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1993 Pacific Northwest Loads and Resources Study

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*This document is a product of the
Energy Resources Development
and Implementation Process:*

Define Situation →

Identify Alternatives

Select Strategies

Implement Strategies

Evaluate Performance

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Energy Resources Development and Implementation Process

The Energy Resources Program contains all the steps needed to plan for and manage energy resources. This chart reflects that process, with major tasks for each step. Though we display a linear process, it is a simplification; many interactions among the stages take place. Throughout the process, Bonneville asks customers, the Northwest Power Planning Council, utility and environmental groups, the public and others for their advice and comment.

*Customers
Northwest Power
Planning Council
Utility and
Environmental Groups
The Public*

Defining the Resource Picture

To define the resource picture, Bonneville assesses its customers' power requirements for the next 20 years and the supply of existing resources. Bonneville and the Northwest Power Planning Council publish energy demand forecasts, and analysts forecast how much power from existing resources will be available to meet projected uses. The difference must be met by new resources.

Identifying Alternatives

Analysts track potential resources and predict future supplies of conservation and generation resources, including imports and power exchanges. Analysts study all aspects of a resource: reliability, public opinion, cost, environmental impact, regulatory transmission and fuel constraints, and development time. Alternatives considered include opportunities for coordinating hydro system operations with Canada and for power purchases and transfers with Canadian and Southwest utilities.

Selecting Strategies

Using information on loads and resources, Bonneville weighs combinations of resources, their consequences, and public comment to choose the most appropriate and cost-effective resource strategy. The Resource Program documents this strategy.

Implementing Strategies

Fulfilling the plans in the Resource Program is the next step. Working with utilities, resource developers, interest groups, the public, and others, Bonneville sponsors conservation and generation programs and projects. BPA conducts environmental reviews of programs and projects and also provides oversight for generation projects. The result: megawatts of electricity generated or saved for the region.

Evaluating Performance

How well did actions meet BPA's objectives? Answering this question through program evaluation provides information on energy savings, energy production, costs and other measures of program quality. It is BPA's policy to evaluate all energy resource acquisitions.

1993 PACIFIC NORTHWEST LOADS AND RESOURCES STUDY

BONNEVILLE POWER ADMINISTRATION
December 1993

MASTER

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*Cover: Ice Harbor Dam
Owned and operated by the
U. S. Army Corps of Engineers
BPA Photo*

ACKNOWLEDGMENTS

Preparation of the annual Pacific Northwest loads and resources study is a complex, multidisciplinary effort. The managers of BPA's Power Forecasting Branch wish to acknowledge the team--BPA staff and others--whose diligence and dedication result in a reliable, high quality document.

Power Forecasting Branch

Loads and Resources Section

Customer Loads Section

Long-Term Forecasting Section

Economic Forecasting Section

Power Systems Branch

Hydro system regulation study and data collection

Pacific Northwest Utilities Conference Committee

Loads and resources data collection

1993 Pacific Northwest Loads and Resources Study

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1993 PACIFIC NORTHWEST LOADS AND RESOURCES STUDY

I. INTRODUCTION

During the past year, through its Competitiveness Project, the Bonneville Power Administration (BPA) has focused on how it will meet its public responsibilities and competitive challenges in a rapidly changing electric utility industry. The Competitiveness Project is the "reinventing" of BPA from a program-driven, beneficiary-focused, spending-prescribed and process-oriented organization to a business model that is market-driven, customer-focused, cost-conscious, and results-oriented. To provide strategic direction to the transformation, BPA will be completing a marketing plan, several 10-year plans, and a business plan. These plans will establish the direction for future conservation, generation, fish and wildlife, transmission, and operation and maintenance programs. These plans will establish what future actions BPA should take to best position itself in an increasingly competitive market while responsibly meeting environmental and other non-power requirements. The study does not attempt to present or analyze future conservation or generation resource scenarios.

This process of "reinventing" BPA brings an added dimension to loads and resources forecasting: the inclusion of load placement uncertainty and new marketing strategies. BPA will reevaluate its planned resource acquisitions. The impact of this re-evalu-

ation and agency "reinvention" will be analyzed in future loads and resources studies.

The 1993 Pacific Northwest Loads and Resources Study presented herein establishes a picture of how the agency is positioned today in its loads and resources balance. It is a snapshot of expected resource operation, contractual obligations, and rights. This study does not attempt to present or analyze future conservation or generation resource scenarios. What it does provide are base case assumptions from which scenarios encompassing a wide range of uncertainties about BPA's future may be evaluated.

The Loads and Resources Study is presented in three documents: 1) this summary of Federal system and Pacific Northwest region loads and resources; 2) a technical appendix detailing forecasted Pacific Northwest economic trends and loads, and 3) a technical appendix detailing the loads and resources for each major Pacific Northwest generating utility. This analysis updates the 1992 Pacific Northwest Loads and Resources Study, published in December 1992.

In this loads and resources study, resource availability is compared with a range of forecasted electricity consumption. The forecasted future electricity demands -- firm loads -- are subtracted from the projected capability of existing and "contracted

for" resources to determine whether BPA and the region will be surplus or deficit. If resources are greater than loads in any particular year or month, there is a surplus of energy and/or capacity, which BPA can sell to increase revenues. Conversely, if firm loads exceed available resources, there is a deficit of energy and/or capacity, and additional conservation, contract purchases, or generating resources will be needed to meet load growth.

The Pacific Northwest Loads and Resources Study analyzes the Pacific Northwest's projected loads and available generating resources in two parts: 1) the loads and resources of the Federal system, for which BPA is the marketing agency; and 2) the larger Pacific Northwest regional power system, which includes loads and resources in addition to the Federal system.

The loads and resources analysis in this study simulates the operation of the power system under the Pacific Northwest Coordination Agreement (PNCA) produced by the Pacific Northwest Coordinating Group.

This study presents the Federal system and regional analyses for five load forecasts: high, medium-high, medium, medium-low, and low. This analysis projects the yearly average energy consumption and resource availability for Operating Years

(OY)¹ 1994-95 through 2003-04. (See Section III, *Changes in the 1993 Pacific Northwest Loads and Resources Study*.) The study shows the Federal system's and the region's monthly estimated maximum electricity demand, monthly energy demand, and monthly maximum generating capability -- capacity -- for OY 1994-95, 1998-99, and 2003-04. The Federal system and regional monthly capacity surpluses/deficits are summarized for 10 operating years.

The Federal system analysis is presented in Section IV, beginning on page 17. The analysis for the Pacific Northwest region is presented in Section VI, page 46.

A glossary of terms is included in Section IX, page 125.

Additional copies of this summary, along with copies of the documents listed below, can be obtained from BPA's Public Involvement Office, toll-free, 1-800-622-4520.

- ◆ 1993 Pacific Northwest Economic and Electricity Use Forecast Technical Appendix: Volume 1 (available January 1994).
- ◆ 1993 Pacific Northwest Loads and Resources Study Technical Appendix: Volume 2 (available January 1994).

¹Operating Year (OY) is the 12-month period August 1 through July 31. For example, OY 1994-95 is August 1, 1994 through July 31, 1995.

II. BACKGROUND

Pacific Northwest Planning Area

The Pacific Northwest regional planning area is defined by the Pacific Northwest Electric Power Planning and Conservation Act (Northwest Power Act), enacted in December 1980. It includes Oregon, Washington, Idaho, Montana west of the Continental Divide, and portions of Nevada, Utah, and Wyoming that lie within the Columbia River drainage basin. In addition, any rural electric cooperative customers not in the geographic area described above that were served by BPA on the effective date of the Northwest Power Act are included in planning for resources to meet load.

Regional Firm Resources

The Pacific Northwest regional resources are comprised of generating resources operated or being built by Federal entities, public agencies, investor-owned utilities (IOUs), and independent power producers (IPPs). This study contains BPA's current projection of generation from existing resources and those future resources with signed contracts.

Hydro Resources

Energy Capability: BPA long-range planning is based on the firm energy capability of the hydro system. The firm hydro energy capability is the amount of power produced by these regional hydro resources in the historical sequence of low water conditions -- called the critical period -- re-

corded for the Columbia River Basin. Currently, the critical period includes September 1928 through February 1932. This creates a 42-month critical period. The energy produced by the region's hydro projects during the critical period is calculated using the generation average. The critical period contains flows in the month of May which are in excess of those needed to meet the region's firm electric needs. These additional flows are needed to assist fish migration in May and are called the Water Budget flows. To avoid overstating the Federal firm hydro energy generation resulting from implementing Water Budget flows, generation resulting from these May flows is shown as a reduction to Federal hydro generation and labeled "May Water Budget" on the utilities' loads and resources tables. (See Section III, *Changes in the 1993 Pacific Northwest Loads and Resources Study*.) The regional hydro system generates approximately 12,700 average megawatts of firm energy under critical water conditions.

Capacity: The monthly instantaneous capacity of hydro projects is defined as the full-gate-flow maximum available generation at each project, based on the average monthly elevation resulting from 1929-30 water reservoir levels. BPA assumes 1929-30 water levels to estimate the regional hydro capacity because that year approximates a peaking capability that is consistent with the reliability criteria set forth in the Pacific Northwest Coordination Agreement. Additional information on water-year selection is contained in the

1993 Pacific Northwest Loads and Resources Study Technical Appendix: Volume 2 (available January 1994).

The monthly instantaneous capacity is limited to 10 times the project's average monthly energy production because, at low or minimum water discharge, a plant may not be allowed to release enough water to achieve maximum capacity. The region's hydro projects have constraints and storage limitations within any water condition.

BPA's planning projections reduce the estimated instantaneous hydro capacity to reflect a Federal sustained peaking level of 50 hours per week. This level provides estimated firm hydro capacity that can be maintained each day and continued for weeks at a time. This definition of firm capacity provides a better measure of resource capability. The hydro generation also is adjusted to allow for scheduled hydro maintenance, spinning reserves, and forced outage reserves.

Sections VII and VIII contain tables showing the amount of surplus capacity as defined above. These capacity tables, based on critical water conditions, should be used to determine the amount of capacity available to support firm sales. **Capacity surplus values do not reflect potential nighttime return problems on the system.** Nighttime return considerations are discussed under *Federal System Marketable Capacity*, page 38.

Additional information regarding the determination of the region's firm hydro capacity is contained in the loads and resources technical appendix.

Multiple-Use Planning: Pacific Northwest hydro projects have many uses besides power generation. The projects may provide flood control, supply irrigation for farming, assist in river navigation and recreation, and contribute to municipal water supplies. In addition, constraints also are in

place to protect and enhance resident and anadromous fish populations. These non-power uses place operating requirements on the reservoirs and limit hydro-electric power production. BPA's resource planning takes into account all presently known non-power operating requirements in assessing regional hydro system capability.

The Corps of Engineers, Bureau of Reclamation, and BPA are jointly preparing a System Operation Review (SOR) Environmental Impact Statement (EIS) on the operation of the Columbia River hydropower system. This EIS will allow the three Federal agencies to make decisions on (1) adopting a System Operating Strategy (SOS), (2) renewing the Pacific Northwest Coordination Agreement, (3) renegotiating five Canadian Entitlement allocation agreements, and (4) developing a means to periodically review and update the SOS.

As part of the development of a multiple-use operating strategy for the hydro system, the SOR EIS will evaluate the trade-offs between power and nonpower uses. Major changes in Columbia River system operations are being considered.

The SOR EIS is scheduled for completion in 1994.

Fish and Wildlife Programs: The augmented flows specified for the Snake River and its tributaries as part of the Northwest Power Planning Council's Phase II Columbia River Basin Fish and Wildlife Program fish amendments, adopted December 11, 1991, were incorporated in this year's critical period hydro regulation study; the augmented Columbia River flows called for in the amendments were not included.

The hydro regulation study for this year's loads and resources analysis was designed to simulate the following firm planning assumptions from the Northwest Power Planning Council Plan, Phase II:

- ◆ Additional non-power requirements;
- ◆ Flow augmentation on the Snake River; and
- ◆ Minimum operating pool elevations and reduced operating ranges during the April 16 through August 31 period at the Lower Snake River projects of Ice Harbor, Lower Monumental, Little Goose, and Lower Granite, and at the John Day project.

The reduced operating ranges and lower reservoir elevations at the Lower Snake River and John Day projects during the late spring and summer significantly reduced their sustained peaking capability. Table 1, page 6, shows the 50-hours-per-week capability of these projects was reduced by up to 1,500 peak megawatts during this period.

Additional hydro regulation assumptions include:

- ◆ Adoption of the PNCA maximum shifting of firm energy in only the first year of the 4-year critical period. This decreased the 50-hours-per-week sustained peaking capability of the hydro system by up to 600 peak megawatts in some winter months. The 1992 study used the PNCA

maximum shift philosophy for the first two years of the critical period. The Council's amended program contains additional requirements that make maximum shifting beyond the first year of the critical period impractical.

- ◆ The Dworshak hydro project was assumed to be operated on a fixed basis using Corps of Engineers guidelines from the Council's Fish and Wildlife Program for the Snake River.

Incorporating these amendments affects the regional hydro firm energy and significantly reduces the 50-hours-per-week capability of the hydro system in some months.

BPA is taking an operational approach to providing the Columbia River flow augmentation included in the Council's Phase II Program for spring migrants. Columbia River flow augmentation requires a water release of 3 million acre-feet during the month of June. To cover this obligation, BPA will 1) store nonfirm energy, or 2) purchase power. Columbia River flow augmentation is not included in the firm planning associated with the critical period hydro regulation study.

Table 1

**Council Phase II Fish and Wildlife Program
50-Hours-Per-Week Capacity Impacts on the
John Day and Lower Snake River Projects ¹**

Period	John Day Hydro Project²	Lower Snake River Hydro Projects²	Total Peak Capacity Reduction (MW)²
April 16-30	0	1,100	1,100
May	1,000	200	1,200
June	400	1,100	1,500
July	100	600	700
August 1-15	100	0	100
August 16-31	100	0	100

¹Lower Snake River projects include Ice Harbor, Lower Monumental, Little Goose, and Lower Granite.

²50-hours-per-week sustained peaking reduction.

On September 9, 1992, the Council adopted an expanded Phase III Fish and Wildlife Program, and later adopted a Phase IV program. However, these amendments have not yet been analyzed or fully incorporated in BPA hydro regulation studies.

The Pacific Northwest Power Planning Council, BPA, and other Pacific Northwest entities will continue to evaluate new ways to enhance fisheries and wildlife. Future proposals could include additional amendments to the Council's Fish and Wildlife Program, recommendations arising from the System Operation Review, and/or implementation of additional programs in support of the Endangered Species Act. The impacts of future proposals are unknown. These proposals, however, most likely will increase non-power requirements

on the hydro system and reduce operating flexibility, change the monthly shape of streamflows, and change the availability of sustained Federal capacity. Future studies will incorporate these impacts.

Thermal Resources

The expected output of regional thermal resources is based on the energy and capacity capabilities submitted to BPA by the project owners. The output of all thermal plants is reduced to allow for scheduled maintenance, spinning reserves, and forced outage reserves. The Trojan nuclear power plant was retired from service on January 14, 1993. This study does not include Washington Public Power Supply System (WPPSS) nuclear plants 1 and 3 (WNP-1, WNP-3) as assured resources, though the plants have been retained in a state of preservation.

Analysis of Regional Firm Loads and Resources

The Pacific Northwest regional analysis contains the Federal system loads and resources, plus non-Federal regional loads, contractual obligations, and generating resources. The region has three load groups: Federal system, generating public agencies, and IOUs. The regional hydro resources are owned and operated by various Federal entities, public agencies, and IOUs. The regional thermal generating resources, fueled by biomass, coal, natural gas, oil, or nuclear power, are owned and operated by various regional entities.

The regional analysis is presented in Section VI, beginning on page 46.

Analysis of Federal System Firm Loads and Resources

BPA is a power marketing agency, responsible for acquiring and delivering sufficient power to serve the needs of its customers. BPA does not own generating resources. BPA's customer loads and contractual obligations, combined with the resources from which BPA acquires the power it sells, are collectively referred to as the Federal system. BPA owns and operates the primary transmission grid -- more than 14,700 circuit miles of power lines -- in the Pacific Northwest.

The Federal system loads are made up of BPA's sales to other Federal agencies, the region's public agencies, several Direct Service Industrial (DSI) customers, and other contractual obligations to deliver power. This study includes only the firm DSI loads; interruptible DSI loads are not served from firm resources. Operation of the Federal system under the PNCA serves interruptible DSI loads on a semi-firm basis, using various operational procedures.

Sales to public agencies and DSIs comprised over 80 percent of the Federal system loads in OY 1991-92.

The hydro resources of the Federal system include 30 dams owned and operated by the United States Bureau of Reclamation (USBR) and the United States Army Corps of Engineers (COE), plus hydroelectric projects owned by the city of Idaho Falls, WPPSS, and Lewis County PUD. Added as a new resource in this year's study is BPA's purchase of firm power from Northern Wasco's McNary Fishway hydro unit. BPA has the exclusive right to sell power generated by USBR and COE hydroelectric projects. BPA also markets the thermal generation from the WNP-2 nuclear plant, operated by WPPSS.

The Federal system analysis is shown in Section IV, beginning on page 17.

Nonfirm Resources

Federal system firm resource capability is estimated using critical water flows. The regional hydro system, however, historically has experienced precipitation levels that produced greater-than-critical-period flows. This excess water is used to produce nonfirm energy.

BPA's loads and resources balance does not include nonfirm energy. Nonfirm energy increases regional generation by about 3,800 to 4,200 average megawatts annually when averaged over 50 years of historical water flows. The Federal share of this nonfirm energy is about 2,300 to 2,600 average megawatts based on 50 years of hydro flow data. Capacity generally is available to support nonfirm energy sales.

The augmented Columbia and Snake River flows called for in the Council's Phase II Fish and Wildlife Program were incorporated in the 50-year nonfirm energy analysis. This changed the shape and

amount of usable nonfirm energy. A detailed discussion of the nonfirm energy analysis and accompanying tables are included in the 1993 Pacific Northwest Loads and Resources Study, Technical Appendix: Volume 2.

Nonfirm energy in the Northwest is generally used to serve the interruptible portion of BPA's DSI load and displace higher cost thermal resources, and is stored for later release during the Columbia River's augmented flows in the month of June. Nonfirm energy in excess of Northwest needs is available for export to other markets.

Load Forecasting

The forecast ranges presented in this study have been changed since the 1992 study. The high, medium-high, medium-low, and low load forecasts were updated to represent more appropriately the near-term uncertainty in loads as they appear in 1994. These new ranges take on the same distributions as the ranges in the 1992 forecast, which were prepared jointly by BPA and the Council in the spring of 1991. The medium forecast was completed by BPA in August 1993. Key factors considered in developing the forecasts are the prices of electricity and fossil fuels; the effects of increasing employment, population, and number of households; future changes in energy-using technologies; and planned conservation actions. Numerous secondary economic and demographic factors also are considered.

The load forecasts are based on ranges of employment, population, households, and fossil fuel price forecasts. The forecasts also incorporate national economic forecasts and historical relationships between the Pacific Northwest and national economies. These major factors are introduced into a series of electricity demand and pricing models. This modeling system

projects future electricity loads and prices based on price/demand relationships. The result is a range of public agency and IOU load forecasts: high, medium-high, medium, medium-low and low. In a similar manner, five DSI load forecasts are produced, with the primary factors being aluminum prices, electricity costs, and other DSI production costs.

The Council's Regional Power Plan and BPA's Resource Program are built upon the full range of forecasts, without strong weighting toward the medium case. However, BPA's power sales contract administration and operational and financial planning focus on the medium forecast. In response to these different needs, BPA staff took primary responsibility for developing the medium forecast for this year's study and updated the forecasts for the other four cases making up the range.

The updated medium forecast prepared by BPA incorporates recent economic trends and load tracking data using BPA's Supply Pricing Model. The BPA pricing model allows the medium forecast to better reflect the detailed near-term assumptions regarding resource costs and loads.

The medium forecast used in this study incorporates a merging of BPA's mid-term public agency econometric load forecast (prepared in the summer of 1993), with the BPA 1993 Long-Term Forecast. The mid-term and long-term load projections were combined to take advantage of the strengths of both near-term and long-term forecasting methods. BPA's mid-term forecast of public agency loads incorporates seasonal and cyclical variations in employment and near-term economic projections without breakdown by consumer sector. The mid-term forecasting method was used to produce the public agency forecast through December 1999; the long-term method was used beginning January

2000 and continuing through the remainder of the study period.

The 1992 high, medium-high, medium-low, and low forecasts were produced using the long-term forecasting models. A simplified approach was used to update these forecast ranges for the 1993 study.

After considering the major sources of load growth uncertainty, BPA concluded that the 1992 forecast distribution around the medium case was still a good representation of load uncertainty; however an adjustment to when the paths for the alternative cases diverge from the medium path had to be made to reflect both the passage of time and modification in the medium path. With the concurrence of the Council, the distribution of the alternative ranges around the medium case for the 1992 forecast were calculated and applied to the merged medium 1993 forecast. This process was applied to both the public agency forecast and the forecast of IOU loads.

All forecasts assume that energy consumers will change their consumption in response to changes in electricity prices, but that utilities and state or local governments will not implement new or additional demand-side load reduction initiatives such as conservation programs, adoption of model conservation standards (MCS), or cost-effective cogeneration beyond currently budgeted programs. These long-term "price-effects" forecasts include:

- ◆ Price-induced conservation;

- ◆ Future impacts of all current building codes and appliance standards in effect at the time the forecasts were produced. These impacts include Federal appliance standards effective January 1990 and January 1993, the 1990 Washington State Energy Codes (MCS), which became effective July 1991, and the 1992 Oregon Building Code (MCS), which became effective January 1993;
- ◆ Conservation savings that have been achieved already, such as weatherization of existing dwellings, construction of Super Good Cents houses, and savings from conservation programs for Fiscal Years (FY) 1991-92, 1992-93, and 1993-94 and are already included as reductions in the loads;
- ◆ Anticipated savings from aluminum DSIs' contracted-for conservation and modernization measures through July 1992; and
- ◆ The levels of electricity prices to consumers if the region pursues the least-cost mix of conservation, demand-side load reductions, and new generating resources.

For more information about the joint forecast and load forecasting methods, see the 1993 Pacific Northwest Economic and Electricity Use Forecast Technical Appendix, and chapters 5 and 6 of the Northwest Power Planning Council's Northwest Conservation and Electric Power Plan, Volume 2.

Canadian Treaty Downstream Benefits

Obligations under the Columbia River Treaty will change during the study period. This treaty between the United States and Canada enhanced the use of storage in the Columbia River Basin. The treaty and treaty projects provide downstream benefits by increasing the firm power generating capability of U.S. hydro projects. Under the terms of the agreement, the downstream power benefits are shared equally between the two countries as determined by a joint Annual Operating Plan.

Canadian Entitlement to Columbia Storage Power Exchange (CSPE) Through March 31, 2003

Canada agreed to sell its share of the downstream power benefits, called the Canadian Entitlement, for 30-year periods beginning with the completion of each of the three Canadian Treaty Projects. The Canadian Entitlement was sold to the Columbia Storage Power Exchange (CSPE), a Pacific Northwest corporation that was formed to sell the Canadian benefits to participating Pacific Northwest utilities. The Canadian Entitlement sale to CSPE begins to expire April 1, 1998, 30 years after the completion of the first Treaty Project, and expires March 31, 2003.

Canadian Entitlement to Canada, Beginning April 1, 1998

A portion of the Canadian share of downstream power benefits will begin to return to Canada April 1, 1998, 30 years after the first Treaty Project was completed. All remaining Canadian downstream power benefits will revert to Canada by April 1, 2003, 30 years after the third Treaty Project was completed. This analysis assumes that the capacity and energy obligations on U.S. hydro projects will equal the utilities' percentages of Canadian Entitlement CSPE participation. These entitlement obligations are being negotiated with the involved parties. The tables will be updated after negotiations are completed. Participating utilities will deliver Canadian Entitlement to the U.S. Entity (BPA) for capacity and energy returns to Canada. The Canadian Entitlement Canada delivery starting April 1, 1998, is included in each participating utility's loads and resources balance. BPA delivers the total Canadian Entitlement, shown in Table 2, as an export to Canada.

Table 2

**Canadian Entitlement to Canada
Energy and Capacity Obligations Beginning April 1, 1998**

Energy in Average Megawatts

OPERATING YEAR	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Investor-Owned Utilities	0	0	0	2	18	42	41	41	51	72
Public Agencies	0	0	0	2	13	26	26	26	34	47
Federal System	0	0	0	13	106	232	232	230	290	411
TOTAL ENERGY OBLIGATION	0	0	0	17	137	300	299	297	375	530

January Capacity in Megawatts

OPERATING YEAR	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Investor-Owned Utilities	0	0	0	0	20	111	111	111	111	200
Public Agencies	0	0	0	0	12	82	82	82	82	152
Federal System	0	0	0	0	94	575	575	575	575	1,048
TOTAL CAPACITY OBLIGATION	0	0	0	0	126	768	768	768	768	1,400

Major Sources of Uncertainty

Loads and Resources Uncertainty

Future Federal system and regional firm surpluses/deficits are subject to a number of uncertainties over the 10-year study period. These uncertainties include:

- ◆ BPA's future marketing efforts and/or revised resources acquisition, including conservation, under BPA's impending business plan;
- ◆ Possible increases in resource acquisitions by BPA's public agency customers, which would decrease their purchases from BPA;
- ◆ Deviation from the forecasted rate of load growth;
- ◆ Changes in conservation program levels, including MCS implementation;

- ◆ Failure of existing or contracted generating resources to operate at anticipated times and levels; and
- ◆ Changes in existing hydro system operation in response to programs developed to address the Endangered Species Act or other environmental considerations.

These uncertainties could affect both the size of projected surpluses or deficits and the times at which they occur.

Contractual Uncertainty

BPA's contractual obligation to serve future regional load growth is uncertain because there is no precise way to predict the amount of load growth regional utilities will place on BPA in coming years. This study assumes that the following contracts, though they are subject to change as noted,

will extend throughout the 10-year study period. What occurs when these contracts expire, which will be at varying times during the 10-year study period, may affect the Federal system and regional loads and resources balances:

- ◆ BPA's power sales contracts with its DSI, public agency, and IOU customers expire June 30, 2001. Renegotiation of these contracts may result in new or different Federal obligations.

- ◆ The Pacific Northwest Coordination Agreement will expire June 30, 2003. BPA expects this agreement, which coordinates operation of the Pacific Northwest power system and that of Canada, will be replaced with a new agreement. The provisions of a new agreement may be different from the existing agreement.

III. CHANGES IN THE 1993 PACIFIC NORTHWEST LOADS AND RESOURCES STUDY

This section describes the major changes in the assumptions of the 1993 Pacific Northwest Loads and Resources Study compared to the 1992 study. Other changes are reflected in the data for each utility contained in the 1993 Pacific Northwest Loads and Resources Study Technical Appendix.

10-Year Planning Period

This year's study covers a 10-year planning period. Historically, this study covered a 20-year planning horizon.

In the 1970s and early 1980s, utilities were building large nuclear and coal plants, which took 7 to 12 years to complete. Thus, utilities needed to know projected energy deficits for a planning, construction, and ramp-up period that could span 20-years. Utilities no longer are building these large thermal resources, relying instead on shorter lead-time resources such as combustion turbines, cogeneration, and conservation to meet their firm power deficits.

Monthly Energy and Capacity Tables

The monthly shape of energy and capacity loads and resources has become more important as the impact of the measures needed to assist fish mitigation have affected Pacific Northwest hydro operations. Monthly firm energy and capacity forecasts

for medium loads under 1930 water conditions for OY 1994-95, 1998-99, and 2003-04 are included as exhibits at the end of this study.

42-Month Hydro Critical Period

This study uses a 42-month critical period average hydro energy capability in conjunction with a reduction for the May Water Budget for the annual firm energy surplus/deficit tables. Previously, studies were based on a 39-month critical period average, eliminating the three May generation periods. By instituting the 42-month critical period along with the May Water Budget for the hydro critical period average, the additional energy due to the May Water Budget can be readily analyzed. The May Water Budget reduction is discussed below.

May Water Budget Generation

This study defines the amount of additional energy due to the May Water Budget generation as a reduction in hydro system energy capability. Previous studies did not include the May Water Budget generation as a line item; rather, the three months of May were eliminated from the 42-month critical period -- September 1929 through February 1932 -- creating a 39-month critical period average. The May Water Budget reduction is used with the 42-month critical period average energy.

May hydro energy is extremely high due to Water Budget operation to support fish mitigation. May Water Budget generation for the Federal system is beyond normal amounts that can be marketed. This energy is included as a reduction to the hydro energy capability on the Federal system loads and resources table. The amount of May Water Budget generation is manageable for all other Pacific Northwest utilities and no adjustments were made in their loads and resources tables.

Extreme Weather Effects on the Federal and Regional Capacity Surplus/Deficit

This year's study includes extreme weather adjustments for the Pacific Northwest utilities' capacity surplus/deficit analysis. The effects of extreme weather are usually of a few days duration in the Pacific Northwest and thus impact capacity availability only. The extreme weather factors in this study were based on the

February 1989 cold snap. Extreme weather peak load adjustments affect the months of November, December, January, and February, and estimate a 5 percent probability that peak load will be exceeded. By incorporating extreme weather conditions, the studies more closely reflect actual operation and reliability levels.

Impacts of extreme weather are included as an additional scenario on lines 43 through 48 in the Federal Capacity Exhibits 14 through 16, pages 88 through 93. The Federal extreme weather adjustments include possible increased obligations on BPA by the public agencies during extreme weather conditions.

The capacity surpluses/deficits presented on line 29 of the public agency capacity load/resource tables represents the surplus/deficit after purchase from BPA under the normal peak forecast. As in past studies, these have a 50-percent probability of being exceeded.

Peak extreme weather adjustments are shown in Table 3.

Table 3
OY 1994-95 Peak Load Extreme Weather Adjustments
Medium Load Forecast

Peak Load Increase (MW)	August 1 - October 31	November	December	January	February	March 1- July 31
Federal Extreme Weather¹	0	1,492	1,680	1,752	1,570	0
Regional Extreme Weather	0	3,655	3,955	4,107	3,923	0

¹Includes potential obligations on BPA by most of BPA's public agency power sales contract customers.

DSI Aluminum Firm Loads

The near-term portion of the 1993 BPA forecast assumes that DSI aluminum smelter firm load will be 2,019 average megawatts in OY 1995. The Aluminum DSI firm loads are forecasted to decline to 1,811 average megawatts in OY 1998, then further decline to 1,663 average megawatts at the end of the current power sales contract in 2001. In the 1992 study, DSI aluminum smelter firm loads were forecasted at 2,013 average megawatts in OY 1995, declining to 1,823 average megawatts in 1998, then further declining to 1,694 average megawatts at the end of the current power sales contract in 2001. The small difference between the 1993 and 1992 study forecasts is due to a changed assumption regarding increased electricity purchases from non-BPA sources.

The declining operating rates in both the 1992 and the 1993 study reflect the greater uncertainties surrounding the effect of salmon recovery plans on the future availability and price of electricity, the effect on smelters of implementing the Clean Air Act amendment, the Variable Industrial (VI)

power rate expiration, and renegotiation of expiring power sales contracts.

DSI Non-Aluminum Firm Loads

The near-term forecast assumes that the non-aluminum DSI firm energy will be 175 average megawatts in OY 1995, rising to 217 average megawatts by OY 1997, declining to 162 average megawatts by OY 2001, and remaining at that level through the rest of the study period. In the 1992 BPA forecast, non-aluminum DSI firm energy was forecasted at 200 average megawatts in OY 1995 and was otherwise the same as the 1993 forecast. This change in the forecast is due to projected changes in Nickel Joint Venture's operations, coupled with a weakening chlorine market, a strengthening sodium chlorate market, and energy efficiency improvements at some DSI plants.

Public Utility Loads

Public utility loads are affected by higher retail electric rates as the result of higher projected PF rates in the forecast period.

are lower than in previous forecasts. These changes in energy prices plus minor changes in economic factors have the effect of lowering forecasted public utility loads compared to the 1992 study. Public utility loads are expected to grow from 7,264 average megawatts in OY 1994-95 to 8,170 average megawatts in OY 2003-04. These forecasted load levels are between 50 and 160 average megawatts lower than for the same period in the 1992 study.

