Annual Report

OF THE ADMINISTRATOR OF THE BONNEVILLE POWER ADMINISTRATION TO THE SECRETARY OF THE INTERIOR

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of the Secretary of the Interior for
the Fiscal Year ended June 30, 1943

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UNITED STATES DEPARTMENT OF THE INTERIOR
Harold L. Ickes, Secretary
Bonneville Power Administration
Paul J. Raver, Administrator

Bonneville Power Administration

PAUL J. RAVER, Administrator

I. THE WAR YEAR

COLUMBIA River hydroelectricity, sold directly by the Bonneville Power Administration during the fiscal year 1943, powered the production of enough aluminum to make 70,000 fighter airplanes.

By mid-year, 19 aluminum pot lines had been installed in 5 huge Northwest aluminum reduction plants. At each plant, as construction neared completion, Bonneville had a power supply ready and waiting.

The wisdom of a regional program, premised on the development of Northwest power resources well in advance of need, had, by 1943, proved the greatest single factor in making effective the Nation's light metals production for war.

The $300,000,000 investment by the people of the United States in the 10-year Bonneville-Grand Coulee enterprise had proved, in the words of Frank J. Taylor, writing in the Saturday Evening Post, "as gilt-edged as any war bond, cheap at any price."

WEAPONS FOR WAR

In the fiscal year 1943, power from the Federal system flowed directly into Northwest war plants with a capacity sufficient to produce in one year:

Enough calcium carbide, valued at $2,400,000, to make approximately 30,000,000 cubic feet of acetylene, sufficient to build 200 Liberty ships.

Enough ferrosilicon, valued at $1,200,000, to deoxidize 2,500,000 tons of steel, sufficient for 150,000 medium tanks.

Enough additional ferrosilicon, valued at $1,000,000, to produce 48,000,000 pounds of magnesium metal, worth $10,000,000, sufficient for 10,000,000 incendiary bombs.

Enough ferrochrome, valued at $5,000,000, to produce 300,000 tons of armor plate, sufficient to protect 30,000 heavy tanks.

Motive power and electric heat for the production of 208 ships.

Not the least of these contributions to victory was the fact that these basic materials were being produced at the year's end through

a minimum use of manpower. The columbia River offset the drain on man-hours with kilowatt-hours.

Power Pooled for War

In addition to direct power service to its own war customers, the Bonneville Administration supplied 11 other utilities systems with net deliveries of 959,617,265 kilowatt-hours during the last 11 months of the fiscal year 1943 under terms of a region-wide power pool agreement.

The autumn months of 1942 saw the lowest stream flow conditions in 54 years of recorded run-off history on all rivers but the Columbia, which has its source in the perpetual ice fields of the Canadian Rockies.

During this period, by consistently overloading the generators at Bonneville and Grand Coulee, the Bonneville Administration was at times able to assume, through pool connections, nearly 50 percent of the entire power load in the States of Oregon and Washington.

But the Bonneville Power Administration's contribution was not confined to the production of weapons and the conservation of manpower. During the fiscal year ending June 30, 1943, the Administration's revenues from the sale of power totaled $11,265,468.[1]

Six Years Growth

This record of wartime achievement was established during the Bonneville Administration's sixth year of existence.

In August of 1937 the Administration was created by act of Congress as a provisional agency, set up for the transmission and sale of hydroelectric power generated at Bonneville Dam.

In the annual report for that first fiscal year (ending June 30, 1938), the Bonneville Administrator said:

> Modern warfare is fought in the factory as much as in the air or trenches. America must be ready to meet not only peacetime needs of power for home, farm and industry, but must be assured of her ability to cope with emergency demands for large blocks of electricity. In the hydroelectric streams of the Pacific Northwest is potential power far in excess of that available in other regions of the Nation. It should be developed at an economic rate to meet mounting peacetime needs and the equally important possibilities of emergency drains.
>
> Preparedness requires foresight.

The second fiscal year (ending June 30, 1939) saw the launching of a basic construction program which involved the design and initial

[1] Detailed financial reports have been omitted for duration of the war.

construction of the agency's huge network of high-voltage transmission lines.

In the third fiscal year (ending June 30, 1940), the agency's power sales program was begun and by the close of that year 188,415,933 kilowatt-hours of electricity had been sold.

