BPA's environmental statement was adequate.

BPA ENGINEERING LOOKS TO TOMORROW

Keeping pace with the expanded transmission network is the design and development of more efficient and environmentally acceptable facilities for bringing power to load centers. During FY 1973, BPA engineers were deeply involved in a number of developmental projects aimed at better utilization of rights-of-way, lower transmission costs, and greater system reliability.

As loads continue to grow in the Pacific Northwest, BPA is exploring various alternatives for in-



Power test of dynamic braking resistor provides an impressive display of tower illumination.

creasing its transmission line capacity. A prime example is the design and construction of a 500-kV double-circuit, ultra-high-capacity line between Grand Coulee Dam and Seattle. When completed in 1976, this line will have three to four times the capacity of a conventional single-circuit 500-kV line, making it the highest capacity transmission line supported by single structures in the world.

Also installed during FY 1973 was a prototype 500-kV one-cycle circuit breaker with a super-trip mechanism and high speed sensor. When a fault occurs on a transmission line, the line must be disconnected quickly in order to minimize damage and prevent system instability which could result in massive power outages. The circuit breaker now being sponsored by BPA is designed to clear faults much faster and substantially increase the amount of power which can reliably be transmitted over the system. Field installation and testing of the new component is scheduled for the near future.

In July 1973 a dynamic braking resistor was installed at Chief Joseph Substation which can apply a resistive load of 1,500 megawatts within six cycles after the occurrence of a major system disturbance. When fully operational, this dynamic brake will increase the transfer capability of major transmission interconnections whose ability to transmit energy would otherwise be impaired by transient disturbances. The cable for each phase of the three-phase resistor is mounted on a square steel tower 30 feet on a side and 90 feet high.

Environmental concerns and the increasing scarcity of rights-of-way for constructing transmission lines have spurred the exploration of high capacity underground transmission. From an economic and engineering viewpoint, one of the most promising developments is the Compressed Gas Insulated Bus System (CGIBS). In June 1973

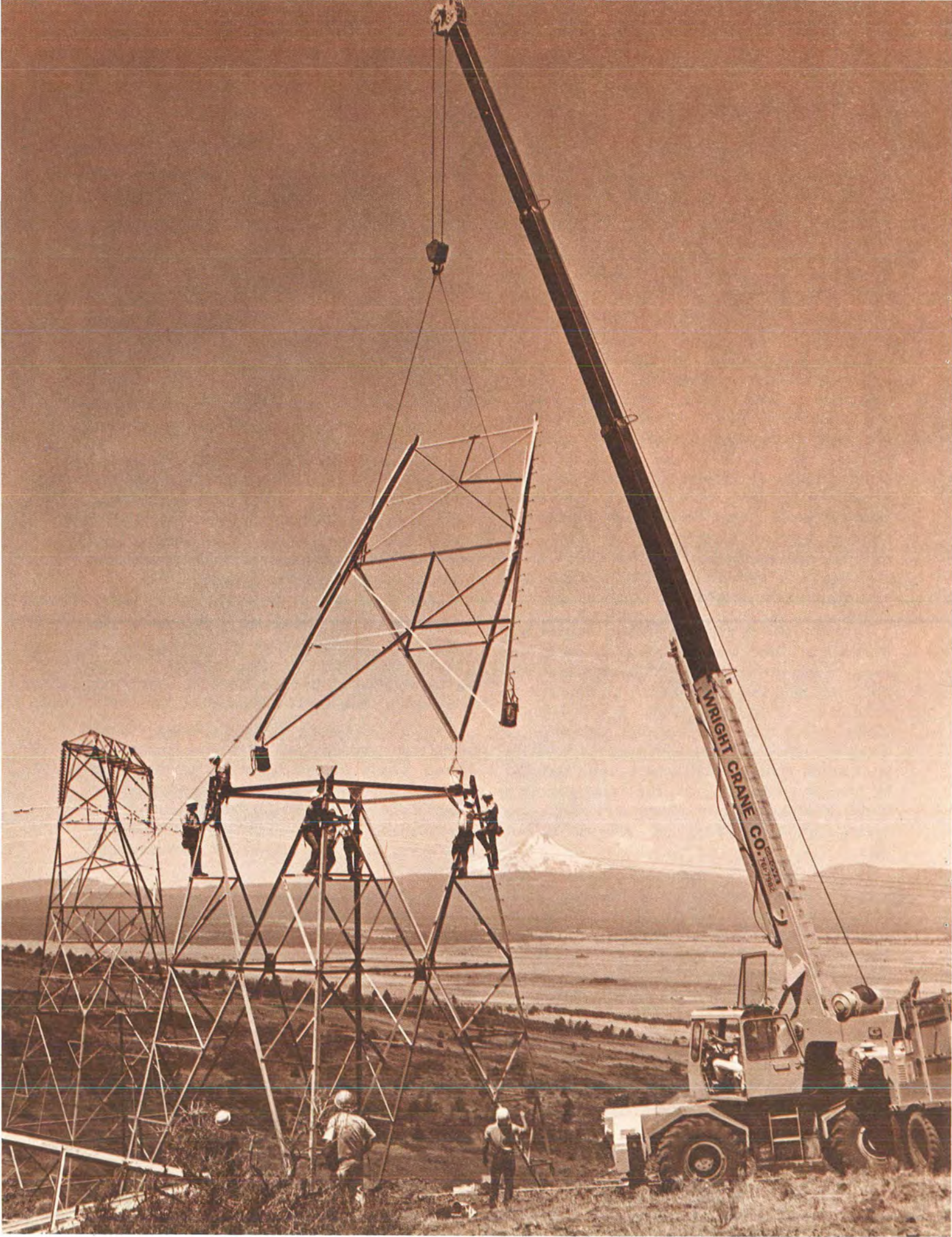
Open house inspection follows dedication of Mangan Laboratory in Vancouver, Washington.

the Bonneville Power Administration awarded a contract for the manufacture and installation of a 600-foot segment of 500-kV underground bus, the first such CGIBS application in the United States. It is being installed on the Sickler-Raver line near Ellensburg, Washington, and is scheduled for energization in November 1974.

Much of the actual testing of new equipment for substation and transmission facilities is performed by the BPA Branch of Laboratories. Its newest test center is the John J. Mangan Mechanical-Electrical Laboratory in Vancouver, Washington, which was dedicated in June 1973.

This laboratory can simulate a broad range of static and dynamic loads at various current and voltage levels under controlled weather conditions. Properties to be evaluated include tensile, compressive, shear and impact strengths, vibration characteristics, mechanical-electrical-thermal characteristics, and the effects of environmental influences.

The Mangan Laboratory joins the Charles E. Carey Testing Station and the Big Eddy Direct Current Test Laboratory in providing BPA with a variety of sophisticated testing facilities which ultimately optimize the reliability, performance efficiency and cost of the entire transmission grid.


WRIGHT CRANE CO.

The Operating Year

The construction and energization of new facilities are the subject of wide attention, both in engineering circles and through the publicity given them by the news media. A less heralded but equally vital BPA activity is that of operating and maintaining the transmission grid and its more than 300 substations.

The BPA service area covers some 300,000 square miles stretching from the Canadian border to northern California, and from the Continental Divide to the Pacific Ocean. This vast area was served last year by an operations and maintenance work force of 814 field personnel, including 303 substation operations personnel, 178 transmission maintenance workers, 165 electricians and 168 control and protection personnel. These crews are strategically based at 45 locations throughout the region. Their operations are in turn supervised from five Area Offices located in Seattle, Portland, Walla Walla, Spokane and Idaho Falls. During FY 1973 it was necessary to add a new O&M headquarters at Lewiston, Idaho, to handle the workload associated with new transmission lines and substations in southeastern Washington and northern Idaho.

At the end of the fiscal year BPA had a completed plant investment exceeding one and one-quarter billion dollars, or 36 percent of the entire Federal Columbia River Power System investment in completed plant. Despite escalating labor and material costs, that portion of the BPA budget allocated to O&M represented less than 2-1/2 cents per dollar of BPA completed plant investment.

THE SYSTEM AGAIN DEMONSTRATES ITS RELIABILITY

During the past year several major system disturbances occurred, but none of them resulted in prolonged or crippling outages. BPA has been able to operate and maintain its transmission grid with high reliability and ready response to troubles arising in its own and interconnected systems.

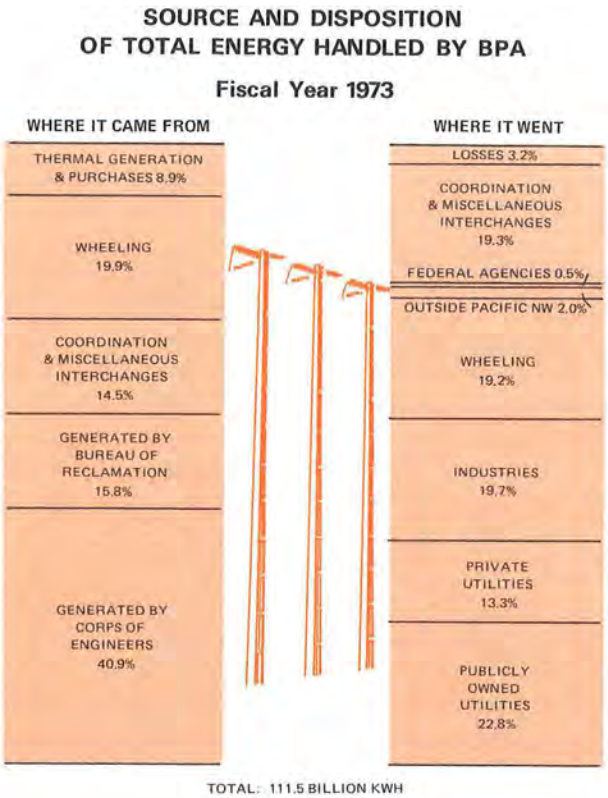
A prime example occurred on August 12, 1973, when the total output of the G. M. Schrum plant on the Peace River in British Columbia was interrupted. Both 500-kV lines between the B.C. Hydro plant and its Williston Substation went out of service, separating 1,700 megawatts of generation from the system. Approximately 1,530 MW of the load deficit was immediately restored by the interconnected system in the United States. Of this, over 1,000 megawatts came from California over the 500-kV Intertie.

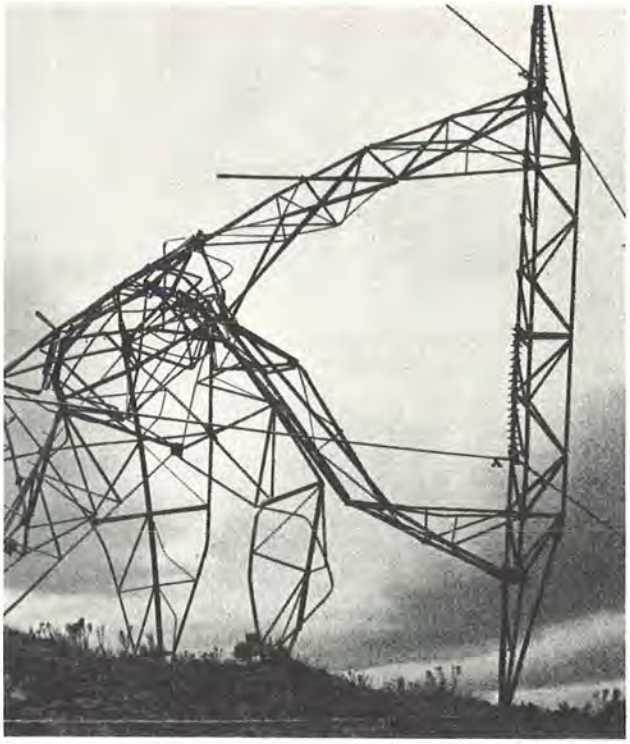
A similar Peace River outage took place 2 weeks later, and again the interconnected system responded when 1,500 MW of generation was lost. In both cases, frequency was restored within 10 minutes by schedule adjustments, and generation and normal interchanges resumed within 25 minutes.

The power loss in each instance was nearly 1-1/2 times that which caused the paralyzing East Coast blackout in 1965, but the interconnected Western system minimized the effects of the outages.

EMERGENCY TOWER REPLACEMENT MEETS TIGHT SCHEDULE

In mid-afternoon on Friday, June 22, 1973, freak winds collapsed three steel towers on the 230-kV McNary-Santiam line near Maupin, Oregon. Emergency switching procedures were implemented so that full service was restored in just over 1 hour. BPA work crews were immediately alerted and the requisitioning of replacement materials began. System reliability is jeopardized whenever primary facilities are out of





Surrealistic effect created by wind-buffeted steel towers.

service; hence the urgency in replacing the downed towers.

By Saturday evening, the necessary tower sections and footing materials were assembled for shipment by truck to the job site. They were unloaded on Sunday while welders cleared the collapsed towers from the line and heavy equipment operators removed them from the right-of-way.

The laborious process of sinking footings for the new towers began on Monday morning and continued through Wednesday. While this was proceeding, the new steel structures were being semi-assembled and tower erection got underway on Wednesday afternoon. The entire job was completed and the line returned to normal service on Friday, June 29, just 6 days and 22 hours after the outage occurred. Under normal construction schedules, this work would have taken 2 weeks to perform. This is a good example of the teamwork and ingenuity required of BPA personnel in carrying out their mission.

FOREST FIRES IMPERIL TRANSMISSION LINES

Because of the prolonged drought throughout the region, most forests were tinder-dry by late summer 1973. The ensuing outbreak of major forest fires placed an added strain on BPA construction and maintenance operations. Two such incidents occurred within a day of each other.

Raging forest fire nearly engulfs a section of transmission line.

Photo courtesy of U. S. Forest Service

On August 16 the BPA Dispatch Center was notified that a major fire was out of control in the vicinity of LaGrande, Oregon, and was endangering the BPA Roundup-LaGrande 230-kV line. A line crew from Pasco, Washington, was immediately dispatched to fight the fire. Upon its arrival, the crew found that the fire had reached the right-of-way and was moving down it toward LaGrande. In addition to fighting the fire, load-switching was effected to transfer a local utility load from BPA to its own substation in LaGrande. Circuit breakers at LaGrande and at Roundup were later opened to complete the isolation of the BPA Roundup-LaGrande line. After the fire had been controlled, it was necessary for BPA line crews to replace eight wood poles which had been partially or completely burned.

Another forest fire broke out near Thompson Falls, Montana, on August 17. By August 20 it had spread extensively and was endangering the newly constructed Dworshak-Hot Springs 500-kV line. At the request of the U.S. Forest Service, this line was taken out of service to reduce the potential electrical hazard to the fire fighters. By the following day it appeared that other lines were imperiled, and the Dworshak-Hot Springs line was returned to service after determining that it would not endanger the fire fighters. When the threat to the other lines subsided, it was again taken out of service until the forest fire was finally controlled on August 24. As a result of this fire, the Forest Service closed all national forests in Montana until mid-September.

VANDALISM PLAGUES THE SYSTEM

During FY 1973 both BPA transmission lines and substations experienced a sharp rise in the vandalism which perennially plagues the system. Shot-up insulator strings led the list of facilities damaged, but conductors, gates and transformers have increasingly become targets for thoughtless hunters and others.

The cost of these incidents over the past year exceeded $109,000, a 60 percent increase over the previous year. Nearly 14,000 man-hours were required to repair facilities damaged by vandals.

In general, there has unfortunately been little success in apprehending and prosecuting the perpetrators of this destruction. One gratifying exception occurred when an insulator string was shot out near Oakridge, Oregon, and blacked out that community for several hours. Aroused residents identified those responsible, and the latter were subsequently convicted, fined and given jail sentences.

In another instance, a juvenile was apprehended while shooting out insulators near Bellingham, Washington. He was required by the judge to make restitution for the damage he had caused.

BPA makes a continuing effort to publicize such vandalism and to make the public more aware of the hazards posed by these acts. Despite this publicity, the number of incidents continues to mount and the ultimate consumer is forced to pay for the damage inflicted by a thoughtless few.

NEW RIGHT-OF-WAY MAINTENANCE PRACTICES INITIATED

Consistent with its environmental responsibilities, BPA is continually reviewing its right-of-way maintenance program with an eye to preserving foliage and terrain features which will not impair transmission system reliability. During FY 1973, a selective right-of-way management policy was inaugurated to meet this criterion.

Orchard growing on 500-kV transmission line right-of-way.

The main emphasis of this policy is on more selective use of herbicides and minimizing the number of access roads required for transmission maintenance. The policy also revises the criteria for removing danger trees, i.e., those which could fall onto the right-of-way and damage power lines. Finally, landowners along rights-of-way are encouraged to use them for growing crops and other uses compatible with power service requirements.

The spraying of herbicides from aircraft, while generally less costly than manual application, can have detrimental effects upon non-target vegetation. During FY 1973, the quantity of chemicals sprayed from aircraft was drastically reduced. It amounted to only 40 percent of the total herbicides used by BPA, compared to 70 percent during the 2 previous years. Eight selective rights-of-way management contracts were awarded

during the year for manual herbicide application and cutting and chipping of potentially hazardous or obstructive trees. With more careful discrimination among the foliage targeted for removal, sensitive rights-of-way areas can more nearly remain in their natural state.