Non-Utility Generation

Regional utilities, primarily the investor owned utilities (IOUs), are acquiring significant non-utility generation (NUG) to meet their customers' needs. The total NUG has increased from 500 average megawatts for OY 1994-95, shown in last year's study, to 936 average megawatts for the same period in this year's study, an 87-percent increase. By OY 2003-04, NUG increases from 478 average megawatts projected in last year's study, to 964 average megawatts in this year's analysis, an increase of 101 percent.

New Federal System Firm Resources

BPA contracted with the North Pacific Division of the Corps of Engineers to install three-dimensional cam controllers on 90 of their Kaplan turbine generators on the Columbia and Snake River projects.

These controllers angle the turbine blades to capture optimum output from head and flow at each unit. The Corps is presently installing the devices and plans on completing the work by the end of March 1994. A conservative estimate shows that this should provide about 45 average megawatts of firm energy to the hydro system.

This additional generation was not included in the data submitted for this year's hydro regulation. The increased generation was added as an ad-hoc adjustment to hydro firm energy.

Northern Wasco's McNary Fishway hydro unit was added as a new Federal system firm generating resource and was included in this year's study.

Trojan Nuclear Power Plant

Portland General Electric Company retired the Trojan nuclear plant from service on January 14, 1993. The permanent shutdown of Trojan caused a loss of 1,104 megawatts of capacity and 713 average megawatts of firm energy in the region. The Federal system lost 331 megawatts of capacity and 214 average megawatts of energy.

IV. FEDERAL SYSTEM ANALYSIS

This study provides base case assumptions from which scenarios encompassing a wide range of uncertainties about BPA's future may be evaluated. It incorporates only load forecast uncertainty and capacity availability under extreme weather conditions.

The Federal system loads and resources analysis is based on the following assumptions:

- ◆ **Capacity surplus/deficit values do not reflect potential nighttime return problems on the Federal system;**
- ◆ The Pacific Northwest Coordination Agreement, which expires June 30, 2003, is replaced with a like agreement;
- ◆ BPA's power sales contracts with Pacific Northwest Federal and public agencies, IOUs, and DSIs, which expire June 30, 2001, are renewed with like agreements;
- ◆ All existing Federal contractual arrangements not included under Pacific Northwest power sales contracts expire and are not renewed;
- ◆ Federal surplus firm power sales to the cities of Burbank, Glendale, and Pasadena, and the Southern California Edison Company (SCE), are shown as power sales through their expiration.
- ◆ BPA's bridge capacity sale of 1,100 peak megawatts to PacifiCorp (formerly doing business as Pacific

Power & Light, a.k.a., PP&L) continues through July 31, 1995;

- ◆ BPA serves all of the Pacific Northwest public agencies' net firm load requirements not served by their own resources;
- ◆ Extreme weather adjustments during the months of November through February. These adjustments vary monthly from 1,400 to 1,800 peak megawatts under the medium load forecast; and
- ◆ The IOUs do not make new long-term BPA purchases under their power sales contracts.

The assumption that there will be no long-term power purchases by BPA's IOU customers is due to the uncertainty of the IOUs' intentions. BPA believes this assumption is reasonable because: 1) The IOUs have not informed BPA to the contrary; and 2) the IOU power sales contracts contain a 7-year notice requirement that provides BPA adequate time to secure resources to meet increased IOU obligations. There is only one IOU placing an obligation on BPA:

- ◆ Portland General Electric Company (PGE) is purchasing capacity of 150 megawatts through June 30, 1999, under its power sales contract.

Puget Sound Power and Light Company (Puget) was purchasing energy from BPA under its power sales contract in last year's study. The company's purchase of energy has been revised to zero for this year's study.

Federal System Firm Energy Loads

The Federal system firm loads include BPA's firm DSI load,¹ sales to Federal agencies, current obligations to regional public agencies and IOUs under their power sales contracts, and other inter- and intra-regional contractual obligations. Figure 1 shows the components of the Federal system firm load for OY 1994-95.

The Federal system firm energy loads under the high, medium-high, medium, medium-low, and low load forecasts for OY 1994-95 through 2003-04 are shown in Figure 2, page 20. The methods and assumptions used to complete this year's range of forecasts are discussed under *Load Forecasting*, page 8.

¹This study includes only firm DSI loads; interruptible DSI loads are not served from firm resources. Operation of the Federal system under the PNCA serves the interruptible DSI loads on a semi-firm basis using various mechanisms.

The Federal loads include all intra-regional contracts made within the Pacific Northwest, called contracts out, and inter-regional contracts or exports of firm surplus power to Southwest utilities. Table 4, page 21, summarizes the Federal system firm energy loads and load growth percentage rate under the five load forecasts through the 10-year study period. The Federal firm energy loads under the five study forecasts are presented on line 15 of Exhibits 1 through 5, pages 62 through 71, and monthly for the medium load forecast for OY 1994-95, 1998-99, and 2003-04 assuming 1930 water conditions in Exhibits 6 through 8, pages 74 through 79.

Figure 1

**Federal System Firm Energy Loads
Medium Load Forecast for OY 1994-95¹
Energy In Average Megawatts**

*Columbia Storage Power Exchange

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¹ Operating Year (OY) is the 12-month period August 1 through July 31. For example, OY 1994-95 is August 1, 1994 through July 31, 1995.

Figure 2
Federal Firm Energy Loads
1993 BPA Forecasts

RPCE:12/93

Table 4

Federal System Firm Energy Loads¹
Includes Contractual Obligations
Energy in Average Megawatts

Load Forecast	Operating Year ²		Load Growth (aMW)	Load Growth OY 1994-95 - 2003-04 (Percent per Year)
	1994-95 (aMW)	2003-04 (aMW)		
High	9,604	11,527	1,923	2.0
Medium-High	9,150	10,406	1,256	1.4
Medium	8,818	9,385	567	.7
Medium-Low	8,125	8,546	421	.6
Low	7,555	6,916	-639	-1.0

¹ Federal system load growth may not parallel load growth for the Pacific Northwest. Federal system loads consist of many contracts and obligations that may increase or decrease through the study period due to customer rights under these contracts.

² Operating Year (OY) is the 12-month period August 1 through July 31. For example, OY 1994-95 is August 1, 1994 through July 31, 1995.

Federal System Firm Peak Loads

Figure 3, page 22, shows the Federal peak loads for OY 1994-95 under each of the five load forecasts. Figure 4 shows the Federal firm peak loads under the medium load forecast for OY 1994-95. The figures show the expected 1-hour monthly demand under the 1993 BPA load forecast, and include extreme weather adjustments. Extreme weather conditions were assumed for the months of November through February and estimate a 5-percent probability that the actual peak load will be exceeded. The extreme weather adjustment includes possible increased obligations on BPA by the public agencies during extreme weather conditions. In the remaining months of March through October, the peak loads estimate normal weather conditions with a 50-percent probability that the actual peak load will be exceeded. The peak load projections are reduced by a diversity component to address the fact that all peak electrical demands do not occur simultaneously throughout the region.

This year's study includes the following BPA contract:

- ◆ A bridge capacity sale of 1,100 megawatts to PacifiCorp through July 31, 1995.

BPA currently is preparing an Environmental Impact Statement (EIS) for a long-term follow-on capacity sale contract for 1,100 peak megawatts with PacifiCorp through August 31, 2010. This contract will begin on August 1, 1995, or when the EIS is completed. If BPA signs the PacifiCorp contract after completing the EIS, it will be included as a long-term firm BPA obligation.

This study assumes that public agencies will purchase capacity from BPA under their power sales contracts to meet peak loads not served by their own resources.

The monthly Federal firm peak loads are presented on line 15, and the monthly extreme weather obligations are presented on lines 45 and 47 of Exhibits 14 through 16, pages 84 through 93, for the medium load forecast for OY 1994-95, 1998-99, and 2003-04, assuming Federal obligations under 1930 water conditions.

Figure 3

**Federal Firm Peak Loads Under Extreme Weather Conditions
OY 1994-95**

Figure 4

**Federal Firm Peak Loads Under Extreme Weather Conditions
Medium Loads**

New Non-Federally Owned System Firm Resources

To cover near-term firm energy deficits, BPA contracted for short-term purchases from the Montana Power Company and the Puget Sound Power and Light Company, and a capacity-for-exchange-energy contract with deferred energy returns with San

Diego Gas and Electric Company. In addition BPA's resource program resulted in the long-term acquisition of Northern Wasco's McNary Fishway hydro unit. This resource is included in this study as a Federal system firm generating resource. The near-term purchases and long-term and resource acquisition are shown in Table 5.

Table 5

New Non-Federally Owned BPA Resources (Included as Federal System Firm Resources)

Project	Type	Operator	On-line Date	Capacity (peak MW)	Firm Energy (aMW)
McNary Fishway unit	Hydro	Northern Wasco PUD	August 1, 1997	8	7

FIRM CONTRACTS					
San Diego Gas & Electric	Deferred Return Energy		1994 ¹	0	43
Montana Power Company	System Sale		1993 ²	0	53
Puget Sound Power & Light Company	System Sale		1993 ³	0	58
Total Firm Contracts				0	154
TOTAL NEW NON-FEDERALLY OWNED BPA RESOURCES				8	161

¹The San Diego capacity-for-energy and deferred return contract starts August 1, 1993, and terminates July 31, 1997.

²The Montana Power Company contract began July 1, 1993, and terminates June 30, 1996.

³The Puget Sound Power & Light contract began July 1, 1993, and terminates June 30, 1996.

Existing Federal System Firm Resources

The Federal system hydro resources from which BPA markets power are shown in Table 6. In addition, BPA markets power purchased from non-Federally owned resources. BPA's capacity/energy exchange contracts provide energy to BPA as payment for the capacity BPA delivers.

The non-Federally owned resources, return energy associated with BPA's existing capacity/energy exchanges, contractual resources, and other BPA hydro-related contracts are shown in Table 7, page 26.

Combined, these resources represent BPA's available firm resources. A detailed listing of all Federal generating resources is contained in the 1993 Pacific Northwest Loads and Resources Technical Appendix: Volume 2.

Table 6

Federal System Hydroelectric Projects

Project	Initial Year of Service	Number of Units	Name-plate Rating (MW)	Instantaneous Generating Capacity ¹ (peak MW)	Firm Energy ² (aMW)
U.S. BUREAU OF RECLAMATION HYDROELECTRIC PROJECTS					
Grand Coulee	1941	27	6,187.5	6,684	1,951
Grand Coulee Pump Gen.	1973	6	314.0	314	0
Hungry Horse	1952	4	392.0	428	100
Pallsades	1957	4	142.2	164	61
Anderson Ranch	1950	2	27.0	30	11
Minidoka	1909	7	13.4	16	9
Roza	1958	1	11.3	13	4
Black Canyon	1925	2	8.0	10	7
Chandler	1956	2	12.0	13	7
TOTAL BUREAU OF RECLAMATION PROJECTS		55	7,107.4	7,672	2,150
U.S. ARMY CORPS OF ENGINEERS HYDROELECTRIC PROJECTS					
Chief Joseph	1955	27	2,069.0	2614	1,194
John Day	1968	16	2,160.0	2484	942
The Dalles	1957	22	1,780.0	2074	744
Bonneville	1938	18	1,050.0	1186	501
McNary	1953	14	980.0	1127	682
Lower Granite	1975	6	810.0	932	216
Lower Monumental	1969	6	810.0	930	220
Little Goose	1970	6	810.0	932	213
Ice Harbor	1961	6	603.0	693	199
Libby	1975	5	525.0	600	184
Dworshak	1974	3	400.0	460	166
Lookout Point	1954	3	120.0	138	24
Detroit	1953	2	100.0	115	34
Green Peter	1967	2	80.0	92	22
Lost Creek	1975	2	49.0	56	23
Albeni Falls	1955	3	42.6	49	26
Hills Creek	1962	2	30.0	35	14
Cougar	1964	2	25.0	29	12
Foster	1968	2	20.0	23	10
Big Cliff	1954	1	18.0	21	11
Dexter	1955	1	15.0	17	8
TOTAL CORPS OF ENGINEERS PROJECTS		149	12,496.6	14,607	5,445
HYDRO EFFICIENCY IMPROVEMENTS³		0	0	0	45
TOTAL BOR AND COE PROJECTS		204	19,604.0	22,279	7,640
MAY WATER BUDGET OVERGENERATION⁴		0	0	0	-265
TOTAL BOR AND COE PROJECTS		204	19,604.0	22,279	7,375

¹Maximum generation under optimum conditions. Does not reflect reduction to the peaking capacity of the hydro system due to the drafting of reservoirs and other project constraints.

²Firm energy from a 42-month critical period. The 1992 Pacific Northwest Loads and Resources Study, Table 4, page 23, summarized a 39-month critical average of 7,197 average megawatts.

³Contracted hydro efficiency improvements are being completed on various hydroelectric projects. These efficiency improvements were not included in this year's hydro regulation.

⁴May Water Budget reduction due to excessive generation in the months of May during the 42-month critical period in support of fish mitigation.

Table 7

**Non-Federally Owned BPA Resources and Contracts
Capacity based on January 1995**

Project	Type	Operator	Date in Service	OY 1994-95 Capacity (peak MW)	OY 1994-95 Firm Energy (aMW)
Existing Non-Federally Owned BPA Resources					
WNP-2	Nuclear	WPPSS	1984	1,100 ¹	715 ¹
Packwood Lake	Hydro	WPPSS	1964	30	8
Idaho Falls	Hydro	City of Idaho Falls	1982	18	18
Cowlitz Falls	Hydro	Lewis County PUD	1994	25 ²	22
McNary Fishway Hydro Unit	Hydro	Northern Wasco PUD	1997	0 ³	0 ³
TOTAL NON-FEDERALLY OWNED BPA RESOURCES				1,173	763
Firm Contracts					
Canadian Entitlement				162	58
Restoration, Columbia River Treaty w/Canada				0	-26
Southwest Capacity/Energy Exchange				0	6
Montana Power Capacity/Energy Exchange				0	29
PacifiCorp (Wyoming) Import for Southern Idaho Load				189	94
Basin Electric Cooperative Purchase⁴				120	105
Powerex (TransAlta) Purchase^{5,6}				125	100
WNP-3 Exchange Settlement Agreements				0	113
Montana Power Purchase⁷				0	53
Puget Sound Power & Light Purchase⁸				0	58
San Diego Gas & Electric, Capacity/Energy Exchange⁹				0	22
San Diego Gas & Electric, Deferred Return Energy⁹				0	51
Sacramento Municipal Utility District, Deferred Return Energy¹⁰				0	7
TOTAL BPA FIRM CONTRACTED RESOURCES				596	670
TOTAL				1,769	1,433

¹Efficiency improvements will increase WNP-2 capacity to 1,155 megawatts and energy capability to 751 average megawatts when completed in OY 1996.

²Operational capacity is 70 megawatts, but is restricted in January.

³Operational date is July 1, 1997. Peak capability will be 8 megawatts and 7 average megawatts of annual energy.

⁴The Basin Electric Cooperative contract began November, 1991, and terminates October 31, 1995.

⁵Powerex (British Columbia Power Exchange Corporation) is a wholly owned subsidiary of British Columbia Hydro and Power Authority (BC Hydro). Powerex has agreed to sell energy to BPA that is provided to them by TransAlta Utilities Corporation (TransAlta).

⁶The Powerex (TransAlta) contract began April 1, 1992, and terminates July 31, 1995.

⁷The Montana Power Company contract began July 1, 1993, and terminates June 30, 1996.

⁸The Puget Sound Power & Light contract began July 1, 1993, and terminates June 30, 1996.

⁹The San Diego Gas & Electric contract begins August 1, 1993, and terminates July 31, 1997.

¹⁰The Sacramento Municipal Utility District contract begins June 1, 1992, and ends December 31, 1995.

Table 8 summarizes the Federal system firm energy resources and contracts available to meet Federal firm loads for OY 1994-95. Federal system firm energy

resources are comprised as follows: 85 percent from hydroelectric power, 8 percent from one nuclear power plant, and 7 percent from BPA's firm contracts.

Table 8

Federal System¹ Firm Resources for OY 1994-95²
Capacity based on January 1995

Project Type	Sustained Peak Capacity (MW)	Generating Peaking Capacity % of Total	Firm Energy (aMW)	Firm Energy % of Total
Hydro	20,095	93	7,456	85
Nuclear	1,100	5	715	8
Firm Contracts	434	2	638	7
TOTAL FEDERAL RESOURCES	21,629	100	8,809	100

¹Includes Federally and non-Federally owned projects.

²Operating Year (OY) is the 12-month period August 1 through July 31. For example, OY 1994-95 is August 1, 1994, through July 31, 1995.

Federal System Nonfirm Resources

BPA planning does not include nonfirm energy in its Federal system loads and resources balance; however, it is an important component of BPA's marketing programs and revenue forecasts. Regional nonfirm energy can vary from zero in the worst water conditions to as much as 8,300 average megawatts in the best water year. Federal system nonfirm energy comprises approximately 60 percent of the region's nonfirm energy. Federal nonfirm energy averaged over 50 years of historical water flows would increase the Federal system resources from 2,300 to 2,600 average megawatts.

The augmented Columbia and Snake River flows called for in the Council's Phase II Fish and Wildlife Program were incorporated in this year's 50-year nonfirm energy analysis. This changed the shape and availability of nonfirm energy. A detailed discussion of nonfirm energy and accompanying tables are included in the 1993 Pacific Northwest Loads and Resources Study, Technical Appendix, Volume 2.

Federal System Firm Energy Surpluses/Deficits

This analysis includes all operating requirements currently adopted by the hydroelectric project owners and the firm planning assumptions from the Northwest

Power Planning Council's Phase II Columbia River Basin Fish and Wildlife Program fish amendments, adopted December 11, 1991 (see *Fish and Wildlife Programs*, page 4).

Figure 5, page 29, illustrates the variability of the Federal firm energy loads and available Federal resources under the high, medium-high, medium, medium-low, and low load forecasts. Federal resources change over time due to yearly scheduled maintenance and the expiration of inter- and intra-regional contracts.

The Federal firm energy surpluses/deficits under the various load forecasts for OY 1994-95 through 2003-04 are presented in Table 9, page 30, and graphically shown in Figure 6, page 31. The Federal system is energy deficit throughout the 10-year study period under the medium, medium-high, or high load forecast. The Federal system would remain firm energy surplus throughout the 10-year study period under the medium-low or low load forecast. Although utility loads continue to grow through the 1990s, the Federal system deficit, under medium loads, does not increase significantly due to the following changes:

- ◆ DSI loads, 26 percent of the Federal system load, are forecasted to decline by 200 average megawatts by OY 2000-01, and decline by 350 average megawatts by OY 2003-04.
- ◆ The WNP-1 exchange contract obligation expires June 30, 1996, returning 340 average megawatts of firm energy to the Federal system.

The components of the 10-year critical period average Federal energy loads and resources balances under the five load scenarios are presented in Exhibits 1 through 5, pages 62 through 71. The 10-year Federal system firm energy surpluses/deficits for each of the five forecasts are shown on line 43 of each exhibit.

To show the monthly variability of the loads and resources study, the monthly Federal system energy components assuming medium loads under 1930 water conditions for OY 1994-95, 1998-99, and 2003-04 are shown in Exhibits 6 through 8, pages 74 through 79.

Figure 7, page 32, shows the impact of the May Water Budget on the Federal system energy surpluses/deficits if it were included as a firm resource for OY 1994-95.

Figure 5

**Federal Firm Energy Loads and Resources
(Includes Inter- and Intra-Regional Contracts)**

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Table 9

**Federal System Firm Energy Surpluses/Deficits
Assuming Existing Loads, Resources, and Contracts¹
Energy In Average Megawatts**

OPERATING YEAR ²	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
LOAD SCENARIO										
High	-794	-1,210	-1,252	-1,577	-1,840	-2,160	-2,334	-2,375	-2,606	-2,890
Medium-High	-340	-668	-614	-850	-1,030	-1,266	-1,371	-1,395	-1,558	-1,769
Medium	-9	-270	-43	-212	-352	-518	-559	-464	-579	-748
Medium-Low	684	611	772	626	520	356	321	332	237	91
Low	1,253	1,389	1,634	1,549	1,480	1,361	1,406	1,885	1,827	1,721

¹The load forecasts on which this study is based were reduced by budgeted conservation acquisitions for FY 1991-92 through FY 1994-95.

²Operating Year (OY) is the 12-month period August 1 through July 31. For example, OY 1994-95 is August 1, 1994, through July 31, 1995.

Figure 6

Federal Firm Energy Surpluses/Deficits

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Figure 7

**Effect of May Water Budget on the
Federal Firm Energy Surplus
Medium Load Forecast**

V. PLANNING TO MEET FORECASTED DEFICITS

As part of its Competitiveness Project, BPA is now developing marketing and business plans that may alter the way the agency acquires and markets resources. Therefore, only the existing contractual resource options available to BPA are included in this section of the study.

In 1990 and 1992, BPA updated its plans for acquiring power to meet future load obligations placed on the Federal system by BPA's customers. The resulting plan, set forth in the Resource Program, described the specific resource actions BPA intended to take over the next 10-year period to meet loads and help implement the Northwest Power Plan adopted by the Northwest Power Planning Council. The 1992 Resource Program described how BPA intended to acquire resources over the next 10 years to offset projected energy deficits. Planned Federal System resource acquisitions include conservation, generation, contractual options, and contingency resource acquisition plans.

As BPA evaluates increasing load placement uncertainty and new marketing and business strategies, it will reevaluate the planned resource acquisitions identified in the 1990 and 1992 Resource Programs.

Contractual Resource Options

BPA has long-term surplus firm power sale and capacity/energy exchange contracts with five Southwest utilities: Southern California Edison (SCE); the M-S-R Public Power Agency (M-S-R), whose members include the Modesto Irri-

gation District, and the cities of Santa Clara and Redding, California; and the cities of Burbank, Glendale, and Pasadena, California.

BPA also has a long-term surplus firm power sale and seasonal exchange contract with one Northwest utility -- Puget Sound Power and Light.

The above contracts contain provisions, throughout their duration, for complete or partial termination of energy deliveries if that energy is needed to serve BPA's firm requirements.

The Southwest utilities contracts allow BPA to terminate surplus firm energy deliveries and convert these contracts to capacity/energy exchange contracts under the following conditions:

- ◆ On an annual basis, following a determination by BPA under annual Pacific Northwest Coordination Agreement planning; or
- ◆ On 60-days' notice pursuant to Public Law 88-552.

These provisions relieve BPA of its energy delivery obligations and make those resources available to BPA for meeting firm energy requirements. Energy may be acquired from the following categories:

- ◆ Energy made available from the termination of energy deliveries under Southwest surplus firm energy sales;
- ◆ Exchange energy available upon conversion of the Southwest surplus firm energy sales to capacity/energy exchanges; and

- ◆ Supplemental energy available to BPA for purchase upon conversion of the Southwest surplus firm energy sales to capacity/energy exchanges.

In the event that BPA terminates energy deliveries of these Southwest surplus sales and converts them to exchanges, provisions within the contracts, except the city of Burbank's, allow for later reversion back to surplus energy sales, depending on the availability of Federal surplus firm energy and certain other conditions.

This study assumes that, under all five forecasts, these contracts retain their power sale status throughout their terms (expiration dates range from OY 2007-08 to 2012-13). Should BPA terminate these sales and convert them to capacity/energy exchanges, exchange energy would become available to BPA as a firm resource. The additional resources resulting from early conversion of these surplus firm power sales to capacity/energy exchanges are shown in Table 10, lines 1 and 2, page 35.

Supplemental Energy: If BPA terminates Southwest sales and converts them to capacity/energy exchange contracts, BPA may elect to purchase supplemental energy in that same operating year. The amount of additional resources that would become available upon early conversion of these contracts and purchase of supplemental energy is shown in Table 10, line 3.

Option Energy: BPA also has contractual rights to purchase optional energy from Southern California Edison. This contract allows BPA to purchase up to 71 average megawatts of optional energy on a rolling 5-year basis starting in OY 1994-95. In addition, BPA has near-term contractual rights to purchase optional energy from San Diego Gas and Electric Company. This contract allows BPA to purchase up to 4.5 average megawatts of

option energy during OY 1994-95 through OY 1996-97. BPA considers these contracts as resource options, which BPA may elect to purchase; they are not considered firm resources in this study. BPA included Southern California Edison option energy as a firm resource in the 1993-94 Pacific Northwest Coordination Agreement operating plan. The total optional energy available to BPA under these contracts is shown in Table 10, line 4.

Pacific Northwest Surplus Firm Energy: In addition, BPA has a surplus firm sale and seasonal power exchange agreement with Puget Sound Power and Light. This contract contains provisions that allow BPA to terminate the surplus energy sale on the earlier of:

- ◆ 5-years' written notice from BPA; or
- ◆ on July 1, 2001.

In this event, the surplus energy sale converts to a seasonal power-for-power exchange. BPA's right to issue 5-years' written notice is in accordance with Section 5(a) of the Bonneville Project Act; (Public Law 75-329, as amended), and Section 5(f) of the Northwest Power Act (Public Law 96-501). This study assumes that this surplus sale will extend through OY 2000-01, when the contract is required to be converted to seasonal exchange status under all five load forecasts. If BPA needs the energy earlier, the contract will be terminated as a power sale and convert to a seasonal power exchange in that year and for the remainder of the contract. The earliest that BPA can terminate surplus firm energy deliveries to Puget Sound Power and Light Company is OY 1999-2000. The amount of resources available to BPA, under all load forecasts, from the conversion of this contract to a seasonal power exchange is shown in Table 10, line 5.

Non-Treaty Storage

On July 9, 1990, BC Hydro and BPA signed an agreement increasing United States-Canadian coordination of the Columbia River system. This agreement cooperatively manages 4.5 million acre-feet of non-treaty hydro storage through June 30, 2003. Studies on the increased coordination indicate a possible increase of 300 average megawatts in firm energy for the combined Canadian and Pacific Northwest systems. Fifty percent of the benefit, 150 average megawatts, is available to the

United States. The Federal system share is 115 average megawatts. This energy, however, is not as valuable as a firm resource because non-treaty storage has a lower refill priority than primary storage reservoirs. Therefore, BPA intends to use the non-treaty storage as a resource option to increase flexibility in operating the hydro system. Since this energy may not be available every year, it is not included as a firm resource in this loads and resources study. However, it may be included as a firm resource in future studies. Non-treaty storage is included in Table 10, line 6.

Table 10

Existing Federal System Contractual Resource Options Energy In Average Megawatts

OPERATING YEAR ¹	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
1. Termination of PSW Surplus Power Sales	212	212	237	237	237	237	237	237	237	237
2. Exchange Energy From PSW	69	68	71	74	73	71	70	69	68	67
3. Supplemental Energy From PSW	36	37	38	39	41	42	43	44	46	47
4. Optional Energy From PSW	76	76	76	71	71	0	0	0	0	0
5. Termination of PNW Surplus Power Sale	0	0	0	0	0	75	75	0	0	0
6. Non-Treaty Storage	115	115	115	115	115	115	115	115	0	0
TOTAL CONTRACTUAL OPTIONS	508	508	537	536	537	540	540	465	351	351

¹Operating Year (OY) is the 12-month period August 1 through July 31. For example, OY 1994-95 is August 1, 1994, through July 31, 1995.

Federal System Firm Capacity Surpluses/Deficits

Figures 8 through 10, pages 37 and 38, show the Federal firm capacity surpluses/deficits under the high, medium-high, medium, medium-low, and low load forecasts for OY 1994-95, 1998-99, and 2003-04. This analysis incorporates all operating requirements currently adopted by the hydroelectric project owners and the firm planning assumptions from the Northwest Power Planning Council's Phase II Columbia River Basin Fish and Wildlife Program fish amendments, adopted December 11, 1991 (see *Fish and Wildlife Programs*, page 4.)

The monthly capacity surpluses assume that the Federal system has the ability to meet a 50-hours-per-week peak load with surplus capacity that is available with 1929-30 water levels after serving all Federal capacity needs.

It is important to note that the capacity surplus values do not reflect potential nighttime return problems on the Federal system. The study assumes that contractual or other provisions would be made to relieve off-peak problems when energy is returned under future capacity sales due to Federal hydro requirements and low Federal nighttime loads. Depending on energy return provisions, these contracts could create forced energy sales and may reduce

the Federal system's ability to meet firm loads. On an operational basis, water and economic conditions may also be taken into account when evaluating capacity nighttime return problems. These potential problems are detailed in the *Federal System Marketable Capacity* section on page 38. See the 1993 Pacific Northwest Loads and Resources Technical Appendix: Volume 2 for more information regarding energy return considerations.

The figures in this year's study also assume extreme weather loads during the months of November through February. Extreme weather capacity surpluses/deficits will more closely reflect actual operation and reliability levels when used in BPA marketing. (See *Extreme Weather Effects*, page 14.)

If BPA acquires future resources, the added capacity will increase the quantity of surplus capacity.

Ten-year summaries of Federal capacity surpluses/deficits under each of the five load forecasts, assuming extreme weather conditions, are presented in Exhibits 9 through 13, pages 82 through 86. The monthly variability of the Federal system capacity components that comprise the loads and resources study assuming medium loads for extreme weather under 1930 water conditions for OY 1994-95, 1998-99, and 2003-04 are shown on line 46 in Exhibits 14 through 16, pages 88 through 93.

Figure 8

1994-95 Federal Firm Capacity Surpluses/Deficits Under Extreme Weather Conditions¹

Figure 9

1998-99 Federal Firm Capacity Surpluses/Deficits Under Extreme Weather Conditions¹

¹Extreme weather conditions in the months of November, December, January, and February assume a 5-percent probability that the peak load will be exceeded.

Figure 10

2003-04 Federal Firm Capacity Surpluses/Deficits Under Extreme Weather Conditions¹

¹ Extreme weather conditions in the months of November, December, January, and February assume a 5-percent probability that the peak load will be exceeded.

Federal System Marketable Capacity

Despite the lack of long-term firm energy surpluses, the Federal system is expected to have surplus firm capacity lasting through the 10-year study period.

Exhibit 11, page 84, shows the long-term 50-hours-per-week Federal surplus firm capacity under the medium load forecast. Exhibits 14 through 16, pages 88 through 93, show the monthly variability of the Federal loads and resources under the medium forecast assuming extreme weather conditions for OY 1994-95, 1998-99, and 2003-04.

The following assumptions were used in developing the Federal marketable capacity forecast under the medium load forecast:

- ◆ Capacity surplus values do not reflect potential nighttime return problems on the Federal system;
- ◆ The region experiences medium load growth;
- ◆ The Pacific Northwest Coordination Agreement, which expires June 30, 2003, is replaced with a like agreement;
- ◆ Extreme weather adjustments during the months of November through February. These adjustments vary monthly from 1,400 to 1,800 peak megawatts under the medium load forecast.
- ◆ BPA's power sales contracts with Pacific Northwest public and Federal agencies, IOUs, and DSIs, which expire June 30, 2001, are renewed with like agreements;

- ◆ All existing Federal contractual arrangements not included under Pacific Northwest power sales contracts expire and are not renewed;
- ◆ BPA's surplus firm power sales to Southern California Edison, Burbank, Glendale, and Pasadena remain as power sales for the duration of the contracts;
- ◆ BPA's surplus firm power sale to M-S-R remains a power sale through October 31, 2009, then converts to a capacity/energy exchange until it expires;
- ◆ BPA's surplus firm power sale to Puget Sound Power and Light terminates and converts to a seasonal power exchange beginning in OY 2001-02, per the terms of the contract;
- ◆ The BPA bridge capacity sale of 1,100 peak megawatts to PacifiCorp is served through July 31, 1995;
- ◆ The IOUs do not make new long-term BPA purchases under their power sales contracts;
- ◆ BPA delivers 150 peak megawatts of capacity to PGE through June 30, 1999, under their requirements power sales contract.
- ◆ A surplus capacity contract of 50 megawatts with WWP continues through September 30, 2010; and
- ◆ Sustained capacity limits are 50 hours per week.

The study assumes that there are no nighttime return problems from future capacity sales. Nighttime return problems can occur when replacement energy from capacity sales, combined with minimum hydro generation, the output from other Federal resources, and other Federal contract returns are greater than BPA's

nighttime load. The following factors contribute to nighttime return problems:

- ◆ Low Federal system loads;
- ◆ Nonpower hydro requirements that dictate minimum streamflows;
- ◆ Reduced shaping of the Lower Snake River projects due to the 1-foot maximum daily change allowed in forebay elevations for the April through August period; and
- ◆ The inability of BPA's WNP-2 nuclear resource to cycle from day to night.