In the fourth fiscal year (ending June 30, 1941), Bonneville, by virtue of its substantial volume of power sales, assumed major status as an operating utilities enterprise. It was during this year that Bonneville became a dominant force in the Northwest's preparedness program. As the year closed, 265,000 kilowatts of demand were under contract to six first-line defense industries.

In the fifth fiscal year (ending June 30, 1942), power contracts had risen to approximately 500,000 kilowatts.

II. POWER SALES FISCAL YEAR 1943

Thirty-five power contracts involving new power sales were executed by the Administration during the fiscal year.

Of these, 20 contracts were with new customers and embraced an over-all contract demand of 203,450 kilowatts. The remaining 15 represented revisions or amendments or supplemental agreements with existing customers for additional power.

Contract demand for all 35 contracts totaled 398,145 kilowatts. Of this total, 363,200 kilowatts represented industrial sales; 15,160 kilowatts, sales to military establishments; 1,100 kilowatts, sales to cooperatives; 18,285 kilowatts, sales to public or peoples' utilities districts; 200 kilowatts, sales to municipalities; and 200 kilowatts, sales to privately owned utilities companies.

By June 30, 1943, the Administration had in effect 85 executed power and interchange contracts, with a total over-all contract demand of 910,752 kilowatts.

On a contract demand basis, these sales were divided as follows:

Industrial sales 806,200 kilowatts; military establishments 21,200 kilowatts; cooperatives 8,060 kilowatts; public or peoples' utilities districts 45,900 kilowatts; municipalities 5,725 kilowatts; and privately owned utilities companies 23,667 kilowatts.

The 1943 revenues of $11,265,468 more than doubled the 1942 total of $5,162,376, and brought the total revenues collected by this Administration since its inception to $18,719,753.

The War Market

The Administration's war power market involved principally two types of customer: industrial purchasers and military establishments.

Principal sales in this category, during the year, were the six contracts executed with Defense Plant Corporation establishments, in-

volving 332,000 kilowatts of contract demand. Most of this power was for aluminum reduction and fabrication. Another 32,000 kilowatts of contract demand was divided among six other customers. Of these, the principal purchaser was a third large shipyard in the lower Columbia River district, with a demand for 12,000 kilowatts. Of the 11 military establishments to execute power contracts during the fiscal year, four were Navy Department installations and seven were army installations. Although these military establishments were widely scattered throughout the entire Northwest area, the wide range of the Administration's already constructed transmission facilities made it possible to render prompt service with relatively small difficulty.

New industrial and military sales fiscal year 1943 [1]

	Contract demand in kilowatts	Date executed
DPC-Spokane Aluminum Reduction Plant	130,000	Feb. 9, 1943
DPC-Spokane Aluminum Rolling Mill	50,000	Nov. 25, 1942
DPC-Spokane Ferrosilicon Magnesium Plant	56,000	Dec. 21, 1942
DPC Tacoma Aluminum Reduction Plant	42,000	Aug. 20, 1942
DPC-Troutdale Aluminum Reduction Plant	32,500	Dec. 23, 1942
DPC-Wenatchee Ferrosilicon Plant	22,000	Dec. 21, 1942
E. I. du Pont de Nemours & Co	[2] 800	Mar. 31, 1943
Electro Metallurgical Co	[3] 2,000	Mar. 1, 1943
Kaiser Company, Inc	[2] 300	July 1, 1942
Kaiser Company, Inc. (Swan Island)	12,000	Nov. 24, 1942
Olympic Mines, Inc	2,000	May 24, 1943
Pacific Carbide & Alloys Co. (Portland)	400	Aug. 1, 1942
Pacific Carbide & Alloys Co. (Tacoma)	6,000	Feb. 25, 1943
Reynolds Metals Co	[4] 4,000	Nov. 18, 1942
Do	[3] 1,200	Jan. 23, 1942
Do	[5] 2,000	
11 military establishments	15,160	
Total	378,360	

[1] Includes direct sales only. Excepts sales and deliveries to public and private utilities for war purposes.
[2] Temporary construction power.
[3] Short-term overload power.
[4] Covered 4,000 kilowatts.
[5] This amendment to be executed as of June 1, 1943, increased to 6,000 kilowatts the contract demand under preceding footnote.