Access road maintenance practices emphasize erosion control and seeding. Special efforts are also directed toward eliminating duplicate roads on multiple line rights-of-way and enhancing the appearance of the remainder.

Under the former danger tree criteria, trees which could fall within a certain distance of a conductor were considered hazardous and were removed along with decayed and insect-infested trees. The new policy allows trees which are stable and non-diseased to remain standing adjacent to the right-of-way. Under this new program, the total number of danger trees removed was 33 percent less than in FY 1972 and 50 percent less than in FY 1971.

Numerous agreements were executed during the year allowing landowners to grow Christmas trees on rights-of-way, and one agreement permits a farmer to develop a vineyard. Right-of-way uses which enhance the terrain without creating human hazards or restricting maintenance accessability are encouraged.

The total right-of-way utilized by Bonneville Power Administration is approximately 190,000 acres. Its preservation in as natural a state as possible is a continuing objective of both the BPA construction and maintenance programs.

COOPERATIVE EFFORTS CONTINUE TO PAY OFF

As the Federal transmission and power marketing agency in the Pacific Northwest, BPA looks to other agencies for hydroelectric generation to supply its needs. Events of the past year attest to the close working relationships which have been forged, and to the regionwide benefits which derive from them.

Newly-completed Mica Dam with reservoir in background.

Operation of Columbia River Treaty Storage Projects

The last of the Columbia River Treaty storage projects, Mica Dam, was completed on schedule on March 29, 1973. This made available the last 7 million of the 15.5 million acre-feet of storage space provided by the Columbia River Treaty with Canada. At the end of FY 1973, the total live storage contained was 4.4 million acre-feet.

Last year (1971-72), the Treaty projects together with Libby Dam proved their worth in helping to avert major floods resulting from the highest peak flows in the largest runoffs of the century. This year (1972-73), the Treaty dams proved equally invaluable, although for a completely different reason. The drought conditions and low runoffs which prevailed in the Northwest resulted in unusual demands for water stored at

Maj. Gen. R. E. McConnell, North Pacific Division Engineer, directs multi-purpose operation of Corps of Engineers projects.
Photo courtesy of U. S. Army Corps of Engineers

Duncan, Keenleyside, and Mica Dams. Thanks in large part to the operation of these projects to provide generation downstream in the United States, the Pacific Northwest was able to serve its firm loads.

Corps of Engineers Response to Power Shortage

The close cooperation between the Bonneville Power Administration and the North Pacific Division, U.S. Army Corps of Engineers, paid extra dividends this year. In spite of the multiple responsibilities of the Corps in operating hydroelectric projects in the Pacific Northwest, the Corps was extremely responsive in helping to alleviate the critical power situation by judicious operation of its reservoirs. In addition to satisfying the pressures to use the rivers for navigation, recreation, fishing and irrigation, Major General R. E. McConnell, Division Engineer, North Pacific Division, directed the Corps to operate the projects in such a manner as to wring from them the last kilowatt possible. This year has offered a clear demonstration that, when the chips are down, two agencies with diverse and sometimes conflicting responsibilities are able to work closely together for the benefit of the people in the region they serve.

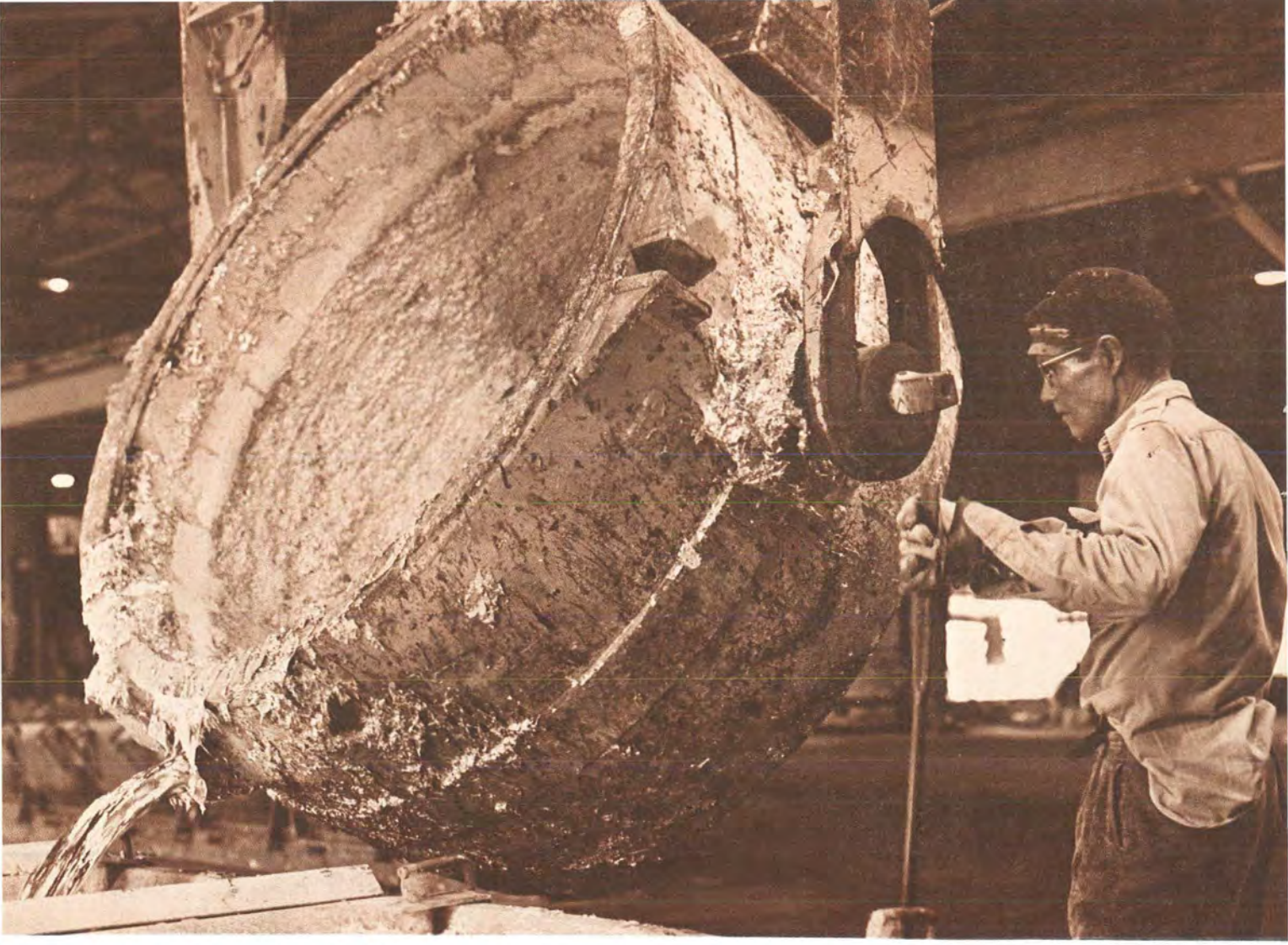
Optimum Output from Reclamation Projects

Regional cooperation between the Bureau of Reclamation, a sister agency within the Department of the Interior, and Bonneville Power Administration has always been of the highest order and is worthy of special mention in this report.

While each project of the Bureau performs an important function, its giant dam at Grand Coulee on the Columbia River is perhaps the single most vital installation contributing to power production and hydrological balancing of the river. Year in and year out, since 1941, the turbines, generators, and reservoir at Grand Coulee, manned by Bureau of Reclamation personnel, have responded to the growing power and irrigation requirements of the region and maximized the available resource of the Columbia River. As projects were completed downstream, the role of this giant dam increased in importance, as did the need for even greater coordination between the two agencies.

In this year of extremely low water conditions, the cooperative relationship was subjected to one of its severest tests of strength and workability. Personnel of both agencies worked round the clock, week in and week out, to keep the system finely tuned. Their joint effort successfully maximized benefits from the meager water supply which was available.

Aerial view of Upper Arrow Lake in British Columbia shows effect of 1973 drought.



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Power Sales for the Year

Energy sales for the fiscal year were 65.0 billion kilowatt-hours. This was a 2.1 percent increase over FY 1972, but was the smallest sales gain posted since FY 1968. Sales of secondary energy dropped off considerably since normal power surpluses were not available due to poor water conditions.

The average revenue from the sale of energy to all classes of customer was 2.40 mills per kilowatt-hour excluding sales of capacity and revenues from other services.

Sales of capacity during FY 1973 totalled $2.8 million, an 8.8 percent drop from FY 1972. The energy associated with the delivery of this capacity is returned to BPA during the recipient's off-peak hours.* Investor-owned utilities increased their purchase of capacity by 26 percent, thereby taking more than half (54 percent) of the total. The remainder was purchased by public agencies and by the Bureau of Reclamation, Mid-Pacific (California) Region, as forced outage reserves.

Publicly-owned utilities — public and peoples' utility districts, cooperatives and municipal systems — bought 25.4 billion kilowatt-hours during the fiscal year. This accounted for 39.1 percent of total BPA energy sales, and represented a 9.6 percent increase over the previous year. Regional load growth has doubled the amount of energy required by the public systems just 11 years ago, in FY 1962.

BPA sold 14.8 billion kilowatt-hours of energy to investor-owned utilities during FY 1973, a 9.0 percent increase over FY 1972. These utilities accounted for 22.8 percent of total energy sales for the year, and they used 23.2 percent more BPA firm power than in the previous year. Because of adverse hydro conditions, only 600 million kilowatt-hours of BPA non-firm energy was available to the investor-owned systems in FY 1973 as compared to 2.0 billion kilowatt-hours in FY 1972. The 20-year contracts between BPA and the investor-owned utilities for firm power expired on August 31, 1973, and were not renewed because of the need to meet the load growth of preference customers. However, non-firm energy sales, capacity sales, and some amounts of firm energy sales continue with them.

Energy sales to Federal agencies in the Pacific Northwest continued to decline in FY 1973, amounting to less than 1 percent of total BPA sales. The Federal purchase of 602 million kilowatt-hours was a 0.8 percent decrease from that of FY 1972.

During the past fiscal year, sales to the aluminum industry totaled 19.9 billion kilowatt-hours or 30.6 percent of all BPA energy sales. Because of new capacity additions and restoration of some temporary curtailments previously invoked by BPA, these firms used 10.2 percent more firm energy than in FY 1972. Interruptible curtailments, however, decreased the aluminum plants' usage of non-firm energy by 36.3 percent, resulting in a net decline of 1.4 percent from FY 1972. The unavoidable curtailment of interruptible energy came at a time when the demand for aluminum would have permitted these plants to operate at full capacity, had the power been available.

Direct-service industries other than aluminum firms purchased 13.7 percent less energy during the past fiscal year than in FY 1972. Most of the decrease resulted from curtailment of interruptible energy. The 2.1 billion kilowatt-hours sold to these industries was 3.3 percent of total BPA energy sales.

Surplus energy sales to the Pacific Southwest fell to 2.2 billion kilowatt-hours, a whopping 40.7

*BPA's rate schedules provide for the sale of capacity without energy, or capacity with only small amounts of energy on a contracted basis. Such sales are normally additive to a baseload block of power (capacity and energy) in order to shape the purchaser's baseload power more nearly to his load profile.

Northwest aluminum production is partially dependent upon interruptible power. A closed-down potline (left, below) is bleak testimony to curtailment of non-firm energy.

percent decrease from FY 1972. This of course was due to the low streamflows and reservoir shortages in the Pacific Northwest. Had surplus energy been available, the Southwestern shortages of natural gas and low-sulphur petroleum could have spurred record energy sales over the Intertie lines.

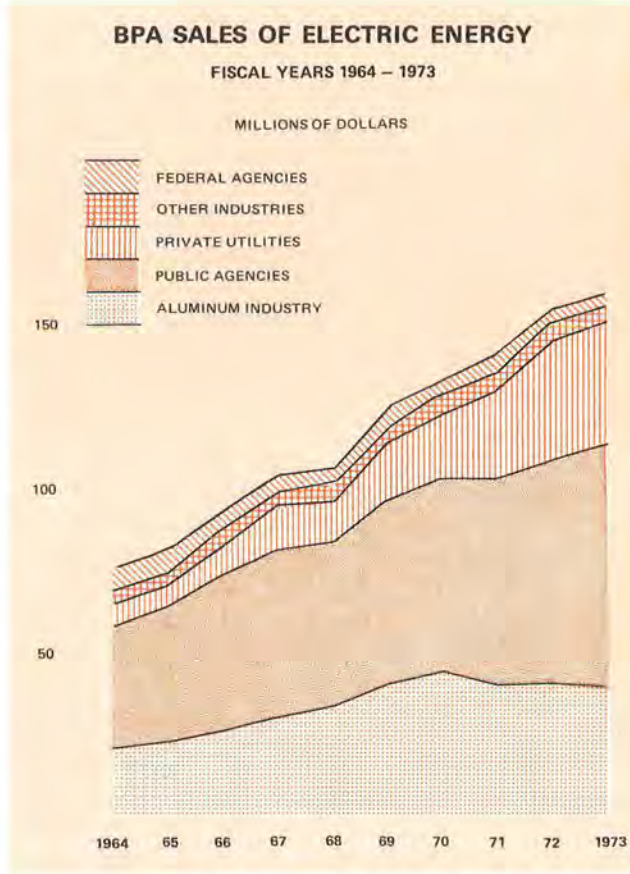
INDUSTRIAL CUSTOMERS BEAR THE BRUNT OF THE ENERGY SHORTAGE

The most vulnerable segment of the economy in the face of a power shortage is the heavy industry which is dependent upon interruptible energy for a significant portion of its load. The 19 operating industrial customers serviced by BPA, the largest of which are electroprocess firms, have capacity for about 1 million kilowatts of interruptible power. Under the terms of its power sales contracts, BPA has the right to curtail all or part of this low-cost energy whenever it is necessary to meet firm loads.

In October 1972 all interruptible power sales were curtailed. The industries continued to meet their requirements by purchasing energy from outside the region, acquiring provisional energy from BPA, and using power acquired under Hanford contracts. Except for short periods in December 1972 and January 1973, these power supplies enabled the firms to maintain normal operations for several months.

On April 10, 1973, one-half of this replacement energy, or 520,000 kilowatts, was curtailed. On July 20 one-half of the remainder was curtailed, and subsequent curtailments reduced that load to 130,000 kilowatts. These reductions were imposed because of difficulties in purchasing energy from other sources, and because the industries elected to conserve energy in the event that an early return of provisional energy to BPA were required.

As a result of these cutbacks, most BPA industrial customers were forced to reduce their production, resulting in some 1,100 fewer jobs in the region. The curtailments also affected up to 8 percent of the United States aluminum production capacity. These firms estimate that their employment will decline by another 2,740 workers if their remaining interruptible capacity and one-fourth of their modified firm power is cut back.



This prospect is largely dependent upon whether a pay-back of some 1 billion kilowatt-hours of provisional energy delivered to 14 of the firms during the period October-December 1972

Power Supply Chief Carl W. Blake (standing) reports on power outlook to Assistant Administrator Bernard Goldhammer (center) and industrial customer representatives.

is required by BPA. This energy is provided by drawing down Hungry Horse Reservoir below established operating levels. Under this arrangement, the industries agree that if BPA needs energy to meet its firm loads before Hungry Horse refills, the industries will return it through purchases of energy from other available sources or by curtailing their firm power loads.

At BPA's request, the affected industries have submitted plans for returning the provisional energy should such returns be required. If the current power situation improves so that such recalls are not required this winter, the pay-back obligation will remain in force through April, 1976, or until Hungry Horse Reservoir refills.

In early December 1973, BPA was able to restore temporarily some secondary power deliveries to its utility and industrial customers. This was made possible by an artificially nonrecurring surplus of power resulting from the drawdown of Grand Coulee reservoir for construction purposes, and by the postponement of Hanford NPR refueling.

July — December 1973

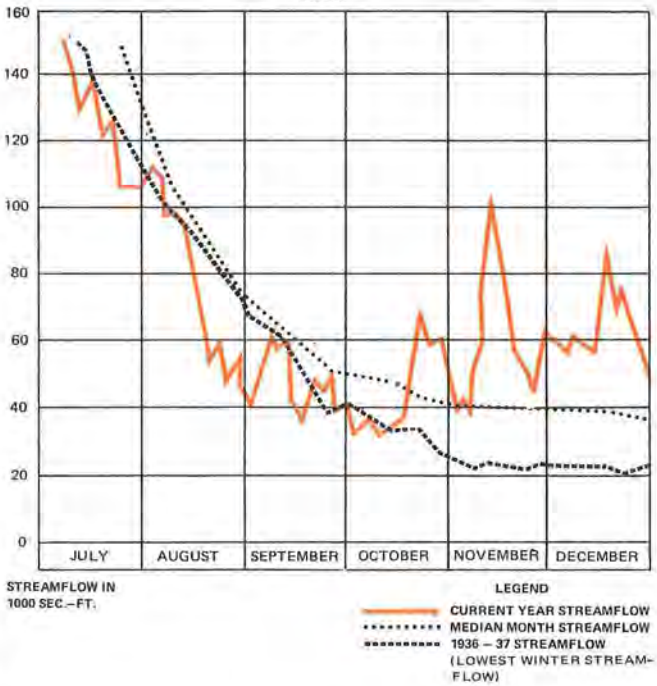
Although this Annual Report is intended to show the financial results and other highlights of Fiscal Year 1973, a number of significant developments occurred during the subsequent 6 months. Since these have a major impact upon the Pacific Northwest power supply system — now and in the future — it appears appropriate to summarize them in this report.