These requirements restrict the ability to accept nighttime return energy, even though there is surplus generating capability during the daytime. These constraints are common in summer and fall, when BPA's nighttime loads are low. BPA's future Federal surplus capacity transactions may include provisions to:

- ◆ Limit return energy to a percentage of contract demand;
- ◆ Defer energy returns to a time more favorable to system operations; or
- ◆ Request cash payment in lieu of return energy.

BPA's surplus firm capacity values take into account the following Federal system hydro constraints:

- ◆ Limitations on moving water between projects, including upstream storage;
- ◆ Pondage limitations due to hydraulic imbalance from reservoir to reservoir; and
- ◆ Navigation and recreation constraints, including restrictions on the rate of rise or fall of tailwater and forebay elevations.

The Pacific Northwest Power Planning Council, BPA, and other Pacific Northwest entities currently are evaluating new ways

to enhance fisheries and wildlife. These include additional amendments to the Council's fish and wildlife program, completion of the System Operation Review, and implementation of additional programs in support of the Endangered Species Act. The impacts of future proposals are unknown; however, they could reduce the generating capability by as little as 50 or as much as several thousand megawatts. These proposals most likely will increase constraints on the hydro system and reduce operating flexibility, change the monthly shape of streamflows, and change the availability of sustained Federal capacity. These impacts would be presented in future analyses.

Federal System Loads and Resources Comparison—Energy

Table 11, page 42, shows changes in the energy analysis of the 1993 Pacific Northwest Loads and Resources Study compared to the 1992 Pacific Northwest Loads and Resources Study for OY 1994-95 through 2003-04. The table lists the Federal firm energy surpluses/deficits for the 1992 study and changes since last year to obtain the current firm energy surplus under the medium load forecast. Positive values in the table indicate an increase and negative values indicate a decrease in Federal system firm energy surpluses. Federal planned resource acquisitions are not included as firm resources because they have not yet been contracted for. Similarly, resource options that BPA already has contractual rights to acquire, if needed, have not been included because BPA may or may not exercise the options in any given year.

Changes were based on the following updates in loads, contracts, and resources:

Federal Agencies

Federal agencies' loads were increased by 10 average megawatts for the study period.

DSI Aluminum Firm Loads

The near-term portion of the 1993 BPA forecast assumes that DSI aluminum smelter firm load will be 2,019 average megawatts in OY 1995. The Aluminum DSI firm loads are forecasted to decline to 1,811 average megawatts in OY 1998, then further decline to 1,663 average megawatts at the end of the current power sales contract in 2001. In the 1992 study, DSI aluminum smelter firm loads were forecasted at 2,013 average megawatts in OY 1995, declining to 1,823 average megawatts in 1998, then further declining to 1,694 average megawatts at the end of the current power sales contract in 2001. The small difference between the 1993 and 1992 study forecasts is due to a changed assumption regarding increased electricity purchases from non-BPA sources. The forecast reflects increased uncertainties associated with the effects of salmon recovery plans on the future availability and price of electricity; the effect on smelters of implementing the Clean Air Act amendment; expiration of the Variable Industrial (VI) power rates; and renegotiation of expiring power sales contracts.

DSI Non-Aluminum Firm Loads

The near-term forecast assumes that the non-aluminum DSI firm energy will be 175 average megawatts in OY 1995, rising to 217 average megawatts by OY 1997, declining to 162 average megawatts by OY 2001, and remaining at that level through the rest of the study period. In the 1992 BPA forecast, non-aluminum DSI firm energy was forecasted at 200 average megawatts in OY 1995 and was otherwise the same as the 1993 forecast. This change in the forecast is due to projected changes

in Nickel Joint Venture's operations, coupled with a weakening chlorine market, a strengthening sodium chlorate market, and energy efficiency improvements at some DSI plants.

Sales to Non-Generating Public Agencies

This year's study shows increased sales to small and non-generating public agencies because of Pacific Northwest Generating Cooperative's sale of their Boardman share (39 average megawatts) starting in 1995 to the City of Turlock, California.

Sales to Generating Public Agencies

Sales to the generating public agencies decreased by 150 average megawatts in the first two years of the study, by 100 average megawatts through OY 2001-02, and by 120 average megawatts for the remainder of the planning period. Most of the sales decrease is due to a 100 average megawatt system load increase.

Sales to Investor-Owned Utilities

Puget removed the 50-average-megawatt contract purchase for OY 1994-95 through 1998-99 from the resource exhibit of their power sale contract with BPA.

Exports

BPA's new contracts with San Diego Gas and Electric and Sacramento Municipal Utility District contain provisions for deferred replacement energy returns. These exports of energy represent the monthly loads on BPA that are associated with the capacity as it is delivered to the southwest utilities.

Contracts Out

A 66 average megawatt decrease in OY 1995-96 is that the assumed starting date of the WNP-3 settlement contract with PacifiCorp was delayed 1 year, until July 1, 1996.

Regulated Hydro

The hydro regulation used 1990 irrigation depletion levels for the historical streamflow available for hydro generation, versus the 1980 depletion levels used in last year's study. This increases hydro resources by about 150 average megawatts. The remaining increase is due to a 100 average megawatt decrease in the May Water Budget compared to the 1992 study.

Hydro efficiency improvements at the Federal hydro projects increased firm energy by 45 average megawatts.

Correction of the spill logic at the Bonneville hydro project decreased its generation by 113 average megawatts.

Import Purchases

To cover short-term firm energy deficits, BPA purchased power from Powerex (TransAlta) through July 31, 1995, from Basin Electric Cooperative through October 31, 1994, and from Montana Power Company through June 30, 1996.

BPA's new contracts with San Diego Gas and Electric and Sacramento Municipal Utility District contain provisions for deferred replacement energy returns. This import of energy represents the time shift of the deferred replacement energy under the contracts.

Contracts In

To cover short-term deficits, BPA purchased power from Puget Sound Power and Light and Montana Power through OY 1995-96.

Large Thermal

PGE retired the Trojan plant from service on January 14, 1993. The shutdown of Trojan caused a loss of 214 average megawatts of firm energy on the Federal system for OY 1994-95, and 181 average megawatts in OY 1995-96.

Pacific Northwest Generating Cooperative's sale to BPA of 28 average megawatts

of firm energy in OY 1994-95 was recalled when the cooperative sold its 10-percent share of the Boardman coal project to the City of Turlock, California.

Miscellaneous Changes

The miscellaneous changes in this year's study include revised USBR loads, and revised transmission losses.

Table 11

Changes in Federal System Firm Energy Surplus/Deficit Medium Load Forecast Energy In Average Megawatts

OPERATING YEAR	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
1992 Federal Firm Energy Surplus/Deficit ¹	-250	-551	-412	-499	-641	-772	-821	-748	-886	-1084
LOAD CHANGES:										
Federal Agencies	-10	-9	-10	-10	-10	-10	-10	-10	-10	-10
DSI Aluminum Firm Loads	-6	12	12	12	12	16	24	32	40	48
DSI Non-Aluminum Firm Loads	25	4	0	0	1	2	2	2	2	2
Small Public Agency Purchases	-23	12	7	-14	-29	-33	-32	-26	-20	-9
Generating Public Agency Purchases	144	154	112	105	98	99	101	108	117	127
Private Utility Purchases	50	50	50	50	50	0	0	0	0	0
Exports	-56	-57	-21	0	3	19	15	15	15	17
Contracts Out	0	66	0	0	0	0	0	0	0	0
TOTAL LOAD CHANGES	124	232	150	143	125	93	100	121	144	175
RESOURCE CHANGES:										
Regulated Hydro	161	161	142	142	165	161	160	162	162	161
Independent Hydro	0	0	0	0	0	0	0	0	0	0
Imports	86	77	75	0	0	0	0	0	0	0
Contracts In	112	-10	0	0	1	-1	0	-1	0	0
Large Thermal	-242	-181	0	0	0	0	0	0	0	0
Miscellaneous	0	2	2	2	-2	1	2	2	1	0
TOTAL RESOURCE CHANGES	117	49	219	144	164	161	162	163	163	161
DIFFERENCE: 1992 STUDY LESS 1993 STUDY	241	281	369	287	289	254	262	284	307	336
1993 FEDERAL FIRM ENERGY SURPLUS/DEFICIT	-9	-270	-43	-212	-352	-518	-559	-464	-579	-748

¹1992 Pacific Northwest Loads and Resources Study, December 1992, Exhibit 3, line 41, pages 68 through 71, for OY 1994-95 through 2003-04.

Federal System Loads and Resources Comparison—Capacity

Table 12, page 45, shows changes in the capacity analysis of the 1993 Pacific Northwest Loads and Resources Study compared to the 1992 Pacific Northwest Loads and Resources Study for OY 1994-95. The table lists the Federal system firm 50-hours-per-week capacity surpluses/deficits for the 1992 study and changes since last year to obtain the current firm 50-hours-per-week capacity surplus under the medium load forecast. Positive values in the table indicate an increase and negative values indicate a decrease in the Federal system firm capacity surpluses. As previously discussed, Federal planned resource acquisitions not yet contracted for and contracted for resource options are not included as firm resources.

Changes were based on the following updates in loads, contracts, and resources:

DSI Firm Loads

The DSI near-term forecast shows capacity loads decreasing by as much as 41 peak megawatts in August of OY 1995 versus the 1992 study. This is due to lower aluminum prices, drought conditions in the region, and changes in Nickel Joint Venture's near-term operation.

Sales to Generating Public Agencies

Sales to the generating public agencies decrease by up to 223 peak megawatts in February of OY 1994-95. This change is due to decreases in the generating public agencies peak load forecast and increases in the amount of resources dedicated by the generating public agencies to serve their own loads.

Sales to Small Public Agencies

This year's study shows generally increased sales to small and non-generating public agencies, with loads increasing as much as 118 peak megawatts in December of OY 1994-95.

Export Sales

Since last year's analysis, BPA has completed a seasonal surplus capacity sale of 50 peak megawatts to Sacramento Municipal Utility District (SMUD), and 250 peak megawatts to San Diego Gas & Electric Company, which decreased the available Federal capacity surplus during May through September.

Federal System Diversity

Decreases in the obligation of the Federal system to the public agencies under their power sales contracts decreased Federal system diversity impacts.

Regulated Hydro

As previously discussed, the 1993 hydro regulation study included flow augmentation on the Snake River and reshaped the Columbia River system hydro generation. These changes included increasing the elevations of the Federal hydro projects during the spring and early summer, which increased the instantaneous peaking capability of the Federal hydro system compared to the 1992 study. Details of these changes are included in the 1993 Pacific Northwest Loads and Resources Study Technical Appendix: Volume 2.

Sustained Peaking Adjustment

The 50-hours-per-week sustained peaking adjustment in this year's analysis increased the regional capacity surplus in the hydro regulation versus the 1992 study. This is due to changes in the shaping of the hydro system to serve Pacific Northwest loads after considering the operation of thermal and other non-hydro resources, and

additional Federal hydro energy under 1930 water conditions, which created more sustained peaking capability.

Import Purchases

To cover short-term firm energy deficits, BPA purchased power (which contains both peak and energy deliveries) from Powerex (TransAlta) through July 31, 1995, and from Basin Electric Cooperative through October 31, 1994.

Large Thermal

The loss of BPA's share of the Trojan nuclear plant (331 peak megawatts) and a 50 peak megawatt error on the WNP-2 upgrade in last year's study resulted in a 381 peak megawatt capacity reduction in some months.

Hydro Reserves/Large Thermal Reserves/Spinning Reserves

The change in reserves is due to variations in hydro and thermal capabilities.

DSI Reserves

The DSI system operating reserve is estimated at one-third the DSI firm load, limited by the amount of Federal thermal forced outage reserve.

In this year's analysis, the DSI system operating reserve changed slightly due to the removal of BPA's share of Trojan forced outage reserves.

Extreme Weather Adjustments

This year's study includes adjustments in the Federal capacity surplus/deficit. The Federal adjustment varies from 1,400 to 1,800 peak megawatts, which occurs in November through February. This adjustment gives a more realistic estimate of actual operation and reliability for BPA marketing. These adjustment factors were based on extreme weather that occurred in the Pacific Northwest during February 1989.

Miscellaneous Changes

The miscellaneous changes in this year's study include revised USBR agency loads, and revised transmission losses.

Table 12

Changes in Federal System 50-Hours-Per-Week Firm Capacity Surplus/Deficit For Operating Year 1994-95¹
Medium Load Forecast
Peak in Megawatts

OPERATING YEAR 1994-95 1930	AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-31	MAY	JUN	JUL
Water Conditions														
1992 Federal Firm Capacity Surplus/Deficit ²	3,093	3,149	2,473	2,661	3,170	3,548	3,016	2,262	3,431	4,173	3,192	5,250	2,435	2,551
LOAD CHANGES														
Federal Agencies	-11	-11	-6	-6	-2	-25	6	-5	-11	-4	-4	-15	-10	-11
DSI Firm Load	41	41	40	22	23	22	36	19	18	18	18	10	11	24
Generating Public Agency Purchases	39	85	98	107	178	81	129	223	99	-36	-13	200	14	96
Small Public Agency Purchases	-57	-57	-40	-64	-87	-118	-66	-59	-90	-90	-90	-32	-43	-30
IOU's Purchases	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exports	-309	-309	-309	1	0	0	0	0	0	0	0	-308	-309	-309
Contracts Out	0	0	0	0	0	0	-1	0	0	-1	-1	0	0	0
Federal Diversity	3	-2	-7	-4	-9	4	-4	-11	1	13	11	-18	5	-7
Extreme Weather Adjustment	0	0	0	0	-1,492	-1,680	-1,752	-1,570	0	0	0	0	0	0
TOTAL LOAD CHANGES	-294	-253	-224	56	-1,389	-1,716	-1,652	-1,403	17	-100	-79	-163	-332	-237
RESOURCE CHANGES														
Regulated Hydro	-207	5	14	20	23	26	-66	-212	-681	-941	-984	-846	-329	70
Independent Hydro	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Sustained Peaking Adjustment	1,644	1,762	790	211	994	735	1,853	1,483	1,877	656	735	137	-31	-355
Imports	0	0	-12	-12	-12	-12	0	0	0	-1	-1	0	0	125
Large Thermal	-331	-331	-381	-381	-381	-381	-381	-381	-381	-50	-50	0	50	-331
Hydro Reserves	10	0	-1	-1	-2	-1	3	10	34	47	49	43	17	-4
Large Thermal Reserves	50	50	57	57	57	57	57	57	57	7	8	0	-7	50
Spinning Reserves	-24	-31	-6	7	-11	-6	-30	-18	-17	8	7	6	7	19
DSI Operating Reserves	-13	-13	-14	-8	-8	-7	-12	-6	-6	-6	-6	-3	-4	-8
Miscellaneous	2	1	0	-1	-1	-4	-1	-1	-2	-1	-2	0	-1	0
TOTAL RESOURCE CHANGES	1,131	1,443	447	-108	659	407	1,423	932	881	-280	-244	-663	-298	-433
DIFFERENCE: 1992 STUDY LESS 1993 STUDY	837	1,190	223	-52	-730	-1,309	-229	-471	898	-380	-323	-826	-630	-670
1993 FEDERAL FIRM CAPACITY SURPLUS/DEFICIT	3,930	4,339	2,696	2,609	2,440	2,239	2,787	1,791	4,329	3,793	2,869	4,424	1,805	1,881

¹Operating Year (OY) is the 12-month period August 1 through July 31. For example, OY 1994-95 is August 1, 1994, through July 31, 1995.

²1992 Pacific Northwest Loads and Resources Study, December 1992, Exhibit 8, page 85, for OY 1994-95.

VI. REGIONAL ANALYSIS

The regional loads and resources analysis is based on the following assumptions:

- ◆ **Capacity surplus values do not reflect potential nighttime return problems on the region's system.**
- ◆ The Pacific Northwest Coordination Agreement, which expires June 30, 2003, is replaced with a like agreement;
- ◆ BPA's power sales contracts with Pacific Northwest Federal and public agencies, IOUs, and DSIs, which expire June 30, 2001, are renewed with like agreements;
- ◆ All existing regional contractual arrangements not included under Pacific Northwest power sales contracts expire and are not renewed;
- ◆ All Federal Southwest surplus firm power sales are shown as power sales through their expiration;
- ◆ The Trojan nuclear power plant was retired from service on January 14, 1993; and
- ◆ Extreme weather adjustments were included for the months of November through February. These adjustments vary monthly from 3,600 to 4,100 peak megawatts under the medium load forecast.

This analysis includes current operating requirements adopted by the hydroelectric project owners, and incorporates the Northwest Power Planning Council's Phase II Columbia River Basin Fish and Wildlife

Program, adopted December 11, 1991. The Council program is described in more detail under *Fish and Wildlife Programs*, page 4. Additional information on water-year selection is contained in the 1993 Pacific Northwest Loads and Resources Study Technical Appendix: Volume 2 (available January 1994).

Regional Firm Energy Loads

The regional firm energy load projections for OY 1994-95 through 2003-04 under the high, medium-high, medium, medium-low, and low load growth scenarios are shown in Figure 11, page 47. The high, medium-high, medium-low and low load forecasts are based on the 1991 Joint Forecast prepared by BPA and the Council, but updated by BPA in November 1993. The medium forecast, prepared by BPA in the summer of 1993, contains slightly higher loads than BPA's 1992 medium forecast. The load projections also include all intra-regional contracts made by Pacific Northwest utilities and the Federal system. The average annual rates of growth for the period from OY 1994-95 through 2003-04 are summarized in Table 13, page 48. The regional firm energy loads for the five forecasts are presented on line 5 in Exhibits 17 through 21, pages 102 through 106, and the monthly firm loads for OY 1994-95, 1998-99, and 2003-04 under the medium load forecast are presented in Exhibits 22 through 24, pages 108 through 110.

Figure 11

**Regional Firm Loads
1993 BPA Forecast**

RPCE:12/93

Table 13

Regional Firm Energy Loads
Energy in Average Megawatts

Load Forecast	OY 1994-95 ¹ Total			OY 2003-04 Total			System Firm Load Growth (Avg %/yr)
	System Firm Loads	Firm Exports	Firm Loads	System Firm Loads	Firm Exports	Firm Loads	
High	21,593	1,311	22,904	26,639	1,731	28,370	2.4
Medium-High	20,611	1,311	21,922	23,731	1,731	25,462	1.6
Medium	20,042	1,311	21,353	21,825	1,731	23,556	1.0
Medium-Low	18,909	1,311	20,220	19,777	1,731	21,508	.5
Low	18,020	1,311	19,331	17,049	1,731	18,780	-.6

¹Operating Year (OY) is the 12-month period August 1 through July 31. For example, OY 1994-95 is August 1, 1994 through July 31, 1995.

Regional Firm Peak Loads

Figure 12, page 49, shows the regional peak loads for OY 1994-95 under each of the five load forecasts. Figure 13 illustrates the regional firm peak loads under the medium load forecast for OY 1994-95, 1998-99, and 2003-04. The figures show the expected 1-hour monthly demand under the 1993 BPA load forecast and include extreme weather adjustments. Extreme weather conditions were assumed for the months of November through February and estimate a 5-percent probability that the forecasted peak load will be exceeded. In the months of March through October, the peak loads estimate normal weather

conditions with a 50-percent probability that the forecasted peak load will be exceeded. The projected regional peak loads include all intra-regional contracts made by Pacific Northwest utilities, including the Federal system. The peak load projections are decreased by a diversity factor due to the fact that all peak electrical demands do not occur simultaneously throughout the region.

The monthly regional firm peak loads, assuming normal weather conditions, are presented on line 5, and the extreme weather adjustments to the regional peak loads are presented on line 36 of Exhibits 30 through 32, pages 114 through 116, for the medium load forecast.

Figure 12

**Regional Firm Peak Loads for OY 1994-95
Under Extreme Weather Conditions**
Medium Loads

Figure 13

**Regional Firm Peak Loads for OY 1994-95, 1998-99, and 2003-04
Under Extreme Weather Conditions**
Medium Loads

Regional Firm Resources

Table 14 summarizes the regional system resources for OY 1994-95. Hydroelectric resources make up a smaller percentage of the regional resources than of the Federal system resources because most of the thermal resources are owned by investor-owned utilities in the region. These ther-

mal resources are composed primarily of IOU-owned coal and nuclear plants. The Trojan nuclear power plant, operated by Portland General Electric, was retired from service January 14, 1993. A detailed listing of all regional generating resources is contained in the 1993 Pacific Northwest Loads and Resources Technical Appendix: Volume 2.

Table 14

Regional Firm Resources for OY 1994-95¹

Capacity based on January 1995

Project Type	Sustained Peak Capacity (MW)	Generating Peak Capacity % of Total	Firm Energy (aMW)	Firm Energy % of Total
Hydro	31,424	74	12,752	61
Coal	4,393	10	3,796	19
Nuclear	1,100	3	715	3
Imports	2,853	6	1,937	9
Combustion Turbines	1,666	4	485	2
Non-Utility Generation	936	2	983	5
Miscellaneous	248	1	140	1
TOTAL RESOURCES	42,620	100	20,808	100

¹Operating Year (OY) is the 12-month period August 1 through July 31. For example, OY 1994-95 is August 1, 1994 through July 31, 1995.

Regional Nonfirm Resources

As previously discussed, BPA uses critical water flows to compute the regional hydro firm energy for resource planning. Nonfirm energy is created when the re-

gion's hydro projects experience water flows greater than critical period levels.

Regional planning does not include nonfirm energy in the loads and resources balance. Nonfirm energy can vary from zero in the worst water year, to as much as 8,300 average megawatts in the best water

year. The average annual nonfirm energy increases regional resources by about 3,800 to 4,200 average megawatts when averaged over 50 years of historical water flows.

The augmented Columbia and Snake River flows called for in the Council's Phase II Fish and Wildlife Program were incorporated in this year's 50-year nonfirm energy analysis, a change from previous studies. This changed the shape and amount of usable nonfirm energy. A detailed discussion of the nonfirm energy analysis and accompanying tables are included in the 1993 Pacific Northwest Loads and Resources Study, Technical Appendix: Volume 2.

Regional Firm Energy Surpluses/Deficits

This study includes all operating requirements currently adopted by the hydroelectric project owners and the firm planning assumptions from the Northwest Power Planning Council's Phase II

Columbia River Basin Fish and Wildlife Program, adopted December 11, 1991 (see *Fish and Wildlife Programs*, page 4).

The regional critical period firm hydro energy shows a net decrease in this study compared to last year's study due to revised hydro project parameters, the impacts of the augmented Snake River flows, a change in the shape of Columbia River generation, up-grades at existing hydro projects, and recategorization of some hydro resources from independents to non-utility generation (NUG) and other resources recategorized from NUG to independent hydro status. Details on these changes are included in the 1993 Pacific Northwest Loads and Resources Study, Technical Appendix: Volume 2.

Figure 14, page 52 illustrates the variability of the regional firm energy loads and resources under the high, medium-high, medium, medium-low, and low load forecasts. The resources change over time due to yearly scheduled maintenance and the expiration of intra-regional contracts.

Figure 14

Regional Firm Energy Loads and Resources

RPCE:12/93

The regional firm energy surpluses/deficits for the various load forecasts for OY 1994-95 through 2003-04 are presented in Table 15, page 53, and graphically in Figure 15, page 54. The region experiences firm energy deficits in OY 1994-95 under the medium, medium-high, and high load forecasts, and in OY 1999-2000 under the medium-low load case. The region remains firm energy surplus under the low load forecast.

The components of the regional energy loads and resources balances for the five load scenarios are presented in Exhibits 17 through 21, pages 102 through 106. Monthly regional firm energy loads under the medium load forecast for OY 1994-95, 1998-99, and 2003-04 are presented on line 5 in Exhibits 22 through 24, on pages 108 through 110.

Table 15**Regional Firm Energy Surpluses/Deficits Assuming Existing Contracts**
Energy In Average Megawatts

OPERATING YEAR ¹	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
High Loads	-2,051	-2,724	-3,288	-3,933	-4,512	-5,177	-5,675	-6,225	-6,818	-7,430
Medium-High Loads	-1,106	-1,524	-1,837	-2,265	-2,646	-3,113	-3,410	-3,822	-4,226	-4,648
Medium Loads	-557	-833	-900	-1,197	-1,473	-1,807	-1,979	-2,210	-2,497	-2,803
Medium-Low Loads	544	578	569	387	213	-50	-150	-395	-606	-840
Low Loads	1,414	1,751	1,916	1,873	1,817	1,668	1,725	2,022	1,928	1,814

¹Operating Year (OY) is the 12-month period August 1 through July 31. For example, OY 1994-95 is August 1, 1994 through July 31, 1995.

Figure 15

Regional Firm Energy Surpluses/Deficits

RPCE:12/93

Regional Firm Capacity Surpluses/Deficits

Figures 16 through 18, pages 56 and 57, show the region's firm 50-hours-per-week capacity surpluses/deficits under the high, medium-high, medium, medium-low, and low load forecasts for OY 1994-95, 1998-99, and 2003-04. This analysis incorporates all operating restrictions currently adopted by the hydroelectric project owners and the firm planning assumptions from the Northwest Power Planning Council's Phase II Columbia River Basin Fish and Wildlife Program fish amendments, adopted December 11, 1991 (see *Fish and Wildlife Programs*, page 4).

The monthly capacity surpluses/deficits assume that the region has the ability to meet a capacity load of 50 hours per week using surplus capacity that is available after serving all regional capacity needs with 1929-30 water levels.

It is important to note that the capacity surplus values do not reflect potential nighttime return problems on the region's system. Peaking replacement energy from capacity sales is returned at night, when the output of the hydro system and other regional resources could be greater than the region's nighttime load. The following factors contribute to nighttime overgeneration:

- ◆ Low regional system loads;
- ◆ Nonpower hydro requirements that dictate minimum streamflows;
- ◆ Reduced shaping of the Lower Snake River projects due to the 1-foot maximum daily change allowed in forebay elevations for the April through August period; and
- ◆ The inability of the region's thermal resources to cycle from day to night.

These requirements restrict the ability to accept nighttime return energy, even

though there is surplus generating capability during the daytime. These requirements are common in summer and fall, when the region's nighttime loads are low. Depending on water availability and economic conditions, return energy from these contracts could create low-priced forced energy sales and may reduce the region's ability to meet firm loads.

The figures in this year's study assume extreme weather loads during the months of November through February. Extreme weather capacity surpluses/deficits will more clearly reflect actual operation and reliability levels when used in BPA marketing. (See *Extreme Weather Effects*, page 12.)

The Pacific Northwest Power Planning Council, BPA, and other Pacific Northwest entities currently are evaluating new ways to enhance fisheries and wildlife. These include additional amendments to the Council's fish and wildlife program, completion of the System Operation Review, and implementation of additional programs in support of the Endangered Species Act. The impacts of future proposals are unknown; however, they could reduce the generating capability by as little as 50 or as much as several thousand megawatts. These proposals most likely will increase non-power requirements on the hydro system and reduce operating flexibility, change the monthly shape of streamflows, and change the availability of sustained regional capacity. These impacts would be presented in future analyses.

Ten-year summaries of regional firm capacity surpluses/deficits for each of the load forecasts are shown in Exhibits 25 through 29, pages 112 through 116. Monthly firm capacity surpluses/deficits under the medium forecast for OY 1994-95, 1998-99, and 2003-04 are presented in Exhibits 30 through 32 on pages 118 through 120.

Figure 16

**1994-95 Regional Firm Capacity Surpluses/Deficits
Under Extreme Weather Conditions¹**

Figure 17

**1998-99 Regional Firm Capacity Surpluses/Deficits
Under Extreme Weather Conditions¹**

¹Extreme weather conditions in the months of November, December, January, and February assume a 5-percent probability that the peak load will be exceeded.

Figure 18

**2003-04 Regional Firm Capacity Surpluses/Deficits
Under Extreme Weather Conditions¹**

RPCE:12/93

¹ Extreme weather conditions in the months of November, December, January, and February assume a 5-percent probability that the peak load will be exceeded.