The Public Power Market

Seven new contracts negotiated with public-owned power agencies and cooperatives during the fiscal year comprised a total demand value of 19,585 kilowatts.

Of these, one contract was signed by a municipality, three were signed by utilities districts, and three by cooperatives. They brought the total of "public agency" contracts in force to 52 by the end of the year exclusive of those contracts executed with federally owned agencies.

The cumulative list follows:

Contracts with public agencies as of June 30, 1943

Name of purchaser (D)	Contract demand	Date
I. Public or Peoples' Utility Districts		
	Kilowatts	
Central Lincoln [1]	(2)	Feb. 25, 1942
Clark County, Wash. No. 1	10,750	Aug. 1, 1942
Clatskanie [3]	800	Mar. 4, 1942
Columbia River [4]	(2)	Dec. 18, 1942
Cowlitz County, Wash. No. 1	3,000	Apr. 28, 1941
Grant County, Wash. No. 2 [5]	370	June 12, 1942
Grays Harbor Co., Wash. No. 1	2,300	Sept. 21, 1942
Kittitas County, Wash. No. 1	100	Aug. 21, 1942
Klickitat County, Wash. No. 1 [6]	[7] 575	June 3, 1942
Lewis County, Wash. No. 1	400	May 1, 1942
Nehalem Basin [4]	(2)	July 9, 1942
Northern Wasco County [4]	4,000	Oct. 28, 1940
Pacific County, Wash. No. 2	980	Sept. 8, 1941
Skamania County, Wash. No. 1 [8]	925	Apr. 9, 1942
Tillamook [4]	2,000	May 15, 1940
Union County [4]	(2)	Mar. 2, 1942
Wahkiakum County, Wash. No. 1	700	Feb. 17, 1943
Whatcom County, Wash. No. 1 [4]	16,500	May 15, 1942
Yakima County, Wash. No. 1 [4]	2,500	July 9, 1941
Total	45,900	
II. Municipalities		
City of—		
Canby, Oreg. [9]	300	Dec. 22, 1939
Cascade Locks, Oreg.	200	Feb. 14, 1939
Centralia, Wash.	300	Feb. 13, 1940
Drain, Oreg. [10]	250	Mar. 14, 1941
Ellensburg, Wash.	2,000	Apr. 1, 1942
Eugene, Oreg.	(11)	Aug. 20, 1940
Forest Grove, Oreg. [9]	750	Nov. 7, 1939
Grand Coulee, Wash.	525	Mar. 6, 1943
McMinnville, Oreg.	1,000	Jan. 13, 1940
Monmouth, Oreg.	400	May 1, 1942
Seattle, Wash.	(11)	May 6, 1940
II. Municipalities—Con.		
City of—Continued		
Tacoma, Department Public Utilities, Division, Tacoma, Wash.	*Kilowatts* (11)	Mar. 5, 1940
Total	5,725	
III. Cooperatives		
Benton-Lincoln Electric Inc.	400	Oct. 9, 1942
Benton Rural Electric Assn., Inc. [12]	325	June 4, 1942
Big Bend Electric, Inc. [5]	260	June 11, 1942
Blachly - Lane County Electric Assn. [13]	50	Oct. 7, 1941
Clearwater Valley Light & Power Assn., Inc. [5]	700	June 17, 1942
Columbia County Rural Electric Assn.	300	Dec. 1, 1942
Douglas Electric, Inc. [10]	625	July 1, 1942
Idaho County Light & Power Assn., Inc. [5]	160	June 8, 1942
Inland Empire Rural Electrification, Inc. [5]	1,400	May 28, 1942
Kootenai County Rural Electric Assn. [5]	210	June 9, 1942
Lincoln Electric, Inc.	700	May 20, 1942
Nehalem Valley Electric Assn.	150	Dec. 24, 1942
Nespelem Valley Electric, Inc.	100	Feb. 19, 1941
Northern Idaho Rural Electrical Rehabilitation Assn., Inc. [5]	400	Apr. 29, 1943
Okanogan County Electric, Inc. [5]	120	June 8, 1942
Pend Oreille Electric, Inc. [5]	200	May 1, 1943
Salem Electric Assn.	100	Mar. 17, 1941
Stevens County Electric, Inc. [5]	310	June 2, 1942
Umatilla Electric Assn [12]	1,350	June 10, 1942
Wasco Electric, Inc.	200	Dec. 1, 1942
Total	8,060	
Grand total	59,685	