THE REGION RESPONDS TO ITS ENERGY SHORTAGE

BPA and regional utility management watched with growing concern as the Pacific Northwest entered the spring runoff season with one of the lowest snowpacks in history. By August 1973, it was grimly apparent that reservoir levels and streamflows throughout the region were below firm load-carrying levels. Based upon a 20-1/2-month critical period commencing in mid-August, the power supply system was some 15 billion kilowatt-hours or 7.5 percent deficient in meeting its firm energy load for the period. This situation did not materially improve as the streamflows during August and September fell to an all-time low for the season based upon 95 years of record.

With continued below-critical streamflows and firm energy loads equal to those projected for the ensuing months, it appeared that all reservoirs could be completely empty by March 1974. The Federal Columbia River Power System would then be wholly dependent upon run-of-the-river streamflow for its power generation. Even with the full availability of other generation resources, this would leave the region some 3.5 billion kWh or 30 percent deficient in meeting its firm loads in March 1974. It should be emphasized that such a plight has far more serious and prolonged consequences than the occasional brief shortages in peaking capacity which occur because of cold temperatures or major system outages.

HYDROGRAPH OF NATURAL STREAMFLOW AT GRAND COULEE 1973



Regionwide Energy Conservation Program

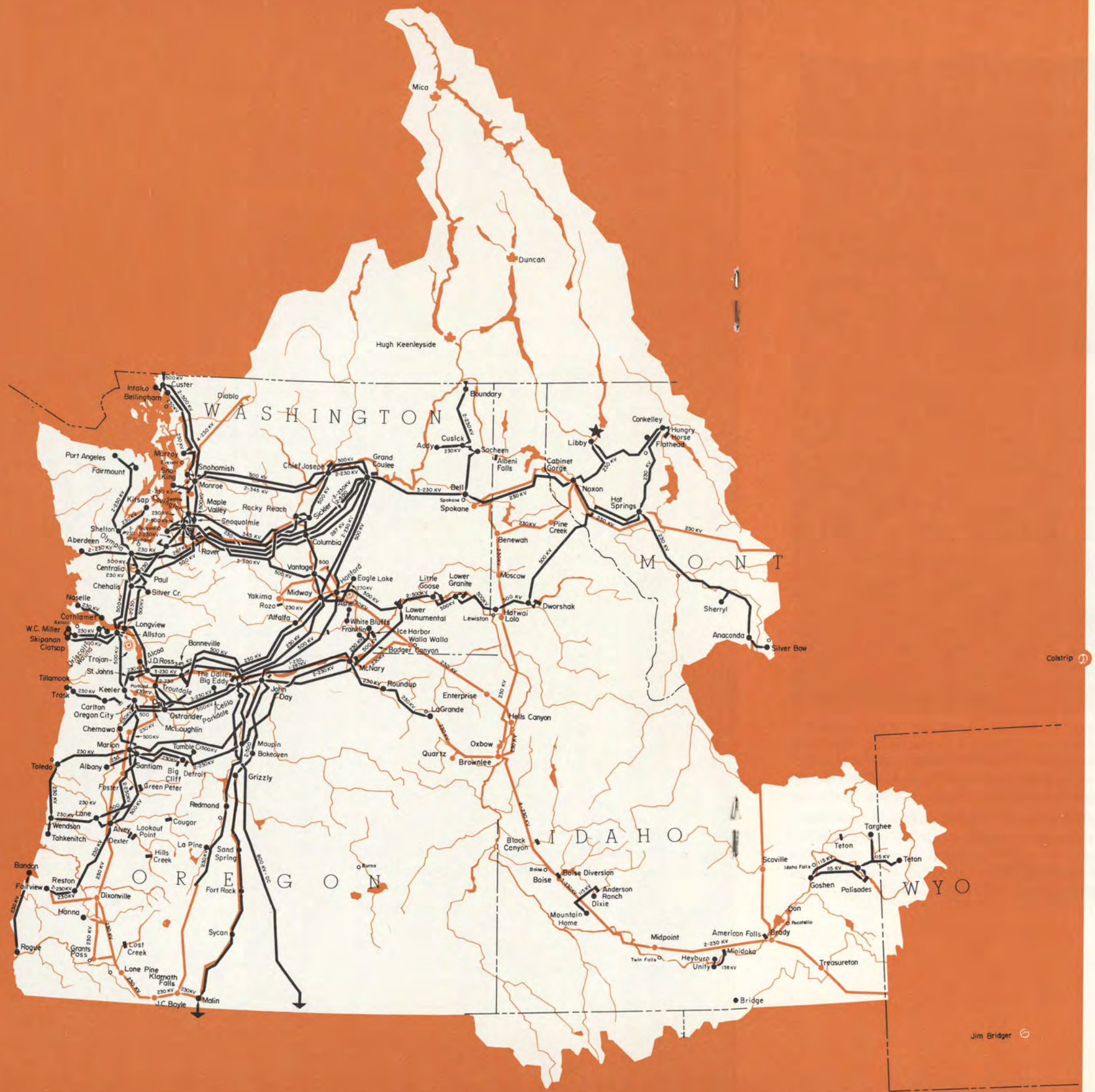
Based upon the low watershed readings compiled as of July 31, 1973, (the end of the annual stream runoff period), the Bonneville Power Administration and major Northwest utilities immediately launched an intensified energy conservation program which had been in preparation for several months. Its stated objective — to provide leadership and assistance to all utilities and consumers in the region, so that a 7.5 percent

BPA energy conservation includes corridor brownout.

PACIFIC NORTHWEST POWER SYSTEM

Major Facilities Existing and Under Construction

As of December 31, 1973



Low water in Lake Roosevelt behind Grand Coulee Dam.

voluntary load curtailment could be effected to counteract the firm energy deficit confronting the Pacific Northwest.

An announcement of the BPA program was issued on August 9, including the formation of a BPA energy conservation task force to identify methods of saving energy and disseminating this information to the public. This unit reports directly to the BPA Administrator and is headed up by the newly-created post of Assistant to the Administrator — Energy Conservation.

In addition, each BPA field office is responsible for working closely with its utility and industrial customers to effect internal energy economies and to promote the elimination of non-essential electricity usage at the consumer level.

A series of meetings with utilities and utility associations was initiated during the month of August and met with an encouraging response. Since then, under BPA, utility, and state government leadership, energy conservation has burgeoned into a regionwide movement which encompasses all sectors of public concern. A major stimulus has been the prominence given this program by the news media, who have become staunch partners in the effort to kindle public awareness of the program, as well as reporting the steps taken by industry and business, public institutions, state and local government and private citizens in reducing their usage of electricity.

In concert with utilities in the region, BPA first identified peak and firm energy requirements by 1) consumer category and 2) type of consumption. This information has been widely disseminated to explain how meaningful savings can be achieved without imposing undue hardship upon individual users.

Visual aids, fact sheets and frequent news releases have contributed to the flow of energy conservation information generated by BPA and its associates in the utility industry. Speakers bureaus have been organized in numerous communities, and BPA staff from all levels of the organization have been recruited to address civic groups, schools and business associations on the need for energy conservation and how to effect it.

Close liaison has been established with state and local government, especially the public service regulatory agencies and the governors of Oregon, Washington, Idaho and Montana. All of these have given strong support to the energy conservation program, and the results have been highly gratifying.

In Oregon, the 1973 Legislative Assembly passed a measure which takes effect January 1, 1974. This measure requires all utilities, both public and investor-owned, to submit plans to the Public Utility Commissioner for the implementation of energy curtailment during emergencies. In September 1973, Oregon Governor Tom McCall issued an executive order banning all commercial display and outdoor lighting except that deemed necessary for safety and security reasons. Subsequently, the Oregon Public Utility Commissioner issued an order directing the investor-owned utilities in the state to disconnect service to customers who are determined by the Commissioner to be in violation of the lighting ban.

The Washington State Legislature called a special session and enacted legislation which empowers the Governor to impose mandatory curtailment of energy usage if and when the situation demands it. Both Idaho and Montana have strongly encouraged voluntary conservation and are considering plans for mandatory curtailment.

The guidelines for such action have been generally agreed upon by the utilities in the region, acting through the Pacific Northwest Utilities Conference Committee. Their recommendations are currently being reviewed by the governors and regulatory commissions of the four states with an eye to formulating reasonably uniform plans of curtailing electrical load on a regionwide basis if required.

The recommended curtailment plan embraces a five-step sequence based upon the severity and length of a power shortage. These steps range from intensified appeals for voluntary conservation to consideration of so-called "rolling blackouts."

Hopefully the more stringent of the mandatory curtailment steps will never have to be taken. As of December 1973, it appeared that the short-term power crisis had been averted.

Estimates compiled by the Northwest Power

Interior Assistant Secretary for Energy and Minerals Stephen A. Wakefield responds to energy queries at a Portland, Oregon, news conference.

Pool indicate that regionwide conservation efforts yielded a 6 percent savings during the period September-November 1973, based upon forecasted loads. These efforts were assisted by heavy precipitation throughout most of the Columbia Basin during November and December. By late December the reservoir deficit had been reduced to 5.8 billion kilowatt-hours.

The threat of a Pacific Northwest power shortage still exists, but there is indisputable proof that voluntary conservation can work. Given the gloomy load/resource forecasts for the coming decade, a continuing conservation program may well become a way of life for those living in the Pacific Northwest.

RATE INCREASE PROPOSAL IN PREPARATION

The Administrator advised BPA customers on December 14, 1972, that to meet its obligation to recover the costs to the Federal Government of generating and transmitting electric power, which are constantly increasing, a substantial wholesale power rate increase will be necessary. The increase is to take effect on December 20, 1974, the earliest date at which BPA's power sales contracts permit the rate level to be adjusted. Preliminary studies made prior to the December 1972 announcement indicated the necessity for a rate increase in the order of 20 to 30 percent. Subsequent cost increases, revisions in revenue forecasts and planning assumptions place this estimate closer to the higher figure.

Since the original announcement, BPA has proceeded with the complex studies necessary to determine its future revenue requirements and to design new rates to meet those requirements. It is anticipated that the new rates will be filed with the Federal Power Commission by about July 1, 1974. By law, the rates must be approved by the FPC to become effective.

BPA has also conducted an in-depth study of the possible effects on the environment of the proposed rate increase, which is described in the following section of this report. The financial requirements for the rate increase are described in the chapter "The Financial Year."

Environmental Effects of Proposed Rate Increase

Upon instructions from the Office of the Secretary of the Interior, a BPA task team was formed in late FY 1973 to study the possible environmental effects of the proposed rate increase. The objective of this study was to determine whether a rate increase could have significant impact on the quality of the human environment, and thus whether or not it would be appropriate to submit an Environmental Impact Statement in conjunction with the BPA rate increase proposal.

After consultation with nationally recognized utility rate experts, economists and others, the BPA task team drafted a preliminary study outline, followed by a review draft of the study. Both were circulated for review and comment to the Northwest Congressional delegation, the Bonneville Regional Advisory Council, BPA customers, Western governors and state environ-

mental protection agencies, public utility commissions and commerce agencies, and to environmental, consumer, voter, legal aid services, low-income, senior citizen, business, labor and farm interest groups both within and outside of the BPA service area. The wide interest generated by this innovative study project attested to the importance of its content and its pioneering concept.

The final study, incorporating numerous comments and viewpoints received from the above sources, was published in November 1973. The study focused not only upon rate levels, but upon alternative bases for structuring rates. The latter included consideration of cost-of-service rates, marginal-cost pricing, a dual rate system, peak pricing and a host of other economic, social and environmental indices.

In summary, the findings of the study are that:

1. Consumption of electricity is responsive to price, although price is but one of many variables affecting consumption.
2. Since most factors, other than price, which influence power consumption will tend to increase future demand, it is inconceivable that a wholesale rate increase of the magnitude contemplated will actually reduce consumption below existing levels.
3. A rate increase of the level envisioned will, however, probably reduce the consumption of electricity below that which would otherwise be anticipated without a rate increase. By the year 1990, after the full effect of a 1974 BPA wholesale power increase has taken place, the reduction in electricity consumption might be in the order of 6 billion kilowatt-hours annually, or about 2 percent of the 1990 projected regional load. With or without a BPA rate increase, the 1990 regional load is expected to be more than double the present load.

In terms of its original objective, the impact study does not clearly answer the question of whether the proposed rate increase or any realistic restructuring of BPA rate schedules in conjunction with such an increase will significantly affect the quality of the human environment. However, it has been decided that in view of the controversial nature of this entire matter, BPA will prepare an Environmental Impact Statement in conjunction with its rate increase submission to the Federal Power Commission.

PLANS FOR MEETING THE POWER NEEDS OF THE FUTURE

It has become increasingly evident in recent

years that the Pacific Northwest faces a paramount dilemma in its planning to meet the power demands of the future. Over the next 20 years, the regional electrical load is expected almost to triple — from 20,000 megawatts peak demand in 1973 to nearly 60,000 MW in 1993. This represents a financial investment in additional generation, transmission and distribution facilities of about $30 billion.

During the mid-1960's, BPA and the utilities in the region undertook a unique program to meet this awesome challenge. The result was the regional Hydro-Thermal Power Program, which involves 104 public agencies, four investor-owned utilities and the Federal Government.

Since its inception, the Hydro-Thermal Power Program has served the region well. If current planning and construction schedules can be met, the Program will provide some 19,300 megawatts of additional peaking capacity and 8,160 average megawatts during the period 1971-1982.

Two factors, however, have telescoped the time frame of the present Hydro-Thermal Power Program and planners are now looking beyond 1982. The first of these factors is the growing leadtime to site, finance, design and construct a modern, optimum-sized thermal plant. Today the sponsors of a 1,200-megawatt nuclear facility face an 11 to 12-year leadtime, or an operational date of at least 1984.

The second factor is that of cost escalation, which has a prodigious impact upon the financing of a plant to be constructed in the 1980's.

The interaction between project leadtime and future cost has already nullified the potential of the present Hydro-Thermal Power Program to sponsor new thermal generation beyond 1982. For planning purposes, BPA's net billing capability — whereby BPA acquires a utility's share of power from thermal plants by offsetting the cost against amounts owed by that utility to BPA for power and other services provided by BPA — has been exhausted.

Recognizing these inadequacies and the need for devising other mechanisms for continuing the Hydro-Thermal Power Program, the Department of the Interior and BPA began seeking alternatives. In March 1973 the latter was directed to explore with the utilities in the region any reasonable plans to 1) provide for an adequate power supply for the Pacific Northwest through 1994; and 2) minimize the financial demand upon the Federal Treasury.

In response to this directive, BPA initiated a series of discussions with the utilities and its industrial customers to devise workable plans. These discussions over a 6-month period resulted in general agreement upon certain planning and financial elements of various alternative programs which were submitted. Other features, however, were not acceptable to one or another of the many interests involved.

To bring the entire matter into focus and provide a common basis for further negotiation, BPA submitted a proposal outline to the Under Secretary of the Interior in September 1973. This proposal attempted to identify a middle ground upon which all segments of the regional utility industry could ultimately agree.

Agreement was reached fairly early on a proposal for minimizing the financial demand upon the Federal Treasury, and work commenced independently on the following 2 points:

1. BPA should continue to develop the regional transmission grid.
2. BPA cash receipts, which now must all be deposited in the U.S. Treasury, should be available to meet operation and maintenance expenses and to finance, either directly or by payment of debt service on bonds, additions to the transmission system.

Meeting on long-range power supply planning draws record turn-out of BPA customers.

Elements of the BPA proposal relating to the long-range power supply proved to be more controversial. They included a proposal for BPA to use its receipts to purchase power from non-Federal thermal plants, seeking authority for BPA revenue bonding for hydro generator additions, and the establishment of a "split rate" structure.

Despite the lack of consensus agreement, the power supply proposal succeeded in its primary objective of stimulating alternative proposals. These efforts culminated in establishing concepts which were jointly announced by BPA, its major industrial customers and 108 public and investor-owned utilities on December 14, 1973.

The concepts for meeting regional power needs through 1986 provide for a marshalling of the joint capabilities of all Federal and non-Federal power agencies, plus 16 large industrial users. These concepts, like the agreement on the proposed use of BPA revenues, also minimize the financial demand upon the Federal Treasury as specified by the Department of the Interior.