SECTION VII FEDERAL SYSTEM EXHIBITS

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EXHIBITS 1 - 5
FEDERAL SYSTEM CRITICAL PERIOD ENERGY
ANALYSIS FOR 10 OPERATING YEARS

TABLE 2: FEDERAL SYSTEM

SHEET 1 OF 2

SUMMARY OF FEDERAL SYSTEM LOADS AND RESOURCES IN THE PACIFIC NORTHWEST REGION
UNDER THE PACIFIC NORTHWEST ELECTRIC POWER PLANNING AND CONSERVATION ACT

H I G H L O A D S

1993 WHITEBOOK: 12/19/93
RUN DATE: 12/20/93

		OPERATING YEAR									1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
		1994-95	1995-96	1996-97	1997-98	1998-99	1999- 0	2000- 1	2001- 2	2002- 3	2003- 4	12/20/93	12/20/94	12/20/95	12/20/96	12/20/97	12/20/98	12/20/99	12/20/00	12/20/01	12/20/02	12/20/03
MEGAHATTS		AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG											
LOADS																						
1	FEDERAL AGENCIES	153	154	155	156	157	158	158	160	160	161											
2	FEDERAL & GEN PUBLIC LOSSES	188	194	193	199	202	206	211	215	220	224											
3	USBR	67	68	68	68	68	68	68	68	68	68											
4	DSI ALUMINUM FIRM	2161	2147	2147	2147	2147	2142	2135	2127	2120	2112											
5	DSI NON-ALUM FIRM	314	314	314	314	314	314	314	239	239	239											
6	DSI FIRM LOSSES	70	69	69	69	69	69	69	67	66	67											
7	SM & NON GEN PUB PURCH 1/	3471	3593	3726	3854	3968	4085	4175	4263	4355	4454											
8	FIRM SYSTEM LOAD	6424	6539	6672	6807	6925	7042	7130	7139	7228	7325											
TRANSFERS OUT																						
9	EXPORTS 2/	278	276	265	261	381	544	543	541	619	775											
10	CONTRACTS OUT 3/	621	596	350	367	367	367	366	341	341	341											
11	CSPE TO WEST GROUP UTIL 4/	275	263	251	236	178	102	98	94	62	0											
12	GEN PUBLIC AGEN PURCH 5/	2006	2145	2299	2433	2556	2692	2781	2866	2973	3086											
13	GEN PRIVATE UTIL PURCH 6/	0	0	0	0	0	0	0	0	0	0											
14	FED DIVERSITY 7/	0	0	0	0	0	0	0	0	0	0											
15	FIRM LOADS	9604	9819	9837	10104	10406	10747	10917	10981	11223	11527											
16	DSI ALUM TOP QUARTILE 8/	717	716	716	716	716	714	712	709	707	704											
17	DSI NON-ALUMINUM TQ 8/	105	105	105	105	105	105	105	80	80	80											
18	TOP QUARTILE LOSSES 8/	23	23	23	23	23	23	23	22	22	22											
19	TOTAL LOADS	10449	10663	10681	10948	11250	11589	11757	11792	12032	12333											
RESOURCES																						
20	REGULATED HYDRO	7391	7391	7391	7391	7414	7414	7414	7414	7414	7414											
21	INDEPENDENT HYDRO	298	298	298	298	298	298	298	298	298	298											
22	MAY WATER BUDGET 9/	-265	-265	-265	-265	-265	-265	-265	-265	-265	-265											
23	SUS. PKNG. ADJUSTMENT 10/	0	0	0	0	0	0	0	0	0	0											
24	CAN. ENT. NON-FED(CSPE) 11/	58	55	53	50	38	23	22	21	14	0											
25	CAN. ENT. NON-FED(CNDA) 12/	0	0	0	4	31	68	67	67	85	119											
26	RESTORATION 13/	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26											
27	TOTAL HYDRO	7456	7453	7451	7452	7490	7512	7510	7509	7520	7540											
28	SMALL THERMAL & MISC	0	0	0	0	0	0	0	0	0	0											
29	COMBUSTION TURBINES	0	0	0	0	0	0	0	0	0	0											
30	RENEWABLES	0	0	0	0	0	0	0	0	0	0											
31	COGENERATION	0	0	0	0	0	0	0	0	0	0											
32	IMPORTS 14/	385	211	176	101	101	101	101	101	101	101											
33	CONTRACTS IN 15/	254	198	207	223	224	223	221	245	245	245											
34	LARGE THERMAL 16/	715	747	751	751	751	751	751	751	751	751											
35	RESOURCE ACQUISITIONS 17/	0	0	0	0	0	0	0	0	0	0											
36	TOTAL RESOURCES	8810	8609	8585	8527	8566	8587	8583	8606	8617	8637											

EXHIBIT 1

TABLE 2: FEDERAL SYSTEM (CONTINUED)

SUMMARY OF FEDERAL SYSTEM LOADS AND RESOURCES IN THE PACIFIC NORTHWEST REGION
UNDER THE PACIFIC NORTHWEST ELECTRIC POWER PLANNING AND CONSERVATION ACT

		H I G H L O A D S								1993 WHITEBOOK: 12/19/93 RUN DATE: 12/20/93	
		OPERATING YEAR									
MEGAHATTS		1994-95 AVG	1995-96 AVG	1996-97 AVG	1997-98 AVG	1998-99 AVG	1999- 0 AVG	2000- 1 AVG	2001- 2 AVG	2002- 3 AVG	2003- 4 AVG
37	HYD, SM THRM & MISC RES 18/	0	0	0	0	0	0	0	0	0	0
38	LARGE THERMAL RESERVES 19/	0	0	0	0	0	0	0	0	0	0
39	SPINNING RESERVES 20/	0	0	0	0	0	0	0	0	0	0
40	DSI RESERVES 21/	0	0	0	0	0	0	0	0	0	0
41	FEDERAL HYDRO MAINT 22/	0	0	0	0	0	0	0	0	0	0
42	NET RESOURCES	8810	8609	8585	8527	8566	8587	8583	8606	8617	8637
43	FIRM SURPLUS/DEFICIT	-794	-1210	-1252	-1577	-1840	-2160	-2334	-2375	-2606	-2890
44	TOTAL SURPLUS/DEFICIT	-1639	-2054	-2096	-2421	-2684	-3002	-3174	-3186	-3415	-3696
45	EXTREME WEATHER ADJ. 23/	0	0	0	0	0	0	0	0	0	0
46	FIRM S/D W/EXT WEATHER ADJ.	-794	-1210	-1252	-1577	-1840	-2160	-2334	-2375	-2606	-2890
47	TOTAL S/D W/EXT WTHR. ADJ.	-1639	-2054	-2096	-2421	-2684	-3002	-3174	-3186	-3415	-3696
48	POSS FED EXT WTHR. OBLG 24/	0	0	0	0	0	0	0	0	0	0
49	FIRM S/D W/EXT WTHR. OBLIG	-794	-1210	-1252	-1577	-1840	-2160	-2334	-2375	-2606	-2890
50	TOTAL S/D W/EXT WTHR. OBLIG	-1639	-2054	-2096	-2421	-2684	-3002	-3174	-3186	-3415	-3696

- NOTE: 1. BPA SURPLUS POWER SALES CONTRACTS WITH THE PSW ARE SHOWN AS POWER SALES UNTIL THEY EXPIRE.
2. BPA SURPLUS POWER SALES CONTRACT WITH PSP&L IS SHOWN AS A POWER SALE THROUGH JUNE 30, 2001. THE CONTRACT THEN CONVERTS TO A SEASONAL POWER EXCHANGE WHICH EXPIRES JULY 1, 2008.
3. THE FOLLOWING BPA CONTRACTS ARE RESOURCE OPTIONS AND NOT INCLUDED IN THIS ANALYSIS.
- A. BGP TO BPA, SUPPLEMENTAL ENERGY
 - B. SCE TO BPA, SUPPLEMENTAL ENERGY
 - C. SCE TO BPA, OPTION ENERGY

EXHIBIT 1 (continued)

TABLE 2: FEDERAL SYSTEM

SHEET 1 OF 2

SUMMARY OF FEDERAL SYSTEM LOADS AND RESOURCES IN THE PACIFIC NORTHWEST REGION
UNDER THE PACIFIC NORTHWEST ELECTRIC POWER PLANNING AND CONSERVATION ACT

M E D I U M - H I G H L O A D S

1993 WHITEBOOK: 12/19/93
RUN DATE: 12/20/93

OPERATING YEAR

MEGAHATTS		1994-95 AVG	1995-96 AVG	1996-97 AVG	1997-98 AVG	1998-99 AVG	1999- 0 AVG	2000- 1 AVG	2001- 2 AVG	2002- 3 AVG	2003- 4 AVG
LOADS											
1	FEDERAL AGENCIES	153	154	155	156	157	158	159	160	161	161
2	FEDERAL & GEN PUBLIC LOSSES	177	181	178	182	183	186	188	191	194	197
3	USBR	67	67	68	67	67	67	67	68	68	68
4	DSI ALUMINUM FIRM	2105	2079	2075	2075	2075	2070	2063	2055	2048	2040
5	DSI NON-ALUM FIRM	245	257	266	266	257	248	236	201	201	201
6	DSI FIRM LOSSES	66	66	66	66	66	65	65	64	63	63
7	SM & NON GEN PUB PURCH 1/	3323	3400	3486	3575	3657	3741	3800	3857	3916	3980
8	FIRM SYSTEM LOAD	6136	6204	6294	6387	6462	6535	6578	6596	6651	6710
TRANSFERS OUT											
9	EXPORTS 2/	278	276	265	261	381	544	543	541	619	775
10	CONTRACTS OUT 3/	621	596	350	367	367	367	366	341	341	341
11	CSPE TO WEST GROUP UTIL 4/	275	263	251	236	178	102	98	94	62	0
12	GEN PUBLIC AGEN PURCH 5/	1840	1938	2039	2126	2208	2305	2369	2429	2502	2580
13	GEN PRIVATE UTIL PURCH 6/	0	0	0	0	0	0	0	0	0	0
14	FED DIVERSITY 7/	0	0	0	0	0	0	0	0	0	0
15	FIRM LOADS	9150	9277	9199	9377	9596	9853	9954	10001	10175	10406
16	DSI ALUM TOP QUARTILE 8/	707	693	692	692	692	690	688	685	683	680
17	DSI NON-ALUMINUM TQ 8/	82	86	89	89	86	83	79	67	67	67
18	TOP QUARTILE LOSSES 8/	22	22	22	22	22	22	22	21	21	21
19	TOTAL LOADS	9961	10078	10002	10179	10396	10647	10742	10774	10946	11174
RESOURCES											
20	REGULATED HYDRO	7391	7391	7391	7391	7414	7414	7414	7414	7414	7414
21	INDEPENDENT HYDRO	298	298	298	298	298	298	298	298	298	298
22	MAY WATER BUDGET 9/	-265	-265	-265	-265	-265	-265	-265	-265	-265	-265
23	SUS. PKNG. ADJUSTMENT 10/	0	0	0	0	0	0	0	0	0	0
24	CAN. ENT. NON-FED(CSPE) 11/	58	55	53	50	38	23	22	21	14	0
25	CAN. ENT. NON-FED(CNDA) 12/	0	0	0	4	31	68	67	67	85	119
26	RESTORATION 13/	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26
27	TOTAL HYDRO	7456	7453	7451	7452	7490	7512	7510	7509	7520	7540
28	SMALL THERMAL & MISC	0	0	0	0	0	0	0	0	0	0
29	COMBUSTION TURBINES	0	0	0	0	0	0	0	0	0	0
30	RENEWABLES	0	0	0	0	0	0	0	0	0	0
31	COGENERATION	0	0	0	0	0	0	0	0	0	0
32	IMPORTS 14/	385	211	176	101	101	101	101	101	101	101
33	CONTRACTS IN 15/	254	198	207	223	224	223	221	245	245	245
34	LARGE THERMAL 16/	715	747	751	751	751	751	751	751	751	751
35	RESOURCE ACQUISITIONS 17/	0	0	0	0	0	0	0	0	0	0
36	TOTAL RESOURCES	8810	8609	8585	8527	8566	8587	8583	8606	8617	8637

EXHIBIT 2

TABLE 2: FEDERAL SYSTEM (CONTINUED)

SUMMARY OF FEDERAL SYSTEM LOADS AND RESOURCES IN THE PACIFIC NORTHWEST REGION
UNDER THE PACIFIC NORTHWEST ELECTRIC POWER PLANNING AND CONSERVATION ACT

		M E D I U M - H I G H L O A D S										1993 WHITEBOOK:	12/19/93
		OPERATING YEAR										RUN DATE:	12/20/93
MEGAWATTS		1994-95 AVG	1995-96 AVG	1996-97 AVG	1997-98 AVG	1998-99 AVG	1999- 0 AVG	2000- 1 AVG	2001- 2 AVG	2002- 3 AVG	2003- 4 AVG		
37	HYD, SM THRM & MISC RES 18/	0	0	0	0	0	0	0	0	0	0		
38	LARGE THERMAL RESERVES 19/	0	0	0	0	0	0	0	0	0	0		
39	SPINNING RESERVES 20/	0	0	0	0	0	0	0	0	0	0		
40	DSI RESERVES 21/	0	0	0	0	0	0	0	0	0	0		
41	FEDERAL HYDRO MAINT 22/	0	0	0	0	0	0	0	0	0	0		
42	NET RESOURCES	8810	8609	8585	8527	8566	8587	8583	8606	8617	8637		
43	FIRM SURPLUS/DEFICIT	-340	-668	-614	-850	-1030	-1266	-1371	-1395	-1558	-1769		
44	TOTAL SURPLUS/DEFICIT	-1151	-1469	-1417	-1652	-1830	-2060	-2159	-2168	-2329	-2537		
45	EXTREME WEATHER ADJ. 23/	0	0	0	0	0	0	0	0	0	0		
46	FIRM S/D W/EXT WEATHER ADJ.	-340	-668	-614	-850	-1030	-1266	-1371	-1395	-1558	-1769		
47	TOTAL S/D W/EXT WTHR. ADJ.	-1151	-1469	-1417	-1652	-1830	-2060	-2159	-2168	-2329	-2537		
48	POSS FED EXT WTHR. OBLG 24/	0	0	0	0	0	0	0	0	0	0		
49	FIRM S/D W/EXT WTHR. OBLIG	-340	-668	-614	-850	-1030	-1266	-1371	-1395	-1558	-1769		
50	TOTAL S/D W/EXT WTHR. OBLIG	-1151	-1469	-1417	-1652	-1830	-2060	-2159	-2168	-2329	-2537		

- NOTE: 1. BPA SURPLUS POWER SALES CONTRACTS WITH THE PSW ARE SHOWN AS POWER SALES UNTIL THEY EXPIRE.
2. BPA SURPLUS POWER SALES CONTRACT WITH PSP&L IS SHOWN AS A POWER SALE THROUGH JUNE 30, 2001. THE CONTRACT THEN CONVERTS TO A SEASONAL POWER EXCHANGE WHICH EXPIRES JULY 1, 2008.
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 - B. SCE TO BPA, SUPPLEMENTAL ENERGY
 - C. SCE TO BPA, OPTION ENERGY

EXHIBIT 2 (continued)

TABLE 2: FEDERAL SYSTEM

SHEET 1 OF 2

SUMMARY OF FEDERAL SYSTEM LOADS AND RESOURCES IN THE PACIFIC NORTHWEST REGION
UNDER THE PACIFIC NORTHWEST ELECTRIC POWER PLANNING AND CONSERVATION ACT

M E D I U M L O A D S

OPERATING YEAR

1993 WHITEBOOK: 12/19/93
RUN DATE: 12/20/93

MEGAHATTS		1994-95 AVG	1995-96 AVG	1996-97 AVG	1997-98 AVG	1998-99 AVG	1999- 0 AVG	2000- 1 AVG	2001- 2 AVG	2002- 3 AVG	2003- 4 AVG
LOADS											
1	FEDERAL AGENCIES	153	154	155	156	157	158	159	160	160	161
2	FEDERAL & GEN PUBLIC LOSSES	172	175	170	173	174	174	176	178	180	181
3	USBR	67	67	67	67	67	67	67	68	68	68
4	DSI ALUMINUM FIRM	2019	1982	1815	1811	1808	1799	1778	1662	1651	1640
5	DSI NON-ALUM FIRM	175	198	217	215	198	179	162	162	162	162
6	DSI FIRM LOSSES	62	61	57	57	56	56	55	51	51	51
7	SM & NON GEN PUB PURCH 1/	3234	3282	3348	3413	3481	3540	3579	3615	3654	3699
8	FIRM SYSTEM LOAD	5882	5919	5829	5892	5941	5973	5976	5896	5926	5962
TRANSFERS OUT											
9	EXPORTS 2/	278	276	265	261	381	544	543	541	619	775
10	CONTRACTS OUT 3/	621	596	350	367	367	367	366	341	341	341
11	CSPE TO WEST GROUP UTIL 4/	275	263	251	236	178	102	98	94	62	0
12	GEN PUBLIC AGEN PURCH 5/	1762	1825	1933	1983	2051	2119	2159	2198	2248	2307
13	GEN PRIVATE UTIL PURCH 6/	0	0	0	0	0	0	0	0	0	0
14	FED DIVERSITY 7/	0	0	0	0	0	0	0	0	0	0
15	FIRM LOADS	8818	8879	8628	8739	8918	9105	9142	9070	9196	9385
16	DSI ALUM TOP QUARTILE 8/	532	661	605	604	603	600	593	554	550	547
17	DSI NON-ALUMINUM TQ 8/	58	66	72	71	66	60	54	54	54	54
18	TOP QUARTILE LOSSES 8/	17	20	19	19	19	19	18	17	17	17
19	TOTAL LOADS	9424	9626	9324	9433	9605	9783	9806	9695	9817	10002
RESOURCES											
20	REGULATED HYDRO	7391	7391	7391	7391	7414	7414	7414	7414	7414	7414
21	INDEPENDENT HYDRO	298	298	298	298	298	298	298	298	298	298
22	MAY WATER BUDGET 9/	-265	-265	-265	-265	-265	-265	-265	-265	-265	-265
23	SUS. PKNG. ADJUSTMENT 10/	0	0	0	0	0	0	0	0	0	0
24	CAN. ENT. NON-FED(CSPE) 11/	58	55	53	50	38	23	22	21	14	0
25	CAN. ENT. NON-FED(CNDA) 12/	0	0	0	4	31	68	67	67	85	119
26	RESTORATION 13/	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26
27	TOTAL HYDRO	7456	7453	7451	7452	7490	7512	7510	7509	7520	7540
28	SMALL THERMAL & MISC	0	0	0	0	0	0	0	0	0	0
29	COMBUSTION TURBINES	0	0	0	0	0	0	0	0	0	0
30	RENEWABLES	0	0	0	0	0	0	0	0	0	0
31	COGENERATION	0	0	0	0	0	0	0	0	0	0
32	IMPORTS 14/	384	211	176	101	101	101	101	101	101	101
33	CONTRACTS IN 15/	254	198	207	223	224	223	221	245	245	245
34	LARGE THERMAL 16/	715	747	751	751	751	751	751	751	751	751
35	RESOURCE ACQUISITIONS 17/	0	0	0	0	0	0	0	0	0	0
36	TOTAL RESOURCES	8809	8609	8585	8527	8566	8587	8583	8606	8617	8637

EXHIBIT 3

TABLE 2: FEDERAL SYSTEM (CONTINUED)

SUMMARY OF FEDERAL SYSTEM LOADS AND RESOURCES IN THE PACIFIC NORTHWEST REGION
UNDER THE PACIFIC NORTHWEST ELECTRIC POWER PLANNING AND CONSERVATION ACT

		M E D I U M L O A D S							1993 WHITEBOOK: 12/19/93		
		O P E R A T I N G Y E A R							R U N D A T E : 12/20/93		
MEGAWATTS		1994-95 AVG	1995-96 AVG	1996-97 AVG	1997-98 AVG	1998-99 AVG	1999- 0 AVG	2000- 1 AVG	2001- 2 AVG	2002- 3 AVG	2003- 4 AVG
37	HYD, SM THRM & MISC RES 18/	0	0	0	0	0	0	0	0	0	0
38	LARGE THERMAL RESERVES 19/	0	0	0	0	0	0	0	0	0	0
39	SPINNING RESERVES 20/	0	0	0	0	0	0	0	0	0	0
40	DSI RESERVES 21/	0	0	0	0	0	0	0	0	0	0
41	FEDERAL HYDRO MAINT 22/	0	0	0	0	0	0	0	0	0	0
42	NET RESOURCES	8809	8609	8585	8527	8566	8587	8583	8606	8617	8637
43	FIRM SURPLUS/DEFICIT	-9	-270	-43	-212	-352	-518	-559	-464	-579	-748
44	TOTAL SURPLUS/DEFICIT	-615	-1017	-739	-906	-1039	-1196	-1223	-1089	-1200	-1365
45	EXTREME WEATHER ADJ. 23/	0	0	0	0	0	0	0	0	0	0
46	FIRM S/D W/EXT WEATHER ADJ.	-9	-270	-43	-212	-352	-518	-559	-464	-579	-748
47	TOTAL S/D W/EXT WTHR. ADJ.	-615	-1017	-739	-906	-1039	-1196	-1223	-1089	-1200	-1365
48	POSS FED EXT WTHR. OBLG 24/	0	0	0	0	0	0	0	0	0	0
49	FIRM S/D W/EXT WTHR. OBLIG	-9	-270	-43	-212	-352	-518	-559	-464	-579	-748
50	TOTAL S/D W/EXT WTHR. OBLIG	-615	-1017	-739	-906	-1039	-1196	-1223	-1089	-1200	-1365

- NOTE: 1. BPA SURPLUS POWER SALES CONTRACTS WITH THE PSW ARE SHOWN AS POWER SALES UNTIL THEY EXPIRE.
2. BPA SURPLUS POWER SALES CONTRACT WITH PSP&L IS SHOWN AS A POWER SALE THROUGH JUNE 30, 2001. THE CONTRACT THEN CONVERTS TO A SEASONAL POWER EXCHANGE WHICH EXPIRES JULY 1, 2008.
3. THE FOLLOWING BPA CONTRACTS ARE RESOURCE OPTIONS AND NOT INCLUDED IN THIS ANALYSIS.
- A. BGP TO BPA, SUPPLEMENTAL ENERGY
 - B. SCE TO BPA, SUPPLEMENTAL ENERGY
 - C. SCE TO BPA, OPTION ENERGY

EXHIBIT 3 (continued)

TABLE 2: FEDERAL SYSTEM

SHEET 1 OF 2

SUMMARY OF FEDERAL SYSTEM LOADS AND RESOURCES IN THE PACIFIC NORTHWEST REGION
UNDER THE PACIFIC NORTHWEST ELECTRIC POWER PLANNING AND CONSERVATION ACT

M E D I U M - L O W L O A D S

1993 WHITEBOOK: 12/19/93
RUN DATE: 12/20/93

		OPERATING YEAR									
MEGAWATTS		1994-95 AVG	1995-96 AVG	1996-97 AVG	1997-98 AVG	1998-99 AVG	1999- 0 AVG	2000- 1 AVG	2001- 2 AVG	2002- 3 AVG	2003- 4 AVG
LOADS											
1	FEDERAL AGENCIES	153	154	155	156	157	158	158	160	160	161
2	FEDERAL & GEN PUBLIC LOSSES	164	166	160	163	162	162	163	164	165	166
3	USBR	67	68	67	67	67	67	68	68	68	68
4	DSI ALUMINUM FIRM	1596	1427	1426	1426	1426	1421	1414	1406	1399	1391
5	DSI NON-ALUM FIRM	137	149	159	157	149	140	131	131	131	131
6	DSI FIRM LOSSES	49	44	45	45	45	44	44	43	43	43
7	SM & NON GEN PUB PURCH 1/	3141	3167	3201	3247	3294	3344	3369	3393	3420	3453
8	FIRM SYSTEM LOAD	5307	5175	5213	5261	5300	5336	5347	5365	5386	5413
TRANSFERS OUT											
9	EXPORTS 2/	278	276	265	261	381	544	543	541	619	775
10	CONTRACTS OUT 3/	621	596	350	367	367	367	366	341	341	341
11	CSPE TO WEST GROUP UTIL 4/	275	263	251	236	178	102	98	94	62	0
12	GEN PUBLIC AGEN PURCH 5/	1644	1688	1734	1776	1820	1882	1908	1933	1972	2017
13	GEN PRIVATE UTIL PURCH 6/	0	0	0	0	0	0	0	0	0	0
14	FED DIVERSITY 7/	0	0	0	0	0	0	0	0	0	0
15	FIRM LOADS	8125	7998	7813	7901	8046	8231	8262	8274	8380	8546
16	DSI ALUM TOP QUARTILE 8/	347	475	475	475	475	474	471	469	466	464
17	DSI NON-ALUMINUM TQ 8/	46	50	53	53	50	47	44	44	44	44
18	TOP QUARTILE LOSSES 8/	11	15	15	15	15	15	14	14	14	14
19	TOTAL LOADS	8529	8538	8356	8443	8585	8766	8791	8801	8904	9067
RESOURCES											
20	REGULATED HYDRO	7391	7391	7391	7391	7414	7414	7414	7414	7414	7414
21	INDEPENDENT HYDRO	298	298	298	298	298	298	298	298	298	298
22	MAY WATER BUDGET 9/	-265	-265	-265	-265	-265	-265	-265	-265	-265	-265
23	SUS. PKNG. ADJUSTMENT 10/	0	0	0	0	0	0	0	0	0	0
24	CAN. ENT. NON-FED(CSPE) 11/	58	55	53	50	38	23	22	21	14	0
25	CAN. ENT. NON-FED(CNDA) 12/	0	0	0	4	31	68	67	67	85	119
26	RESTORATION 13/	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26
27	TOTAL HYDRO	7456	7453	7451	7452	7490	7512	7510	7509	7520	7540
28	SMALL THERMAL & MISC	0	0	0	0	0	0	0	0	0	0
29	COMBUSTION TURBINES	0	0	0	0	0	0	0	0	0	0
30	RENEWABLES	0	0	0	0	0	0	0	0	0	0
31	COGENERATION	0	0	0	0	0	0	0	0	0	0
32	IMPORTS 14/	384	211	176	101	101	101	101	101	101	101
33	CONTRACTS IN 15/	254	198	207	223	224	223	221	245	245	245
34	LARGE THERMAL 16/	715	747	751	751	751	751	751	751	751	751
35	RESOURCE ACQUISITIONS 17/	0	0	0	0	0	0	0	0	0	0
36	TOTAL RESOURCES	8809	8609	8585	8527	8566	8587	8583	8606	8617	8637

EXHIBIT 4

TABLE 2: FEDERAL SYSTEM (CONTINUED)

SUMMARY OF FEDERAL SYSTEM LOADS AND RESOURCES IN THE PACIFIC NORTHWEST REGION
UNDER THE PACIFIC NORTHWEST ELECTRIC POWER PLANNING AND CONSERVATION ACT

		M E D I U M - L O W L O A D S							1993 WHITEBOOK: 12/19/93		
		O P E R A T I N G Y E A R							R U N D A T E : 12/20/93		
MEGAWATTS		1994-95 AVG	1995-96 AVG	1996-97 AVG	1997-98 AVG	1998-99 AVG	1999- 0 AVG	2000- 1 AVG	2001- 2 AVG	2002- 3 AVG	2003- 4 AVG
37 HYD, SM THRM & MISC RES	18/	0	0	0	0	0	0	0	0	0	0
38 LARGE THERMAL RESERVES	19/	0	0	0	0	0	0	0	0	0	0
39 SPINNING RESERVES	20/	0	0	0	0	0	0	0	0	0	0
40 DSI RESERVES	21/	0	0	0	0	0	0	0	0	0	0
41 FEDERAL HYDRO MAINT	22/	0	0	0	0	0	0	0	0	0	0
42 NET RESOURCES		8809	8609	8585	8527	8566	8587	8583	8606	8617	8637
43 FIRM SURPLUS/DEFICIT		684	611	772	626	520	356	321	332	237	91
44 TOTAL SURPLUS/DEFICIT		280	71	229	84	-19	-179	-208	-195	-287	-430
45 EXTREME WEATHER ADJ.	23/	0	0	0	0	0	0	0	0	0	0
46 FIRM S/D W/EXT WEATHER ADJ.		684	611	772	626	520	356	321	332	237	91
47 TOTAL S/D W/EXT WTHR. ADJ.		280	71	229	84	-19	-179	-208	-195	-287	-430
48 POSS FED EXT WTHR. OBLIG	24/	0	0	0	0	0	0	0	0	0	0
49 FIRM S/D W/EXT WTHR. OBLIG		684	611	772	626	520	356	321	332	237	91
50 TOTAL S/D W/EXT WTHR. OBLIG		280	71	229	84	-19	-179	-208	-195	-287	-430

- NOTE: 1. BPA SURPLUS POWER SALES CONTRACTS WITH THE PSW ARE SHOWN AS POWER SALES UNTIL THEY EXPIRE.
2. BPA SURPLUS POWER SALES CONTRACT WITH PSP&L IS SHOWN AS A POWER SALE THROUGH JUNE 30, 2001. THE CONTRACT THEN CONVERTS TO A SEASONAL POWER EXCHANGE WHICH EXPIRES JULY 1, 2008.
3. THE FOLLOWING BPA CONTRACTS ARE RESOURCE OPTIONS AND NOT INCLUDED IN THIS ANALYSIS.
- A. BGP TO BPA, SUPPLEMENTAL ENERGY
 - B. SCE TO BPA, SUPPLEMENTAL ENERGY
 - C. SCE TO BPA, OPTION ENERGY

EXHIBIT 4 (continued)

TABLE 2: FEDERAL SYSTEM

SHEET 1 OF 2

SUMMARY OF FEDERAL SYSTEM LOADS AND RESOURCES IN THE PACIFIC NORTHWEST REGION
UNDER THE PACIFIC NORTHWEST ELECTRIC POWER PLANNING AND CONSERVATION ACT

LOADS	LOW LOADS										1993 WHITEBOOK:	
	OPERATING YEAR										RUN DATE:	
	1994-95 AVG	1995-96 AVG	1996-97 AVG	1997-98 AVG	1998-99 AVG	1999-00 AVG	2000-01 AVG	2001-02 AVG	2002-03 AVG	2003-04 AVG	12/19/93	12/20/93
MEGAWATTS												
1 FEDERAL AGENCIES	153	154	155	156	157	158	159	159	160	161		
2 FEDERAL & GEN PUBLIC LOSSES	155	156	149	150	148	147	147	146	146	146		
3 USBR	67	67	68	67	67	67	67	68	68	68		
4 DSI ALUMINUM FIRM	1324	1023	1014	1014	1014	1010	965	549	549	549		
5 DSI NON-ALUM FIRM	97	97	97	97	97	97	97	97	97	97		
6 DSI FIRM LOSSES	40	32	31	31	31	31	30	18	18	18		
7 SM & NON GEN PUB PURCH 1/	3025	3019	3022	3040	3062	3087	3089	3089	3095	3107		
8 FIRM SYSTEM LOAD	4861	4548	4536	4555	4576	4597	4554	4126	4133	4146		
TRANSFERS OUT												
9 EXPORTS	278	276	265	261	381	544	543	541	619	775		
10 CONTRACTS OUT	621	596	350	367	367	367	366	341	341	341		
11 CSPE TO WEST GROUP UTIL	275	263	251	236	178	102	98	94	62	0		
12 GEN PUBLIC AGEN PURCH	1521	1537	1521	1559	1584	1616	1616	1619	1635	1654		
13 GEN PRIVATE UTIL PURCH	0	0	0	0	0	0	0	0	0	0		
14 FED DIVERSITY	0	0	0	0	0	0	0	0	0	0		
15 FIRM LOADS	7555	7220	6951	6978	7086	7226	7177	6721	6790	6916		
16 DSI ALUM TOP QUARTILE	276	341	338	338	338	337	322	183	183	183		
17 DSI NON-ALUMINUM TQ	32	32	32	32	32	32	32	32	32	32		
18 TOP QUARTILE LOSSES	9	11	10	10	10	10	10	6	6	6		
19 TOTAL LOADS	7872	7604	7332	7358	7466	7605	7541	6942	7011	7138		
RESOURCES												
20 REGULATED HYDRO	7391	7391	7391	7391	7414	7414	7414	7414	7414	7414		
21 INDEPENDENT HYDRO	298	298	298	298	298	298	298	298	298	298		
22 MAY WATER BUDGET	-265	-265	-265	-265	-265	-265	-265	-265	-265	-265		
23 SUS. PKNG. ADJUSTMENT	0	0	0	0	0	0	0	0	0	0		
24 CAN. ENT. NON-FED(CSPE)	58	55	53	50	38	23	22	21	14	0		
25 CAN. ENT. NON-FED(CNDA)	0	0	0	4	31	68	67	67	85	119		
26 RESTORATION	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26		
27 TOTAL HYDRO	7456	7453	7451	7452	7490	7512	7510	7509	7520	7540		
28 SMALL THERMAL & MISC	0	0	0	0	0	0	0	0	0	0		
29 COMBUSTION TURBINES	0	0	0	0	0	0	0	0	0	0		
30 RENEWABLES	0	0	0	0	0	0	0	0	0	0		
31 COGENERATION	0	0	0	0	0	0	0	0	0	0		
32 IMPORTS	384	211	176	101	101	101	101	101	101	101		
33 CONTRACTS IN	254	198	207	223	224	223	221	245	245	245		
34 LARGE THERMAL	715	747	751	751	751	751	751	751	751	751		
35 RESOURCE ACQUISITIONS	0	0	0	0	0	0	0	0	0	0		
36 TOTAL RESOURCES	8809	8609	8585	8527	8566	8587	8583	8606	8617	8637		

TABLE 2: FEDERAL SYSTEM (CONTINUED)

SUMMARY OF FEDERAL SYSTEM LOADS AND RESOURCES IN THE PACIFIC NORTHWEST REGION
UNDER THE PACIFIC NORTHWEST ELECTRIC POWER PLANNING AND CONSERVATION ACT

		L O W L O A D S								1993 WHITEBOOK: 12/19/93	
		OPERATING YEAR								RUN DATE: 12/20/93	
MEGAWATTS		1994-95 AVG	1995-96 AVG	1996-97 AVG	1997-98 AVG	1998-99 AVG	1999- 0 AVG	2000- 1 AVG	2001- 2 AVG	2002- 3 AVG	2003- 4 AVG
37	HYD, SM THRM & MISC RES 18/	0	0	0	0	0	0	0	0	0	0
38	LARGE THERMAL RESERVES 19/	0	0	0	0	0	0	0	0	0	0
39	SPINNING RESERVES 20/	0	0	0	0	0	0	0	0	0	0
40	DSI RESERVES 21/	0	0	0	0	0	0	0	0	0	0
41	FEDERAL HYDRO MAINT 22/	0	0	0	0	0	0	0	0	0	0
42	NET RESOURCES	8809	8609	8585	8527	8566	8587	8583	8606	8617	8637
43	FIRM SURPLUS/DEFICIT	1253	1389	1634	1549	1480	1361	1406	1885	1827	1721
44	TOTAL SURPLUS/DEFICIT	936	1005	1253	1169	1100	982	1042	1664	1606	1499
45	EXTREME WEATHER ADJ. 23/	0	0	0	0	0	0	0	0	0	0
46	FIRM S/D W/EXT WEATHER ADJ.	1253	1389	1634	1549	1480	1361	1406	1885	1827	1721
47	TOTAL S/D W/EXT WTHR. ADJ.	936	1005	1253	1169	1100	982	1042	1664	1606	1499
48	POSS FED EXT WTHR. OBLG 24/	0	0	0	0	0	0	0	0	0	0
49	FIRM S/D W/EXT WTHR. OBLIG	1253	1389	1634	1549	1480	1361	1406	1885	1827	1721
50	TOTAL S/D W/EXT WTHR. OBLIG	936	1005	1253	1169	1100	982	1042	1664	1606	1499

NOTE: 1. BPA SURPLUS POWER SALES CONTRACTS WITH THE PSW ARE SHOWN AS POWER SALES UNTIL THEY EXPIRE.

2. BPA SURPLUS POWER SALES CONTRACT WITH PSP&L IS SHOWN AS A POWER SALE THROUGH JUNE 30, 2001.
THE CONTRACT THEN CONVERTS TO A SEASONAL POWER EXCHANGE WHICH EXPIRES JULY 1, 2008.