[1] This public utility district is currently operating but is not at present served by BPA.
[2] No contract demand specified.
[3] This public utility district is currently operating but presently has only an emergency service connection with BPA.
[4] This public utility district is not yet in operation.
[5] Served via WWP Co.
[6] Served (at Condit point of delivery) via PP&L Co.
[7] Total of 3 points of delivery, only 1 of which is energized or constructed, viz.: Condit, 100 kilowatts; North Dalles, 125 kilowatts; Goldendale, 350 kilowatts.
[8] Served via PP&L Co. at White Salmon River point of delivery, but directly by BPA at North Bonneville and Bonneville Dam delivery points.
[9] Served via PGE Co.
[10] Served via COP Co.
[11] Interchange.
[12] Served via PP&L Co.
[13] Not energized; completion of line to connect with Eugene substation deferred for duration.

Progress of Publicly-Owned Agencies

The progress of the Northwest's publicly owned and operated power distribution agencies which purchased all or part of their requirements from the Bonneville Administration was reflected during fiscal 1943 in the increased volume of these purchases. During

the year Bonneville power sales to such agencies practically doubled, rising from a total of 89,454,000 kilowatt-hours in fiscal 1942 to 176,723,000 kilowatt-hours.

Of this total, Bonneville's sales to municipalities rose from 22,212,000 in 1942 to 25,737,000 in 1943, while the revenue received increased from $98,463 to $99,952. Sales to public utility districts rose from 62,918,000 kilowatt-hours in 1942 to 123,519,000 kilowatt-hours in 1943, while the revenue received rose from $159,194 to $364,546. Sales to cooperatives rose from 4,324,000 kilowatt-hours in 1942 to 27,467,000, an increase of 500 percent, in 1943, and the revenues received rose from $20,526 to $123,142.

Public power distribution agencies showed steady gains throughout the year in operating revenue, and many showed continued reductions in retail power rates to consumers. A number accumulated substantial surplus funds and, pending further reductions in rates, applied these moneys to the purchase of war bonds.

Several public agencies went into operation during the year. Of these, particularly notable were the Central Lincoln Public Utility District and the Clatskanie Public Utility District, both in the State of Oregon. The latter agency succeeded in selling its revenue bonds at the remarkably low interest rate of 2.8 percent.

Following are typical case histories of public power distribution agencies in the Pacific Northwest.

Cowlitz County Public Utility District No. 1, one of the larger districts in the State of Washington, acquired its properties in November 1940 at $6,800,000. For the year ending December 31, 1942, it showed a net surplus of $112,575.06 and an accumulated surplus of $405,669.99 for amortization after paying all costs of operation, interest, depreciation, and taxes.

During the year ending June 30, 1943, the district reduced the rates or "revenue per kilowatt-hour" from 2 to 1.8 cents. This reduction, together with previous reductions, effected annual savings over rates previously charged by privately owned companies amounting to $9.60 or 21 percent to customers using 100 kilowatt-hours per month and $123.60 to those using 750 kilowatt-hours (6 kw.) per month.

Pacific County Public Utility District No. 2 for the year ending December 31, 1942, increased its power requirements from 10,345,680 kilowatt-hours to 11,676,936 for the year, and its annual operating revenues from $222,273.31 to $237,479.61 or 6.84 percent. Total operating expenses for the same period had increased 5.14 percent, allowing a net operating income of $61,050.95, an increase of 7.20 percent over the previous year and a net to surplus of $52,904.69.

Total annual reductions under present rates compared to those previously charged by private companies were estimated at $51,121 or 25 percent.

Monmouth municipal system by March 31, 1943, had increased its sales by 467,009 kilowatt-hours over the previous year, or 47.2 percent; had reduced its rates or "revenue per kilowatt-hour," from an average of 1.649 to 1.368 cents, thus effecting an annual saving over former rates of $13.20 or 31 percent to customers using 100 kilowatt-hours per month, and $147 or 45 percent to those using 75 kilowatt-hours per month.