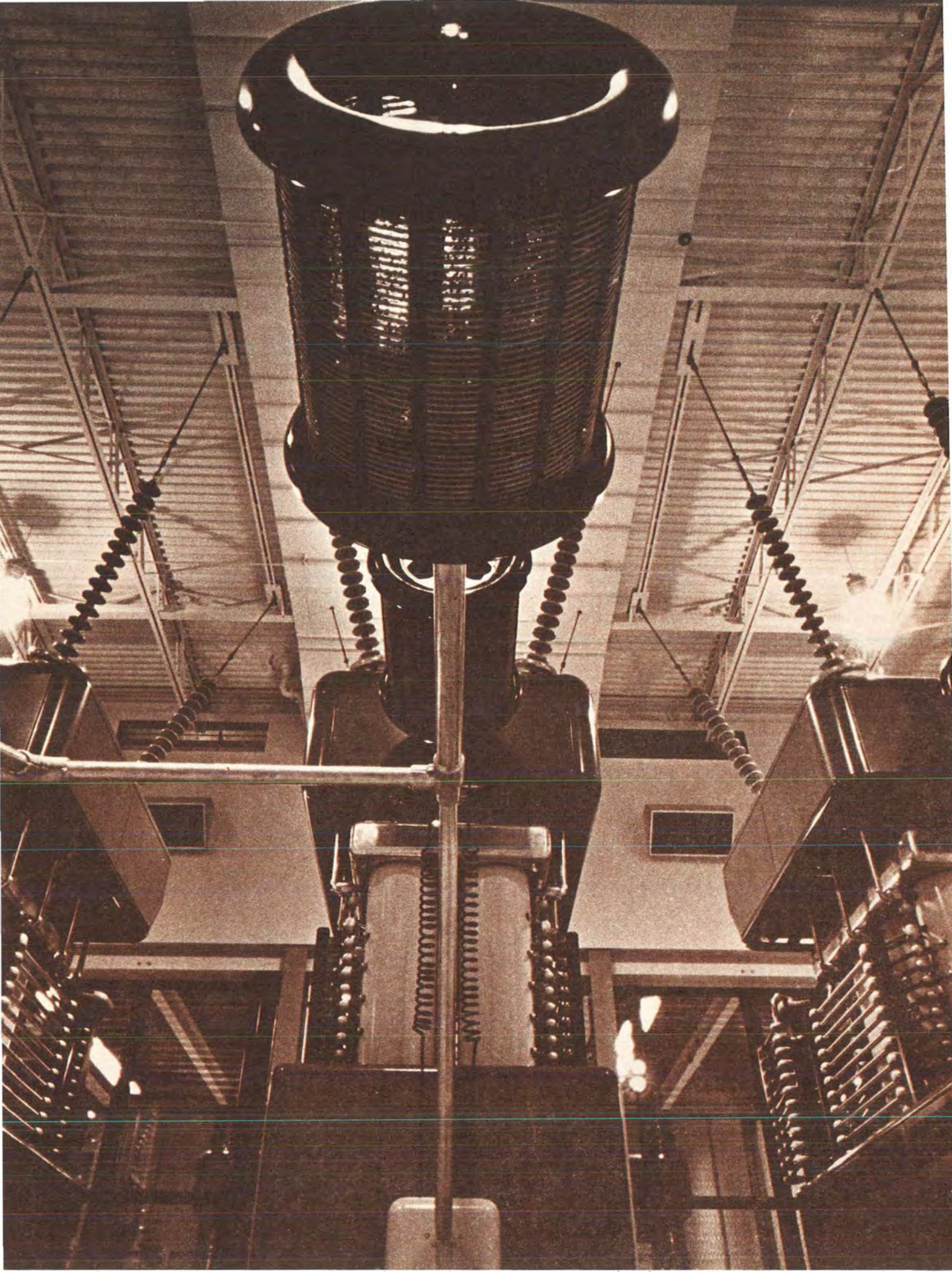
In concept, the power supply plan stipulates that:

1. All power supply needs, including those of current industrial customers, will be met.
2. The utilities will assume the financial and planning responsibility to construct thermal plants and some hydro facilities on a coordinated regional basis.
3. Bonneville Power Administration and other Federal agencies will provide hydroelectric additions and peaking capacity, together with transmission services and marketing functions as required.

The goal is to plan, site, finance and construct 10.4 million kilowatts of additional generation between 1978 and 1986. Of the new generation, 6.7 million kilowatts will be supplied by coal-fired and nuclear plants, and 3.7 million kilowatts by additional hydro facilities.

At the time of this publication, all parties to the power supply agreement are engaged in translating its concepts into a detailed plan. These negotiations are being conducted with a general realization that an early agreement upon specifics is imperative. Based upon current forecasts and planning assumptions, the Pacific Northwest is already the equivalent of four 1,200-megawatt thermal plants behind schedule in terms of needed generation for the mid-1980's.

In drafting a comprehensive plan to meet future power requirements, the Northwest utility industry is reaffirming its national leadership in power supply planning. The results of these efforts should help to point the way for achieving the national goal of self-sufficiency in energy.



The Financial Year

The Federal Columbia River Power System compiled record gross revenues of $177.4 million during FY 1973. However, it also showed the largest deficit in history, $24 million, which was slightly below that forecasted. These results were a continuation of the trend over the past several years during which expenses have increased at a much faster rate than have revenues.

This trend will be even more pronounced during FY 1974. Current estimates indicate that revenues may actually decline because adverse water conditions during the first 4 months of FY 1974 severely limited non-firm energy sales. Firm power revenues also are expected to decrease as a result of the intensive energy conservation program now underway. This will be coupled with continued increases in expenses, including the purchase of power from outside sources to make up for the shortage of generation in the Federal system. Although the dynamic nature of the situation makes it difficult to estimate precisely, a substantially larger deficit than that of FY 1973 is within the range of possibility for FY 1974. (See chart on page 48.)

BASIS OF FINANCIAL REPORTING

To comply fully with all legal requirements, BPA prepares (1) cost accounting financial statements (adjacent to the Acting Comptroller General's opinion on pages 51 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 (pages 66 and 67), which begins with cumulative historical results through June 30, 1973, 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. (A correlation between the two types of statements is provided by Schedule B, page 58.)

COST ACCOUNTING RESULTS

The Statement of Revenues and Expenses, page 51, shows that gross revenues increased from $176.0 million in FY 1972 to $177.4 million in FY 1973. Although this was an all-time high for revenues, the increase was only $1.4 million, or less than 1 percent. Revenues fell $8.6 million below the estimate made at the beginning of the year. This was caused primarily by poor water conditions which greatly reduced non-firm energy sales during the last half of the fiscal year. This resulted in decreased revenues from all categories of customers except the publicly-owned utilities. Increased sales to that group accounted for the overall slight revenue gain.

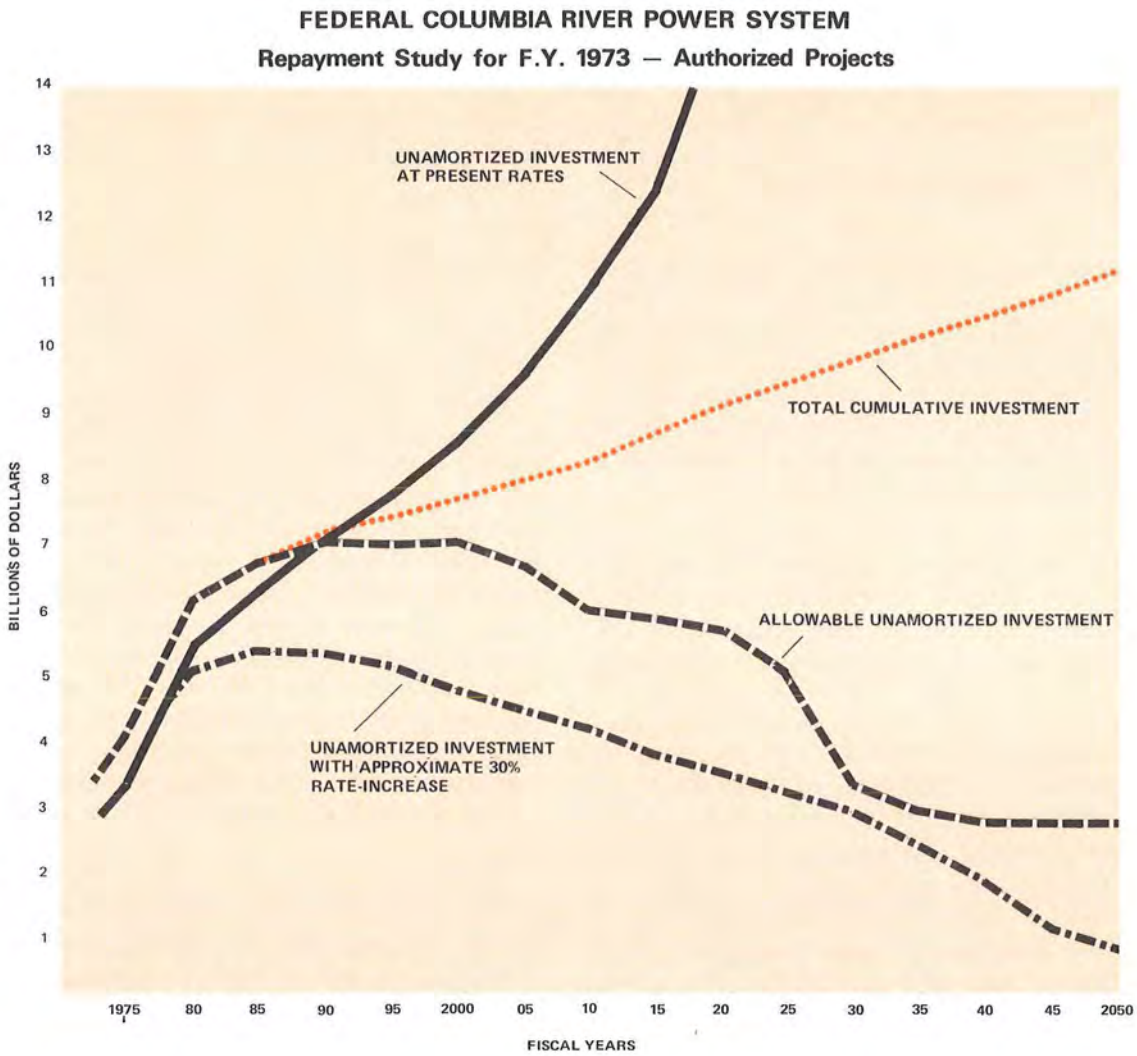
Total expenses increased from $171.9 million in FY 1972 to $201.4 million in FY 1973. The largest increase was in purchase and exchange power, which was up $15.5 million. This was primarily attributable to larger purchases from the Centralia steam plant, although such purchases were less than had been forecast a year ago. All other categories of expense also increased substantially.

The inevitable result of this trend was a net loss on the cost accounting basis for the first time in 10 years. The loss totaled $24 million as compared to the estimated loss of $26.7 million which was indicated in last year's annual report.

REPAYMENT STUDY RESULTS

To test the adequacy of the power rate level,

Valve equipment (left) at Celilo Converter Station helps to generate revenues through Intertie power sales to the Pacific Southwest.



BPA is required by law to prepare annually and submit to the President and Congress a consolidated financial statement on the repayment basis (table 6, page 66).

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 50 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 40 years); and

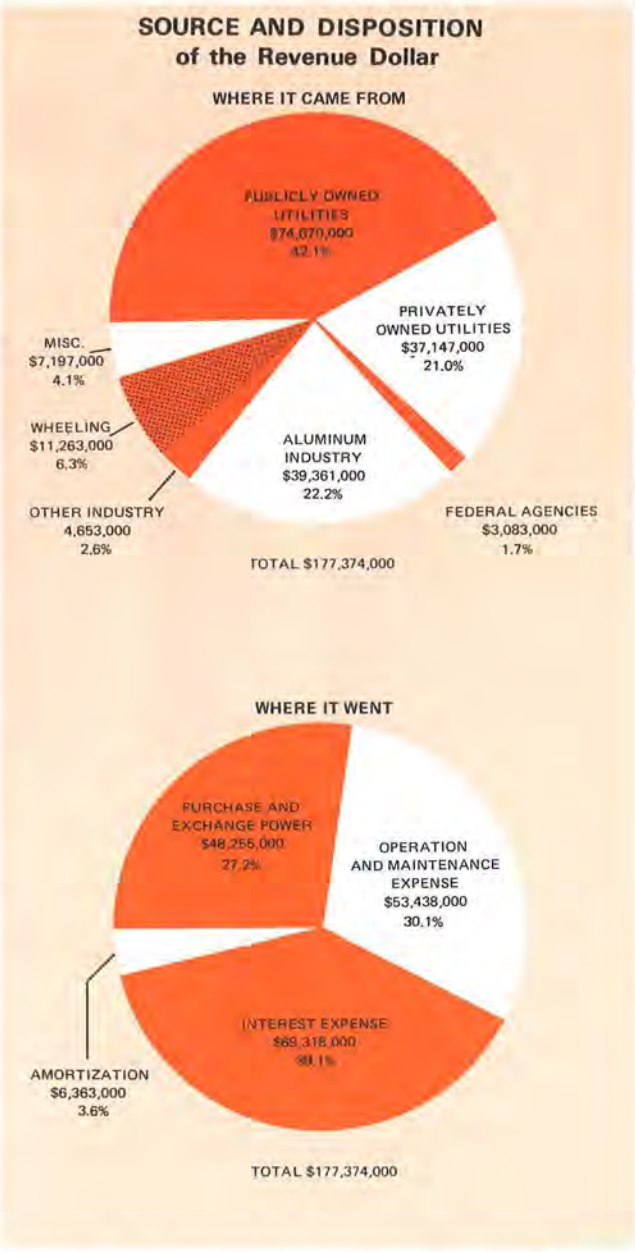
c. the investment in each replacement of a facility at a generating project within its service life.

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 FY 1973 repayment study (table 6, pages 66 and 67), prepared in accordance with the foregoing criteria, shows that cumulative revenues through June 30, 1973, totaled $2.28 billion. These have been applied to pay interest costs of $795.0 million, purchase and exchange power costs of $156.8 million, and operation and maintenance costs of $635.3 million, with the remaining $693.6 million applied to amortization of the investment in power facilities. Cumulative investment in power facilities totaled $3.56 billion, with the unamortized balance totaling $2.87 billion.

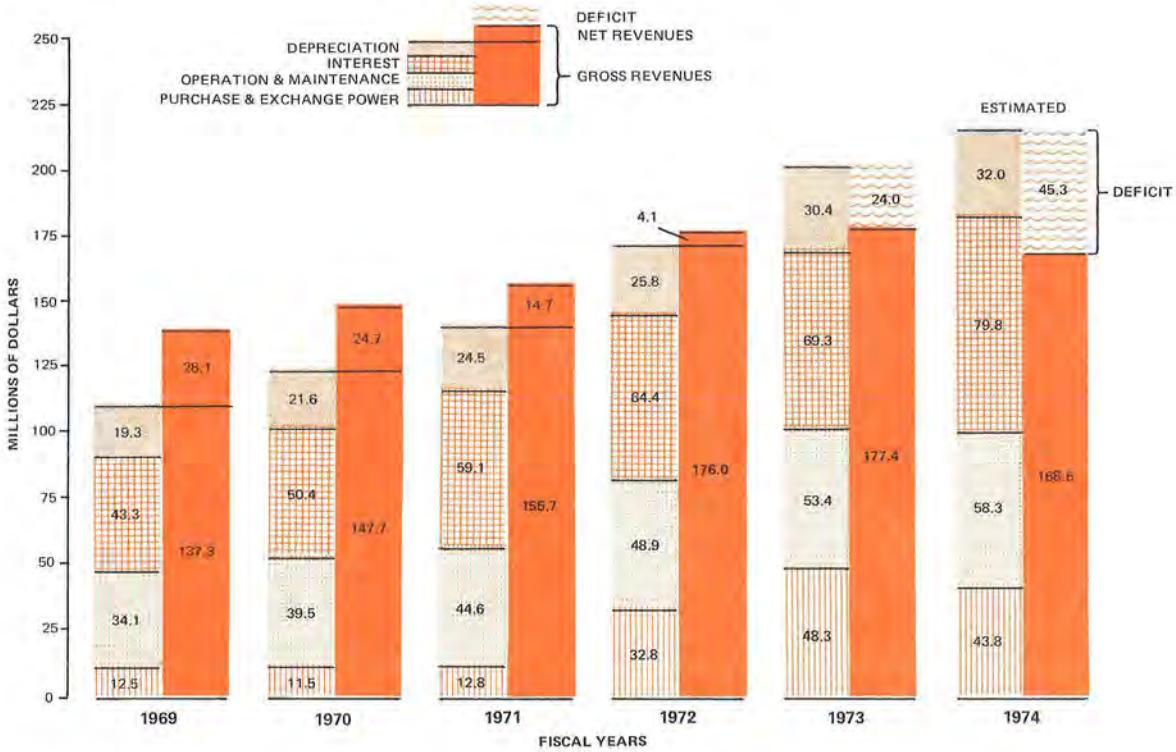
Starting with these cumulative results, the repayment study forecasts future revenues and costs over the balance of the repayment period.



Costs and revenues are included for all Federal projects (1) currently in service, (2) under construction, and (3) authorized by Congress and scheduled for construction by the constructing agency. BPA power purchase costs are included in future years as described later in this section.