3. THE FOLLOWING BPA CONTRACTS ARE RESOURCE OPTIONS AND NOT INCLUDED IN THIS ANALYSIS.
A. BGP TO BPA, SUPPLEMENTAL ENERGY
B. SCE TO BPA, SUPPLEMENTAL ENERGY
C. SCE TO BPA, OPTION ENERGY

EXHIBIT 5 (continued)

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EXHIBITS 6 - 8
FEDERAL SYSTEM MONTHLY ENERGY ANALYSIS
UNDER MEDIUM LOADS FOR 1930 WATER
CONDITIONS

TABLE 2: FEDERAL SYSTEM

SHEET 1 OF 2

SUMMARY OF FEDERAL SYSTEM LOADS AND RESOURCES IN THE PACIFIC NORTHWEST REGION
UNDER THE PACIFIC NORTHWEST ELECTRIC POWER PLANNING AND CONSERVATION ACT

M E D I U M L O A D S

1994-95 OPERATING YEAR

1993 WHITEBOOK: 12/19/93

RUN DATE: 12/20/93

1930 WATER YEAR ENERGY IN AVERAGE MEGAWATTS		AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN	JUL	12 MO AVG
LCADS																
1	FEDERAL AGENCIES	152	152	145	149	153	169	163	164	157	149	149	143	142	151	153
2	FEDERAL & GEN PUBLIC LOSSES	143	143	137	151	191	222	232	211	184	163	163	145	141	141	172
3	USBR	161	161	108	42	2	2	2	2	4	50	50	117	151	168	67
4	DSI ALUMINUM FIRM	2033	2033	2033	2033	2033	2033	2011	2011	2011	2011	2011	2011	2011	1998	2019
5	DSI NON-ALUM FIRM	151	151	151	164	164	157	172	187	187	187	187	194	194	187	175
6	DSI FIRM LOSSES	57	57	57	59	64	68	68	68	64	61	61	60	60	57	62
7	SM & NON GEN PUB PURCH 1/	3014	3015	2820	2901	3354	3723	3850	3623	3304	3123	3125	3002	2963	3122	3233
8	FIRM SYSTEM LOAD	5711	5712	5451	5499	5961	6374	6498	6266	5911	5744	5746	5672	5662	5824	5881
TRANSFERS OUT																
9	EXPORTS 2/	394	394	397	240	221	196	198	187	188	185	185	351	381	393	278
10	CONTRACTS OUT 3/	409	409	438	654	985	1039	1013	945	753	487	487	192	203	338	621
11	CSPE TO WEST GROUP UTIL 4/	279	279	279	279	279	279	279	279	279	268	268	268	268	268	275
12	GEN PUBLIC AGEN PURCH 5/	1488	1493	1519	1688	2005	2121	2220	2061	1962	1768	1761	1641	1524	1492	1791
13	GEN PRIVATE UTIL PURCH 6/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	FED DIVERSITY 7/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	FIRM LOADS	8281	8287	8085	8360	9451	10009	10208	9738	9092	8452	8447	8124	8038	8315	8846
16	DSI ALUM TOP QUARTILE 8/	338	338	338	338	338	338	671	671	671	671	671	671	671	666	532
17	DSI NON-ALUMINUM TQ 8/	50	50	50	55	55	52	57	62	62	62	62	65	65	62	58
18	TOP QUARTILE LOSSES 8/	10	10	10	11	11	12	23	23	21	21	21	20	20	19	17
19	TOTAL LOADS	8679	8685	8483	8763		10412	10958	10493	9846	9205	9200	8879	8793	9062	9452
RESOURCES																
20	REGULATED HYDRO	6646	6936	6182	6441		7967	9043	7624	7732	7317	8161	10684	6445	6078	7542
21	INDEPENDENT HYDRO	407	356	321	316		342	192	339	242	236	259	346	381	363	313
22	MAY WATER BUDGET 9/	0	0	0	0	0	0	0	0	0	0	0	-2965	0	0	-247
23	SUS. PKNG. ADJUSTMENT 10/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	CAN. ENT. NON-FED(CSPE) 11/	59	59	59	59	59	59	59	59	59	56	56	56	56	56	58
25	CAN. ENT. NON-FED(CNDA) 12/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	RESTORATION 13/	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26
27	TOTAL HYDRO	7086	7325	6536	6796	8094	8342	9268	7996	8007	7583	8450	8095	6856	6471	7640
28	SMALL THERMAL & MISC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	COMBUSTION TURBINES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	RENEWABLES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	COGENERATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	IMPORTS 14/	266	266	461	539	592	646	599	555	382	213	89	0	138	287	385
33	CONTRACTS IN 15/	29	29	260	368	368	368	368	368	368	368	260	29	180	29	254
34	LARGE THERMAL 16/	826	826	826	826	826	826	826	826	826	661	0	0	771	867	715
35	RESOURCE ACQUISITIONS 17/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	TOTAL RESOURCES	8207	8446	8083	8529	9880	10182	11061	9745	9583	8825	8799	8124	7945	7654	8994

EXHIBIT 6

TABLE 2: FEDERAL SYSTEM (CONTINUED)

SUMMARY OF FEDERAL SYSTEM LOADS AND RESOURCES IN THE PACIFIC NORTHWEST REGION
UNDER THE PACIFIC NORTHWEST ELECTRIC POWER PLANNING AND CONSERVATION ACT

M E D I U M L O A D S															1993 WHITEBOOK: 12/19/93 RUN DATE: 12/20/93	
1994-95 OPERATING YEAR																
1930 WATER YEAR ENERGY IN AVERAGE MEGAWATTS	AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN	JUL	12 MO AVG	
37 HYD, SM THRM & MISC RES 18/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
38 LARGE THERMAL RESERVES 19/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
39 SPINNING RESERVES 20/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40 DSI RESERVES 21/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 FEDERAL HYDRO MAINT 22/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
42 NET RESOURCES	8207	8446	8083	8529	9880	10182	11061	9745	9583	8825	8799	8124	7945	7654	8994	
43 FIRM SURPLUS/DEFICIT	-74	159	-2	169	429	173	853	7	491	373	352	0	-93	-661	148	
44 TOTAL SURPLUS/DEFICIT	-472	-239	-400	-234	25	-230	103	-748	-263	-380	-401	-755	-848	-1408	-459	
45 EXTREME WEATHER ADJ. 23/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
46 FIRM S/D W/EXT WEATHER ADJ.	-74	159	-2	169	429	173	853	7	491	373	352	0	-93	-661	148	
47 TOTAL S/D W/EXT WTHR. ADJ.	-472	-239	-400	-234	25	-230	103	-748	-263	-380	-401	-755	-848	-1408	-459	
48 POSS FED EXT WTHR. OBLG 24/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
49 FIRM S/D W/EXT WTHR. OBLIG	-74	159	-2	169	429	173	853	7	491	373	352	0	-93	-661	148	
50 TOTAL S/D W/EXT WTHR. OBLIG	-472	-239	-400	-234	25	-230	103	-748	-263	-380	-401	-755	-848	-1408	-459	

NOTE: 1. BPA SURPLUS POWER SALES CONTRACTS WITH THE PSW ARE SHOWN AS POWER SALES UNTIL THEY EXPIRE.

2. BPA SURPLUS POWER SALES CONTRACT WITH PSP&L IS SHOWN AS A POWER SALE THROUGH JUNE 30, 2001.
THE CONTRACT THEN CONVERTS TO A SEASONAL POWER EXCHANGE WHICH EXPIRES JULY 1, 2008.

3. THE FOLLOWING BPA CONTRACTS ARE RESOURCE OPTIONS AND NOT INCLUDED IN THIS ANALYSIS.
A. BGP TO BPA, SUPPLEMENTAL ENERGY
B. SCE TO BPA, SUPPLEMENTAL ENERGY
C. SCE TO BPA, OPTION ENERGY

EXHIBIT 6 (continued)

TABLE 2: FEDERAL SYSTEM

SHEET 1 OF 2

SUMMARY OF FEDERAL SYSTEM LOADS AND RESOURCES IN THE PACIFIC NORTHWEST REGION
UNDER THE PACIFIC NORTHWEST ELECTRIC POWER PLANNING AND CONSERVATION ACT

1990 WATER YEAR ENERGY IN AVERAGE MEGAWATTS	M E D I U M L O A D S											
	1998-99 OPERATING YEAR											
	AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	1993 WHITEBOOK: RUN DATE: 12/19/93 12/20/93
LOADS												12 MO AVG
1 FEDERAL AGENCIES	156	156	149	152	157	173	167	168	160	152	147	145
2 FEDERAL & GEN PUBLIC LOSSES	142	142	135	151	195	227	239	218	188	164	164	155
3 USBR	161	161	109	42	2	2	2	2	4	50	117	139
4 DS1 ALUMINUM FIRM	1810	1810	1810	1810	1810	1810	1808	1808	1808	1806	1806	1805
5 DS1 NON-ALUM FIRM	210	210	208	207	206	180	186	201	200	198	197	186
6 DS1 FIRM LOSSES	53	53	52	54	58	62	62	62	58	56	54	52
7 SM & NON GEN PUB PURCH	3263	3262	3083	3156	3601	3956	4167	3915	3564	3358	3212	3330
8 FIRM SYSTEM LOAD	5795	5794	5546	5572	6029	6410	6631	6374	5982	5784	5679	5835
TRANSFERS OUT												
9 EXPORTS	348	348	352	330	298	265	267	254	255	510	510	565
10 CONTRACTS OUT	13	13	42	258	785	840	813	770	502	325	325	367
11 CSPE TO WEST GROUP UTIL	215	215	215	215	215	215	215	215	215	103	103	103
12 GEN PUBLIC AGEN PURCH	1765	1792	1800	1976	2286	2406	2561	2385	2268	2063	2048	1726
13 GEN PRIVATE UTIL PURCH	0	0	0	0	0	0	0	0	0	0	0	0
14 FED DIVERSITY	0	0	0	0	0	0	0	0	0	0	0	0
15 FIRM LOADS	8135	8161	7955	8350	9613	10135	10487	9998	9222	8785	8772	8305
16 DS1 ALUM TOP QUARTILE	603	603	603	603	603	603	603	603	603	602	602	602
17 DS1 NON-ALUMINUM TQ	70	70	70	69	69	60	62	67	67	66	66	65
18 TOP QUARTILE LOSSES	18	18	18	18	20	21	21	21	19	19	19	17
19 TOTAL LOADS	8826	8852	8645	9041	10305	10819	11172	10689	9910	9471	9458	8986
RESOURCES												
20 REGULATED HYDRO	6266	6790	5987	6267	7450	8060	8972	7614	7707	7297	8205	7778
21 INDEPENDENT HYDRO	407	356	321	316	289	342	192	339	242	236	259	363
22 MAY WATER BUDGET	0	0	0	0	0	0	0	0	0	0	0	0
23 SUS. PKNG. ADJUSTMENT	10/	0	0	0	0	0	0	0	0	0	0	0
24 CAN. ENT. NON-FED(CSPE)	45	45	45	45	45	45	45	45	45	23	23	23
25 CAN. ENT. NON-FED(CNDA)	11/	11	11	11	11	11	11	11	11	70	70	70
26 RESTORATION	12/	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26
27 TOTAL HYDRO	6703	7176	6338	6613	7769	8432	9194	7983	7979	7600	8531	8226
28 SMALL THERMAL & MISC	0	0	0	0	0	0	0	0	0	0	0	0
29 COMBUSTION TURBINES	0	0	0	0	0	0	0	0	0	0	0	0
30 RENEWABLES	0	0	0	0	0	0	0	0	0	0	0	0
31 COGENERATION	0	0	0	0	0	0	0	0	0	0	0	0
32 IMPORTS	14/	13	42	120	173	227	201	157	129	101	89	34
33 CONTRACTS IN	15/	29	288	288	288	288	288	288	288	288	288	223
34 LARGE THERMAL	16/	872	872	872	872	872	872	872	872	698	0	815
35 RESOURCE ACQUISITIONS	17/	0	0	0	0	0	0	0	0	0	0	0
36 TOTAL RESOURCES	7617	8090	7540	7893	9102	9819	10555	9300	9268	8687	8908	9347
												7702
												8806

TABLE 2: FEDERAL SYSTEM (CONTINUED)

SUMMARY OF FEDERAL SYSTEM LOADS AND RESOURCES IN THE PACIFIC NORTHWEST REGION
UNDER THE PACIFIC NORTHWEST ELECTRIC POWER PLANNING AND CONSERVATION ACT

M E D I U M L O A D S															1993 WHITEBOOK: 12/19/93	
1998-99 OPERATING YEAR															RUN DATE: 12/20/93	
1930 WATER YEAR ENERGY IN AVERAGE MEGAWATTS	AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN	JUL	12 MO AVG	
37 HYD, SM THRM & MISC RES 18/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
38 LARGE THERMAL RESERVES 19/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
39 SPINNING RESERVES 20/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40 DSI RESERVES 21/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 FEDERAL HYDRO MAINT 22/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
42 NET RESOURCES	7617	8090	7540	7893	9102	9819	10555	9300	9268	8687	8908	8500	9347	7702	8806	
43 FIRM SURPLUS/DEFICIT	-518	-71	-415	-457	-511	-316	68	-698	46	-98	136	311	1255	-603	-133	
44 TOTAL SURPLUS/DEFICIT	-1209	-762	-1105	-1148	-1203	-1000	-617	-1389	-642	-784	-550	-375	570	-1284	-820	
45 EXTREME WEATHER ADJ. 23/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
46 FIRM S/D W/EXT WEATHER ADJ.	-518	-71	-415	-457	-511	-316	68	-698	46	-98	136	311	1255	-603	-133	
47 TOTAL S/D W/EXT WTHR. ADJ.	-1209	-762	-1105	-1148	-1203	-1000	-617	-1389	-642	-784	-550	-375	570	-1284	-820	
48 POSS FED EXT WTHR. OBLG 24/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
49 FIRM S/D W/EXT WTHR. OBLIG	-518	-71	-415	-457	-511	-316	68	-698	46	-98	136	311	1255	-603	-133	
50 TOTAL S/D W/EXT WTHR. OBLIG	-1209	-762	-1105	-1148	-1203	-1000	-617	-1389	-642	-784	-550	-375	570	-1284	-820	

NOTE: 1. BPA SURPLUS POWER SALES CONTRACTS WITH THE PSW ARE SHOWN AS POWER SALES UNTIL THEY EXPIRE.

2. BPA SURPLUS POWER SALES CONTRACT WITH PSP&L IS SHOWN AS A POWER SALE THROUGH JUNE 30, 2001.
THE CONTRACT THEN CONVERTS TO A SEASONAL POWER EXCHANGE WHICH EXPIRES JULY 1, 2008.

3. THE FOLLOWING BPA CONTRACTS ARE RESOURCE OPTIONS AND NOT INCLUDED IN THIS ANALYSIS.

- A. BGP TO BPA, SUPPLEMENTAL ENERGY
- B. SCE TO BPA, SUPPLEMENTAL ENERGY
- C. SCE TO BPA, OPTION ENERGY

TABLE 2: FEDERAL SYSTEM

SHEET 1 OF 2

SUMMARY OF FEDERAL SYSTEM LOADS AND RESOURCES IN THE PACIFIC NORTHWEST REGION
UNDER THE PACIFIC NORTHWEST ELECTRIC POWER PLANNING AND CONSERVATION ACT

M E D I U M L O A D S																
2003- 4 OPERATING YEAR																
1993 WHITEBOOK: 12/19/93 RUN DATE: 12/20/93																
1930 WATER YEAR ENERGY IN AVERAGE MEGAWATTS		AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN	JUL	12 MO AVG
LOADS																
1	FEDERAL AGENCIES	160	160	153	156	161	179	172	174	165	156	156	150	149	159	161
2	FEDERAL & GEN PUBLIC LOSSES	147	147	139	153	204	238	249	226	192	173	173	155	149	147	181
3	USBR	162	162	109	42	2	2	2	2	4	50	50	118	152	169	68
4	DSI ALUMINUM FIRM	1646	1646	1646	1646	1646	1646	1637	1637	1637	1637	1637	1636	1636	1635	1640
5	DSI NON-ALUM FIRM	166	166	166	166	166	142	149	166	166	166	166	166	166	158	162
6	DSI FIRM LOSSES	47	47	47	49	53	55	56	56	52	50	50	49	49	47	51
7	SM & NON GEN PUB PURCH 1/	3446	3445	3253	3351	3867	4266	4426	4160	3791	3557	3559	3404	3339	3526	3699
8	FIRM SYSTEM LOAD	5774	5773	5513	5563	6099	6528	6691	6421	6007	5789	5791	5678	5640	5841	5962
TRANSFERS OUT																
9	EXPORTS 2/	827	827	831	809	777	744	747	733	734	731	731	745	786	828	774
10	CONTRACTS OUT 3/	13	13	42	108	784	839	812	769	352	326	326	0	18	34	341
11	CSPE TO WEST GROUP UTIL 4/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	GEN PUBLIC AGEN PURCH /	1955	1986	1996	2217	2586	2738	2867	2675	2545	2317	2302	2124	1969	1941	2328
13	GEN PRIVATE UTIL PURCH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	FED DIVERSITY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	FIRM LOADS	8569	8599	8382	8697	10246	10849	11117	10598	9638	9163	9150	8547	8413	8644	9406
16	DSI ALUM TOP QUARTILE 8/	549	549	549	549	549	549	546	546	546	546	546	546	546	545	547
17	DSI NON-ALUMINUM TQ 8/	55	55	55	55	55	47	50	55	55	55	55	55	55	53	54
18	TOP QUARTILE LOSSES 8/	16	16	16	16	18	19	19	19	17	17	17	16	16	16	17
19	TOTAL LOADS	9189	9219	9002	9317	10867	11463	11731	11217	10256	9781	9768	9164	9030	9257	10024
RESOURCES																
20	REGULATED HYDRO	6266	6790	5987	6267	7450	8060	8972	7614	7707	7297	8205	11023	7778	6337	7623
21	INDEPENDENT HYDRO	407	356	321	316	289	342	192	339	242	236	259	346	381	363	313
22	MAY WATER BUDGET 9/	0	0	0	0	0	0	0	0	0	0	0	-2965	0	0	-247
23	SU. PKNG. ADJUSTMENT 10/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	CAN. ENT. NON-FED(CSPE) 11/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	CAN. ENT. NON-FED(CNDA) 12/	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119
26	RESTORATION 13/	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26
27	TOTAL HYDRO	6766	7239	6401	6676	7832	8495	9257	8046	8042	7626	8557	8497	8252	6793	7782
28	SMALL THERMAL & MISC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	COMBUSTION TURBINES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	RENEWABLES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	COGENERATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	IMPORTS 14/	13	13	42	120	173	227	201	157	129	101	89	0	18	34	101
33	CONTRACTS IN 15/	151	152	410	411	259	259	259	259	259	259	259	0	259	151	245
34	LARGE THERMAL 16/	872	872	872	872	872	872	872	872	872	698	0	0	815	872	751
35	RESOURCE ACQUISITIONS 17/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	TOTAL RESOURCES	7802	8276	7725	8079	9136	9853	10589	9334	9302	8684	8905	8497	9344	7850	8879

EXHIBIT 8

TABLE 2: FEDERAL SYSTEM (CONTINUED)

SUMMARY OF FEDERAL SYSTEM LOADS AND RESOURCES IN THE PACIFIC NORTHWEST REGION
UNDER THE PACIFIC NORTHWEST ELECTRIC POWER PLANNING AND CONSERVATION ACT

M E D I U M L O A D S															1993 WHITEBOOK: 12/19/93			
2003- 4 OPERATING YEAR																	RUN DATE: 12/20/93	
1930 WATER YEAR ENERGY IN AVERAGE MEGAWATTS		AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN	JUL	12 MO AVG		
		-----															-----	
37 HYD, SM THRM & MISC RES 18/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
38 LARGE THERMAL RESERVES 19/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
39 SPINNING RESERVES 20/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
40 DSI RESERVES 21/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
41 FEDERAL HYDRO MAINT 22/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----		
42 NET RESOURCES		7802	8276	7725	8079	9136	9853	10589	9334	9302	8684	8905	8497	9344	7850	8879		
43 FIRM SURPLUS/DEFICIT		-767	-323	-657	-618	-1110	-996	-528	-1264	-336	-479	-245	-50	931	-794	-527		
44 TOTAL SURPLUS/DEFICIT		-1387	-943	-1277	-1238	-1731	-1610	-1142	-1883	-954	-1097	-863	-667	314	-1407	-1145		
		-----															-----	
45 EXTREME WEATHER ADJ. 23/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
46 FIRM S/D W/EXT WEATHER ADJ.	-767	-323	-657	-618	-1110	-996	-528	-1264	-336	-479	-245	-50	931	-794	-527	-527		
47 TOTAL S/D W/EXT WTHR. ADJ.	-1387	-943	-1277	-1238	-1731	-1610	-1142	-1883	-954	-1097	-863	-667	314	-1407	-1145	-1145		
		-----															-----	
48 POSS FED EXT WTHR. OBLG 24/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
49 FIRM S/D W/EXT WTHR. OBLIG	-767	-323	-657	-618	-1110	-996	-528	-1264	-336	-479	-245	-50	931	-794	-527	-527		
50 TOTAL S/D W/EXT WTHR. OBLIG	-1387	-943	-1277	-1238	-1731	-1610	-1142	-1883	-954	-1097	-863	-667	314	-1407	-1145	-1145		

BE SHOWN AS POWER SALES UNTIL THEY EXPIRE.																		

- NOTE: 1. BPA SURPLUS POWER SALES CONTRACTS WITH THE PSW ARE SHOWN AS POWER SALES UNTIL THEY EXPIRE.
2. BPA SURPLUS POWER SALES CONTRACT WITH PSP&L IS SHOWN AS A POWER SALE THROUGH JUNE 30, 2001. THE CONTRACT THEN CONVERTS TO A SEASONAL POWER EXCHANGE WHICH EXPIRES JULY 1, 2008.
3. THE FOLLOWING BPA CONTRACTS ARE RESOURCE OPTIONS AND NOT INCLUDED IN THIS ANALYSIS.
- A. BGP TO BPA, SUPPLEMENTAL ENERGY
 - B. SCE TO BPA, SUPPLEMENTAL ENERGY
 - C. SCE TO BPA, OPTION ENERGY

EXHIBIT 8 (continued)

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EXHIBITS 9 - 13
FEDERAL SYSTEM MONTHLY 50-HOUR CAPACITY
SURPLUS/DEFICIT UNDER THE FIVE LOAD
SCENARIOS FOR 1930 WATER CONDITIONS

TABLE F-1: 50-HOUR SUSTAINED PEAKING
BASE CASE: EXISTING FEDERAL CONTRACTS

FEDERAL SYSTEM FIRM 50-HOUR CAPACITY SURPLUS/DEFICIT
INCLUDING EXTREME WEATHER ADJUSTMENTS DURING NOVEMBER THROUGH FEBRUARY

20 YEAR MONTHLY SUMMARY

ASSUMING NO NIGHTTIME RETURN CONSTRAINTS,
EXISTING FEDERAL CONTRACTS, AND NO NEW RESOURCE ACQUISITIONS

H I G H L O A D S

1993 WHITEBOOK: 12/19/93
RUN DATE: 12/20/93

1930 WATER YEAR	AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN	JUL
PEAK IN MEGAWATTS														
1994-95	3402	3817	2166	2033	1593	1340	1448	564	3449	3006	2083	3739	1217	1287
1995-96	4164	4579	2933	2767	2033	1776	1868	1014	4010	3708	2856	4574	1986	2264
1996-97	4228	4643	3020	2738	1855	1564	1548	718	3909	3631	2775	4896	2372	2272
1997-98	4280	4696	3059	2421	1405	1061	1149	351	3490	3291	2471	4612	2108	2015
1998-99	3208	4160	2247	1682	508	769	641	-79	3163	2618	1947	4257	3705	2152
1999-00	2913	3865	1961	1393	-201	-46	-197	-881	2510	2329	1680	4033	3831	2195
2000-01	2842	3792	1880	1258	-452	-325	-381	-1063	2387	2226	1576	3988	3815	2307
2001-02	3167	4117	2199	1791	-556	-450	-586	-1248	2538	2129	1481	3948	3795	2500
2002-03	2988	3956	2032	1557	-876	-807	-926	-1573	2288	1465	816	3363	3228	1937
2003-04	2382	3395	1445	908	-1600	-1560	-1714	-2335	1592	1198	549	3142	3044	1755

- NOTE: 1. BPA SURPLUS POWER SALES CONTRACTS WITH THE PSW ARE SHOWN AS POWER SALES UNTIL THEY EXPIRE.
2. BPA SURPLUS POWER SALES CONTRACT WITH PSP&L IS SHOWN AS A POWER SALE THROUGH JUNE 30, 2001. THE CONTRACT THEN CONVERTS TO A SEASONAL POWER EXCHANGE WHICH EXPIRES JULY 1, 2008.
3. THE FOLLOWING BPA CONTRACTS ARE RESOURCE OPTIONS AND NOT INCLUDED IN THIS ANALYSIS.
- A. BGP TO BPA, SUPPLEMENTAL ENERGY
 - B. SCE TO BPA, SUPPLEMENTAL ENERGY
 - C. SCE TO BPA, OPTION ENERGY

TABLE F-1: 50-HOUR SUSTAINED PEAKING
BASE CASE: EXISTING FEDERAL CONTRACTS

FEDERAL SYSTEM FIRM 50-HOUR CAPACITY SURPLUS/DEFICIT
INCLUDING EXTREME WEATHER ADJUSTMENTS DURING NOVEMBER THROUGH FEBRUARY

20 YEAR MONTHLY SUMMARY

ASSUMING NO NIGHTTIME RETURN CONSTRAINTS,
EXISTING FEDERAL CONTRACTS, AND NO NEW RESOURCE ACQUISITIONS

M E D I U M - H I G H L O A D S

1993 WHITEBOOK: 12/19/93
RUN DATE: 12/20/93

1930 WATER YEAR	AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN	JUL
PEAK IN MEGAWATTS														
1994-95	3713	4122	2477	2375	2126	1917	2204	1281	3954	3484	2560	4173	1581	1647
1995-96	4547	4954	3294	3204	2721	2528	2809	1908	4640	4303	3451	5119	2436	2718
1996-97	4705	5120	3478	3294	2690	2483	2675	1787	4718	4330	3473	5535	2899	2825
1997-98	4838	5253	3626	3084	2401	2160	2410	1546	4443	4107	3250	5323	2732	2644
1998-99	3841	4792	2888	2425	1624	2003	2073	1263	4218	3598	2821	5082	4447	2870
1999-00	3638	4589	2697	2217	1039	1356	1412	613	3688	3442	2664	4940	4647	2996
2000-01	3643	4591	2700	2189	920	1213	1342	559	3673	3438	2689	4971	4695	3198
2001-02	3999	4946	3054	2795	899	1184	1236	466	3896	3410	2688	4972	4714	3396
2002-03	3898	4846	2949	2671	715	959	1033	274	3756	2852	2173	4465	4216	2903
2003-04	3405	4354	2447	2190	157	350	393	-338	3176	2689	2038	4336	4102	2791

- NOTE: 1. BPA SURPLUS POWER SALES CONTRACTS WITH THE PSW ARE SHOWN AS POWER SALES UNTIL THEY EXPIRE.
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 - B. SCE TO BPA, SUPPLEMENTAL ENERGY
 - C. SCE TO BPA, OPTION ENERGY

TABLE F-1: 50-HOUR SUSTAINED PEAKING
BASE CASE: EXISTING FEDERAL CONTRACTS

FEDERAL SYSTEM FIRM 50-HOUR CAPACITY SURPLUS/DEFICIT
INCLUDING EXTREME WEATHER ADJUSTMENTS DURING NOVEMBER THROUGH FEBRUARY

20 YEAR MONTHLY SUMMARY

ASSUMING NO NIGHTTIME RETURN CONSTRAINTS,
EXISTING FEDERAL CONTRACTS, AND NO NEW RESOURCE ACQUISITIONS

M E D I U M L O A D S

1993 WHITEBOOK: 12/19/93
RUN DATE: 12/20/93

1930 WATER YEAR	AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN	JUL
PEAK IN MEGAWATTS														
1994-95	3930	4339	2696	2609	2440	2239	2787	1791	4329	3793	2869	4424	1805	1881
1995-96	4782	5188	3535	3470	3162	3029	3563	2583	5095	4673	3821	5421	2681	3091
1996-97	5079	5493	3830	3691	3237	3099	3658	2660	5339	4847	3990	5973	3272	3210
1997-98	5226	5641	4003	3548	3120	3003	3524	2524	5131	4678	3822	5805	3052	3071
1998-99	4265	5215	3307	2928	2419	2946	3014	2159	4934	4254	3477	5701	5037	3437
1999-00	4221	5171	3271	2851	1895	2286	2471	1624	4516	4157	3380	5620	5271	3617
2000-01	4280	5227	3329	2886	1867	2241	2499	1661	4572	4242	3463	5707	5375	3908
2001-02	4724	5671	3774	3590	1972	2341	2531	1699	4910	4342	3565	5813	5496	4155
2002-03	4670	5618	3717	3514	1877	2211	2420	1610	4830	3900	3122	5358	5041	3719
2003-04	4216	5163	3274	3080	1397	1726	1880	1078	4338	3796	3036	5274	4967	3647

- NOTE: 1. BPA SURPLUS POWER SALES CONTRACTS WITH THE PSW ARE SHOWN AS POWER SALES UNTIL THEY EXPIRE.
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TABLE F-1: 50-HOUR SUSTAINED PEAKING
BASE CASE: EXISTING FEDERAL CONTRACTS

FEDERAL SYSTEM FIRM 50-HOUR CAPACITY SURPLUS/DEFICIT
INCLUDING EXTREME WEATHER ADJUSTMENTS DURING NOVEMBER THROUGH FEBRUARY
20 YEAR MONTHLY SUMMARY
ASSUMING NO NIGHTTIME RETURN CONSTRAINTS,
EXISTING FEDERAL CONTRACTS, AND NO NEW RESOURCE ACQUISITIONS

M E D I U M - L O W L O A D S

1993 WHITEBOOK: 12/19/93
RUN DATE: 12/20/93

1930 WATER YEAR	AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN	JUL
PEAK IN MEGAWATTS														
1994-95	4247	4656	3019	2963	2907	2781	3573	2535	5018	4511	3587	5109	2474	2526
1995-96	5429	5834	4184	4145	3970	3860	4368	3385	5821	5440	4588	6166	3404	3673
1996-97	5687	6091	4440	4342	4133	4012	4443	3490	6032	5593	4736	6710	3953	3867
1997-98	5925	6331	4681	4263	4035	3893	4321	3381	5847	5451	4594	6589	3847	3756
1998-99	5001	5946	4017	3699	3375	3872	4116	3227	5740	5027	4250	6424	5676	4057
1999-00	4881	5830	3907	3585	2908	3358	3615	2732	5353	4953	4174	6363	5926	4260
2000-01	4959	5906	3990	3646	2911	3352	3682	2806	5453	5059	4282	6469	6047	4500
2001-02	5347	6293	4382	4293	2997	3419	3685	2829	5761	5107	4330	6522	6119	4775
2002-03	5315	6261	4362	4245	2930	3357	3643	2786	5724	4698	3920	6119	5721	4389
2003-04	4898	5845	3965	3837	2477	2908	3178	2307	5305	4640	3862	6060	5682	4339

- NOTE: 1. BPA SURPLUS POWER SALES CONTRACTS WITH THE PSW ARE SHOWN AS POWER SALES UNTIL THEY EXPIRE.
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 - C. SCE TO BPA, OPTION ENERGY

TABLE F-1: 50-HOUR SUSTAINED PEAKING
BASE CASE: EXISTING FEDERAL CONTRACTS

FEDERAL SYSTEM FIRM 50-HOUR CAPACITY SURPLUS/DEFICIT
INCLUDING EXTREME WEATHER ADJUSTMENTS DURING NOVEMBER THROUGH FEBRUARY
20 YEAR MONTHLY SUMMARY