The city met all operating costs including interest, bond payments and taxes of $13,311.60, and earned a surplus of $1,734.13 in 1943 and $8,170.81 in 1942, or a total surplus to date of $9,904.94 which is $4,995.44 in excess of the total debt charges, or 24.84 percent of gross revenue.

Forest Grove municipal system increased its total number of customers for the 12 months ending March 31, 1943, from 1,294 to 1,349, a gain of 55. Its kilowatt-hour sales for the period increased from 2,910,297 to 3,490,245 or 19.93 percent; its operating revenues from $51,256.95 to $56,797.96 or 10.81 percent. Operating income increased 23.27 percent. The city reduced the operating revenue received per kilowatt-hour from 1.749 to 1.61 cents during the period. This, added to previous reductions, resulted in an annual saving of $13.68 over former rates to customers using 100 kilowatt-hours per month or 31 percent, and $258 or 61 percent to those using 750 kilowatt-hours (6 kw.) per month.

The system paid all operating costs including city taxes of $4,800, interest of $7,500 and depreciation, leaving a net income of $16,095.53. An amount equal to $7,500 of deferred maintenance was set aside for post-war purposes. A building fund of $12,000 was established.

McMinnville municipal system increased its total number of customers in the year ending March 31, 1943, from 2,362 to 2,406, a gain of 44; increased its total generated and purchased power from 10,435,552 kilowatt-hours to 11,223,971. The city reduced rates during the year from an average operating revenue per kilowatt-hour of 1.439 to 1.298 cents, effecting an annual saving of $8.40 or .22 percent to domestic customers using 100 kilowatt-hours per month, and $147 or 47 percent for such customers using 750 kilowatt-hours (6 kw.) per month.

Meanwhile the system met all operation and depreciation costs, paid $26,400 interest to the city, paid $3,925.79 taxes and had a net income for the period of $19,272.64. Total earned surplus, accumulated since the beginning of Bonneville Power Administration service, was $40,893.40.

The Inland Empire Cooperative, Inc., operating in eastern Washington, one of the largest in the United States, began operation in 1938 but did not begin using Bonneville power until August 1942. Securing Bonneville power at once reduced the cooperative's annual wholesale power cost by $32,851. This in turn effected annual savings of $12 or 16 percent to retail customers using 100 kilowatt-hours per month, and $78 or 25 percent to those using 750 kilowatt-hours per month.

By the end of 1943 the cooperative had 2,010 miles of energized lines and 3,293 consumers. Its operating revenues for the year were $193,833.44; expenses were $155,333.86.

Other Sales

By June 30, 1943, three power contracts with private utilities companies were operative. Deliveries had been continued through the year to the Portland General Electric Co. on a day-to-day extension of the terms of the contract first executed in December 1939. Efforts to negotiate a long-term contract with the company were not successful due largely to the fact that the parent company, which owns all of Portland General Electric Co.'s common stock is in reorganization and negotiations had to be conducted with a number of parties who had diverse interests in that reorganization. Agreement could not be reached with all of these diverse interests on terms which would comply with the Bonneville Act and adequately protect the Federal Government's interest. This inability to agree on a long-term power contract resulted in the filing of two lawsuits against the Administrator. The purposes of these suits were to determine the terms under which the Administrator may enter into long-term power contracts with privately owned utilities. The Administrator, however, has continued to serve the growing demands of this company's system on a day-to-day basis because of the shortage of generating capacity in the Portland area.

As the fiscal year closed, the Bonneville Administration was furnishing the operating company approximately 70,000 kilowatts of monthly billing demand—about one-third of its total power requirements.

Other power sales contracts with utility companies at year's end were in force with the Pacific Power & Light Co., with a delivery point at Astoria, Oreg., for a demand of 2,000 kilowatts; and an interchange contract with the Washington Water Power Co. and the Pacific Power & Light Co., which included transfer service to public-owned distribution agencies under contract to the Bonneville Administration.