As can be seen from table 6 and the graphic illustration thereof shown on page 46, the reve-

REVENUE AND EXPENSE TREND



nues projected from the existing wholesale power rate level fall far short of recovering the power investment, thus indicating a need for a very substantial rate increase.

Calculations indicate that an increase in revenues of about 30 percent would provide for the full amortization of the investment within the allowable repayment period. This has been tested by rerunning the repayment study with the revenues increased by that percentage. The result of this test is also shown on the graph on page 46.

The repayment study included in the FY 1972 Annual Report showed a revenue deficiency in relation to the repayment criteria of approximately 2 percent, but indicated that a substantially higher increase was anticipated for the 1974 rate adjustment when future cost increases were taken into account. These factors have been included in the FY 1973 repayment study as described below. The much greater revenue increase now indicated is due to the following factors (listed in order of their relative impact).

Additional Thermal Power Purchases

The FY 1972 repayment study included only those thermal power purchases then in effect, i.e., from the Hanford No. 1 nuclear plant and the Centralia coal-fired plant. The FY 1973 study, however, includes for the first time the cost of BPA's acquisition through net-billing agreements of power from the Trojan nuclear plant commencing in FY 1974 and the Washington Public Power Supply System Nuclear Project No. 2 commencing in FY 1977. Although no expense for these latter purchases was incurred during FY 1973, firm contracts have been signed committing BPA to these purchases commencing within the forthcoming 5-year rate period, and they thus constitute a firm cost which must be covered by future BPA revenues. The costs and revenues associated with these thermal plants are

included in the repayment study for the expected 35-year operational life of the plants and then deleted.

Higher Costs

The FY 1973 repayment study includes updated cost estimates for all of the Federal hydroelectric projects and BPA transmission facilities. Due to the continued cost escalation experienced in recent years, the new estimates reflect higher construction costs to complete projects under construction, higher costs for future replacements at all projects, plus higher operation and maintenance costs.

Interest Rate

The interest rate on future construction increased from the 5-1/2 percent used in the FY 1972 repayment study to 5-5/8 percent in the FY 1973 study due to higher average yields on long-term Treasury bonds.

As previously noted, the next date on which BPA's power sales contracts permit the adjustment of rates is December 20, 1974. As the contract provisions presently permit the adjustment of rates only at 5-year intervals, that rate adjustment must prove sufficient for the ensuing 5-year period, i.e., through December 19, 1979. Hence, it is appropriate and necessary to include in the repayment study, as noted above, those additional power purchase commitments which will take effect during that 5-year period.

The FY 1973 repayment study thus gives an approximation of the amount by which revenues will have to be increased on December 20, 1974, to meet the repayment criteria. It should be noted, however, that preparations for the rate filing are still in process. Decisions have yet to be made as to the exact rate structure and level to be proposed. Also, a final determination is yet to be made as to the exact amount of the revenue increase required.

Interior Under Secretary John C. Whitaker (right) inspects The Dalles Dam with Administrator Hodel and Special Assistant to the Secretary Roy H. Sampsel.

Some refinements and adjustments may be made in the repayment study which will be filed with the Federal Power Commission, probably in July 1974, in support of the rate increase proposal. For instance, the interest rate on future Federal investment may change by that time based upon calculations by the Treasury Department as to the then current average yield on long-term Treasury bonds. Some adjustments also may be made in the cost estimates for future projects based on more up-to-date information, including the possible impact of alternative means of financing future Federal projects. Extension of the operation of the Hanford No. 1 nuclear plant beyond October 1977, which is currently under discussion, would require some revision in the estimates of future purchase and exchange power costs. Further analysis also will be given to the question of the size of the contingency allowance which should be included in the rate proposal.

It seems reasonable, especially in view of the present requirement for retaining the new rate level for a 5-year period, to allow for some contingencies which could arise over that period so as to provide better assurance that the rate level established will be fully adequate to meet BPA's financial obligation. How these issues are resolved could push the amount of the rate increase to be proposed slightly upward or downward from the 30 percent range presently indicated.

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

B-114858

December 28, 1973

The Honorable
The Secretary of the Interior

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, 1973, and the related Statements of Revenues and Expenses and of Changes in Financial Position for fiscal year 1973. 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.

Subject to the financial effects of future adjustments related to the adoption of firm cost allocations, as explained in note 2, the accompanying financial statements, in our opinion, present fairly the assets and liabilities of the System at June 30, 1973, 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 by the Comptroller General of the United States.

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,

R. F. Keller

Acting Comptroller General
of the United States

Enclosures - 5

EXHIBIT 1

FEDERAL COLUMBIA RIVER POWER SYSTEM

STATEMENT OF REVENUES AND EXPENSES
FOR THE FISCAL YEARS ENDED JUNE 30, 1973 AND JUNE 30, 1972

(In thousands)

	1973	1972
OPERATING REVENUES:		
Bonneville Power Administration		
Sales of electric energy:		
Publicly owned utilities	$ 74,670	$ 69,392
Privately owned utilities	37,147	37,848
Federal agencies	3,083	4,572
Aluminum industry	39,361	40,423
Other industry	4,653	5,310
Total	158,914	157,545
Other operating revenues:		
Wheeling revenues	11,263	11,391
Other revenues	4,316	4,014
Total	15,579	15,405
Total Bonneville Power Administration revenues	174,493	172,950
Associated projects:		
Other operating revenues	2,881	3,035
Total power system operating revenues	177,374	175,985
OPERATING EXPENSES OTHER THAN DEPRECIATION:		
Purchase and exchange power (Note 7)	48,255	32,794
Operation and maintenance expense:		
Operation expense (Note 8)	31,466	31,558
Maintenance expense	21,972	17,335
Total operation and maintenance expense	53,438	48,893
Total operating expense other than depreciation	101,693	81,687
Net operating revenues	75,681	94,298
INTEREST EXPENSE:		
Interest on Federal investment (projects in service)	88,147	74,612
Related interest charged to construction	18,829*	10,200*
Net interest expense	69,318	64,412
NET REVENUES AVAILABLE FOR REPAYMENT	6,363	29,886
LESS DEPRECIATION	30,418	25,788
NET (LOSS), REVENUES (Schedule B)	($ 24,055)	$ 4,098

*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, 1973 AND JUNE 30, 1972

(In thousands)

EXHIBIT 2

ASSETS

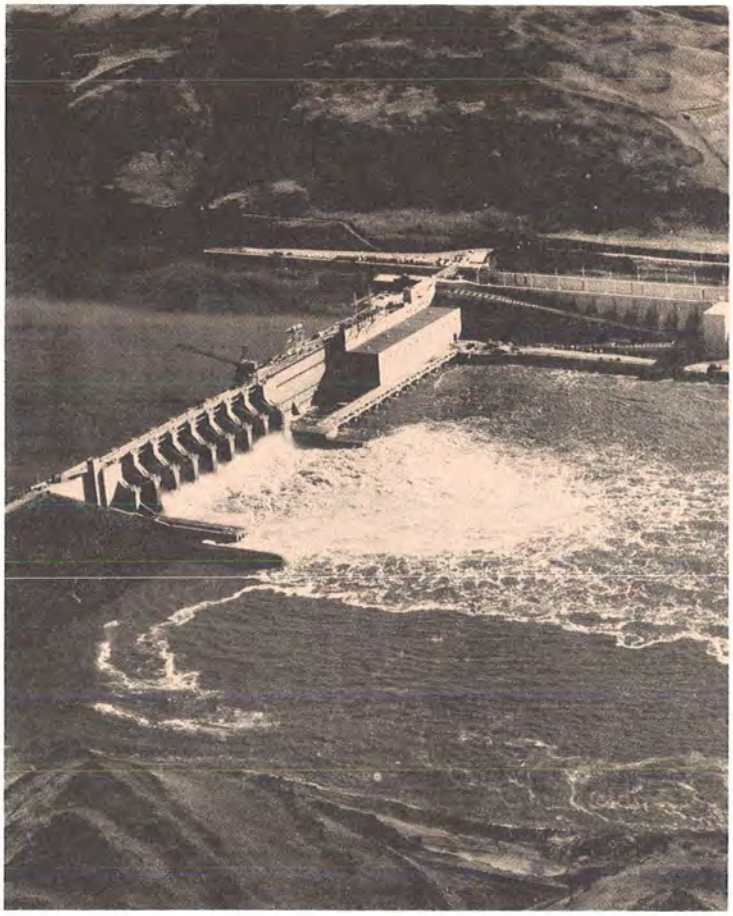
	June 30	
	1973	1972
FIXED ASSETS:		
Completed plant (Schedule A)	$3,466,817	$3,045,072
Retirement work in progress	25,805	26,253
	3,492,622	3,071,325
Less accumulated depreciation	295,455	275,489
	3,197,167	2,795,836
Construction work in progress (Schedule A) (Note 8)	897,213	1,031,977
Total fixed assets	4,094,380	3,827,813
CURRENT ASSETS:		
Unexpended funds	139,092	137,572
Special funds	12,336	7,033
Accounts receivable	24,733	26,259
Materials and supplies	14,907	14,968
Total current assets	191,068	185,832
DEFERRED CHARGE FOR PAYMENT OF IRRIGATION ASSISTANCE (Schedule A) (Note 3)	438,720	415,548
OTHER ASSETS AND DEFERRED CHARGES:		
Trust funds	14,649	5,912
Other assets and deferred charges	6,693	10,443
Total other assets and deferred charges	21,342	16,355
TOTAL ASSETS	$4,745,510	$4,445,548

"Notes to the Financial Statements" are an integral part of this statement.

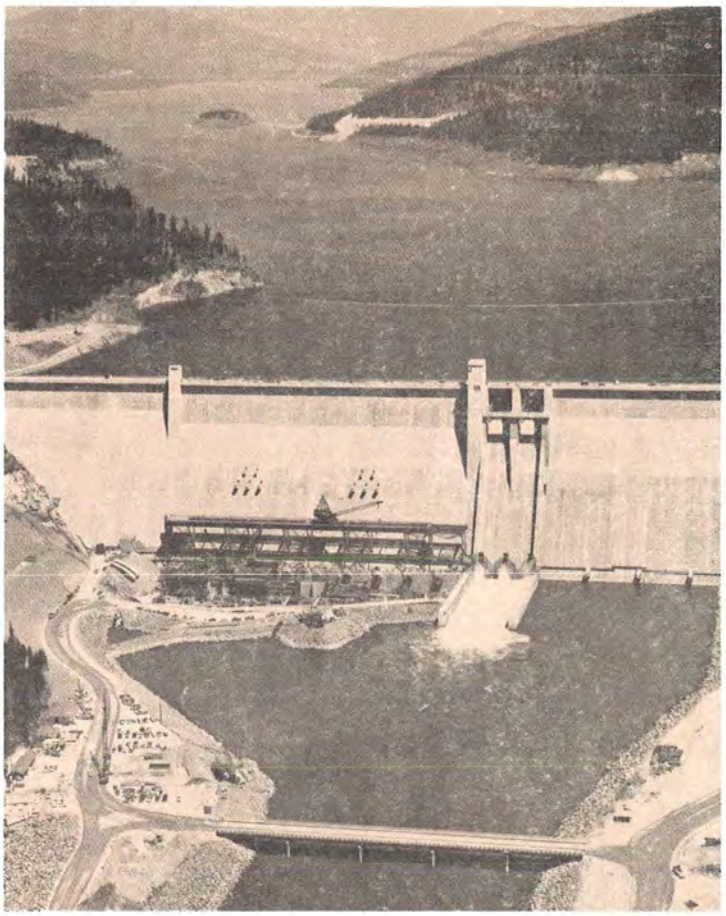
LIABILITIES

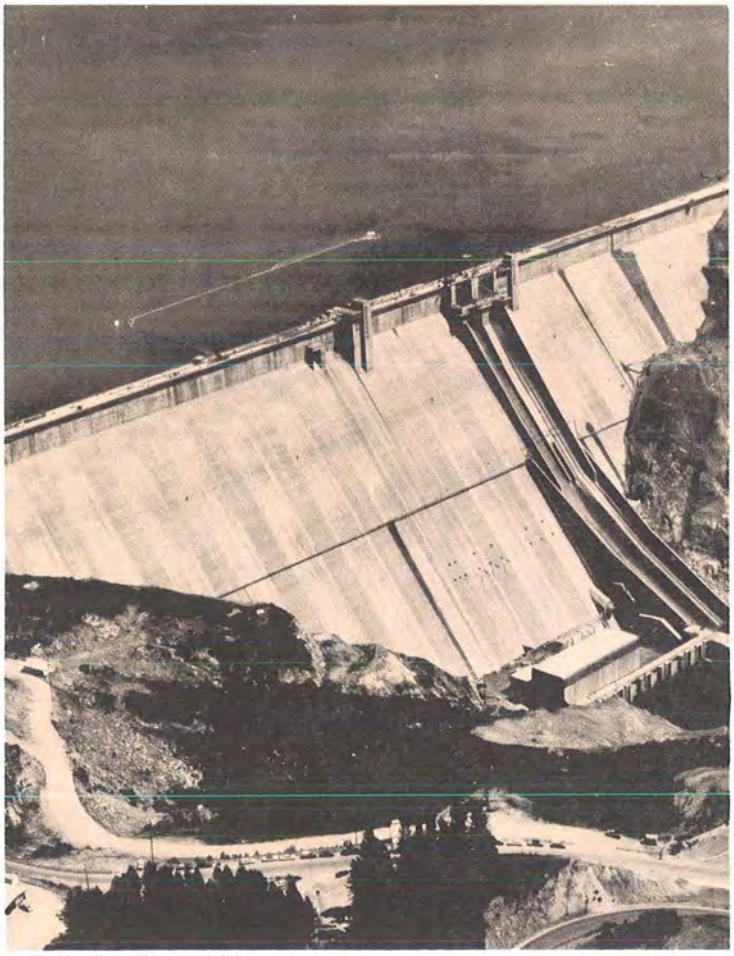
	June 30	
	1973	1972
PROPRIETARY CAPITAL:		
Investment of U.S. Government:		
Congressional appropriations	$4,888,238	$4,575,475
Revenues transferred to Continuing Fund	4,390	4,287
Transfers from other Federal agencies, net	33,056	31,274
Interest on Federal investment (Note 6)	1,049,149	948,597
Gross Federal investment	5,974,833	5,559,633
Less funds returned to U.S. Treasury	2,086,170	1,957,148
Net investment of U.S. Government	3,888,663	3,602,485
Accumulated net revenues (Schedule B)	328,546	354,155
Total proprietary capital	4,217,209	3,956,640
COMMITMENTS (Note 4)		
CURRENT LIABILITIES:		
Accounts payable	62,998	57,742
Employees accrued leave	5,473	4,639
Total current liabilities	68,471	62,381
LIABILITY OF U.S. GOVERNMENT FOR PAYMENT OF IRRIGATION ASSISTANCE (Schedule A) (Note 3)	438,720	415,548
OTHER LIABILITIES AND DEFERRED CREDITS:		
Trust fund advances	14,649	5,912
Other deferred credits	6,461	5,067
Total other liabilities and deferred credits	21,110	10,979
TOTAL LIABILITIES	$4,745,510	$4,445,548

Little Goose Dam, Washington



Libby Dam, Montana





Dworshak Dam, Idaho

Lower Granite Dam, Washington

EXHIBIT 3

FEDERAL COLUMBIA RIVER POWER SYSTEM

STATEMENT OF CHANGES IN FINANCIAL POSITION
FOR THE FISCAL YEARS ENDED JUNE 30, 1973 AND JUNE 30, 1972

(In thousands)

	1973	1972
SOURCE OF FUNDS:		
Net revenues available for repayment (Exhibit 1)	$ 6,363	$ 29,886
Prior years adjustments	1,554*	1,535*
Net funds from operations	4,809	28,351
Federal investment:		
Congressional appropriations	312,763	394,107
Transfers from other Federal agencies, net	1,782	3,291
Interest on Federal investment(a)	100,552	90,950
Transfers to continuing fund	103	254
Total funds from Federal investment	415,200	488,602
Other sources:		
Decrease in current assets net of current liabilities	854	43,662*
Decrease in other assets net of other liabilities	5,144	5,163*
Total other sources	5,998	48,825*
Total source of funds	$426,007	$468,128
APPLICATION OF FUNDS:		
Investment in electric utility plant and facilities, net(a)	$296,985	$333,147
Funds returned to U.S. Treasury	129,022	134,981
Total application of funds	$426,007	$468,128

(a) Includes capitalized interest on projects in service, and on projects under construction. In FY 1973 these amounts were $18,829 and $12,405.

*Denotes deduction

"Notes to the Financial Statements" are an integral part of this statement.