ASSUMING NO NIGHTTIME RETURN CONSTRAINTS,
EXISTING FEDERAL CONTRACTS, AND NO NEW RESOURCE ACQUISITIONS

L O W L O A D S

1993 WHITEBOOK: 12/19/93
RUN DATE: 12/20/93

1930 WATER YEAR	AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN	JUL
PEAK IN MEGAWATTS														
1994-95	4528	4936	3303	3282	3320	3230	4340	3246	5637	5109	4185	5653	2988	3032
1995-96	5935	6341	4696	4726	4694	4628	5327	4247	6558	6148	5296	6803	4006	4264
1996-97	6280	6685	5047	4997	4963	4906	5548	4463	6855	6384	5527	7416	4618	4519
1997-98	6578	6983	5341	4982	4981	4922	5525	4458	6734	6299	5442	7346	4549	4444
1998-99	5695	6634	4714	4461	4416	4961	5395	4358	6682	5926	5148	7237	6412	4779
1999-00	5624	6562	4638	4388	4066	4616	5003	4026	6346	5901	5123	7231	6694	5013
2000-01	5744	6681	4754	4499	4181	4699	5156	4199	6502	6058	5279	7385	6850	5601
2001-02	6490	7426	5498	5513	4652	5198	5591	4633	7183	6474	5697	7805	7271	5912
2002-03	6502	7438	5512	5524	4652	5202	5609	4643	7192	6109	5331	7453	6926	5568
2003-04	6146	7093	5165	5179	4285	4820	5209	4273	6820	6094	5317	7437	6918	5556

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 - B. SCE TO BPA, SUPPLEMENTAL ENERGY
 - C. SCE TO BPA, OPTION ENERGY

EXHIBIT 13

EXHIBITS 14 - 16
FEDERAL SYSTEM MONTHLY CAPACITY ANALYSIS
UNDER MEDIUM LOADS FOR 1930 WATER
CONDITIONS

2 of 2

TABLE 2: FEDERAL SYSTEM

SHEET 1 OF 2

SUMMARY OF FEDERAL SYSTEM LOADS AND RESOURCES IN THE PACIFIC NORTHWEST REGION
UNDER THE PACIFIC NORTHWEST ELECTRIC POWER PLANNING AND CONSERVATION ACT

M E D I U M L O A D S

1994-95 OPERATING YEAR

1993 WHITEBOOK: 12/19/93
RUN DATE: 12/20/93

1930 WATER YEAR PEAK IN MEGAWATTS		AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN	JUL
LOADS															
1	FEDERAL AGENCIES	201	201	192	201	205	234	220	226	215	204	204	194	196	197
2	FEDERAL & GEN PUBLIC LOSSES	206	206	218	267	338	381	419	382	345	298	298	268	220	208
3	USBR	198	198	156	75	7	4	4	3	9	99	99	169	197	204
4	DSI ALUMINUM FIRM	2064	2064	2064	2064	2064	2064	2042	2042	2042	2042	2042	2042	2042	2028
5	DSI NON-ALUM FIRM	167	167	167	183	182	174	191	208	208	208	208	216	216	207
6	DSI FIRM LOSSES	65	65	67	72	79	83	87	85	81	77	77	75	67	65
7	SM & NON GEN PUB PURCH 1/	4232	4232	4223	4776	5318	5800	6124	5571	5394	5058	5058	4807	4328	4416
8	FIRM SYSTEM LOAD	7133	7133	7087	7638	8193	8740	9087	8517	8294	7986	7986	7771	7266	7325
TRANSFERS OUT															
9	EXPORTS 2/	1095	1095	1095	734	431	431	431	431	431	431	431	837	1095	1095
10	CONTRACTS OUT 3/	2038	2038	2067	2433	2821	2875	2849	2805	2606	2231	2231	1977	1995	2010
11	CSPE TO WEST GROUP UTIL 4/	666	666	666	666	666	666	666	666	666	576	576	576	576	576
12	GEN PUBLIC AGEN PURCH 5/	1234	1192	1314	1717	2053	2339	2495	2470	2172	2003	1995	1702	1339	1197
13	GEN PRIVATE UTIL PURCH 6/	150	150	150	150	150	150	150	150	150	150	150	150	150	150
14	FED DIVERSITY 7/	-1134	-1129	-1148	-1225	-1155	-871	-905	-859	-1155	-1052	-1051	-1161	-1144	-1138
15	FIRM LOADS	11181	11145	11231	12113	13158	14330	14773	14179	13164	12325	12317	11852	11276	11214
16	DSI ALUM TOP QUARTILE 8/	343	343	343	343	343	343	681	681	681	681	681	681	681	676
17	DSI NON-ALUMINUM TQ 8/	56	56	56	61	61	58	64	69	69	69	69	72	72	69
18	TOP QUARTILE LOSSES 8/	12	12	12	13	14	15	29	29	27	26	26	25	23	22
19	TOTAL LOADS	11592	11555	11642	12530	13576	14746	15546	14958	13941	13100	13093	12629	12051	11981
RESOURCES															
20	REGULATED HYDRO	20151	20515	20539	20588	20938	20892	20743	20533	19844	18787	18682	19019	19662	20342
21	INDEPENDENT HYDRO	687	681	684	694	674	636	633	760	766	793	791	690	683	670
22	MAY WATER BUDGET 9/	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	SUS. PKNG. ADJUSTMENT 10/	-3191	-3652	-5297	-4632	-2620	-2244	-1443	-2667	-2005	-2100	-2147	-1200	-6302	-5927
24	CAN. ENT. NON-FED(CSPE) 11/	162	162	162	162	162	162	162	162	162	138	138	138	138	138
25	CAN. ENT. NON-FED(CNDA) 12/	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	RESTORATION 13/	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	TOTAL HYDRO	17809	17706	16088	16812	19154	19446	20095	18788	18767	17618	17464	18647	14181	15223
28	SMALL THERMAL & MISC	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	COMBUSTION TURBINES	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	RENEWABLES	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	COGENERATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	IMPORTS 14/	258	258	287	353	406	460	434	390	362	201	89	0	138	279
33	CONTRACTS IN 15/	0	0	0	0	0	0	0	0	0	0	0	0	0	0
34	LARGE THERMAL 16/	1100	1100	1100	1100	1100	1100	1100	1100	1100	1100	0	0	1150	1150
35	RESOURCE ACQUISITIONS 17/	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	TOTAL RESOURCES	19167	19064	17475	18265	20660	21006	21629	20278	20229	18919	17553	18647	15469	16652

EXHIBIT 14

TABLE 2: FEDERAL SYSTEM (CONTINUED)

SUMMARY OF FEDERAL SYSTEM LOADS AND RESOURCES IN THE PACIFIC NORTHWEST REGION
UNDER THE PACIFIC NORTHWEST ELECTRIC POWER PLANNING AND CONSERVATION ACT

M E D I U M L O A D S

1993 WHITEBOOK: 12/19/93
RUN DATE: 12/20/93

1994-95 OPERATING YEAR

1930 WATER YEAR PEAK IN MEGAWATTS		AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN	JUL
37 HYD, SM THRM & MISC RES	18/	-1042	-1060	-1061	-1064	-1081	-1076	-1069	-1065	-1031	-979	-974	-985	-1017	-1051
38 LARGE THERMAL RESERVES	19/	-165	-165	-165	-165	-165	-165	-165	-165	-165	-165	0	0	-172	-172
39 SPINNING RESERVES	20/	-350	-359	-317	-335	-393	-422	-449	-402	-402	-371	-362	-407	-338	-315
40 DSI RESERVES	21/	765	765	765	772	774	773	773	778	776	775	775	777	774	766
41 FEDERAL HYDRO MAINT	22/	-3263	-2761	-2770	-2752	-2705	-1866	-1408	-1883	-1915	-2061	-1805	-1756	-1635	-2785
42 NET RESOURCES		15112	15483	13928	14722	17090	18250	19311	17540	17493	16117	15187	16276	13081	13095
43 FIRM SURPLUS/DEFICIT		3930	4339	2696	2609	3932	3920	4539	3361	4329	3793	2869	4424	1805	1881
44 TOTAL SURPLUS/DEFICIT		3520	3928	2285	2192	3514	3504	3765	2582	3552	3017	2094	3646	1030	1114
45 EXTREME WEATHER ADJ.	23/	0	0	0	0	-4	-5	-4	-5	0	0	0	0	0	0
46 FIRM S/D W/EXT WEATHER ADJ.		3930	4339	2696	2609	3928	3915	4535	3356	4329	3793	2869	4424	1805	1881
47 TOTAL S/D W/EXT WTHR. ADJ.		3520	3928	2285	2192	3510	3499	3761	2577	3552	3017	2094	3646	1030	1114
48 POSS FED EXT WTHR. OBLG	24/	0	0	0	0	-1488	-1675	-1748	-1565	0	0	0	0	0	0
49 FIRM S/D W/EXT WTHR. OBLIG		3930	4339	2696	2609	2440	2239	2787	1791	4329	3793	2869	4424	1805	1881
50 TOTAL S/D W/EXT WTHR. OBLIG		3520	3928	2285	2192	2022	1823	2013	1013	3552	3017	2094	3646	1030	1114

NOTE: 1. BPA SURPLUS POWER SALES CONTRACTS WITH THE PSW ARE SHOWN AS POWER SALES UNTIL THEY EXPIRE.

2. BPA SURPLUS POWER SALES CONTRACT WITH PSP&L IS SHOWN AS A POWER SALE THROUGH JUNE 30, 2001.
THE CONTRACT THEN CONVERTS TO A SEASONAL POWER EXCHANGE WHICH EXPIRES JULY 1, 2008.3. THE FOLLOWING BPA CONTRACTS ARE RESOURCE OPTIONS AND NOT INCLUDED IN THIS ANALYSIS.
A. BGP TO BPA, SUPPLEMENTAL ENERGY
B. SCE TO BPA, SUPPLEMENTAL ENERGY
C. SCE TO BPA, OPTION ENERGY

EXHIBIT 14 (continued)

TABLE 2: FEDERAL SYSTEM

SHEET 1 OF 2

SUMMARY OF FEDERAL SYSTEM LOADS AND RESOURCES IN THE PACIFIC NORTHWEST REGION
UNDER THE PACIFIC NORTHWEST ELECTRIC POWER PLANNING AND CONSERVATION ACT

M E D I U M L O A D S

1993 WHITEBOOK: 12/19/93

RUN DATE: 12/20/93

1930 WATER YEAR PEAK IN MEGAWATTS		1998-99 OPERATING YEAR												RUN DATE: 1	
		AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN	JUL
LOADS															
1	FEDERAL AGENCIES	206	206	196	207	211	241	225	233	221	209	209	199	201	202
2	FEDERAL & GEN PUBLIC LOSSES	203	203	214	264	344	387	430	391	350	293	293	259	208	198
3	USBR	199	199	157	76	7	4	4	3	9	99	99	169	197	204
4	DSI ALUMINUM FIRM	1837	1837	1837	1837	1837	1837	1836	1836	1836	1834	1834	1834	1834	1833
5	DSI NON-ALUM FIRM	233	233	232	230	228	200	207	223	222	220	220	218	217	207
6	DSI FIRM LOSSES	60	60	62	66	72	76	79	78	74	70	70	68	61	59
7	SM & NON GEN PUB PURCH 1/	4614	4614	4643	5225	5735	6199	6670	6050	5853	5465	5465	5180	4658	4753
8	FIRM SYSTEM LOAD	7352	7352	7341	7905	8434	8944	9451	8814	8565	8190	8190	7927	7376	7456
TRANSFERS OUT															
9	EXPORTS 2/	912	912	912	912	608	608	608	608	608	1250	1250	1297	1554	1554
10	CONTRACTS OUT 3/	409	409	438	804	1356	1410	1383	1340	1059	631	631	296	314	329
11	CSPE TO WEST GROUP UTIL 4/	416	416	416	416	416	416	416	416	416	200	200	200	200	200
12	GEN PUBLIC AGEN PURCH 5/	1466	1433	1503	1954	2335	2618	2904	2786	2466	2303	2296	1951	1543	1353
13	GEN PRIVATE UTIL PURCH 6/	150	150	150	150	150	150	150	150	150	150	150	150	150	150
14	FED DIVERSITY 7/	-970	-966	-983	-1082	-1055	-799	-852	-796	-1052	-925	-924	-988	-946	-934
15	FIRM LOADS	9735	9706	9778	11058	12244	13347	14060	13319	12213	11799	11792	10833	10191	10108
16	DSI ALUM TOP QUARTILE 8/	612	612	612	612	612	612	612	612	612	611	611	611	611	611
17	DSI NON-ALUMINUM TQ 8/	78	78	77	77	76	67	69	74	74	73	73	73	72	69
18	TOP QUARTILE LOSSES 8/	20	20	21	22	24	25	27	26	25	23	23	23	21	20
19	TOTAL LOADS	10445	10416	10488	11770	12957	14051	14767	14031	12923	12507	12500	11539	10895	10807
RESOURCES															
20	REGULATED HYDRO	20343	20531	20549	20592	20942	20894	20595	20082	19234	18271	18796	19263	19818	20381
21	INDEPENDENT HYDRO	687	681	684	694	674	636	633	760	766	793	791	690	683	670
22	MAY WATER BUDGET 9/	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	SUS. PKNG. ADJUSTMENT 10/	-4216	-3948	-5874	-5087	-3092	-2102	-1363	-2257	-1473	-1642	-2205	-1200	-4160	-5291
24	CAN. ENT. NON-FED(CSPE) 11/	96	96	96	96	96	96	96	96	96	46	46	46	46	46
25	CAN. ENT. NON-FED(CNDA) 12/	32	32	32	32	32	32	32	32	32	193	193	193	193	193
26	RESTORATION 13/	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	TOTAL HYDRO	16942	17392	15487	16327	18652	19556	19993	18713	18655	17661	17621	18992	16580	15999
28	SMALL THERMAL & MISC	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	COMBUSTION TURBINES	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	RENEWABLES	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	COGENERATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	IMPORTS 14/	13	13	42	108	161	215	189	145	117	89	89	0	18	34
33	CONTRACTS IN 15/	0	0	0	0	0	0	0	0	0	0	0	0	0	0
34	LARGE THERMAL 16/	1155	1155	1155	1155	1155	1155	1155	1155	1155	1155	0	0	1155	1155
35	RESOURCE ACQUISITIONS 17/	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	TOTAL RESOURCES	18110	18560	16684	17590	19968	20926	21337	20013	19927	18905	17710	18992	17753	17188

EXHIBIT 15

TABLE 2: FEDERAL SYSTEM (CONTINUED)

SHEET 2 OF 2

SUMMARY OF FEDERAL SYSTEM LOADS AND RESOURCES IN THE PACIFIC NORTHWEST REGION
UNDER THE PACIFIC NORTHWEST ELECTRIC POWER PLANNING AND CONSERVATION ACT

1930 WATER YEAR PEAK IN MEGAWATTS	M E D I U M L O A D S													
	1998-99 OPERATING YEAR													
	AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN	JUL
37 HYD, SM THRM & MISC RES	18/ -1052	-1061	-1062	-1064	-1081	-1076	-1061	-1042	-1000	-953	-979	-997	-1025	-1053
38 LARGE THERMAL RESERVES	19/ -173	-173	-173	-173	-173	-173	-173	-173	-173	-173	0	0	-173	-173
39 SPINNING RESERVES	20/ -331	-354	-305	-326	-383	-427	-449	-404	-403	-373	-364	-411	-394	-332
40 DSI RESERVES	21/ 709	709	710	710	712	704	707	712	710	707	707	706	703	699
41 FEDERAL HYDRO MAINT	22/ -3263	-2761	-2770	-2752	-2705	-1866	-1408	-1883	-1915	-2061	-1805	-1756	-1635	-2785
42 NET RESOURCES	14000	14921	13084	13986	16337	18087	18953	17222	17147	16053	15270	16533	15229	13544
43 FIRM SURPLUS/DEFICIT	4265	5215	3307	2928	4093	4741	4893	3903	4934	4254	3477	5701	5037	3437
44 TOTAL SURPLUS/DEFICIT	3555	4505	2596	2217	3380	4037	4185	3191	4224	3546	2769	4994	4333	2737
45 EXTREME WEATHER ADJ.	23/ 0	0	0	0	-4	-5	-5	-5	0	0	0	0	0	0
46 FIRM S/D W/EXT WEATHER ADJ.	4265	5215	3307	2928	4089	4736	4888	3898	4934	4254	3477	5701	5037	3437
47 TOTAL S/D W/EXT WTHR. ADJ.	3555	4505	2596	2217	3376	4032	4180	3186	4224	3546	2769	4994	4333	2737
48 POSS FED EXT WTHR. OBLG	24/ 0	0	0	0	-1670	-1790	-1873	-1740	0	0	0	0	0	0
49 FIRM S/D W/EXT WTHR. OBLIG	4265	5215	3307	2928	2419	2946	3014	2159	4934	4254	3477	5701	5037	3437
50 TOTAL S/D W/EXT WTHR. OBLIG	3555	4505	2596	2217	1706	2241	2307	1446	4224	3546	2769	4994	4333	2737

- NOTE: 1. BPA SURPLUS POWER SALES CONTRACTS WITH THE PSW ARE SHOWN AS POWER SALES UNTIL THEY EXPIRE.
2. BPA SURPLUS POWER SALES CONTRACT WITH PSP&L IS SHOWN AS A POWER SALE THROUGH JUNE 30, 2001. THE CONTRACT THEN CONVERTS TO A SEASONAL POWER EXCHANGE WHICH EXPIRES JULY 1, 2008.
3. THE FOLLOWING BPA CONTRACTS ARE RESOURCE OPTIONS AND NOT INCLUDED IN THIS ANALYSIS.
- A. BGP TO BPA, SUPPLEMENTAL ENERGY
 - B. SCE TO BPA, SUPPLEMENTAL ENERGY
 - C. SCE TO BPA, OPTION ENERGY

EXHIBIT 15 (continued)

TABLE 2: FEDERAL SYSTEM

SHEET 1 OF 2

SUMMARY OF FEDERAL SYSTEM LOADS AND RESOURCES IN THE PACIFIC NORTHWEST REGION
UNDER THE PACIFIC NORTHWEST ELECTRIC POWER PLANNING AND CONSERVATION ACT

M E D I U M L O A D S

2003- 4 OPERATING YEAR

1993 WHITEBOOK: 12/19/93
RUN DATE: 12/20/93

1930 WATER YEAR PEAK IN MEGAWATTS		AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN	JUL
LOADS															
1	FEDERAL AGENCIES	212	212	202	212	217	249	232	240	228	215	215	205	206	207
2	FEDERAL & GEN PUBLIC LOSSES	200	200	210	256	349	395	439	398	346	303	303	266	213	204
3	USBR	200	200	157	76	7	4	4	3	9	100	100	170	198	205
4	DSI ALUMINUM FIRM	1671	1671	1671	1671	1671	1662	1662	1662	1662	1661	1661	1662	1661	1660
5	DSI NON-ALUM FIRM	184	184	184	184	184	157	166	184	184	184	184	184	184	176
6	DSI FIRM LOSSES	54	54	56	60	65	68	71	70	67	63	63	61	56	53
7	SM & NON GEN PUB PURCH	1/ 4883	4883	4915	5552	6161	6695	7123	6462	6255	5803	5804	5501	4954	5035
8	FIRM SYSTEM LOAD	7404	7404	7395	8011	8654	9239	9697	9019	8751	8329	8330	8049	7472	7540
TRANSFERS OUT															
9	EXPORTS	2/ 1928	1928	1928	1928	1882	1882	1882	1882	1882	1882	1882	1929	1929	1929
10	CONTRACTS OUT	3/ 117	117	146	212	1056	1111	1084	1041	467	439	439	104	122	138
11	CSPE TO WEST GROUP UTIL	4/ 0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	GEN PUBLIC AGEN PURCH	5/ 1711	1680	1729	2221	2788	3138	3401	3275	2878	2582	2555	2213	1719	1562
13	GEN PRIVATE UTIL PURCH	6/ 0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	FED DIVERSITY	7/ -926	-922	-936	-1014	-1057	-811	-860	-799	-1017	-934	-932	-995	-938	-929
15	FIRM LOADS	10234	10207	10262	11358	13323	14559	15205	14418	12960	12298	12275	11300	10305	10240
16	DSI ALUM TOP QUARTILE	8/ 557	557	557	557	557	557	554	554	554	554	554	554	554	553
17	DSI NON-ALUMINUM TQ	8/ 61	61	61	61	61	53	55	61	61	61	61	61	61	59
18	TOP QUARTILE LOSSES	8/ 18	18	19	20	22	23	24	23	22	21	21	20	19	18
19	TOTAL LOADS	10871	10844	10899	11996	13963	15191	15838	15057	13598	12934	12911	11936	10938	10869
RESOURCES															
20	REGULATED HYDRO	20343	20531	20549	20592	20942	20894	20595	20082	19234	18271	18796	19263	19818	20381
21	INDEPENDENT HYDRO	687	681	684	694	674	636	633	760	766	793	791	690	683	670
22	MAY WATER BUDGET	9/ 0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	SUS. PKNG. ADJUSTMENT	10/ -4216	-3948	-5874	-5087	-3092	-2102	-1363	-2257	-1473	-1642	-2205	-1200	-4160	-5291
24	CAN. ENT. NON-FED(CSPE)	11/ 0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	CAN. ENT. NON-FED(CNDA)	12/ 352	352	352	352	352	352	352	352	352	352	352	352	352	352
26	RESTORATION	13/ 0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	TOTAL HYDRO	17166	17616	15711	16551	18876	19780	20217	18937	18879	17774	17734	19105	16693	16112
28	SMALL THERMAL & MISC	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	COMBUSTION TURBINES	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	RENEWABLES	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	COGENERATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	IMPORTS	14/ 13	13	42	108	161	215	189	145	117	89	89	0	18	34
33	CONTRACTS IN	15/ 300	300	300	300	0	0	0	0	0	0	0	0	0	300
34	LARGE THERMAL	16/ 1155	1155	1155	1155	1155	1155	1155	1155	1155	1155	1155	0	1155	1155
35	RESOURCE ACQUISITIONS	17/ 0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	TOTAL RESOURCES	18634	19084	17208	18114	20192	21150	21561	20237	20151	19018	17823	19105	17866	17601

EXHIBIT 16

TABLE 2: FEDERAL SYSTEM (CONTINUED)

SUMMARY OF FEDERAL SYSTEM LOADS AND RESOURCES IN THE PACIFIC NORTHWEST REGION
UNDER THE PACIFIC NORTHWEST ELECTRIC POWER PLANNING AND CONSERVATION ACT

M E D I U M L O A D S															
2003- 4 OPERATING YEAR															
1993 WHITEBOOK: 12/19/93															
RUN DATE: 12/20/93															
1930 WATER YEAR PEAK IN MEGAWATTS	AUG		SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR		MAY	JUN	JUL	
	1-15	16-31								1-15	16-30				
37 HYD,SM THRM & MISC RES	18/	-1052	-1061	-1062	-1064	-1081	-1076	-1061	-1042	-1000	-953	-979	-998	-1025	-1053
38 LARGE THERMAL RESERVES	19/	-173	-173	-173	-173	-173	-173	-173	-173	-173	-173	0	0	-173	-173
39 SPINNING RESERVES	20/	-331	-354	-305	-326	-383	-427	-449	-404	-403	-373	-364	-411	-394	-332
40 DSI RESERVES	21/	636	636	636	638	639	631	632	638	637	635	635	635	633	629
41 FEDERAL HYDRO MAINT	22/	-3263	-2761	-2770	-2752	-2705	-1866	-1408	-1883	-1915	-2061	-1805	-1756	-1635	-2785
42 NET RESOURCES		14450	15371	13535	14438	16489	18239	19102	17373	17298	16094	15311	16575	15272	13887
43 FIRM SURPLUS/DEFICIT		4216	5163	3274	3080	3166	3680	3898	2955	4338	3796	3036	5274	4967	3647
44 TOTAL SURPLUS/DEFICIT		3580	4527	2636	2442	2526	3048	3264	2316	3700	3160	2400	4639	4333	3018
45 EXTREME WEATHER ADJ.	23/	0	0	0	0	-4	-5	-5	-5	0	0	0	0	0	0
46 FIRM S/D W/EXT WEATHER ADJ.		4216	5163	3274	3080	3162	3675	3893	2950	4338	3796	3036	5274	4967	3647
47 TOTAL S/D W/EXT WTHR. ADJ.		3580	4527	2636	2442	2522	3043	3259	2311	3700	3160	2400	4639	4333	3018
48 POSS FED EXT WTHR. OBLG	24/	0	0	0	0	-1764	-1950	-2012	-1871	0	0	0	0	0	0
49 FIRM S/D W/EXT WTHR. OBLIG		4216	5163	3274	3080	1397	1726	1880	1078	4338	3796	3036	5274	4967	3647
50 TOTAL S/D W/EXT WTHR. OBLIG		3580	4527	2636	2442	757	1093	1247	440	3700	3160	2400	4639	4333	3018

NOTE: 1. BPA SURPLUS POWER SALES CONTRACTS WITH THE PSW ARE SHOWN AS POWER SALES UNTIL THEY EXPIRE.

2. BPA SURPLUS POWER SALES CONTRACT WITH PSP&L IS SHOWN AS A POWER SALE THROUGH JUNE 30, 2001.
THE CONTRACT THEN CONVERTS TO A SEASONAL POWER EXCHANGE WHICH EXPIRES JULY 1, 2008.3. THE FOLLOWING BPA CONTRACTS ARE RESOURCE OPTIONS AND NOT INCLUDED IN THIS ANALYSIS.
A. BGP TO BPA, SUPPLEMENTAL ENERGY
B. SCE TO BPA, SUPPLEMENTAL ENERGY
C. SCE TO BPA, OPTION ENERGY

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FEDERAL SYSTEM FOOTNOTES

For Exhibits 1 through 16

1. BPA's small and nongenerating public agencies' purchases are requirements these agencies place on BPA under their power sales contracts and BPA's partnership program. BPA's obligation is each agency's net firm load requirement not served by its own dedicated resources.
2. BPA's exports include surplus firm power sales to the cities of Burbank, Glendale, and Pasadena, and to Southern California Edison; BPA's surplus firm power sale to M-S-R Power agency, which converts to a capacity sale on November 1, 2009; BPA's capacity contracts with the cities of Anaheim and Riverside; BPA's capacity for exchange energy with deferred return with the Sacramento Municipal Utility District and San Diego Gas and Electric; BPA's contract with BC Hydro for Canadian Entitlement beginning April 1, 1998; and BPA's Northwest-Southwest Intertie losses.
3. BPA's contracts out include its contracts of Canadian Entitlement capacity and supplemental capacity to Pacific Northwest public agencies and IOUs, which expire March 31, 2003; BPA's contracts with Clark County PUD and other public agencies (Packwood Lake); BPA's WNP-1 obligation contracts with Montana Power Company, Pacific Power and Light, Portland General Electric, Puget Sound Power and Light, and Washington Water Power; BPA's WNP-3 settlement contracts with Pacific Power and Light, Portland General Electric, Puget Sound Power and Light, and Washington Water Power; BPA's power transfer through Pacific Power and Light's system to serve BPA's Southern Idaho load; BPA's capacity sale with Montana Power Company; BPA's surplus firm power sale to Puget Sound Power and Light, which converts to a seasonal power exchange in OY 2001-02; BPA's surplus firm capacity sale to Washington Water Power; BPA's bridge capacity sale to Pacific Power and Light through July 31, 1995; and BPA's Baker Head loss replacement with Puget Sound Power and Light.
4. Columbia Storage Power Exchange (CSPE) is the sale of the Canadian share of downstream benefits under the Columbia River Treaty with Canada to a group of Northwest utilities, expiring April 1, 2003.
5. BPA's generating public agencies' purchases are requirements which these agencies place on BPA under their power sales contracts and BPA's partnership program. BPA's obligation is each agency's net firm load requirement not served by its own dedicated resources. These contracts actually expire June 30, 2001; however, they are assumed to remain in effect through the 20-year study period.
6. Generating private utility purchase is the contracted peak and energy requirement placed on the Federal system under the IOUs' power sales contracts with BPA.

Portland General Electric is purchasing capacity through June 30, 1999. These contracts actually expire June 30, 2001; however, they are assumed to remain in effect through the 10-year study period.

7. Federal diversity is a percentage reduction applied to the Federal system non-coincidental peak utility requirements. This is due to the fact that all peaking electrical loads do not occur simultaneously throughout the region.
8. DSIs' aluminum and nonaluminum top quartile load and associated line losses are BPA's interruptible loads.
9. May Water Budget is the energy loss due to the overgeneration which may be unusable as a firm resource on the Federal system. This is a new adjustment due to the use of a 42-month critical period average hydro number rather than the 39-month critical period average hydro number used in last year's study.
10. Sustained peaking adjustment is a percentage reduction applied to the Federal hydro system to meet a capacity load of 50 hours per week. This adjustment also includes reductions for Federal hydro maintenance, spinning reserves, forced outage reserves, and summer flow augmentation on the Lower Snake River and John Day hydro projects.
11. Canadian Entitlement Return non-Federal to the Columbia River Storage Exchange (CSPE) reflects the public agencies' and IOUs' obligation of Canadian Entitlement allocation to the Northwest entities of the CSPE, which expires March 31, 2003.
12. Canadian Entitlement Return non-Federal to Canada reflects the Federal system, public agencies', and IOUs' obligation of Canadian Entitlement allocation to Canada, which begins April 1, 1998.
13. Restoration adjusts for the losses and gains of the hydro system due to Canadian storage under the terms of the Pacific Northwest Coordination Agreement. It is an obligation to those utilities that gained generation from the addition of Canadian storage, and a resource gain to utilities that lost generation from Canadian storage.
14. Imports includes exchange energy to BPA from the cities of Anaheim and Riverside; exchange energy from the M-S-R Public Power Agency after its surplus firm sale converts to a capacity/energy exchange beginning November 1, 2009; exchange energy returned from San Diego Gas and Electric; deferred energy return from Sacramento Municipal Utility District and San Diego Gas and Electric; power purchases from Basin Electric Cooperative and Trans Alta; and power from Pacific Power and Light's Wyoming Division to serve BPA's Southern Idaho load.
15. Federal contracts in includes exchange energy to BPA from Montana Power Company; WNP-3 settlement exchange energy from Pacific Power and Light, Portland General Electric, Puget Sound Power and Light, and Washington Water Power; and seasonal power exchange energy from Puget Sound Power and Light beginning in OY 2001-02; and power purchases from Puget Sound Power and Light and Montana Power Company.
16. Federal large thermal includes the generation from WNP-2, operated by WPPSS.

17. Resource acquisitions are resources BPA has identified and contracted for future purchase. When new Federal resource acquisitions are contracted for and/or on-line, they will be included in the loads and resources balance.
18. Hydro, small thermal and miscellaneous resources, and combustion turbine reserve requirements are estimated at 5 percent of the Federal capacity of these resources.
19. Large thermal reserve requirements are estimated at 15 percent of the WNP-2 nuclear project.
20. Federal spinning reserve is the reserve generating capacity maintained to provide a regulating margin for the automatic generation and frequency control of power generation.
21. Direct service industrial reserve requirements are one-third of the industrial firm load, or the sum of the reserve requirements for Federal hydro, small thermal and miscellaneous resources, combustion turbines, and large thermal resources, whichever is smaller.
22. Hydro maintenance is the sum of all Federal hydro project maintenance based on the mean of the 1983-84 through 1988-89 schedules submitted to the Northwest Power Pool.
23. Extreme weather adjustment for BPA's directly served loads.
24. Possible Federal extreme weather adjustment is the possible load on BPA by public agencies customers having the right to place this obligation on BPA.