In addition to its sales contracts, the administration had in force a large number of pole contact and miscellaneous amendatory agree-

ments. Contract actions of all types during the fiscal year totaled 125 items, as follows:

Summary of contract actions fiscal year 1943

Type of Item	*Number of Items*
Strictly new customers	20
Amendments or new agreements with existing customers for additional power	13
Revisions to apply revised wholesale rate schedules	12
Pole contact agreements, including amendments and supplements thereto	5
Miscellaneous amendatory agreements	25
Miscellaneous agreements	29
Supplemental agreements in regard to transfer service for Bonneville's account under the interchange contract of April 1, 1942, with The Washington Water Power Co. and Pacific Power & Light Co	21
Total	125

III. FUTURE POWER SALES

On June 30, 1943, 11 contracts involving an over-all minimum demand of 237,000 kilowatts and a possible maximum demand of 312,000 kilowatts were in active negotiation. Individually, these sales prospects ranged from 2,000 to 120,000 kilowatts of demand. They included the new electro-development laboratory and the new alumina reduction plant approved during the fiscal year 1943, as well as a number of new war industries, military establishments and several utilities systems. It was anticipated execution of these contracts during the fiscal year 1944 would bring total contract demands on the Bonneville-Grand Coulee system to nearly 1,300,000 kilowatts, with actual monthly billing demands probably running well in excess of that figure at times.

Market Development Shows Results

Industrial progress of the Pacific Northwest region clearly demonstrated, during the fiscal year 1943, the importance of a strong power market development program; and as the year drew to a close, it became increasingly apparent that this phase of the Bonneville Administration's activities had materially assisted not only in the orderly development of the region's war industry but in providing a solid foundation for future industrial expansion.

Strenuous efforts were made toward stabilizing the tremendous aluminum manufacturing industry. Of the six huge Northwest aluminum plants, four were built by the Defense Plant Corporation

and operated under lease as war plants. In order to safeguard the continued operation of such industries as permanent enterprises, the Administration's Market Development staff concentrated its efforts on the establishment of a plant for the manufacture of aluminum oxide from local Northwest clays.

As the fiscal year drew to a close, agencies of the War Production Board and the Bureau of Mines approved the establishment of an aluminum oxide plant in the Pacific Northwest. This plant, of 50-ton production capacity, will be constructed and operated in its initial stages by the Chemical Construction Co., an affiliate of American Cyanamid. Plans for this plant, as approved by the several interested agencies, require that it be operated ultimately by Columbia Metals Co., owned and financed by a group of Northwest businessmen.

During the year the Administration was also able to be of some assistance to the Bureau of Mines in the establishment of an electrodevelopment laboratory in the region. This laboratory, under construction as the year closed, was to investigate the feasibility of using the many large deposits of Northwest minerals through the application of low-cost electric power.

In addition to this work, the Administration's Market Development staff continued to cooperate with chambers of commerce and other public and semipublic agencies of the region in the development of community industrial surveys. More than 20 such surveys were completed during the fiscal year. Results were published by the Administration with the inclusion of complete information on available industrial plant sites, raw material and labor supplies, transportation and housing facilities and other pertinent factors.

These reports were made available to a large number of industrial organizations, for the purpose of encouraging them to consider the Pacific Northwest as a suitable region for the expansion of their enterprises.

All these activities brought substantial recognition of the program's value from a number of industrial sources. Typical was the comment of the industrial publication The Iron Age, which, in its issue of May 20, 1943, stated:

> . . . The Bonneville-Coulee Power Administration in its business development and industrial analysis departments has now become a general agency and factor in the industrial life and future of the Pacific Northwest which is not only primary but which has become constantly more constructive and beneficial.

The Post-War Power Market

As the United Nations gained victory after victory during 1943, it became necessary, in the interest of good management, for the

Bonneville Administration to consider the effects of the post-war period upon its power market. Furthermore, this was required by Presidential memorandum on May 22, 1943.

The post-war problem, as it directly affected Bonneville, was two-fold: (1) the stabilization and expansion of power-using industry; and (2) the development of the rural and domestic use of low-cost electric power.

Accordingly, it was toward the solution of this dual problem that the Bonneville Administration began to shape a post-war program, to be undertaken as soon as possible, for the approval of the Congress, the Department of the Interior and the War Production Board.

Stabilization of the immense Northwest aluminum industry comprised one of the largest single phases of the problem. In order to determine what steps were necessary to this stabilization, consideration was given to a study of the competitive position of existing aluminum plants, an analysis of the Defense Plant Corporation contracts for each of the plants, and finally, to the active promotion of steps to provide continuing operations on a competitive basis, by businessmen of the region.

With this proposal, consideration was given to methods whereby post-war aluminum markets could be developed in and accessible to the Northwest region.