FEDERAL COLUMBIA RIVER POWER SYSTEM

AMOUNT AND ALLOCATION OF PLANT INVESTMENT
AS OF JUNE 30, 1973

(In thousands)

SCHEDULE A

Project	Total	COMMERCIAL POWER: Completed Plant	COMMERCIAL POWER: Construction Work in Progress	COMMERCIAL POWER: Total Commercial Power	ALLOCATED TO: IRRIGATION: Returnable from Commercial Power Revenues	IRRIGATION: Returnable from Other Sources	IRRIGATION: Total Irrigation	NONREIMBURSABLE: Navigation	NONREIMBURSABLE: Flood Control	NONREIMBURSABLE: Fish and Wildlife	NONREIMBURSABLE: Recreation	NONREIMBURSABLE: Other	Percent of Total Returnable from Commercial Power Revenues
Projects in Service													
Transmission facilities (BPA)	$1,406,279	$1,257,496	$148,783	$1,406,279									100.0
Albeni Falls (CE)	33,006	31,915		31,915				$ 134	$ 173		$ 784		96.7
Boise (BR)	65,867	4,931	172	5,103	$ 10,683	$ 35,130	$ 45,813		14,951				24.0
Bonneville (CE)	106,850	61,732	14,448	76,180				30,284			379	$ 7	71.3
Chief Joseph (CE)	158,678	155,006	2,656	157,662	710		710				251	55	99.8
Columbia Basin (BR)	908,681	179,541	253,923	433,464	360,308	68,189	428,497	1,000	45,543			177	87.4
Cougar (CE)	58,263	17,918		17,918		2,936	2,936	524	36,677			208	30.8
Detroit-Big Cliff (CE)	66,567	40,403	41	40,444		4,759	4,759	220	20,854			290	60.8
Dworshak (CE) (c)	292,795	264,003		264,003				9,139	17,264		2,389		90.2
Green Peter-Foster (CE)	88,948	49,300	22	49,322		5,721	5,721	360	29,841		1,643	2,061	55.5
Hills Creek (CE)	48,795	17,314	3	17,317		4,314	4,314	626	26,266			272	35.5
Hungry Horse (BR)	102,183	77,521	19	77,540					24,643				75.9
Ice Harbor (CE)	150,274	95,212	9,697	104,909				44,110			1,255		69.8
John Day (CE) (c)	500,192	370,758	8	370,766				81,859	14,015		7,220	26,332	74.1
Little Goose (CE) (c)	167,188	115,596	208	115,804				45,632			1,989	3,763	69.3
Lookout Point-Dexter (CE)	94,846	45,787	7	45,794		1,322	1,322	708	46,722		206	94	48.3
Lower Monumental (CE) (c)	194,668	146,445	42	146,487				46,653			1,528		75.3
McNary (CE)	309,177	256,107	495	256,602				51,563			1,012		83.0
Minidoka-Palisades (BR)	96,951	13,364		13,364	10,040	43,351	53,391		29,730		172	294	24.1
The Dalles (CE)	316,419	261,697	11,153	272,850				41,979			1,568	22	86.2
Yakima (BR)	63,610	4,771		4,771	8,695	48,943	57,638		49	$1,152			21.2
Projects Under Construction (c)													
Libby (CE)	407,135		300,714	300,714					70,200			36,221	73.9
Lost Creek (CE)	46,528		6,195	6,195		764	764		19,558	8,526	7,379	4,106	13.3
Lower Granite (CE)	194,231		145,842	145,842				47,205			517	667	75.1
Teton (BR)	24,205		2,785	2,785	13,104	3,673	16,777		4,275		368		65.6
Irrigation Assistance at 11 Projects Having No Power Generation	34,321				34,321		34,321						100.0
Subtotal plant investment	5,936,657	3,466,817	897,213	4,364,030	437,861	219,102	656,963	401,996	400,761	9,678	28,660	74,569 (a)	80.9
Repayment Obligation Retained by Columbia Basin Project (b)	2,211	1,352		1,352	859		859						100.0
Total	$5,938,868	$3,468,169	$897,213	$4,365,382	$438,720	$219,102	$657,822	$401,996	$400,761	$9,678	$28,660	$74,569 (a)	80.9

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

(a) Included in this amount are nonreimbursable road costs amounting to $69 million.

(b) Joint facilities transferred to Bureau of Sport Fisheries and Wildlife. Power portion is included in Exhibit 2 as a Deferred Item.

(c) Projects in service that have tentative cost allocations at June 30, 1973. Projects under construction have tentative cost allocations (Note 2).

"Notes to the Financial Statements" are an integral part of this schedule.

SCHEDULE B

FEDERAL COLUMBIA RIVER POWER SYSTEM

CHANGES IN ACCUMULATED NET REVENUES
FOR THE FISCAL YEAR ENDED JUNE 30, 1973

(In thousands)

	Cumulative Balance June 30, 1972	Fiscal Year 1973	Prior Years Adjustments (Note 9)	Cumulative Balance June 30, 1973
OPERATING REVENUES	$2,103,333	$177,374		$2,280,707
EXPENSES:				
Purchase and Exchange Power	108,538	48,255		156,793
Operation and Maintenance Expense	581,109	53,438	$ 787	635,334
Interest Expense	725,664	69,318		794,982
Total	1,415,311	171,011	787	1,587,109
NET REVENUES AVAILABLE FOR REPAYMENT	688,022	6,363	787*	693,598
LESS DEPRECIATION	333,867	30,418	767	365,052
ACCUMULATED NET REVENUES (Exhibit 2)	$ 354,155	$ 24,055*	$1,554*	$ 328,546

*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 title.

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

BPA wholesale power rates are established by using a separate repayment analysis. The major difference between the financial statements and the historical data on the repayment analysis is the treatment of fixed assets. In the accompanying statements, the depreciation life for fixed assets allocated to power averages about 61 years, with the transmission system averaging 40 years and generating projects averaging 87 years. However, the repayment periods used to establish power rates are 50 years for the generating projects and 40 years fcr the transmission system for an average of 46 years. Schedule A lists the projects included in FCRPS and the allocation of plant investment to the various purposes. Schedule B provides a correlation between the accompanying cost statements and cumulative totals shown in the first line of the separate repayment analysis.

Note 2. Tentative Cost Allocations

Plant cost 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 cost and accumulated net revenues when firm allocations were adopted. At June 30, 1973, total joint plant costs for these eight projects are about $1.2 billion of which $.9 billion are tentatively allocated to power and subject to retroactive adjustment. The amount of adjustments that may be necessary when the allocations become firm is not determinable at this time.

Note 3. Repayment Responsibility for Irrigation Costs

The law requires that FCRPS net revenues be used to repay to the U.S. Treasury the construction costs of Bureau irrigation facilities which benefitting water users are unable to repay. Investment made through June 30, 1973 results in estimated irrigation costs to be repaid from FCRPS revenues of $439 million. Repayments on this amount are due to start in 1997.

Congress may also authorize additional assistance of up to $19.8 million for investment allocated to irrigation at six Corps projects.

Note 4. Commitments to Exchange Power and Acquire Project Capability

BPA has made commitments with various customers to acquire all or part of the generating capability of various thermal power plants. These commitments are basically to accept the power generated and in exchange to pay each participant's share of the costs of the plants. BPA is obligated to pay its share of the project costs whether or not the project is completed, operable or operated. The table below shows significant statistics regarding these projects. The "Present Termination Commitment" represents those costs (without credit for assets) which would be payable if the project terminated at this time. The Hanford Project is expected to terminate on October 31, 1977. Thus, the sunk capital of Hanford is included in the Washington Public Power Supply System (WPPSS) Nuclear Project #1 capital costs, which will use the existing generating facilities along with a new steam supply system.

Project Name	Commitment Period	Estimated BPA Portion: Capacity	Annual Cost	Total Capital Cost	Present Termination Commitment
		(Megawatts)	(In Thousands)	(In Thousands)	(In Thousands)
Hanford	1974-1978	800	$11,000	$ 80,000	$ 61,000
Centralia	1974	173*	10,800	–	–
Trojan Nuclear Plant	1976-2011	339	15,100	112,000	100,500
WPPSS Nuclear Project #1	1982-2017	820	59,600	607,000	25,000
WPPSS Nuclear Project #2	1979-2014	1100	55,800	476,000	150,000
WPPSS Nuclear Project #3	1982-2017	840	54,500	529,000	29,000

*At tested capability of 1200 megawatts

BPA has also entered into agreements with 41 utilities to exchange an agreed amount of power for their rights to the Canadian Entitlement. The Canadian Entitlement is one-half of the additional power benefits realized from three Canadian Treaty dams. It was purchased for a 30-year period by the 41 utilities with a $314.1 million bond issue. BPA furnishes a specified amount of power regardless of the actual additional power generated.

Note 5. Contingent Liabilities

Contingent Liabilities total approximately $62.8 million of which $60.5 million represent various contractor claims and $2.3 million represent claims under the Federal Tort Claims Act.

Note 6. Interest Rates

Rates of interest applied to the unamortized Federal investment for each generating project and for each year's investment in the transmission system, as shown below, have been set either by law, by administrative order pursuant to law, or by administrative policies. The rates have not necessarily been designed to recover the interest costs to the U.S. Treasury to finance the investment.

Generating Projects

Albeni Falls	2-1/2%	Lower Granite	2-1/2%
Boise	3%	Lower Monumental	2-1/2%
Bonneville	2-1/2%	McNary	2-1/2%
Bonneville Second Power House and Peaking Modifications	3-1/4%	Minidoka	3%
		Palisades	3%
Chief Joseph	2-1/2%	Teton	3.342%
Chief Joseph Additional Units	3-1/4%	The Dalles	2-1/2%

Columbia Basin	3%
Columbia Basin Third Power Plant	3-1/8%
Cougar	2-1/2%
Detroit-Big Cliff	2-1/2%
Dworshak	2-5/8%
Green Peter-Foster	2-1/2%
Hills Creek	2-1/2%
Hungry Horse	3%
Ice Harbor	2-1/2%
John Day	2-1/2%
Libby	3-1/8%
Little Goose	2-1/2%
Lookout Point-Dexter	2-1/2%
Lost Creek	3-1/8%
The Dalles Additional Units	3-1/8%
Yakima – Roza Division	3%
Yakima – Kennewick Division	2-1/2%
Transmission Facilities – BPA	
Through Fiscal Year 1963	2-1/2%
Fiscal Year 1964	2-7/8%
Fiscal Year 1965	3%
Fiscal Year 1966 thru 1968	3-1/8%
Fiscal Years 1969 and 1970	3-1/4%
Fiscal Year 1971	4-7/8%
Fiscal Year 1972	5-3/8%
Fiscal Year 1973	5-7/8%

Note 7. Purchase and Exchange Power

The current year increase in this expense is primarily the result of purchases from Centralia, which increased by approximately $13.8 million over FY 1972.

Note 8. Imputed Rent

The General Services Administration provides facilities to BPA, the Corps and the Bureau. Although the Bureau and BPA impute a rent expense on these facilities, the Corps does not. Fiscal Year 1972 was the only year the Corps recognized these costs in the accounts. However, in FY 1973, they again decided to exclude these costs because they considered them to be immaterial. The Corps has estimated these rental costs at $625,000 for FY 1972 and $529,000 for FY 1973, of which $170,000 and $158,000 respectively, are applicable to expense accounts and $455,000 and $371,000 respectively, are applicable to capital accounts. These figures were estimated by the Corps on an informal basis to evaluate the potential materiality. The Corps is reviewing this matter further to ascertain whether a practical method can be devised to allocate these costs.

Note 9. Adjustments to Accumulated Net Revenues

The following table lists the adjustments which have caused the net decrease in Accumulated Net Revenues of $1,554,000 shown in Exhibit 3 and Schedule B.

	In Thousands
1. Settlement of tort claim on Hills Creek Project	$ 899
2. Extraordinary retirements caused by construction of the third power plant at Columbia Basin Project	740
3. Reversal of GSA rental expense imputed during FY 1972 at the Corps projects (See Note 8)	(170)
4. Adjustment for a change in the cost allocation at Little Goose Project	58
5. Adjustment at several Corps projects for fee land payments	27
Total	$1,554

TABLE 1

SALES OF ELECTRIC ENERGY

FISCAL YEAR 1973

Customer	Energy Delivered for Year (000) KWH	Revenue from Sales of Energy
NORTHWEST AREA		
Publicly Owned Utilities		
Municipalities		
Albion, Idaho	3,003	$ 9,766
Bandon, Oregon	44,470	154,613
Blaine, Washington	27,744	92,139
Bonners Ferry, Idaho	21,239	98,743
Burley, Idaho	76,955	240,933
Canby, Oregon	53,435	191,607
Cascade Locks, Oregon	23,663	78,035
Centralia, Washington	60,069	308,552
Cheney, Washington	92,878	302,297
Consolidated Irrigation District, Washington	1,187	4,181
Coulee Dam, Washington	25,087	92,509
Declo, Idaho	1,967	6,447
Drain, Oregon	25,988	90,509
Ellensburg, Washington	141,918	449,961
Eugene, Oregon	1,518,470	3,729,530[1]
Forest Grove, Oregon	122,813	426,297
Heyburn, Idaho	60,159	184,393
Idaho Falls, Idaho	247,331	767,291[1]
McCleary, Washington	31,557	106,147
McMinnville, Oregon	209,065	726,251
Milton-Freewater, Oregon	92,311	299,370
Minidoka, Idaho	742	2,489
Monmouth, Oregon	55,841	200,135
Port Angeles, Washington	411,548	1,183,800
Richland, Washington	356,237	1,155,146
Rupert, Idaho	47,238	150,308
Seattle, Washington	1,458,482	3,159,556[1]
Springfield, Oregon	220,506	693,207
Sumas, Washington	5,277	18,587
Tacoma, Washington	1,475,629	3,250,683[1]
Vera Irrigation District, Washington	94,238	305,909
Washington Public Power Supply System	5,813	16,013
Total Municipalities (32)	7,012,860	$18,495,404[1]
Public Utility Districts		
Benton Co. PUD No. 1	708,053	$ 2,037,520
Central Lincoln PUD	880,268	2,665,526
Chelan Co. PUD No. 1	342,032	744,893
Clallam Co. PUD No. 1	273,044	896,549
Clark Co. PUD No. 1	1,845,126	6,110,681
Clatskanie PUD	658,051	1,621,576
Cowlitz Co. PUD No. 1	2,117,816	4,987,347[1]
Douglas Co. PUD No. 1	291,190	848,500
Ferry Co. PUD No. 1	38,229	118,279
Franklin Co. PUD No. 1	355,856	1,078,305
Grant Co. PUD No. 2	590,003	1,782,566[1]
Grays Harbor PUD No. 1	950,595	3,023,447
Kittitas Co. PUD No. 1	33,676	110,235
Klickitat Co. PUD No. 1	168,883	507,598
Lewis Co. PUD No. 1	409,620	1,267,690
Mason Co. PUD No. 1	36,308	117,135
Mason Co. PUD No. 3	296,879	893,687
Northern Wasco Co. PUD	64,044	210,850
Okanogan Co. PUD No. 1	341,073	1,035,654
Pacific Co. PUD No. 2	213,098	717,769
Pend Oreille Co. PUD No. 1	3,540	8,853
Skamania Co. PUD No. 1	76,254	254,240
Snohomish Co. PUD No. 1	3,337,041	10,426,081
Tillamook PUD	283,866	984,333
Wahkiakum Co. PUD No. 1	39,067	133,123
Whatcom Co. PUD No. 1	110,012	268,533
Total Public Utility Districts (26)	14,463,624	$42,850,970[1]
Cooperatives		
Benton Rural Elec. Assn.	128,373	$ 386,178
Big Bend Electric Coop.	239,017	639,800
Blachly-Lane Co. Coop.	93,736	309,522
Central Electric Coop.	126,303	378,683
Clearwater Power Co.	117,315	383,308
Columbia Basin Electric Coop.	99,385	285,596
Columbia Power Coop. Assn.	34,505	118,210
Columbia Rural Electric Assn.	107,424	297,082
Consumers Power	217,632	714,191
Coos-Curry Electric Coop.	229,228	796,902
Douglas Electric Coop.	101,165	344,098
East End Mutual Electric Co., Ltd.	6,456	21,019
Fall River Electric Coop.	62,185	192,961
Farmers Electric Co.	4,853	16,491
Flathead Electric Coop.	66,016	203,065
Harney Electric Coop.	84,655	219,281
Hood River Electric Coop.	65,965	213,914
Idaho Co. L&P Coop. Assn.	28,645	93,394
Inland Power & Light Co.	270,384	860,598
Kootenai Electric Coop.	86,323	274,564
Lane Electric Coop.	238,714	809,286
Lincoln Electric Coop.—Montana	45,429	149,503
Lincoln Electric Coop.—Washington	86,115	244,177
Lost River Electric Coop.	24,673	72,573
Lower Valley Power & Light Co.	133,283	423,564
Midstate Electric Coop.	92,718	$ 273,052
Missoula Electric Coop.	57,059	174,029
Nespelem Valley Electric Coop.	27,440	89,558
Northern Lights	97,197	307,735
Okanogan Co. Electric Coop.	18,256	57,736
Orcas Power & Light Co.	73,010	244,518
Prairie Power Coop.	3,031	9,882
Raft River Electric Coop.	113,220	305,025
Ravalli Electric Coop.	52,388	171,257
Riverside Electric Co.	4,513	15,226
Rural Electric Co.	42,037	134,304
Salem Electric	175,816	579,277
Salmon River Electric Coop.	21,315	61,089
South Side Electric Lines	14,442	45,037
Surprise Valley Electric Corp.	48,788	147,849
Tanner Electric	10,728	36,202
Umatilla Electric Coop. Assn.	198,303	572,300
Unity Light & Power Co.	29,352	94,099
Vigilante Electric Coop.	45,599	135,606
Wasco Electric Coop.	72,714	240,869
West Oregon Electric Coop.	50,068	166,597
Total Cooperatives (46)	3,945,773	$ 12,309,207
Total Publicly Owned Utilities (104)	25,422,257	$ 73,655,581[1]
Federal & State Agencies (6)	601,974	1,800,586
Privately Owned Utilities		
California-Pacific Utilities Co.	37,278	$ 93,498
Idaho Power Co.	0	0
Montana Power Co.	1,289,888	2,867,384[1]
Pacific Power & Light Co.	4,823,700	11,204,017[1]
Portland General Electric Co.	6,096,854	13,777,097[1]
Puget Sound Power & Light Co.	2,130,522	4,542,883
Utah Power Co.	0	0
Washington Water Power Co.	421,604	961,804
Total Privately Owned Utilities (8)	14,799,846	$ 33,446,683[1]
Aluminum Industries		
Aluminum Co. of America		
Vancouver Plant	1,896,653	$ 4,001,818
Wenatchee Plant	1,166,109	2,537,460
Anaconda Aluminum Co.	2,619,171	4,890,339
Intalco Aluminum Co.	3,019,750	6,228,603
Kaiser Aluminum & Chemical Corp.		
Spokane Reduction Plant	2,902,737	6,003,059
Spokane Rolling Mill	399,748	940,779
Tacoma Reduction Plant	1,177,377	2,435,405
Martin-Marietta Aluminum Corp.		
Goldendale Plant	1,557,421	2,714,148
The Dalles Plant	1,266,905	2,185,099
Reynolds Metals Co.		
Longview Plant	3,057,396	6,263,020
Troutdale Plant	810,354	1,762,855
Other Industries		
Carborundum Co.	191,751	415,959
Cominco American Inc.	0	0
Crown Zellerbach Corp.		
Port Angeles Plant	13,845	36,511
Port Townsend Plant	87,283	194,966
Foote Mineral Co.	105,808	224,378
Georgia-Pacific Corp.	165,357	360,282
Hanna Nickel Smelting Co.	680,181	1,546,603
ITT Rayonier, Inc.	27,910	83,700
Oregon Metallurgical Corp.	0	0
Pacific Carbide & Alloys	47,361	108,510
Pennwalt Corporation	345,115	720,646
Stauffer Chemical Works	326,442	781,226
Stewart Elsner	44	295
Union Carbide Corp.	125,362	269,084
Total Industries (19)	21,990,080	$ 44,704,745
OUTSIDE NORTHWEST AREA		
British Columbia Hydro & Power Authority	250	$ 525
Burbank, California	25,094	68,917
Glendale, California	33,649	67,298
Los Angeles, California	298,155	714,736
Pasadena, California	20,832	39,411
Sacramento, California	44,026	88,052
State of California—		
Dept. of Water Resources	12,761	25,522
Pacific Gas & Electric Co.	615,250	1,230,500
San Diego Gas & Electric Co.	68,131	136,262
Southern California Edison Co.	576,897	1,384,251
U.S.B.R. —		
Mid-Pacific Region	532,398	1,295,977
Lower Colorado Region	0	0
Total Outside Northwest Area (12)	2,227,443	$ 5,051,451
Total Sales of Electric Energy (149)	65,041,600	$158,659,046[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, 1973