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SECTION VIII

REGIONAL SYSTEM EXHIBITS

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EXHIBITS 17 - 21
REGIONAL CRITICAL PERIOD ANALYSIS
ENERGY FOR 10 OPERATING YEARS

TABLE 1: PACIFIC NORTHWEST REGIONAL AREA

SUMMARY OF PACIFIC NORTHWEST REGIONAL LOADS AND RESOURCES
UNDER THE PACIFIC NORTHWEST ELECTRIC POWER PLANNING AND CONSERVATION ACT

		H I G H L O A D S								1993 WHITEBOOK: 12/19/93			
		OPERATING YEAR										RUN DATE: 12/20/93	
MEGAHATTS		1994-95 AVG	1995-96 AVG	1996-97 AVG	1997-98 AVG	1998-99 AVG	1999- 0 AVG	2000- 1 AVG	2001- 2 AVG	2002- 3 AVG	2003- 4 AVG		
LOADS													
1	SYSTEM FIRM LOADS	1/	21593	22232	22906	23527	24088	24635	25162	25583	26107	26639	
2	SYSTEM TOTAL LOADS	2/	22438	23076	23750	24371	24931	25477	26002	26394	26916	27446	
3	EXPORTS	3/	1311	1312	1298	1295	1411	1535	1525	1525	1601	1731	
4	FED DIVERSITY	4/	0	0	0	0	0	0	0	0	0	0	
5	FIRM LOADS		22904	23544	24204	24822	25499	26170	26687	27108	27708	28370	
6	TOTAL LOADS		23749	24388	25048	25666	26342	27012	27527	27919	28517	29177	
RESOURCES													
7	REGULATED HYDRO	5/	12049	12041	12056	12057	12109	12110	12111	12107	12108	12110	
8	INDEPENDENT HYDRO	6/	977	970	989	991	991	992	992	989	990	992	
9	MAY WATER BUDGET	7/	-265	-265	-265	-265	-265	-265	-265	-265	-265	-265	
10	SUS. PKNG. ADJUSTMENT	8/	0	0	0	0	0	0	0	0	0	0	
11	TOTAL HYDRO		12761	12746	12780	12783	12835	12837	12838	12831	12833	12837	
12	SMALL THERMAL & MISC	9/	51	45	56	57	57	58	58	56	57	57	
13	COMBUSTION TURBINES	10/	485	485	485	488	585	585	585	585	585	585	
14	RENEWABLES	11/	42	43	43	43	43	43	43	44	44	44	
15	COGENERATION	12/	50	271	301	301	301	301	301	301	301	301	
16	IMPORTS	13/	1968	1687	1651	1579	1538	1544	1563	1496	1535	1541	
17	CENTRALIA		1185	1165	1164	1187	1186	1187	1185	1165	1164	1188	
18	JIM BRIDGER		578	584	572	584	584	578	578	584	572	584	
19	COLSTRIP 1 & 2		346	335	357	358	357	358	359	354	356	358	
20	BOARDMAN		385	385	385	385	385	385	385	385	385	385	
21	VALMY		195	195	195	195	195	195	195	195	195	194	
22	COLSTRIP 3		502	493	509	511	510	511	511	508	508	510	
23	WNP 2		715	747	751	751	751	751	751	751	751	751	
24	COLSTRIP 4		617	618	617	617	617	617	617	617	617	617	
25	FED RESOURCE ACQUIS	14/	0	0	0	0	0	0	0	0	0	0	
26	NON-UTILITY GENERATION	15/	984	1032	1062	1062	1054	1054	1054	1022	998	999	
27	TOTAL RESOURCES		20864	20831	20928	20901	20998	21004	21023	20894	20901	20951	
28	HYD,SM THRM & MISC RES	16/	0	0	0	0	0	0	0	0	0	0	
29	LARGE THERMAL RESERVES	17/	0	0	0	0	0	0	0	0	0	0	
30	BPA SPINNING RESERVES	18/	0	0	0	0	0	0	0	0	0	0	
31	DSI RESERVES	19/	0	0	0	0	0	0	0	0	0	0	
32	HYDRO MAINTENANCE	20/	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11	
33	NET RESOURCES		20853	20820	20917	20890	20987	20993	21012	20883	20890	20940	
34	FIRM SURPLUS/DEFICIT		-2051	-2724	-3288	-3933	-4512	-5177	-5675	-6225	-6818	-7430	
35	TOTAL SURPLUS/DEFICIT		-2896	-3568	-4131	-4776	-5356	-6019	-6515	-7036	-7627	-8237	
36	EXTREME WEATHER ADJ.	21/	0	0	0	0	0	0	0	0	0	0	
37	FIRM S/D W/EXT WEATHER ADJ.		-2051	-2724	-3288	-3933	-4512	-5177	-5675	-6225	-6818	-7430	
38	TOTAL S/D W/EXT WTHR. ADJ.		-2896	-3568	-4131	-4776	-5356	-6019	-6515	-7036	-7627	-8237	

EXHIBIT 17

TABLE 1: PACIFIC NORTHWEST REGIONAL AREA

SUMMARY OF PACIFIC NORTHWEST REGIONAL LOADS AND RESOURCES
UNDER THE PACIFIC NORTHWEST ELECTRIC POWER PLANNING AND CONSERVATION ACT

M E D I U M - H I G H L O A D S

		OPERATING YEAR									1993 WHITEBOOK: 12/19/93 RUN DATE: 12/20/93	
MEGAHATTS		1994-95 AVG	1995-96 AVG	1996-97 AVG	1997-98 AVG	1998-99 AVG	1999- 0 AVG	2000- 1 AVG	2001- 2 AVG	2002- 3 AVG	2003- 4 AVG	
LOADS												
1	SYSTEM FIRM LOADS	1/	20611	20982	21394	21787	22141	22482	22801	23072	23399	23731
2	SYSTEM TOTAL LOADS	2/	21422	21783	22197	22590	22941	23277	23589	23846	24170	24499
3	EXPORTS	3/	1311	1312	1298	1295	1411	1535	1525	1525	1601	1731
4	FED DIVERSITY	4/	0	0	0	0	0	0	0	0	0	0
5	FIRM LOADS		21922	22294	22692	23082	23552	24017	24326	24597	25000	25462
6	TOTAL LOADS		22733	23095	23495	23885	24352	24812	25114	25371	25771	26230
RESOURCES												
7	REGULATED HYDRO	5/	12046	12037	12051	12051	12103	12103	12103	12098	12099	12100
8	INDEPENDENT HYDRO	6/	975	966	985	986	986	985	986	982	982	983
9	MAY WATER BUDGET	7/	-265	-265	-265	-265	-265	-265	-265	-265	-265	-265
10	SUS. PKNG. ADJUSTMENT	8/	0	0	0	0	0	0	0	0	0	0
11	TOTAL HYDRO		12756	12738	12771	12772	12824	12823	12824	12815	12816	12818
12	SMALL THERMAL & MISC	9/	49	42	52	53	52	53	53	49	50	50
13	COMBUSTION TURBINES	10/	485	485	485	488	585	585	585	585	585	585
14	RENEWABLES	11/	42	43	43	43	43	43	43	44	44	44
15	COGENERATION	12/	50	271	301	301	301	301	301	301	301	301
16	IMPORTS	13/	1947	1660	1618	1540	1493	1495	1508	1436	1469	1470
17	CENTRALIA		1185	1165	1164	1187	1186	1187	1185	1165	1164	1188
18	JIM BRIDGER		578	584	572	584	584	578	578	584	572	584
19	COLSTRIP 1 & 2		341	329	349	350	348	348	348	342	343	344
20	BOARDMAN		385	385	385	385	385	385	385	385	385	385
21	VALMY		195	195	195	195	195	195	195	195	195	194
22	COLSTRIP 3		498	489	504	504	503	503	503	498	499	500
23	WNP 2		715	747	751	751	751	751	751	751	751	751
24	COLSTRIP 4		617	618	617	617	617	617	617	618	617	617
25	FED RESOURCE ACQUIS	14/	0	0	0	0	0	0	0	0	0	0
26	NON-UTILITY GENERATION	15/	984	1030	1059	1059	1051	1051	1051	1018	994	994
27	TOTAL RESOURCES		20827	20781	20866	20829	20918	20915	20927	20786	20785	20825
28	HYD, SM THRM & MISC RES	16/	0	0	0	0	0	0	0	0	0	0
29	LARGE THERMAL RESERVES	17/	0	0	0	0	0	0	0	0	0	0
30	BPA SPINNING RESERVES	18/	0	0	0	0	0	0	0	0	0	0
31	DSI RESERVES	19/	0	0	0	0	0	0	0	0	0	0
32	HYDRO MAINTENANCE	20/	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11
33	NET RESOURCES		20816	20770	20855	20818	20907	20904	20916	20775	20774	20814
34	FIRM SURPLUS/DEFICIT		-1106	-1524	-1837	-2265	-2646	-3113	-3410	-3822	-4226	-4648
35	TOTAL SURPLUS/DEFICIT		-1917	-2325	-2640	-3067	-3445	-3908	-4198	-4596	-4997	-5416
36	EXTREME WEATHER ADJ.	21/	0	0	0	0	0	0	0	0	0	0
37	FIRM S/D W/EXT WEATHER ADJ.		-1106	-1524	-1837	-2265	-2646	-3113	-3410	-3822	-4226	-4648
38	TOTAL S/D W/EXT WTHR. ADJ.		-1917	-2325	-2640	-3067	-3445	-3908	-4198	-4596	-4997	-5416

EXHIBIT 18

TABLE 1: PACIFIC NORTHWEST REGIONAL AREA

SUMMARY OF PACIFIC NORTHWEST REGIONAL LOADS AND RESOURCES
UNDER THE PACIFIC NORTHWEST ELECTRIC POWER PLANNING AND CONSERVATION ACT

		M E D I U M L O A D S								1993 WHITEBOOK:		12/19/93
		OPERATING YEAR										12/20/93
MEGAHATTS		1994-95 AVG	1995-96 AVG	1996-97 AVG	1997-98 AVG	1998-99 AVG	1999- 0 AVG	2000- 1 AVG	2001- 2 AVG	2002- 3 AVG	2003- 4 AVG	
LOADS												
1	SYSTEM FIRM LOADS	1/	20042	20269	20430	20687	20931	21133	21322	21408	21615	21825
2	SYSTEM TOTAL LOADS	2/	20649	21016	21126	21381	21618	21811	21987	22033	22236	22443
3	EXPORTS	3/	1311	1312	1298	1295	1411	1535	1525	1525	1601	1731
4	FED DIVERSITY	4/	0	0	0	0	0	0	0	0	0	0
5	FIRM LOADS		21353	21581	21728	21982	22342	22668	22847	22933	23216	23556
6	TOTAL LOADS		21960	22328	22424	22676	23029	23346	23512	23558	23837	24174
RESOURCES												
7	REGULATED HYDRO	5/	12044	12035	12048	12049	12100	12099	12099	12094	12095	12095
8	INDEPENDENT HYDRO	6/	973	965	983	983	983	982	982	978	979	980
9	MAY WATER BUDGET	7/	-265	-265	-265	-265	-265	-265	-265	-265	-265	-265
10	SUS. PKNG. ADJUSTMENT	8/	0	0	0	0	0	0	0	0	0	0
11	TOTAL HYDRO		12752	12735	12766	12767	12818	12817	12816	12807	12809	12810
12	SMALL THERMAL & MISC	9/	48	41	51	51	50	50	50	46	47	47
13	COMBUSTION TURBINES	10/	485	485	485	488	585	585	585	585	585	585
14	RENEWABLES	11/	42	43	43	43	43	43	43	44	44	44
15	COGENERATION	12/	50	271	301	301	301	301	301	301	301	301
16	IMPORTS	13/	1937	1648	1603	1522	1473	1471	1482	1407	1437	1434
17	CENTRALIA		1186	1165	1164	1188	1186	1187	1185	1165	1164	1188
18	JIM BRIDGER		578	584	572	584	584	578	578	584	572	584
19	COLSTRIP 1 & 2		339	326	346	346	344	343	343	336	337	337
20	BOARDMAN		385	385	385	385	385	385	385	385	385	385
21	VALMY		195	195	196	195	194	195	195	195	195	194
22	COLSTRIP 3		496	487	501	501	500	500	499	495	494	495
23	WNP 2		715	747	751	751	751	751	751	751	751	751
24	COLSTRIP 4		617	618	617	617	617	617	617	617	617	617
25	FED RESOURCE ACQUIS	14/	0	0	0	0	0	0	0	0	0	0
26	NON-UTILITY GENERATION	15/	983	1029	1058	1057	1049	1049	1049	1016	992	992
27	TOTAL RESOURCES		20808	20759	20839	20796	20880	20872	20879	20734	20730	20764
28	HYD,SM THRM & MISC RES	16/	0	0	0	0	0	0	0	0	0	0
29	LARGE THERMAL RESERVES	17/	0	0	0	0	0	0	0	0	0	0
30	BPA SPINNING RESERVES	18/	0	0	0	0	0	0	0	0	0	0
31	DSI RESERVES	19/	0	0	0	0	0	0	0	0	0	0
32	HYDRO MAINTENANCE	20/	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11
33	NET RESOURCES		20797	20748	20828	20785	20869	20861	20868	20723	20719	20753
34	FIRM SURPLUS/DEFICIT		-557	-833	-900	-1197	-1473	-1807	-1979	-2210	-2497	-2803
35	TOTAL SURPLUS/DEFICIT		-1163	-1580	-1596	-1891	-2160	-2485	-2644	-2835	-3118	-3421
36	EXTREME WEATHER ADJ.	21/	0	0	0	0	0	0	0	0	0	0
37	FIRM S/D W/EXT WEATHER ADJ.		-557	-833	-900	-1197	-1473	-1807	-1979	-2210	-2497	-2803
38	TOTAL S/D W/EXT WTHR. ADJ.		-1163	-1580	-1596	-1891	-2160	-2485	-2644	-2835	-3118	-3421

EXHIBIT 19

TABLE 1: PACIFIC NORTHWEST REGIONAL AREA

SUMMARY OF PACIFIC NORTHWEST REGIONAL LOADS AND RESOURCES
UNDER THE PACIFIC NORTHWEST ELECTRIC POWER PLANNING AND CONSERVATION ACT

M E D I U M - L O W L O A D S											
OPERATING YEAR											
1993 WHITEBOOK: 12/19/93 RUN DATE: 12/20/93											
MEGAWATTS		1994-95 AVG	1995-96 AVG	1996-97 AVG	1997-98 AVG	1998-99 AVG	1999- 0 AVG	2000- 1 AVG	2001- 2 AVG	2002- 3 AVG	2003- 4 AVG
LOADS											
1 SYSTEM FIRM LOADS	1/	18909	18816	18911	19046	19185	19310	19421	19518	19642	19777
2 SYSTEM TOTAL LOADS	2/	19313	19356	19454	19588	19725	19845	19950	20045	20166	20299
3 EXPORTS	3/	1311	1312	1298	1295	1411	1535	1525	1525	1601	1731
4 FED DIVERSITY	4/	0	0	0	0	0	0	0	0	0	0
5 FIRM LOADS		20220	20128	20209	20341	20596	20845	20946	21043	21243	21508
6 TOTAL LOADS		20624	20668	20752	20883	21136	21380	21475	21570	21767	22030
RESOURCES											
7 REGULATED HYDRO	5/	12042	12032	12044	12044	12095	12094	12093	12088	12088	12088
8 INDEPENDENT HYDRO	6/	970	962	980	980	979	979	978	974	973	974
9 MAY WATER BUDGET	7/	-265	-265	-265	-265	-265	-265	-265	-265	-265	-265
10 SUS. PKNG. ADJUSTMENT	8/	0	0	0	0	0	0	0	0	0	0
11 TOTAL HYDRO		12747	12729	12759	12759	12809	12808	12806	12797	12796	12797
12 SMALL THERMAL & MISC	9/	46	38	48	47	47	46	46	42	42	42
13 COMBUSTION TURBINES	10/	485	485	485	488	585	585	585	585	585	585
14 RENEWABLES	11/	42	43	43	43	43	43	43	44	44	44
15 COGENERATION	12/	50	271	301	301	301	301	301	301	301	301
16 IMPORTS	13/	1920	1626	1576	1491	1439	1434	1441	1363	1391	1386
17 CENTRALIA		1185	1165	1164	1188	1186	1187	1185	1165	1164	1188
18 JIM BRIDGER		578	584	572	584	584	578	578	584	572	584
19 COLSTRIP 1 & 2		335	322	340	339	337	336	335	328	328	328
20 BOARDMAN		385	385	385	385	385	385	385	385	385	385
21 VALMY		195	195	195	195	194	195	195	196	195	194
22 COLSTRIP 3		494	483	497	496	495	494	493	488	488	488
23 WNP 2		715	747	751	751	751	751	751	751	751	751
24 COLSTRIP 4		617	617	617	617	617	617	617	617	617	617
25 FED RESOURCE ACQUIS	14/	0	0	0	0	0	0	0	0	0	0
26 NON-UTILITY GENERATION	15/	982	1027	1056	1055	1047	1046	1046	1013	989	989
27 TOTAL RESOURCES		20776	20717	20789	20739	20820	20806	20807	20659	20648	20679
28 HYD, SM THRM & MISC RES	16/	0	0	0	0	0	0	0	0	0	0
29 LARGE THERMAL RESERVES	17/	0	0	0	0	0	0	0	0	0	0
30 BPA SPINNING RESERVES	18/	0	0	0	0	0	0	0	0	0	0
31 DSI RESERVES	19/	0	0	0	0	0	0	0	0	0	0
32 HYDRO MAINTENANCE	20/	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11
33 NET RESOURCES		20765	20706	20778	20728	20809	20795	20796	20648	20637	20668
34 FIRM SURPLUS/DEFICIT		545	578	569	387	213	-50	-150	-395	-606	-840
35 TOTAL SURPLUS/DEFICIT		141	38	26	-156	-327	-586	-679	-922	-1130	-1362
36 EXTREME WEATHER ADJ.	21/	0	0	0	0	0	0	0	0	0	0
37 FIRM S/D W/EXT WEATHER ADJ.		545	578	569	387	213	-50	-150	-395	-606	-840
38 TOTAL S/D W/EXT WTHR. ADJ.		141	38	26	-156	-327	-586	-679	-922	-1130	-1362

EXHIBIT 20

TABLE 1: PACIFIC NORTHWEST REGIONAL AREA

SUMMARY OF PACIFIC NORTHWEST REGIONAL LOADS AND RESOURCES
UNDER THE PACIFIC NORTHWEST ELECTRIC POWER PLANNING AND CONSERVATION ACT

		LOW LOADS							1993 WHITEBOOK:		12/19/93	
		OPERATING YEAR							RUN DATE:		12/20/93	
MEGAWATTS		1994-95 AVG	1995-96 AVG	1996-97 AVG	1997-98 AVG	1998-99 AVG	1999- 0 AVG	2000- 1 AVG	2001- 2 AVG	2002- 3 AVG	2003- 4 AVG	
LOADS												
1	SYSTEM FIRM LOADS	1/	18020	17614	17528	17518	17533	17538	17488	17037	17038	17049
2	SYSTEM TOTAL LOADS	2/	18337	17998	17908	17899	17914	17918	17852	17258	17259	17271
3	EXPORTS	3/	1311	1312	1298	1295	1411	1535	1525	1525	1601	1731
4	FED DIVERSITY	4/	0	0	0	0	0	0	0	0	0	0
5	FIRM LOADS		19331	18926	18826	18813	18944	19073	19013	18562	18639	18780
6	TOTAL LOADS		19648	19310	19206	19194	19325	19453	19377	18783	18860	19002
RESOURCES												
7	REGULATED HYDRO	5/	12040	12030	12041	12041	12091	12090	12089	12083	12083	12083
8	INDEPENDENT HYDRO	6/	970	960	977	976	976	974	974	969	969	969
9	MAY WATER BUDGET	7/	-265	-265	-265	-265	-265	-265	-265	-265	-265	-265
10	SUS. PKNG. ADJUSTMENT	8/	0	0	0	0	0	0	0	0	0	0
11	TOTAL HYDRO		12745	12725	12753	12752	12802	12799	12798	12787	12787	12787
12	SMALL THERMAL & MISC	9/	45	36	46	45	44	43	42	39	38	38
13	COMBUSTION TURBINES	10/	485	485	485	488	585	585	585	585	585	585
14	RENEWABLES	11/	42	43	43	43	43	43	43	44	44	44
15	COGENERATION	12/	50	271	301	301	301	301	301	301	301	301
16	IMPORTS	13/	1908	1611	1556	1468	1413	1405	1408	1327	1351	1343
17	CENTRALIA		1186	1165	1164	1187	1186	1187	1186	1165	1164	1188
18	JIM BRIDGER		578	584	572	584	584	578	578	584	572	584
19	COLSTRIP 1 & 2		332	318	335	334	331	330	328	321	320	320
20	BOARDMAN		385	385	385	385	385	385	385	385	385	385
21	VALMY		195	195	196	195	194	195	195	195	195	194
22	COLSTRIP 3		491	481	494	493	491	489	488	483	482	482
23	WNP 2		715	747	751	751	751	751	751	751	751	751
24	COLSTRIP 4		617	617	617	617	617	617	617	617	617	617
25	FED RESOURCE ACQUIS	14/	0	0	0	0	0	0	0	0	0	0
26	NON-UTILITY GENERATION	15/	982	1026	1055	1054	1045	1044	1044	1011	986	986
27	TOTAL RESOURCES		20756	20689	20753	20697	20772	20752	20749	20595	20578	20605
28	HYD,SM THRM & MISC RES	16/	0	0	0	0	0	0	0	0	0	0
29	LARGE THERMAL RESERVES	17/	0	0	0	0	0	0	0	0	0	0
30	BPA SPINNING RESERVES	18/	0	0	0	0	0	0	0	0	0	0
31	DSI RESERVES	19/	0	0	0	0	0	0	0	0	0	0
32	HYDRO MAINTENANCE	20/	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11
33	NET RESOURCES		20745	20678	20742	20686	20761	20741	20738	20584	20567	20594
34	FIRM SURPLUS/DEFICIT		1414	1751	1916	1873	1817	1668	1725	2022	1928	1814
35	TOTAL SURPLUS/DEFICIT		1097	1368	1535	1492	1436	1288	1361	1801	1707	1592
36	EXTREME WEATHER ADJ.	21/	0	0	0	0	0	0	0	0	0	0
37	FIRM S/D W/EXT WEATHER ADJ.		1414	1751	1916	1873	1817	1668	1725	2022	1928	1814
38	TOTAL S/D W/EXT WTHR. ADJ.		1097	1368	1535	1492	1436	1288	1361	1801	1707	1592

EXHIBIT 21

EXHIBITS 22 - 24
REGIONAL MONTHLY ANALYSIS UNDER MEDIUM
LOADS FOR 1930 WATER CONDITIONS

EXHIBIT 22

TABLE 1: PACIFIC NORTHWEST REGIONAL AREA

SUMMARY OF PACIFIC NORTHWEST REGIONAL LOADS AND RESOURCES UNDER THE PACIFIC NORTHWEST ELECTRIC POWER PLANNING AND CONSERVATION ACT

1993 WHITEBOOK: 12/19/93 RUN DATE: 12/20/93																
M E D I U M L O A D S																
1994-95 OPERATING YEAR																
1930 WATER YEAR																
ENERGY IN AVERAGE MEGAWATTS																
	AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN	JUL	12 MO AVG	
LOADS																
1/	18520	18520	17980	18776	20780	22371	23186	22060	20724	19481	19481	18830	18837	18976	20043	SYSTEM FIRM LOADS
2/	18918	18918	18378	19179	21184	22773	23936	22815	21478	20234	20234	19585	19592	19723	20650	SYSTEM TOTAL LOADS
3/	1761	1761	1729	1186	1112	1098	1095	1024	1049	1045	1045	1155	1683	1793	1311	EXPORTS
4/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	FED DIVERSITY
5/	20281	20281	19709	19962	21892	23469	24281	23084	21773	20526	20526	19985	20520	20769	21354	FIRM LOADS
6/	20679	20679	20107	20365	22296	23871	25031	23839	22527	21279	21279	20740	21275	21516	21961	TOTAL LOADS
RESOURCES																
5/	10575	10618	10268	10804	12324	13123	14395	12664	12496	12072	13299	16156	10796	10184	12208	REGULATED HYDRO
6/	1020	962	911	888	896	1082	851	1177	966	999	1032	1065	1049	975	989	INDEPENDENT HYDRO
7/	0	0	0	0	0	0	0	0	0	0	0	-2965	0	0	-247	MAY WATER BUDGET
8/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	SUS. PKNG. ADJUSTMENT
11/	11595	11580	11179	11692	13220	14205	15246	13841	13462	13071	14331	14256	11845	11159	12949	TOTAL HYDRO
12/	51	49	54	51	57	51	47	48	41	53	63	53	1	50	47	SMALL THERMAL & MISC
13/	423	423	428	435	591	589	592	604	442	436	436	432	428	423	485	COMBUSTION TURBINES
14/	46	46	46	46	46	46	46	46	46	46	46	46	46	46	42	RENEWABLES
15/	51	51	51	51	51	44	51	51	51	51	51	51	51	44	50	COGENERATION
16/	1787	1787	1624	1809	2282	2446	2387	2389	1877	1486	1362	1469	1746	2019	1938	IMPORTS
17/	1235	1235	1235	1235	1235	1235	1235	1235	1235	1235	1235	861	1015	1235	1185	CENTRALIA
18/	636	636	636	585	531	636	636	636	566	393	393	464	577	636	578	JIM BRIDGER
19/	364	360	368	363	362	351	343	344	345	184	324	244	350	362	337	COLSTRIP 1 & 2
20/	436	436	436	436	436	436	436	436	436	436	436	28	233	436	385	BOARDMAN
21/	202	202	202	202	202	202	202	202	160	202	189	163	202	202	195	VALMY
22/	530	528	534	530	529	521	515	516	516	534	219	327	520	529	495	COLSTRIP 3
23/	826	826	826	826	826	826	826	826	826	661	0	0	771	867	715	WNP 2
24/	655	654	655	654	654	654	654	655	654	655	262	401	655	655	617	COLSTRIP 4
14/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	FED RESOURCE ACQUIS
15/	1111	1110	1050	959	915	899	870	899	932	1070	1073	787	1114	1185	983	NON-UTILITY GENERATION
27/	19948	19923	19324	19874	21937	23141	24086	22728	21589	20513	20420	19582	19510	19848	21002	TOTAL RESOURCES
28/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	HYD.SM THRM & MISC RES
17/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	LARGE THERMAL RESERVES
18/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	BPA SPINNING RESERVES
19/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	DSI RESERVES
20/	-31	-25	-9	-9	-4	0	0	0	-5	-7	-8	-20	-15	-50	-12	HYDRO MAINTENANCE
33/	19917	19898	19315	19865	21933	23141	24086	22728	21584	20506	20412	19562	19495	19798	20989	NET RESOURCES
34/	-364	-383	-394	-97	41	-328	-195	-356	-189	-20	-114	-423	-1025	-971	-365	FIRM SURPLUS/DEFICIT
35/	-762	-782	-792	-500	-363	-730	-945	-1111	-943	-774	-867	-1178	-1780	-1718	-971	TOTAL SURPLUS/DEFICIT
36/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	EXTREME WEATHER ADJ.
37/	-364	-383	-394	-97	41	-328	-195	-356	-189	-20	-114	-423	-1025	-971	-365	FIRM S/D W/EXT WEATHER ADJ.
38/	-762	-782	-792	-500	-363	-730	-945	-1111	-943	-774	-867	-1178	-1780	-1718	-971	TOTAL S/D W/EXT WTHR. ADJ.

TABLE 1: PACIFIC NORTHWEST REGIONAL AREA

SUMMARY OF PACIFIC NORTHWEST REGIONAL LOADS AND RESOURCES
UNDER THE PACIFIC NORTHWEST ELECTRIC POWER PLANNING AND CONSERVATION ACT

		M E D I U M L O A D S												1993 WHITEBOOK: 12/19/93		
		1998-99 OPERATING YEAR												RUN DATE: 12/20/93		
1930 WATER YEAR ENERGY IN AVERAGE MEGAWATTS		AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN	JUL	12 MO AVG
LOADS																
1	SYSTEM FIRM LOADS	1/ 19442	19442	18874	19662	21713	23308	24350	23132	21680	20290	20290	19539	19509	19673	20931
2	SYSTEM TOTAL LOADS	2/ 20133	20133	19564	20353	22404	23992	25035	23823	22369	20977	20977	20225	20194	20354	21618
3	EXPORTS	3/ 1721	1721	1683	1273	1189	1166	1168	1095	1118	1374	1374	1338	1833	1975	1411
4	FED DIVERSITY	4/ 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	FIRM LOADS	21163	21163	20557	20935	22902	24474	25518	24227	22798	21664	21664	20877	21342	21648	22342
6	TOTAL LOADS	21854	21854	21247	21626	23593	25158	26203	24918	23487	22351	22351	21563	22027	22329	23030
RESOURCES																
7	REGULATED HYDRO	5/ 10222	10348	10006	10562	12077	13230	14394	12651	12442	11982	13256	16716	12654	10539	12348
8	INDEPENDENT HYDRO	6/ 1021	970	909	892	903	1098	871	1196	982	1004	1038	1075	1061	981	999
9	MAY WATER BUDGET	7/ 0	0	0	0	0	0	0	0	0	0	0	-2965	0	0	-247
10	SUS. PKNG. ADJUSTMENT	8/ 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	TOTAL HYDRO	11243	11318	10915	11454	12980	14328	15265	13847	13424	12986	14294	14826	13715	11520	13100
12	SMALL THERMAL & MISC	9/ 47	51	45	48	57	59	60	59	50	51	62	57	2	50	49
13	COMBUSTION TURBINES	10/ 602	602	602	602	750	745	745	760	602	355	355	355	452	452	585
14	RENEWABLES	11/ 47	47	47	47	47	47	47	47	47	47	47	47	4	47	43
15	COGENERATION	12/ 329	329	318	318	318	311	318	318	318	89	89	329	329	322	301
16	IMPORTS	13/ 1384	1384	1004	1120	1498	1901	1864	1849	1358	1243	1231	1331	1485	1628	1472
17	CENTRALIA	1235	1235	1235	1235	1235	1235	1235	1235	1235	1235	1235	905	979	1235	1186
18	JIM BRIDGER	636	636	636	595	521	636	636	636	541	465	465	465	604	636	584
19	COLSTRIP 1 & 2	355	363	352	357	361	366	367	366	360	181	321	247	360	359	342
20	BOARDMAN	436	436	436	436	436	436	436	436	436	436	436	28	233	436	385
21	VALMY	211	211	211	211	211	211	211	211	169	116	101	165	211	202	194
22	COLSTRIP 3	524	529	522	525	528	532	533	532	528	530	218	329	528	527	499
23	WNP 2	872	872	872	872	872	872	872	872	872	698	0	0	815	872	751
24	COLSTRIP 4	655	655	655	654	655	654	654	654	655	654	262	401	655	655	617
25	FED RESOURCE ACQUIS	14/ 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	NON-UTILITY GENERATION	15/ 1173	1175	1097	1015	979	965	952	983	1012	1142	1148	858	1179	1224	1049
27	TOTAL RESOURCES	19749	19843	18947	19489	21448	23298	24195	22805	21602	20228	20264	20343	21551	20165	21157
28	HYD, SM THRM & MISC RES	16/ 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	LARGE THERMAL RESERVES	17/ 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	BPA SPINNING RESERVES	18/ 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	DSI RESERVES	19/ 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	HYDRO MAINTENANCE	20/ -31	-25	-9	-9	-4	0	0	0	-5	-7	-8	-20	-15	-50	-12
33	NET RESOURCES	19718	19818	18938	19480	21444	23298	24195	22805	21602	20221	20256	20323	21536	20115	21145
34	FIRM SURPLUS/DEFICIT	-1445	-1345	-1619	-1455	-1458	-1176	-1323	-1422	-1196	-1443	-1408	-554	194	-1533	-1197
35	TOTAL SURPLUS/DEFICIT	-2136	-2036	-2309	-2146	-2149	-1860	-2008	-2113	-1885	-2130	-2094	-1240	-491	-2214	-1884
36	EXTREME WEATHER ADJ.	21/ 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
37	FIRM S/D W/EXT WEATHER ADJ.	-1445	-1345	-1619	-1455	-1458	-1176	-1323	-1422	-1196	-1443	-1408	-554	194	-1533	-1197
38	TOTAL S/D W/EXT WTHR. ADJ.	-2136	-2036	-2309	-2146	-2149	-1860	-2008	-2113	-1885	-2130	-2094	-1240	-491	-2214	-1884

TABLE 1: PACIFIC NORTHWEST REGIONAL AREA

SUMMARY OF PACIFIC NORTHWEST REGIONAL LOADS AND RESOURCES
UNDER THE PACIFIC NORTHWEST ELECTRIC POWER PLANNING AND CONSERVATION ACT