Along with this, the possibilities of assisting in further research relative to other power-using industries were being considered.

Active consideration also was being given to plans for expansion of the rural and domestic power market. Rough estimates arrived at during the fiscal year indicated that, with proper development, irrigation, rural electrification and domestic power use would require, during the first post-war decade, an additional generating capacity in the Pacific Northwest of about 1,700,000 kilowatts.

All these aspects of the post-war problem as it would affect the Northwest power market were being pulled together for consideration by the proper Government bureaus and the Congress during the fiscal year 1944. Such studies were considered not only to be fundamental to the proper administration of the Bonneville Act, but of considerable importance to future protection of the Pacific Northwest economy.

IV. GROWTH AND OPERATION OF THE SYSTEM

At the beginning of fiscal 1943 the Administration had on hand a total of $55,365,170 in unexpended congressional appropriations. This sum included the 1943 appropriation of $20,007,000 for facili-

ties required for war power deliveries, a carry-over from former fiscal years of $26,000,000 which were being maintained as a reserve for projects authorized prior to the war but which could not be built during the critical material shortage, and approximately $8,700,000 which had been allocated to specific projects then under construction.

On October 20, 1942, the chairman of the War Production Board halted all nonmilitary construction projects generally throughout the United States, pending review by a special Facilities Review Committee to determine which could be postponed as least essential to the war program.

On November 17, 1942, the Bonneville Administrator was ordered by the Facilities Review Committee to continue the agency's 1943 construction program to completion. The committee's findings showed that without exception the 23 major construction projects reviewed, as well as a number of smaller, related projects, were all of first importance to the Northwest's war production program.

Power System Extended

In accordance with this approval, the Administration completed and energized 695 circuit miles of transmission line during fiscal 1943, of which 495.6 circuit miles were of 230 kilovolt construction. The Bonneville system's power substations were increased in number from 37 to 51 during the same period. Substation transformer capacity was increased by 733,667 kilovolt-amperes—a substantial gain over the 530,050 kilovolt-amperes of substation capacity installed during the previous fiscal year.

By June 30, 1943, the Administration had in operation a total of 2,443 circuit miles of transmission lines and a total substation transformer capacity of 2,049,579 kilovolt-amperes.

Operations

All facilities of the entire system were taxed to their utmost throughout the year. During the fall months of calendar year 1942, the unprecedented drought conditions on all Northwest power streams, with the single exception of the Columbia River, made it necessary for Bonneville to operate without adequate reserves of generating or transmission capacity. At times the generators at Grand Coulee and Bonneville were overloaded well in excess of 10 percent as an emergency measure. Following the extreme low-water period in the fall months of 1942, added demands by war industry throughout the Northwest made it necessary to continue overload conditions much of the time.

The Northwest Power Pool

The principal emergency operations measure undertaken during the year was the development of the Northwest power pool in cooperation with 10 other major utilities serving the entire Pacific Northwest region. Prior to the beginning of the fiscal year 1943, the Bonneville Administration's system was already interconnected with several major utilities systems. In order to forestall the development of area-wide power shortages within the region and to make available at all times maximum power for war production within six Northwest States, arrangements for interconnections with six other major utilities systems were completed, with the concurrence and sponsorship of the War Production Board, in April of 1942. Later the War Production Board endorsed and made mandatory such interconnection programs by its Limitations Order L–94, issued May 1, 1942.

Actual operations of the Northwest power pool began August 1, 1942—one month after the beginning of the fiscal year. During the 11-month period between August 1, 1942, and June 30, 1943, the Bonneville Power Administration made total energy deliveries to other pool members of 1,365,911,630 kilowatt-hours.

During this same period, energy received by the Bonneville Administration from other pool members totaled 406,294,365 kilowatt-hours. This made the Government's net contribution to the Northwest power pool 959,617,265 kilowatt-hours during the 11-month period.

Thus, in addition to direct power deliveries to Bonneville's own war customers, the two Federal dams on the Columbia River contributed nearly 1 billion kilowatt-hours to fill the wartime needs of other utility systems.