				Existing			Under Construction		Authorized		Other Potential		Total	
Project	Operating Agency[1]	Location	Stream	Initial Date in Service	Number of Units	Total Capacity Kilowatts	Number of Units	Total Capacity Kilowatts	Number of Units	Total Capacity Kilowatts	Number of Units	Total Capacity Kilowatts	Number of Units	Total Capacity Kilowatts
Bonneville	CE	Ore.-Wash.	Columbia	June 1938	10	518,400	–	–	8	544,000	–	–	18	1,062,400
Grand Coulee	BR	Washington	Columbia	Sept. 1941	18-3	2,161,000[2]	6	4,019,000[3]	–	–	6	3,600,000	36-3	10,080,000
Grand Coulee (Pump Generator)		Washington	Banks Lake – 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	20-2	1,635,000[4]	2	172,000	–	–	–	–	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						10,485,900		6,962,880		4,168,500		5,741,500		27,358,780
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 eleven rewound main units.
[3] Includes an increase of 17,000 kw each for 7 units to be rewound, three 600,000 kw units and three 700,000 kilowatts units being installed at the Third Powerplant.
[4] Includes two fishway units of 13,500 kw each, 14 units of 78,000 kw and 6 units of 86,000 kw at The Dalles Powerplant.
[5] U.S. Bureau of Reclamation project incorporated into the Federal Columbia River Power System, effective July 1, 1963.
[6] Authorized, but not under active consideration.

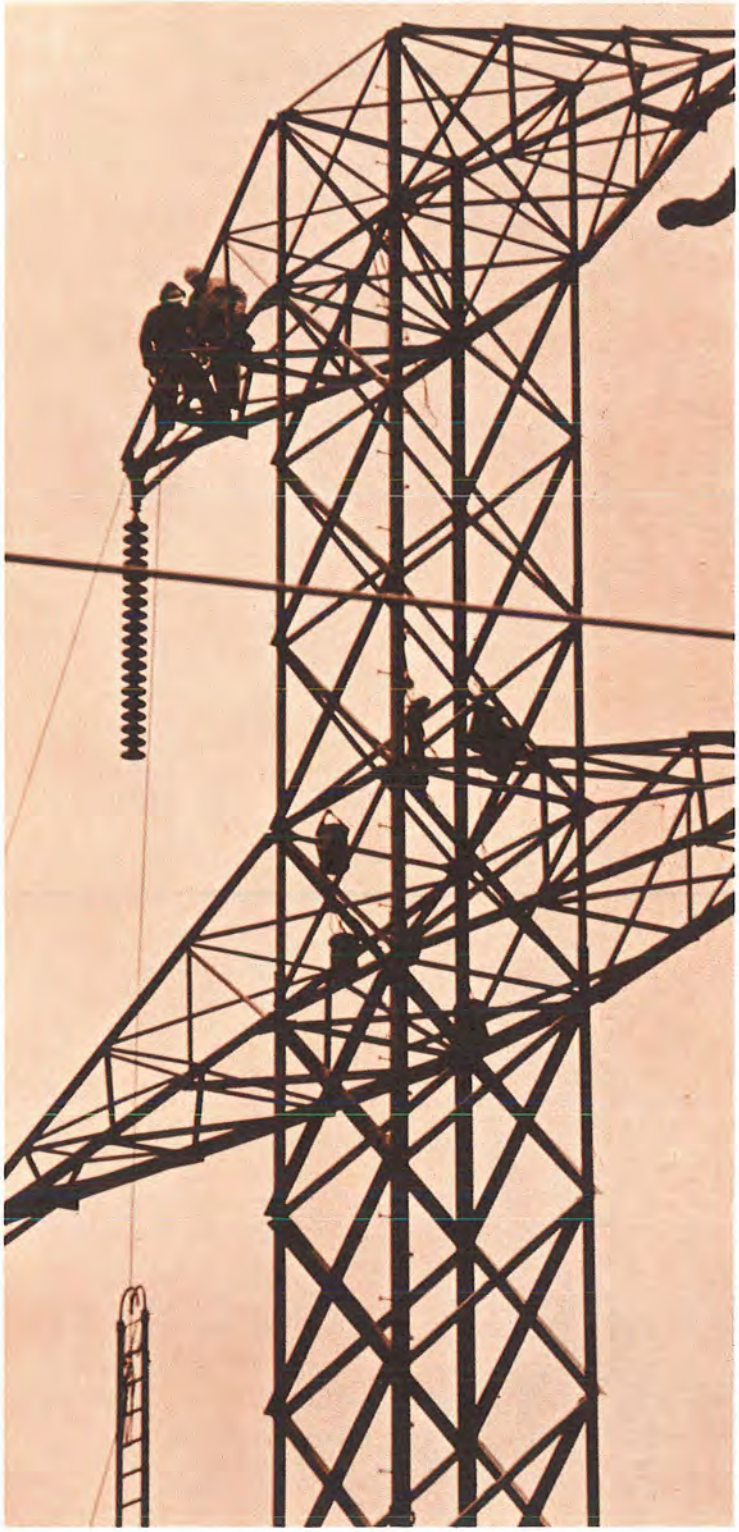


TABLE 3

ELECTRIC ENERGY ACCOUNT FOR FISCAL YEAR 1973

Energy Received (millions of kilowatt-hours)	
Energy Generated for BPA	
Bureau of Reclamation	45,620
Corps of Engineers	17,596
Washington Public Power Supply System (Hanford)	4,497
Centralia Thermal Project	4,128
Power Interchanged in	39,655
Total Received	111,496
Energy Delivered (millions of kilowatt-hours)	
Sales	65,042
Power Interchanged Out	42,765
Used by the Administration	76
Total Delivered	107,883
Energy losses in transmission and transformation	3,613
Total	111,496
Losses in percent of total received	3.2
Maximum demand on Federal plants (kilowatts) (Date and Time) December 13, 1972 6 P.M.	11,613,000
Load factor in percent of total generated for BPA	70.6

TABLE 4

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

Fiscal Year 1973

Utility	Kilowatt-Hours (Billions)	Of Total Generation (Percent)
Publicly Owned:		
Federal Columbia River Power System[2]	72.2	57.3
Grant County PUD	9.8	7.8
Chelan County PUD	7.0	5.5
Seattle City Light	5.3	4.2
Douglas County PUD	3.7	2.9
Tacoma City Light	2.5	2.0
Eugene Water & Electric Board	0.5	0.4
Pend Oreille County PUD	0.4	0.3
Total Publicly Owned	101.4	80.4
Privately Owned:		
Idaho Power Company	8.8	7.0
Pacific Power & Light Co.	4.1	3.3
Montana Power Company	4.8	3.8
Washington Water Power Co.	3.4	2.7
Portland General Electric Co.	2.3	1.8
Puget Sound Power & Light Co.	1.3	1.0
Total Privately Owned	24.7	19.6
Total Generation	126.1	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

Period 1973-74 through 1983-84

	Status[1]	Type of Fuel	Nameplate Rating MW	Commercial Operation Date		Principal Sponsor[2]
Combustion Turbines						
(Salem, Or.) #1&2	UC	Oil/Gas	65 ea.[3]	Sept.	1973	PGE
(Portland, Or.) #3-6	UC	Oil/Gas	65 ea.[3]	Sept.	1973	PGE
Combustion Turbine						
(Puget Sound Area)	UC	Oil	27	Sept.	1973	PSP&L
Combustion Turbines						
Othello (Moses Lake)	UC	Oil	33	Sept.	1973	WWP
Combustion Turbine						
(NW Or.)	UC	Oil/Gas	460	Aug.	1974	PGE
Combustion Turbines						
(Near Seattle, Wash.)	UC	Oil	60	Sept.	1974	Seattle
Trojan	UC	Nuclear	1,130	July	1975	PGE
Colstrip #1	UC	Coal	175[4]	July	1975	PSP&L
Colstrip #2	UC	Coal	175[4]	July	1976	
Jim Bridger #2[5]	UC	Coal	500	Sept.	1975	PP&L
Jim Bridger #3			500	Sept.	1976	
WPPSS Nuclear Project						
#2 (Hanford)	UC	Nuclear	1,100	Sept.	1978	WPPSS
Colstrip #3	T	Coal	490[4]	Sept.	1978	PSP&L
Colstrip #4			490[4]	Sept.	1979	
Boardman	C	Nuclear	1,260	Sept.	1980	PGE
WPPSS Nuclear Project						
#1 (Hanford)	C	Nuclear	1,220	Sept.	1981	WPPSS
WPPSS Nuclear Project						
#3 (NW Wash.)	C	Nuclear	1,300	Sept.	1981	WPPSS

[1] Status on 9-20-73; UC—Under Construction; C—Committed; T—Tentatively Scheduled.

[2] 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.

[3] Nominal rating 65 mw at 25° F. – 50 mw at 80° F.

[4] 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; 70 percent of each unit will be used by West Group Area.

