1 Aug 1963 Washington

LOWER SAUK RIVER, MILE 1.1

PERTINENT DATA

Maximum pool elevation	500 ft.
Normal power pool elevation	477 ft.
Minimum pool elevation	391 ft.
Gross storage	712,000 ac.-ft.
Flood control storage	200,000 ac.-ft.
Non-flood usable storage	432,000 ac.-ft.
Dead storage	80,000 ac.-ft.
Tailwater elevation	280 ft.
Average head	199 ft.
Minimum average release (April-October)	2,600 c.f.s.
Minimum average release (November-March)	3,050 c.f.s.
Critical period average	44,300 kw.

INITIAL INSTALLATION

Nameplate capacity	64,000 kw. (1 unit)
Dependable capacity 1/	63,300 kw.
Average energy	54,000 kw.
Annual energy benefit @ 2.70 mills/kw.-hr.	$1,277,000
Annual capacity benefit @ $9.70/kw. 2/	$614,000
Annual capacity benefit @ $14.80/kw. 3/	$937,000
Total Annual Power Benefit 2/	$1,891,000
Total Annual Power Benefit 3/	$2,214,000

ULTIMATE INSTALLATION

Nameplate capacity	192,000 kw. (3 units)
Dependable capacity 4/	221,500 kw.
Average energy	56,350 kw.
Annual energy benefit @ 2.70 mills /kw.-hr.	$1,333,000
Annual capacity benefit @ $9.70/kw. 2/	$2,149,000
Annual capacity benefit @ $14.80/kw.	$3,278,000
Total Annual Power Benefit 2/	$3,482,000
Total Annual Power Benefit 3/	$4,611,000

1/ 70% = critical period L.F.
2/ Formulation power value.
3/ Evaluation power value.
4/ 20% = critical period L.F.

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file - Skagit River F.C. Study.
RHS

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1. Reservoir regulation for power. Reservoir regulation must consider all other authorized purposes in addition to power. The major uses of project storage are expected to be flood control, water supply, and power. The first two uses generally conflict with use of storage for maximum power. The maximum power demand occurs in the winter, but the maximum demand for water supply is in the summer. Flood control requires evacuation of storage space prior to the flood season, which coincides with the time of maximum power demand. The need for flood control storage varies during the flood season. The maximum flood storage reservation of 250,000 acre-feet is required each year from 1 November through the month of February. During the months of October and March the flood storage requirement is less and can be provided on the basis of forecast flood potential without loss of prime power. When not required for flood storage, the entire usable storage capacity may be utilized for power. However, use of the flood storage reservation for power does not increase the prime power available during the winter peak load months, but does increase secondary power available during the summer. Minor floods of late spring and early summer may be stored for use later in the summer. The requirement that the flood storage reservation be evacuated by 1 November, prior to the peak power load, limits the additional power benefits to the summer.

2. Preliminary power studies indicate that a minimum monthly mean flow of 2,600 c.f.s. may be maintained during the months of April through

October without loss of prime power. An average prime power release of 2,950 c.f.s., plus an assumed leakage and miscellaneous loss of 100 c.f.s., gives a minimum winter average flow of 3,050 c.f.s. More detailed regulation studies may increase the minimum summer flow above 2,600 c.f.s. Later requirements for low flow augmentation may take precedence over regulation for maximum prime power, but a significant power benefit would remain under any foreseeable plan of reservoir regulation.

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1. Power requirements. Forecasts of power requirements are quite numerous. The Bonneville Power Administration prepares ten-year load estimates in its "Advance Program" covering the western members of the Northwest Power Pool, referred to as the "West Group Area." The Federal Power Commission has prepared estimates for the "Pacific Northwest Power Area" which are given in a report by the Power Planning Subcommittee of the Columbia Basin Interagency Committee entitled "Review of Power Planning in the Pacific Northwest, Calendar Year 1962," dated 13 March 1963. Ten-year forecasts of loads are also given in the "West Group Forecast of Power Loads and Resources" by the Pacific Northwest Utilities Conference Committee, published annually. These forecasts do not all cover exactly the same area and are not in exact agreement concerning the estimated rate of load growth, although most of them use an annual rate of growth of about 6 percent.

2. The various estimates are all in general agreement that the loads in the Pacific Northwest will continue to grow and that existing, under construction, and planned hydroelectric resources will be able to meet the expected load growth for approximately the next ten years. Other sources of electric power will be needed in large amounts to supplement the hydroelectric production in meeting future power loads in the area. When this need will occur depends upon the development schedule of remaining hydroelectric sites and the rate of load growth. This need will be met by conventional thermal-electric power, nuclear sources, or

importation of power through interconnections with outside areas.

3. As thermal-electric power sources are developed, secondary hydro-electric energy will become usable as thermal replacement energy. This will ultimately allow the use of all hydroelectric energy which can be economically generated. Sufficient thermal-electric power sources are expected during the period 1970-1980 to utilize a major portion of the secondary hydroelectric power of the Pacific Northwest.

4. As the total system load increases, thermal generation will supply more of the base load and hydro generation will supply more of the peaking load. Hydroelectric generating units are particularly suitable for meeting peak loads because they can be quickly increased to full load capacity from low load or even from complete shutdown. On the other hand, thermal generating units operate most efficiently under continuous rated load, avoiding unnecessary shutdowns or periods of part-load operation. Thus the future hydro-thermal combination of generating resources will provide peaking loads for more hydroelectric generating units.

5. The undeveloped hydroelectric resources under study in the Puget Sound area are small compared to the expected local load growth, and will have a correspondingly small effect on the proportion of thermal-electric power required to meet the expected load. For the purposes of project formulation and evaluation, all hydro energy generated is assumed to be usable to replace thermal energy in the local load. Although this may not be true in the early stages of the life of a proposed hydroelectric project, it will be the case for the major part of the 100-year period

of analysis, and is considered sufficiently accurate for project formulation.