The Power-Supply Problem

On June 30, 1943, combined installed rated generating capacity at the Bonneville and Grand Coulee plants totaled 884,400 kilowatts. Additional units totaling 432,000 kilowatts were undergoing construction and installation. Completion of these latter units was scheduled to increase combined rated capacity at both plants to 1,316,400 kilowatts by the spring of calendar year 1944. In addition, U. S. Army engineers were engaged in raising the pool elevation behind Bonneville Dam for the purpose of adding 29,000 kilowatts of prime power capacity to the over-all system total.

Estimates by Bonneville engineers in the spring of 1943 indicated that in the 12 months immediately following final installation of this capacity, the total average load on the Bonneville system would rise as high as 1,038,400 kilowatts, of which 97 percent would comprise

deliveries to war industries and military establishments. It was estimated that during the same period the loads for the interconnected utilities systems, excluding the Bonneville-Grand Coulee system, might exceed the dependable generating capacity of these other systems by 100,000 to 200,000 kilowatts if the year proved to be one of low water. In such event, the Bonneville-Grand Coulee system would have to supply the deficiency.

These and other pertinent factors were presented to the Bonneville Advisory Board at a meeting in Washington, D. C., on March 12–13, 1943.

In its consideration of these matters, the Advisory Board came to the conclusion that, if the war continued, there was some danger of a region-wide power shortage in the winter of 1944 and almost certain danger of such a shortage in the winter of 1945 and thereafter.

Accordingly, at its March 12-13 meeting, the Advisory Board recommended the following program:

(1) Rapid completion of generating units already under construction at both dams.

(2) Rapid completion of the City of Seattle's Ross Dam and the 35,000-kilowatt unit at the city of Tacoma's Nisqually project.

(3) Increase in the level of the Bonneville pool.[1]

(4) Reinstatement immediately, with adequate priorities, of generator No. 7 at Grand Coulee for service in 1944, if possible.

(5) Arrangement for completion of Rock Island project.

(6) Investigation of the possibility of developing not less than 3 million acre-feet of water storage on the Clark Fork of the Columbia River.

(7) Reinstatement, with adequate priorities, of generating units 8 and 9 to be installed at Grand Coulee Dam by 1945.

(8) Action to insure immediate construction of substantial additional power supply for 1946 and subsequent years by construction of the Umatilla project.

Upon presentation of these recommendations, the War Production Board concurred in a number of them, including the proposal to investigate the possibilities of storage projects in the Clark Fork watershed. As the fiscal year closed, the Clark Fork investigations were in an advanced stage; and on June 28, 1943, the War Production Board approved the construction and installation of Grand Coulee generating unit No. 7.

Depending upon successful conclusion of these negotiations for upstream storage and completion of Coulee Generator No. 7, the

[1] This had already been undertaken by the U. S. Army engineers.

Administration anticipated any power shortage developing in 1945 could be adequately met.

Post-war Construction Program

On May 22, 1943, in a memorandum to the heads of all departments and agencies, the President of the United States requested the submittal of detailed construction plans for public works which had been deferred because of the war, along with proposed supplemental appropriations required for effectuating such plans and suggestions as to additional legislation which might be required to implement them.

In accordance with this order, the Bonneville Administration began work on a detailed post-war construction program. As the year closed, initial estimates indicated the Administration would be prepared, on demobilization day, to call for bids on $26,000,000 worth of projects.

This blacklog represented about 45,000 man-months of labor and an expenditure of at least $15,000,000 for equipment and materials.

Money for these projects already had been appropriated by the Congress prior to and during the early months of the war and was being held in reserve for continuance of the agency's peacetime program.

In addition to this sum, it was estimated that at least $25,000,000 more must be spent, following the war, on Bonneville's huge network of transmission lines, if the Congress appropriated funds for additional generators at Grand Coulee Dam and for construction of the $90,000,000 Umatilla Dam.

The initial $26,000,000 program included nearly 35 individual projects involving additions to existing substations, construction of new substations, construction of new high-voltage transmission lines and extensions to Bonneville's subtransmission system. The plan also included about $11,000,000 of expenditure for a wide variety of service lines, substations and other facilities for the delivery of Columbia River power to public distribution agencies in Oregon and Washington.

It was the Administration's view that such a program was in conformance with Department of Interior policy to build Northwest power facilities in advance of need.

Such a policy had already paid high dividends, both in promoting industrialization prior to the war and in heavy contribution to war production following Pearl Harbor.

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