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

TABLE 6

FEDERAL COLUMBIA RIVER POWER SYSTEM
REPAYMENT STUDY FOR F.Y. 1973

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 6-30-73	2,280,707	635,334	156,793	794,982	3,563,570		3,563,570	3,563,570		3,563,570	693,598	2,869,972	3,562,648		3,562,648	438,720		438,720	438,720		
1974	168,600	58,271	36,200	79,603	108,530	6,336	114,866	3,672,100	6,336	3,678,436	(5,474)	2,990,312	3,670,836	6,336	3,677,172	438,720		438,720	438,720		1974
1975	203,200	64,539	25,500	91,462	428,343	17,208	445,551	4,100,443	23,544	4,123,987	21,699	3,414,164	4,099,179	23,544	4,122,723	454,639		454,639	454,639		1975
1976	235,700	69,154	28,000	109,643	696,031	7,523	703,554	4,796,474	31,067	4,827,541	28,903	4,088,815	4,795,210	31,067	4,826,277	472,059		472,059	472,059		1976
1977	249,000	71,431	49,400	119,949	381,647	19,248	400,895	5,178,121	50,315	5,228,436	8,220	4,481,490	5,176,713	50,315	5,227,028	472,059		472,059	472,059		1977
1978	263,400	75,092	86,500	134,719	504,777	11,507	516,284	5,682,898	61,822	5,744,720	(32,911)	5,030,685	5,681,490	61,822	5,743,312	494,986		494,986	494,986		1978
1979	289,700	78,248	85,700	171,683	270,712	10,161	280,873	5,953,610	71,983	6,025,593	(45,931)	5,357,489	5,951,644	71,982	6,023,626	512,866		512,866	512,866		1979
1980	296,700	80,658	83,500	177,964	100,000	24,514	124,514	6,053,610	96,497	6,150,107	(45,422)	5,527,425	6,047,036	96,486	6,143,522	539,550		539,550	539,550		1980
1981	300,600	81,758	61,300	181,141	49,082	12,413	61,495	6,102,692	108,910	6,211,602	(23,599)	5,612,519	6,077,703	108,892	6,186,595	573,469		573,469	573,469		1981
1982	306,400	82,793	61,600	190,672	281,488	22,718	304,206	6,384,180	131,628	6,515,808	(28,665)	5,945,390	6,352,548	131,602	6,484,150	600,616		600,616	600,616		1982
1983	312,800	84,384	58,900	197,919	161,657	14,098	175,755	6,545,837	145,726	6,691,563	(28,403)	6,149,548	6,498,538	145,682	6,644,220	611,717		611,717	611,717		1983
1984	321,600	84,924	61,000	224,442	38,525	18,498	57,023	6,584,362	164,224	6,748,586	(48,766)	6,255,337	6,536,433	164,141	6,700,574	611,717		611,717	611,717		1984
1985	320,800	85,064	61,500	227,570	3,935	23,532	27,467	6,588,297	187,756	6,776,053	(53,334)	6,336,138	6,533,958	187,605	6,721,563	611,717		611,717	611,717		1985
1986	323,900	85,104	60,400	230,245	2,000	18,318	20,318	6,590,297	206,074	6,796,371	(51,849)	6,408,305	6,533,723	205,896	6,739,619	611,717		611,717	611,717		1986
1987	325,200	85,616	66,100	234,581	49,752	24,772	74,524	6,640,049	230,846	6,870,895	(61,097)	6,543,926	6,580,807	230,606	6,811,413	611,717		611,717	611,717		1987
1988	332,100	86,308	75,300	239,451	43,752	22,356	66,108	6,683,801	253,202	6,937,003	(68,959)	6,678,993	6,609,686	252,922	6,862,608	630,162		630,162	630,162		1988
1989	333,200	86,528	76,600	243,682	2,000	36,240	38,240	6,685,801	289,442	6,975,243	(73,610)	6,790,843	6,595,942	288,543	6,884,485	654,162		654,162	654,162		1989
1990	334,300	87,508	75,100	253,493	205,312	36,095	241,407	6,891,113	325,537	7,216,650	(81,801)	7,114,051	6,775,012	324,591	7,099,603	669,097		669,097	669,097		1990
1991	340,500	87,968	71,800	259,292	1,000	29,967	30,967	6,892,113	355,504	7,247,617	(78,560)	7,223,578	6,747,092	354,219	7,101,311	685,098		685,098	685,098		1991
1992	341,600	88,121	71,200	265,250	40,794	59,306	100,100	6,932,907	414,810	7,347,717	(82,971)	7,406,649	6,646,598	412,726	7,059,324	715,590		715,590	715,590		1992
1993	341,800	88,201	71,200	270,159	1,000	32,652	33,652	6,933,907	447,462	7,381,369	(87,760)	7,528,061	6,586,881	442,343	7,029,224	736,091		736,091	736,091		1993
1994	342,200	88,281	71,200	275,298	8,000	48,801	56,801	6,941,907	496,263	7,438,170	(92,579)	7,677,441	6,504,006	490,872	6,994,878	770,215		770,215	770,215		1994
1995	343,000	88,281	71,200	280,251		36,954	36,954	6,941,907	533,217	7,475,124	(96,732)	7,811,127	6,482,631	527,154	7,009,785	798,550		798,550	798,550		1995
1996	343,800	88,281	71,200	285,680		54,768	54,768	6,941,907	587,985	7,529,892	(101,361)	7,967,256	6,436,765	581,652	7,018,417	806,640		806,640	806,640		1996
1997	344,700	88,281	71,200	291,308		50,118	50,118	6,941,907	638,103	7,580,010	(116,761)	8,134,135	6,410,974	630,974	7,041,948	828,474	10,672	817,802	817,802		1997
1998	345,000	88,281	71,200	297,502		50,907	50,907	6,941,907	689,010	7,630,917	(111,983)	8,297,025	6,348,164	681,860	7,030,024	851,308		840,636	840,636		1998
1999	345,800	88,281	71,200	303,468		49,298	49,298	6,941,907	738,308	7,680,215	(117,149)	8,463,472	6,314,977	730,296	7,045,273	878,642		867,970	867,970		1999
2000	348,600	88,281	71,200	309,602		50,981	50,981	6,941,907	789,289	7,731,196	(120,483)	8,634,936	6,271,633	779,827	7,051,460	905,643		894,971	894,971		2000
2001	348,700	88,281	71,200	316,095		56,140	56,140	6,941,907	845,429	7,787,336	(136,913)	8,827,989	6,202,567	835,181	7,037,748	924,075	10,037	903,366	903,366		2001
2002	348,700	88,281	71,200	323,341		59,523	59,523	6,941,907	904,952	7,846,859	(134,122)	9,021,634	6,076,196	892,249	6,968,445	940,742		920,033	920,033		2002
2003	349,200	88,281	71,200	330,382		55,363	55,363	6,941,907	960,315	7,902,222	(140,663)	9,217,660	5,950,713	946,419	6,897,132	962,408		941,699	941,699		2003
2004	351,300	88,281	71,200	337,747		61,142	61,142	6,941,907	1,021,457	7,963,364	(146,709)	9,425,511	5,781,907	999,846	6,781,753	980,243	781	958,753	958,753		2004
2005	351,300	88,281	71,200	345,229		53,448	53,448	6,941,907	1,074,905	8,016,812	(153,410)	9,632,369	5,604,692	1,052,378	6,657,070	998,244		976,754	976,754		2005
2006	351,300	88,281	71,200	353,375		70,646	70,646	6,941,907	1,145,551	8,087,458	(161,556)	9,864,571	5,445,470	1,119,575	6,565,045	1,007,245		985,755	985,755		2006
2007	351,300	88,281	71,200	362,021		72,251	72,251	6,941,907	1,217,802	8,159,709	(170,202)	10,107,024	5,291,381	1,191,107	6,482,488	1,034,579		1,013,089	1,013,089		2007
2008	349,600	88,281	71,200	370,657		58,290	58,290	6,941,907	1,276,092	8,217,999	(183,490)	10,348,804	5,047,720	1,246,280	6,294,000	1,053,912	2,952	1,029,470	1,029,470		2008
2009	349,600	88,281	71,200	379,826		65,903	65,903	6,941,907	1,341,995	8,283,902	(195,983)	10,610,690	4,867,409	1,310,812	6,178,221	1,086,079	6,276	1,055,361	1,055,361		2009
2010	349,600	88,281	71,200	389,884		78,604	78,604	6,941,907	1,420,599	8,362,506	(199,765)	10,889,059	4,644,113	1,373,584	6,017,697	1,110,746		1,080,028	1,080,028		2010
2011	343,600	88,281	57,900	400,274		88,706	88,706	6,941,907	1,509,305	8,451,212	(202,855)	11,180,620	4,613,715	1,461,776	6,075,491	1,130,079		1,099,361	1,099,361		2011
2012	343,600	88,281	57,900	410,840		80,405	80,405	6,941,907	1,589,710	8,531,617	(213,967)	11,474,992	4,425,475	1,529,474	5,954,949	1,146,746	546	1,115,482	1,115,482		2012
2013	343,600	88,281	57,900	421,514		72,242	72,242	6,941,907	1,661,952	8,603,859	(260,111)	11,807,345	4,391,198	1,599,531	5,990,729	1,165,081	36,016	1,097,801	1,097,801		2013
2014	324,200	88,281	1,400	433,086		83,144	83,144	6,941,907	1,745,096	8,687,003	(236,429)	12,126,918	4,283,274	1,674,310	5,957,584	1,181,748	37,862	1,076,606	1,076,606		2014
2015	324,200	88,281	1,400	444,441		65,993	65,993	6,941,907	1,811,089	8,752,996	(246,260)	12,439,171	4,178,274	1,732,015	5,910,289	1,205,250	36,338	1,063,770	1,063,770		2015
2016	324,200	88,281	1,400	456,838		95,550	95,550	6,941,907	1,906,639	8,848,546	(268,920)	12,803,641	4,068,274	1,819,323	5,887,597	1,228,251	46,601	1,040,170	1,040,170		2016
2017	324,200	88,281	1,400	469,399		62,142	62,142	6,941,907	1,968,781	8,910,688	(272,642)	13,138,425	3,848,831	1,871,707	5,720,538	1,259,918	37,762	1,034,075	1,034,075		2017
2018	324,200	88,281	1,400	481,870		64,667	64,667	6,941,907	2,033,448	8,975,355	(266,698)	13,469,790	3,678,831	1,926,792	5,605,623	1,282,251	19,347	1,037,061	1,037,061		2018
2019	324,200	88,281	1,400	494,657		82,908	82,908	6,941,907	2,116,356	9,058,263	(311,696)	13,864,394	3,304,770	1,990,882	5,295,652	1,302,919	51,558	1,006,171	1,006,171		2019
2020	324,200	88,281	1,400	775,450		77,287	77,287	6,941,907	2,193,643	9,135,550	(562,330)	14,504,011	2,975,916	2,041,754	5,017,670	1,322,919	21,399	1,004,772	1,004,772		2020
2021	324,200	88,281	1,400	811,230		70,236	70,236	6,941,907	2,263,879	9,205,786	(587,622)	15,161,869	2,843,506	2,097,049	4,940,555	1,341,420	10,911	1,012,362	1,012,362		2021
2022	324,200	88,281	1,400	848,361		74,747	74,747	6,941,907	2,338,626	9,280,533	(624,894)	15,861,510	2,756,160	2,147,534	4,903,694	1,360,254	11,052	1,020,144	1,020,144		2022
2023	324,200	88,281	1,400	887,570		69,542	69,542	6,941,907	2,408,168	9,350,075	(659,197)	16,590,249	2,400,995	2,197,759	4,598,754	1,374,613	6,146	1,028,357	1,028,357		2023
2024	324,200	88,281	1,400	928,541		68,814	68,814	6,941,907	2,476,982	9,418,889	(707,321)	17,366,384	2,370,807	2,245,706	4,616,513	1,385,470	13,299	1,025,915	1,025,915		2024
2025	324,200	88,281	1,400	972,158		67,389	67,389	6,941,907	2,544,371	9,486,278	(745,798)	18,179,571	2,045,464	2,292,567	4,338,031	1,396,327	8,159	1,028,613	1,028,613		2025
2026	324,200	88,281	1,400	1,018,656		94,266	94,266	6,941,907	2,638,637	9,580,544	(802,636)	19,076,473	1,457,433	2,366,520	3,823,953	1,407,184	18,499	1,020,971	1,020,971		2026
2027	324,200	88,281	1,400	1,068,615		76,768	76,768	6,941,907	2,715,405	9,657,312	(851,824)	20,005,065	1,229,786	2,407,646	3,637,432	1,418,041	17,728	1,014,100	1,014,100		2027
2028	324,200	88,281	1,400	1,120,381		60,149	60,149	6,941,907	2,775,554	9,717,461	(902,914)	20,968,128	875,009	2,447,262	3,322,271	1,428,153	17,052	1,007,160	1,007,160		2028
2029	324,200	88,281	1,400	1,174,980		75,323	75,323	6,941,907	2,850,877	9,792,784	(954,330)	21,997,781	732,297	2,484,797	3,217,094	1,428,153	13,869	993,291	993,291		2029
2030	324,200	88,281	1,400	1,232,561		63,350	63,350	6,941,907	2,914,227	9,856,134	(998,042)	23,059,173	688,297	2,518,190	3,206,487	1,428,153		993,291	993,291		2030
2031	324,200	88,281	1,400	1,292,576		74,427	74,427	6,941,907	2,988,654	9,930,561	(1,066,589)	24,200,189	647,215	2,547,761	3,194,976	1,428,153	8,532	984,759	984,759		2031
2032	324,200	88,281	1,400	1,356,725		73,271	73,271	6,941,907	3,061,925	10,003,832	(1,123,559)	25,397,019	401,727	2,575,644	2,977,371	1,428,153	1,353	983,406	983,406		2032
2033	324,200	88,281	1,400	1,423,856		66,491	66,491	6,941,907	3,128,416	10,070,323	(1,189,337)	26,652,847	281,070	2,600,296	2,881,366	1,428,153		983,406	983,406		2033
2034	324,200	88,281	1,400	1,494,477		65,795	65,795	6,941,907	3,194,211	10,136,118	(1,259,958)	27,978,600	246,545	2,623,042	2,869,587	1,428,153		983,406	983,406		2034
2035	324,200	88,281	1,400	1,568,753		55,208	55,208	6,941,907	3,249,419	10,191,326	(1,343,232)	29,377,040	244,610	2,642,724	2,887,334	1,428,153	8,998	974,408	974,408		2035
2036	324,200	88,281	1,400	1,647,837		70,197	70,197	6,941,907	3,319,616	10,261,523	(1,445,675)	30,892,912	244,610	2,659,870	2,904,480	1,428,153	32,357	942,051	942,051		2036
2037	324,200	88,281	1,400	1,732,846		61,015	61,015	6,941,907	3,380,631	10,322,538	(1,521,760)	32,475,687	220,858	2,674,660	2,895,518	1,428,153	23,433	918,618	918,618		2037
2038	324,200	88,281	1,400	1,821,702		54,787	54,787	6,941,907	3,435,418	10,377,325	(1,613,523)	34,143,997	197,106	2,687,855	2,884,961	1,428,153	26,340	892,278	892,278		2038
2039	324,200	88,281	1,400	1,915,651		58,558	58,558	6,941,907	3,493,976	10,435,883	(1,696,677)	35,899,232	197,106	2,698,337	2,895,443	1,428,153	15,545	876,733	876,733		2039
2040	324,200	88,281	1,400	2,014,519		63,417	63,417	6,941,907	3,557,393	10,499,300	(1,786,131)	37,748,780	35,794	2,707,621	2,743,415	1,428,153	6,131	870,602	870,602		2040
2041	324,200	88,281	1,400	2,118,597		64,846	64,846	6,941,907	3,622,239	10,564,146	(1,911,880)	39,725,506	35,794	2,714,369	2,750,163	1,428,153	27,802	842,800	842,800		2041
2042	324,200	88,281	1,400	2,230,301		83,103	83,103	6,941,907	3,705,342	10,647,249	(2,005,499)	41,814,108		2,719,760	2,719,760	1,428,153	9,717	833,083	833,083		2042
2043	324,200	88,281	1,400	2,347,169		61,203	61,203	6,941,907	3,766,545	10,708,452	(2,118,096)	43,993,407		2,723,325	2,723,325	1,428,153	5,446	827,637	827,637		2043
2044	324,200	88,281	1,400	2,469,655		57,671	57,671	6,941,907	3,824,216	10,766,123	(2,246,237)	46,297,315		2,725,448	2,725,448	1,428,153	11,101	816,536	816,536		2044
2045	324,200	88,281	1,400	2,599,529		67,609	67,609	6,941,907	3,891,825	10,833,732	(2,365,010)	48,729,934		2,726,251	2,726,251	1,428,153		816,536	816,536		2045
2046	324,200	88,281	1,400	2,736,565		74,751	74,751	6,941,907	3,966,576	10,908,483	(2,502,046)	51,306,731		2,725,874	2,725,874	1,428,153		816,536	816,536		2046
2047	324,200	88,281	1,400	2,881,171		62,696	62,696	6,941,907	4,029,272	10,971,179	(2,646,652)	54,016,079		2,724,432	2,724,432	1,428,153		816,536	816,536		2047
2048	324,200	88,281	1,400	3,033,430		57,648	57,648	6,941,907	4,086,920	11,028,827	(2,817,356)	56,891,083		2,722,141	2,722,141	1,428,153	18,445	798,091	798,091		2048
2049	324,200	88,281	1,400	3,195,714		77,739	77,739	6,941,907	4,164,659	11,106,566	(2,985,195)	59,954,017		2,718,876	2,718,876	1,428,153	24,000	774,091	774,091		2049
2050	324,200	88,281	1,400	3,367,562		62,020	62,020	6,941,907	4,226,679	11,168,586	(3,147,978)	63,164,015		2,714,826	2,714,826	1,428,153	14,935	759,156	759,156		2050
TOTALS	27,161,707	7,279,021	2,859,493	68,349,625	6,941,907	4,226,679	11,168,586				(51,995,429)						668,997				

Deputy Administrator Ray Foleen takes oath of office administered by Circuit Judge Alfred T. Goodwin of the U. S. Court of Appeals.

BPA Structure and Administration

BPA hosts Joint Power Planning Council meeting.

BPA ORGANIZATION CHART

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Donald Paul Hodel

DEPUTY ADMINISTRATOR
Carl R. Foleen

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Assistant Administrator (Mgr., Wash.D.C.Ofc.) William B. Clagett, IV
Assistant Manager - George W. Toman

REGIONAL SOLICITOR
Robert E. Ratcliffe

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PUBLIC INFORMATION OFFICER (AI) - John R. Ulrich

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Assistant Administrator for Engineering and Construction (Chief Engineer) - George S. Bingham
Chief of Program Control -
E&C Environmental Coordinator - John O. Hooson
Construction Program Coor. (EA) - John L. Bloodworth
Asst. to Chief Engineer, Computer Applications Staff (EC) - R. Scott McDuffie
Administrative Officer (ED) - William H. Hagestedt, Jr.

Engineering Manager (EH) - Harry D. Burless

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Assistant Chief - James L. Jones
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- Control & Protection Section (EPG) - Richard E. Dietrich
- Data Systems Section (EPH) - Wallace E. Helm
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- Materials Laboratory Section (ERG) - Alvin R. Batiste
- Electrical Laboratory Section (ERH)
- EHV-DC Test Center Section (ERI) - Harold L. Hill

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- Specifications Section (ESG) - William S. Thompson, Jr.
- Station Projects Section (ESH) - Stanley C. Mirecki
- Architectural, Civil & Mech. Section (ESI) - Norman R. Drulard

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Assistant Chief - Charles F. Clark
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- Electrical Design Section (ETG) - James J. Ray
- Line Design Section (ETH) - H. Gordon Jensen
- Location & Mapping Section (ETI) - Kirk E. Williams

Assistant Chief Engineer (EI)
BPA Project Manager - Phillip C. Otness
Thermal-Nuclear Analysis Staff (EIC) - Eugene C. Starr

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Asst.Ch., Res. & Devel. - Delmer G. Wohlgemuth
- System Planning Section (EOF) - Walter G. Hegg
- Analysis Section (EOG) - Delmer G. Wohlgemuth
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Assistant O&M Manager - Bruce Rogers
Assistant to the O&M Manager - John H. Jones, Jr.
Assistant to the O&M Manager (Computer Applications) - Jack S. Clubb
Chief of Aircraft Services (OC) - Harry L. Windus

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- Substation Operations Staff (OGC) - Albert B. Faulkner, Jr.
- Technical Staff (OGE) - Ingo P. Thurein
- Control Systems Section (OGR) - Delbert M. Poole
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Area O&M Manager - Dale R. Brooks

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Area Power Manager -
Area O&M Manager - J. Bernell Sebby
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- Kalispell District Office (OKK) - District Manager - Ronald H. Wilkerson
- Wenatchee District Office (OKN) - District Manager - Joseph J. Anderson

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Area Engineer - Robert J. Gilbert
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Area O&M Manager - Frank E. Rush
Area Engineer - Everett L. Richardson

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Area Power Manager - Roy Nishi
Area O&M Manager - Charles E. O'Connor
Area Engineer - Jerry Frick, Jr.

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Assistant Power Manager - Hector J. Durocher
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Asst. to Pwr. Mgr. (Tech.-Admin.) - Richard C. Nyland
Asst. to Pwr. Mgr. (Pub. Util. Spec.) - Oliver G. Hittle
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- Operations Section (SWO) - Mike W. Speyer
- System Programing Section (SWS) - Wesley A. Christenson

December 1, 1973

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