M E D I U M L O A D S																	
2003- 4 OPERATING YEAR																	
1993 WHITEBOOK: 12/19/93																	
RUN DATE: 12/20/93																	
1930 WATER YEAR																	
ENERGY IN AVERAGE MEGAWATTS		AUG	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	APR	MAY	JUN	JUL	12 MO	
		1-15	16-31								1-15	16-30				AVG	
LOADS																	
1	SYSTEM FIRM LOADS	1/	20141	20141	19563	20469	22742	24515	25448	24115	22623	21154	21154	20345	20304	20480	21825
2	SYSTEM TOTAL LOADS	2/	20761	20761	20183	21089	23364	25130	26062	24735	23241	21772	21772	20962	20921	21093	22443
3	EXPORTS	3/	2151	2151	2112	1704	1618	1588	1528	1463	1493	1506	1506	1466	2002	2136	1731
4	FED DIVERSITY	4/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	FIRM LOADS		22292	22292	21675	22173	24360	26103	26976	25578	24116	22660	22660	21811	22306	22616	23555
6	TOTAL LOADS		22912	22912	22295	22793	24982	26718	27590	26198	24734	23278	23278	22428	22923	23229	24173
RESOURCES																	
7	REGULATED HYDRO	5/	10216	10344	10000	10557	12071	13225	14390	12648	12439	11978	13251	16710	12648	10535	12343
8	INDEPENDENT HYDRO	6/	1018	966	905	887	899	1093	868	1192	978	999	1034	1071	1058	978	995
9	MAY WATER BUDGET	7/	0	0	0	0	0	0	0	0	0	0	0	-2965	0	0	-247
10	SUS. PKNG. ADJUSTMENT	8/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	TOTAL HYDRO		11234	11310	10905	11444	12970	14318	15258	13840	13417	12977	14285	14816	13706	11513	13091
12	SMALL THERMAL & MISC	9/	44	48	42	44	53	55	57	56	47	48	58	53	2	47	46
13	COMBUSTION TURBINES	10/	602	602	602	602	750	745	745	760	602	355	355	355	452	452	585
14	RENEWABLES	11/	48	48	48	48	48	48	48	48	48	48	48	48	4	48	44
15	COGENERATION	12/	329	329	318	318	318	311	318	318	318	89	89	329	329	322	301
16	IMPORTS	13/	1318	1318	990	1145	1656	1810	1744	1771	1401	1146	1134	1252	1412	1559	1433
17	CENTRALIA		1235	1235	1235	1235	1235	1235	1235	1235	1235	1235	1235	792	1107	1235	1187
18	JIM BRIDGER		636	636	636	601	515	636	636	636	546	465	465	465	599	636	584
19	COLSTRIP 1 & 2		348	355	345	349	354	359	361	360	354	178	315	243	354	354	336
20	BOARDMAN		436	436	436	436	436	436	436	436	436	436	436	28	233	436	385
21	VALMY		211	211	211	211	211	211	211	211	169	116	101	165	211	202	194
22	COLSTRIP 3		519	524	517	520	523	527	529	527	523	524	215	326	523	524	494
23	WNP 2		872	872	872	872	872	872	872	872	872	698	0	0	815	872	751
24	COLSTRIP 4		655	655	654	655	655	654	655	655	654	654	262	401	655	655	617
25	FED RESOURCE ACQUIS	14/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	NON-UTILITY GENERATION	15/	1111	1114	1035	954	917	904	891	922	951	1080	1087	821	1142	1160	991
27	TOTAL RESOURCES		19598	19693	18846	19434	21513	23121	23996	22647	21573	20049	20085	20094	21544	20015	21041
28	HYD,SM THRM & MISC RES	16/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	LARGE THERMAL RESERVES	17/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	BPA SPINNING RESERVES	18/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	DSI RESERVES	19/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	HYDRO MAINTENANCE	20/	-31	-25	-9	-9	-4	0	0	0	-5	-7	-8	-20	-15	-50	-12
33	NET RESOURCES		19567	19668	18837	19425	21509	23121	23996	22647	21568	20042	20077	20074	21529	19965	21029
34	FIRM SURPLUS/DEFICIT		-2725	-2624	-2838	-2748	-2851	-2982	-2980	-2931	-2548	-2618	-2583	-1737	-777	-2651	-2526
35	TOTAL SURPLUS/DEFICIT		-3345	-3244	-3457	-3368	-3472	-3597	-3594	-3551	-3167	-3236	-3200	-2354	-1394	-3264	-3144
36	EXTREME WEATHER ADJ.	21/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
37	FIRM S/D W/EXT WEATHER ADJ.		-2725	-2624	-2838	-2748	-2851	-2982	-2980	-2931	-2548	-2618	-2583	-1737	-777	-2651	-2526
38	TOTAL S/D W/EXT WTHR. ADJ.		-3345	-3244	-3457	-3368	-3472	-3597	-3594	-3551	-3167	-3236	-3200	-2354	-1394	-3264	-3144

EXHIBIT 24

EXHIBITS 25 - 29
REGIONAL MONTHLY 50-HOUR CAPACITY
SURPLUS/DEFICIT UNDER THE FIVE LOAD
SCENARIOS FOR 1930 WATER CONDITIONS

TABLE R-1: 50-HOUR SUSTAINED PEAKING
BASE CASE: EXISTING REGIONAL CONTRACTS

REGIONAL FIRM 50-HOUR CAPACITY SURPLUS/DEFICIT
INCLUDING EXTREME WEATHER ADJUSTMENTS DURING NOVEMBER THROUGH FEBRUARY
20 YEAR MONTHLY SUMMARY
ASSUMING NO NIGHTTIME RETURN CONSTRAINTS,
EXISTING REGIONAL CONTRACTS, AND NO NEW RESOURCE ACQUISITIONS

H I G H L O A D S

1993 WHITEBOOK: 12/19/93
RUN DATE: 12/20/93

1930 WATER YEAR

	AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN	JUL
PEAK IN MEGAWATTS														
1994-95	5084	5602	4350	3840	1378	82	-1198	-1656	3468	3021	1464	3857	2920	2952
1995-96	4084	4602	3462	2792	-38	-1144	-2428	-2650	2301	2009	523	2968	2249	2265
1996-97	3516	4032	2940	1884	-483	-2126	-3643	-4004	1268	975	-410	2690	1721	1622
1997-98	3014	3531	2251	1103	-1651	-3468	-4690	-5014	591	-20	-1512	1847	907	1029
1998-99	1594	2663	1090	-165	-3410	-4152	-5588	-5833	-138	-1456	-2863	611	1635	453
1999-00	622	1691	385	-1040	-4713	-5786	-7251	-7240	-1646	-2048	-3459	-455	1771	40
2000-01	-68	1001	-491	-1823	-5688	-6845	-8128	-8299	-2080	-2692	-4101	-614	1210	-417
2001-02	-461	608	-971	-2468	-6508	-7523	-9008	-9137	-2963	-3408	-4716	-1450	698	-1015
2002-03	-1116	-49	-1349	-3206	-6903	-8527	-9988	-10074	-3807	-4864	-6275	-2459	-569	-2277
2003-04	-2376	-1316	-2798	-4405	-8424	-10132	-11584	-11576	-4906	-5447	-6858	-3088	-1151	-2846

EXHIBIT 25

TABLE R-1: 50-HOUR SUSTAINED PEAKING
BASE CASE: EXISTING REGIONAL CONTRACTS

REGIONAL FIRM 50-HOUR CAPACITY SURPLUS/DEFICIT
INCLUDING EXTREME WEATHER ADJUSTMENTS DURING NOVEMBER THROUGH FEBRUARY
20 YEAR MONTHLY SUMMARY

ASSUMING NO NIGHTTIME RETURN CONSTRAINTS,
EXISTING REGIONAL CONTRACTS, AND NO NEW RESOURCE ACQUISITIONS

M E D I U M - H I G H L O A D S

1993 WHITEBOOK: 12/19/93
RUN DATE: 12/20/93

1930 WATER YEAR	AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN	JUL
PEAK IN MEGAWATTS														
1994-95	5967	6485	5225	4824	2602	1413	640	103	4899	4362	2803	5094	4096	4114
1995-96	5240	5757	4609	4115	1612	653	-103	-431	4116	3710	2225	4536	3738	3735
1996-97	4979	5495	4386	3534	1582	128	-833	-1314	3447	3021	1635	4577	3509	3385
1997-98	4773	5291	3992	3098	843	-734	-1518	-1982	3043	2285	796	3973	2921	3020
1998-99	3580	4649	3056	2088	-592	-1064	-2055	-2453	2593	1103	-294	2978	3873	2668
1999-00	2831	3900	2575	1472	-1572	-2348	-3355	-3537	1367	772	-623	2158	4241	2489
2000-01	2375	3444	1930	951	-2218	-3046	-3884	-4237	1203	379	-1021	2232	3896	2268
2001-02	2164	3234	1631	510	-2766	-3426	-4442	-4770	560	-118	-1416	1595	3575	1825
2002-03	1722	2791	1466	15	-2857	-4089	-5061	-5364	-6	-1313	-2720	828	2535	789
2003-04	681	1750	236	-940	-4058	-5343	-6289	-6521	-826	-1634	-3044	443	2182	443

TABLE R-1: 50-HOUR SUSTAINED PEAKING
BASE CASE: EXISTING REGIONAL CONTRACTS

REGIONAL FIRM 50-HOUR CAPACITY SURPLUS/DEFICIT
INCLUDING EXTREME WEATHER ADJUSTMENTS DURING NOVEMBER THROUGH FEBRUARY
20 YEAR MONTHLY SUMMARY
ASSUMING NO NIGHTTIME RETURN CONSTRAINTS,
EXISTING REGIONAL CONTRACTS, AND NO NEW RESOURCE ACQUISITIONS
M E D I U M L O A D S

1993 WHITEBOOK: 12/19/93
RUN DATE: 12/20/93

1930 WATER YEAR	AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN	JUL
PEAK IN MEGAWATTS														
1994-95	6447	6965	5699	5344	3217	2065	1713	1086	5693	5057	3500	5709	4667	4689
1995-96	5816	6334	5188	4784	2483	1629	1295	853	5127	4587	3101	5294	4428	4540
1996-97	5774	6291	5155	4404	2673	1335	927	301	4731	4141	2754	5557	4412	4282
1997-98	5670	6187	4877	4145	2237	851	496	-138	4507	3559	2069	5081	3937	4032
1998-99	4591	5660	4050	3268	986	740	-114	-594	4135	2561	1165	4337	5163	3949
1999-00	4107	5176	3843	2901	173	-447	-1197	-1481	3070	2388	992	3661	5671	3913
2000-01	3792	4861	3341	2537	-277	-934	-1520	-1975	3067	2141	746	3872	5454	3864
2001-02	3753	4823	3213	2289	-599	-1068	-1825	-2263	2631	1842	549	3423	5309	3548
2002-03	3439	4509	3173	1936	-511	-1538	-2228	-2647	2233	795	-600	2800	4407	2642
2003-04	2530	3599	2075	1136	-1519	-2578	-3239	-3602	1579	629	-768	2558	4190	2432

EXHIBIT 27

TABLE R-1: 50-HOUR SUSTAINED PEAKING
BASE CASE: EXISTING REGIONAL CONTRACTS

REGIONAL FIRM 50-HOUR CAPACITY SURPLUS/DEFICIT
INCLUDING EXTREME WEATHER ADJUSTMENTS DURING NOVEMBER THROUGH FEBRUARY
20 YEAR MONTHLY SUMMARY
ASSUMING NO NIGHTTIME RETURN CONSTRAINTS,
EXISTING REGIONAL CONTRACTS, AND NO NEW RESOURCE ACQUISITIONS
M E D I U M - L O W L O A D S

1993 WHITEBOOK: 12/19/93
RUN DATE: 12/20/93

1930 WATER YEAR	AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN	JUL
PEAK IN MEGAWATTS														
1994-95	7236	7754	6482	6232	4307	3253	3370	2735	7125	6472	4917	7082	6003	5998
1995-96	7128	7646	6481	6180	4080	3301	3192	2731	6775	6228	4740	6892	5997	5967
1996-97	7211	7730	6601	6004	4566	3333	3041	2417	6554	5957	4569	7316	6130	5975
1997-98	7361	7879	6563	5974	4343	3035	2745	2125	6454	5501	4011	6971	5792	5852
1998-99	6408	7477	5867	5238	3251	3085	2591	2022	6301	4600	3203	6234	6980	5741
1999-00	5899	6968	5622	4892	2609	2178	1679	1284	5369	4551	3154	5672	7596	5806
2000-01	5689	6759	5218	4651	2311	1858	1519	957	5490	4423	3027	5990	7482	5783
2001-02	5674	6744	5113	4441	2056	1805	1310	760	5107	4170	2878	5579	7371	5573
2002-03	5468	6537	5180	4215	2299	1509	1045	505	4814	3223	1828	5043	6547	4750
2003-04	4643	5712	4164	3514	1412	601	174	-320	4265	3159	1761	4895	6419	4626

TABLE R-1: 50-HOUR SUSTAINED PEAKING
BASE CASE: EXISTING REGIONAL CONTRACTS

REGIONAL FIRM 50-HOUR CAPACITY SURPLUS/DEFICIT
INCLUDING EXTREME WEATHER ADJUSTMENTS DURING NOVEMBER THROUGH FEBRUARY

20 YEAR MONTHLY SUMMARY

ASSUMING NO NIGHTTIME RETURN CONSTRAINTS,
EXISTING REGIONAL CONTRACTS, AND NO NEW RESOURCE ACQUISITIONS

L O W L O A D S

1993 WHITEBOOK: 12/19/93
RUN DATE: 12/20/93

1930 WATER YEAR	AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN	JUL
PEAK IN MEGAWATTS														
1994-95	7878	8396	7121	6956	5196	4212	4824	4138	8307	7597	6039	8146	7018	6997
1995-96	8131	8649	7478	7316	5438	4753	4990	4451	8229	7603	6119	8187	7233	7183
1996-97	8432	8951	7822	7363	6200	5079	5141	4446	8249	7559	6172	8819	7561	7386
1997-98	8775	9293	7969	7544	6246	5078	5090	4383	8333	7274	5785	8631	7373	7409
1998-99	7968	9038	7417	6973	5365	5358	5168	4503	8360	6538	5143	8044	8703	7439
1999-00	7597	8668	7313	6788	4931	4676	4491	3977	7602	6655	5259	7633	9463	7643
2000-01	7524	8595	7045	6708	4842	4588	4552	3881	7897	6690	5292	8101	9489	8069
2001-02	7964	9035	7398	6975	5104	5074	4890	4215	8010	6916	5623	8153	9831	8002
2002-03	7895	8966	7601	6906	5553	5003	4855	4186	7893	6135	4739	7766	9150	7319
2003-04	7207	8277	6724	6366	4870	4318	4217	3579	7523	6237	4840	7772	9166	7336

EXHIBITS 30 - 32
REGIONAL MONTHLY CAPACITY ANALYSIS UNDER
MEDIUM LOADS FOR 1930 WATER CONDITIONS

TABLE 1: PACIFIC NORTHWEST REGIONAL AREA

SUMMARY OF PACIFIC NORTHWEST REGIONAL LOADS AND RESOURCES
UNDER THE PACIFIC NORTHWEST ELECTRIC POWER PLANNING AND CONSERVATION ACT

		M E D I U M L O A D S												1993 WHITEBOOK: 12/19/93 RUN DATE: 12/20/93	
1930 WATER YEAR PEAK IN MEGAWATTS		1994-95 OPERATING YEAR													
		AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN	JUL
LOADS															
1	SYSTEM FIRM LOADS	1/ 23718	23718	23447	26372	28653	30875	32013	30765	28838	27194	27194	25556	24501	24253
2	SYSTEM TOTAL LOADS	2/ 24306	24306	24036	26967	29249	31469	32964	31721	29793	28147	28147	26511	25454	25198
3	EXPORTS	3/ 3075	3075	3033	1946	1644	1664	1669	1640	1628	1607	1607	2049	3053	3108
4	FED DIVERSITY	4/ -1134	-1129	-1148	-1225	-1155	-871	-905	-859	-1155	-1052	-1051	-1161	-1144	-1138
5	FIRM LOADS	25659	25664	25332	27093	29142	31668	32777	31546	29311	27749	27750	26444	26410	26223
6	TOTAL LOADS	26247	26252	25921	27688	29738	32262	33729	32503	30266	28702	28703	27400	27363	27168
RESOURCES															
7	REGULATED HYDRO	5/ 30505	30994	31267	31352	31520	31548	31173	30843	30161	29132	29226	29336	30284	30989
8	INDEPENDENT HYDRO	6/ 1817	1782	1748	1716	1718	1694	1694	1822	1865	1892	1934	1780	1786	1766
9	MAY WATER BUDGET	7/ 0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	SUS. PKNG. ADJUSTMENT	8/ -3191	-3652	-5297	-4632	-2620	-2244	-1443	-2667	-2005	-2100	-2147	-1200	-6302	-5927
11	TOTAL HYDRO	29131	29124	27718	28436	30618	30998	31424	29998	30021	28924	29013	29916	25768	26828
12	SMALL THERMAL & MISC	9/ 45	45	36	32	125	129	134	136	32	37	56	36	7	43
13	COMBUSTION TURBINES	10/ 884	884	893	938	1653	1661	1666	1660	954	912	912	902	893	884
14	RENEWABLES	11/ 49	49	49	49	49	49	49	49	49	49	49	49	2	49
15	COGENERATION	12/ 65	65	65	65	65	45	65	65	65	65	65	65	65	45
16	IMPORTS	13/ 2150	2150	1713	1918	2523	2849	2853	2877	2367	1605	1493	1903	2209	2276
17	CENTRALIA	1310	1310	1310	1310	1310	1310	1310	1310	1310	1310	1310	655	1310	1310
18	JIM BRIDGER	693	693	693	693	520	693	693	693	693	347	347	520	693	693
19	COLSTRIP 1 & 2	395	395	377	369	362	367	375	378	369	190	417	188	373	392
20	BOARDMAN	500	500	500	500	500	500	500	500	500	500	500	0	500	500
21	VALMY	242	242	242	242	242	242	242	242	242	242	242	242	242	242
22	COLSTRIP 3	560	560	548	543	538	541	547	549	543	550	0	548	546	559
23	WNP 2	1100	1100	1100	1100	1100	1100	1100	1100	1100	1100	0	0	1150	1150
24	COLSTRIP 4	726	726	726	726	726	726	726	726	726	726	0	726	726	726
25	FED RESOURCE ACQUIS	14/ 0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	NON-UTILITY GENERATION	15/ 1190	1190	1115	1023	975	962	936	965	1003	1146	1152	700	1103	1257
27	TOTAL RESOURCES	39040	39033	37085	37944	41306	42172	42620	41248	39974	37703	35556	36450	35587	36954
28	HYD, SM THRM & MISC RES	16/ -1725	-1748	-1757	-1757	-1803	-1802	-1784	-1775	-1704	-1659	-1667	-1641	-1705	-1750
29	LARGE THERMAL RESERVES	17/ -1021	-1021	-958	-980	-936	-996	-1001	-1004	-1011	-891	-569	-666	-1040	-1022
30	BPA SPINNING RESERVES	18/ -350	-359	-317	-335	-393	-422	-449	-402	-402	-371	-362	-407	-338	-315
31	DSI RESERVES	19/ 765	765	765	772	774	773	773	778	776	775	775	777	774	766
32	HYDRO MAINTENANCE	20/ -4603	-4040	-3787	-3208	-2935	-2037	-1561	-2287	-2629	-2751	-2483	-2360	-2202	-3721
33	NET RESOURCES	32106	32629	31031	32437	36014	37688	38597	36557	35005	32806	31250	32153	31077	30912
34	FIRM SURPLUS/DEFICIT	6447	6965	5699	5344	6872	6020	5820	5011	5693	5057	3500	5709	4667	4689
35	TOTAL SURPLUS/DEFICIT	5859	6376	5110	4749	6276	5426	4869	4054	4739	4103	2547	4754	3714	3744
36	EXTREME WEATHER ADJ.	21/ 0	0	0	0	-3655	-3955	-4107	-3925	0	0	0	0	0	0
37	FIRM S/D W/EXT WEATHER ADJ.	6447	6965	5699	5344	3217	2065	1713	1086	5693	5057	3500	5709	4667	4689
38	TOTAL S/D W/EXT WTHR. ADJ.	5859	6376	5110	4749	2621	1471	762	129	4739	4103	2547	4754	3714	3744

TABLE 1: PACIFIC NORTHWEST REGIONAL AREA

SUMMARY OF PACIFIC NORTHWEST REGIONAL LOADS AND RESOURCES
UNDER THE PACIFIC NORTHWEST ELECTRIC POWER PLANNING AND CONSERVATION ACT

		M E D I U M L O A D S												1993 WHITEBOOK: 12/19/93	
		1998-99 OPERATING YEAR												RUN DATE: 12/20/93	
1930 WATER YEAR	PEAK IN MEGAWATTS	AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN	JUL
LOADS															
1	SYSTEM FIRM LOADS	1/ 25010	25010	24764	27803	30078	32316	33728	32378	30307	28464	28464	26655	25508	25267
2	SYSTEM TOTAL LOADS	2/ 25898	25898	25652	28692	30969	33198	34613	33268	31195	29350	29350	27540	26390	26144
3	EXPORTS	3/ 2849	2849	2797	2070	1748	1769	1775	1746	1733	2375	2375	2467	3393	3448
4	FED DIVERSITY	4/ -970	-966	-983	-1082	-1055	-799	-852	-796	-1052	-925	-924	-988	-946	-934
5	FIRM LOADS	26889	26893	26578	28791	30771	33286	34651	33328	30988	29914	29915	28134	27955	27781
6	TOTAL LOADS	27777	27781	27466	29680	31662	34168	35536	34219	31877	30800	30800	29018	28837	28658
RESOURCES															
7	REGULATED HYDRO	5/ 30706	31021	31306	31400	31571	31607	31082	30444	29598	28648	29383	29617	30475	31049
8	INDEPENDENT HYDRO	6/ 1825	1790	1770	1745	1752	1739	1738	1861	1898	1916	1957	1802	1811	1773
9	MAY WATER BUDGET	7/ 0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	SUS. PKNG. ADJUSTMENT	8/ -4216	-3948	-5874	-5087	-3092	-2102	-1363	-2257	-1473	-1642	-2205	-1200	-4160	-5291
11	TOTAL HYDRO	28315	28863	27202	28058	30231	31244	31457	30048	30023	28922	29135	30219	28126	27531
12	SMALL THERMAL & MISC	9/ 44	44	43	46	148	160	164	162	62	62	85	60	21	58
13	COMBUSTION TURBINES	10/ 1191	1191	1193	1227	1929	1931	1932	1931	1231	798	798	795	1193	1191
14	RENEWABLES	11/ 51	51	51	51	51	51	51	51	51	51	51	51	4	51
15	COGENERATION	12/ 343	343	332	332	332	312	332	332	332	103	103	343	343	323
16	IMPORTS	13/ 1698	1698	1166	1221	1827	2448	2441	2481	1755	1310	1310	1710	1901	1836
17	CENTRALIA	1310	1310	1310	1310	1310	1310	1310	1310	1310	1310	1310	655	655	1310
18	JIM BRIDGER	693	693	693	693	520	693	693	693	693	347	347	520	693	693
19	COLSTRIP 1 & 2	394	394	392	397	395	412	418	417	398	200	433	198	392	392
20	BOARDMAN	500	500	500	500	500	500	500	500	500	500	500	0	500	500
21	VALMY	242	242	242	242	242	242	242	242	242	121	121	242	242	242
22	COLSTRIP 3	560	560	558	562	560	572	576	575	563	563	0	561	559	559
23	HNP 2	1155	1155	1155	1155	1155	1155	1155	1155	1155	1155	0	0	1155	1155
24	COLSTRIP 4	725	725	726	726	726	726	726	726	726	726	0	726	726	726
25	FED RESOURCE ACQUIS	14/ 0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	NON-UTILITY GENERATION	15/ 1245	1245	1159	1078	1036	1027	1015	1046	1077	1213	1224	763	1166	1293
27	TOTAL RESOURCES	38466	39014	36722	37598	40962	42783	43012	41669	40118	37381	35417	36843	37676	37860
28	HYD, SM THRM & MISC RES	16/ -1768	-1782	-1790	-1792	-1839	-1839	-1814	-1789	-1710	-1638	-1678	-1669	-1749	-1785
29	LARGE THERMAL RESERVES	17/ -994	-994	-922	-924	-881	-980	-984	-990	-961	-852	-520	-638	-916	-991
30	BPA SPINNING RESERVES	18/ -331	-354	-305	-326	-383	-427	-449	-404	-403	-373	-364	-411	-394	-332
31	DSI RESERVES	19/ 709	709	710	710	712	704	707	712	710	707	707	706	703	699
32	HYDRO MAINTENANCE	20/ -4603	-4040	-3787	-3208	-2935	-2037	-1561	-2289	-2631	-2751	-2483	-2360	-2202	-3721
33	NET RESOURCES	31479	32553	30628	32059	35636	38204	38910	36909	35124	32475	31080	32471	33118	31730
34	FIRM SURPLUS/DEFICIT	4591	5660	4050	3268	4864	4918	4259	3580	4135	2561	1165	4337	5163	3949
35	TOTAL SURPLUS/DEFICIT	3703	4772	3161	2379	3974	4036	3374	2690	3247	1676	279	3453	4281	3071
36	EXTREME WEATHER ADJ.	21/ 0	0	0	0	-3878	-4178	-4373	-4174	0	0	0	0	0	0
37	FIRM S/D W/EXT WEATHER ADJ.	4591	5660	4050	3268	986	740	-114	-594	4135	2561	1165	4337	5163	3949
38	TOTAL S/D W/EXT WTHR. ADJ.	3703	4772	3161	2379	96	-142	-999	-1484	3247	1676	279	3453	4281	3071

TABLE 1: PACIFIC NORTHWEST REGIONAL AREA

SUMMARY OF PACIFIC NORTHWEST REGIONAL LOADS AND RESOURCES
UNDER THE PACIFIC NORTHWEST ELECTRIC POWER PLANNING AND CONSERVATION ACT

M E D I U M L O A D S																
2003- 4 OPERATING YEAR																
1993 WHITEBOOK: 12/19/93																
RUN DATE: 12/20/93																
1930 WATER YEAR																
PEAK IN MEGAWATTS																
		AUG	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	APR	MAY	JUN	JUL	
		1-15	16-31								1-15	16-30				
LOADS																
1	SYSTEM FIRM LOADS	1/	25988	25988	25753	29023	31547	34042	35333	33881	31727	29784	29784	27867	26657	26393
2	SYSTEM TOTAL LOADS	2/	26802	26802	26568	29839	32365	34852	36144	34698	32543	30598	30598	28680	27469	27201
3	EXPORTS	3/	3776	3776	3722	3023	2958	2954	2889	2863	2859	2865	2865	2951	3689	3737
4	FED DIVERSITY	4/	-926	-922	-936	-1014	-1057	-811	-860	-799	-1017	-934	-932	-995	-938	-929
5	FIRM LOADS		28838	28842	28539	31032	33448	36185	37362	35945	33569	31715	31717	29823	29408	29201
6	TOTAL LOADS		29652	29656	29354	31848	34266	36995	38174	36762	34384	32529	32531	30637	30220	30009
RESOURCES																
7	REGULATED HYDRO	5/	30722	31037	31326	31420	31589	31626	31100	30464	29617	28669	29406	29638	30495	31068
8	INDEPENDENT HYDRO	6/	1843	1808	1794	1764	1773	1761	1761	1882	1920	1941	1983	1828	1837	1797
9	MAY WATER BUDGET	7/	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	SUS. PKNG. ADJUSTMENT	8/	-4216	-3948	-5874	-5087	-3092	-2102	-1363	-2257	-1473	-1642	-2205	-1200	-4160	-5291
11	TOTAL HYDRO		28349	28897	27246	28097	30270	31285	31498	30089	30064	28968	29184	30266	28172	27574
12	SMALL THERMAL & MISC	9/	72	72	56	59	165	177	181	181	80	82	106	80	26	75
13	COMBUSTION TURBINES	10/	1191	1191	1193	1227	1929	1931	1932	1931	1231	798	798	795	1193	1191
14	RENEWABLES	11/	52	52	52	52	52	52	52	52	52	52	52	52	5	52
15	COGENERATION	12/	343	343	332	332	332	312	332	332	332	103	103	343	343	323
16	IMPORTS	13/	1603	1603	1178	1382	2330	2304	2284	2327	1819	1184	1184	1601	1810	1745
17	CENTRALIA		1310	1310	1310	1310	1310	1310	1310	1310	1310	1310	1310	655	1310	1310
18	JIM BRIDGER		693	693	693	693	520	693	693	693	693	347	347	520	693	693
19	COLSTRIP 1 & 2		414	414	417	423	420	438	444	443	425	214	464	213	420	418
20	BOARDMAN		500	500	500	500	500	500	500	500	500	500	500	0	500	500
21	VALMY		242	242	242	242	242	242	242	242	242	121	121	242	242	242
22	COLSTRIP 3		574	574	576	580	578	590	594	594	581	583	0	581	577	576
23	WNP 2		1155	1155	1155	1155	1155	1155	1155	1155	1155	1155	0	0	1155	1155
24	COLSTRIP 4		726	726	726	726	725	726	726	726	726	726	0	726	726	726
25	FED RESOURCE ACQUIS	14/	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	NON-UTILITY GENERATION	15/	1192	1192	1108	1027	985	976	964	995	1026	1163	1175	737	1140	1238
27	TOTAL RESOURCES		38416	38964	36784	37805	41513	42691	42907	41570	40236	37306	35344	36811	38312	37818
28	HYD,SM THRM & MISC RES	16/	-1769	-1783	-1791	-1792	-1839	-1839	-1814	-1790	-1711	-1638	-1679	-1671	-1750	-1785
29	LARGE THERMAL RESERVES	17/	-979	-979	-924	-949	-957	-966	-969	-974	-979	-837	-504	-623	-1000	-976
30	BPA SPINNING RESERVES	18/	-331	-354	-305	-326	-383	-427	-449	-404	-403	-373	-364	-411	-394	-332
31	DSI RESERVES	19/	636	636	636	638	639	631	632	638	637	635	635	635	633	629
32	HYDRO MAINTENANCE	20/	-4605	-4042	-3787	-3208	-2935	-2037	-1561	-2289	-2633	-2751	-2483	-2360	-2202	-3721
33	NET RESOURCES		31368	32441	30614	32168	36038	38053	38746	36750	35148	32343	30950	32381	33599	31633
34	FIRM SURPLUS/DEFICIT		2530	3599	2075	1136	2591	1869	1383	805	1579	629	-768	2558	4190	2432
35	TOTAL SURPLUS/DEFICIT		1715	2785	1260	320	1772	1058	572	-11	764	-186	-1582	1744	3379	1624
36	EXTREME WEATHER ADJ.	21/	0	0	0	0	-4110	-4447	-4622	-4407	0	0	0	0	0	0
37	FIRM S/D W/EXT WEATHER ADJ.		2530	3599	2075	1136	-1519	-2578	-3239	-3602	1579	629	-768	2558	4190	2432
38	TOTAL S/D W/EXT WTHR. ADJ.		1715	2785	1260	320	-2338	-3389	-4050	-4418	764	-186	-1582	1744	3379	1624

REGIONAL FOOTNOTES

For Exhibits 17 through 32

1. Firm loads for the region include the sum of the estimated firm loads of Federal agencies, public agencies, Direct Service Industries (DSIs), Investor-Owned Utilities (IOUs), and associated transmission losses. Peak loads represent non-coincidental capacity demands adjusted to account for Federal system diversity; they are based on the prediction of normal weather and have a 50-percent chance of being exceeded.
2. Total loads for the region include system firm loads, plus BPA's nonfirm loads, which include industrial top-quartile loads, associated transmission losses, and Utah Power Company's interruptible load.
3. Exports from the region by Northwest utilities include BPA's surplus firm power sales to the cities of Burbank, Glendale, Pasadena, Sacramento Municipal Utility District, San Diego Gas and Electric, and Southern California Edison; BPA's surplus firm power sale to M-S-R Power agency, which converts to a capacity sale on November 1, 2009; BPA's capacity contracts with the cities of Anaheim and Riverside; BPA's contract with BC Hydro for Canadian Entitlement beginning April 1, 1998; BPA's Northwest-Southwest Intertie losses; Idaho Power Company's power sales to Sierra Pacific, the cities of Azusa, Banning, and Colton in California, the city of Washington in Utah, and Utah Associated Municipal Power Systems (UAMPS); Montana Power Company's power sales to the Los Angeles Department of Water and Power; Pacific Power and Light's transfer to its Northern California load, power sales to California Department of Water Resources, Pacific Gas and Electric, Southern California Edison, Sacramento Municipal Utility District, and the Western Area Power Administration (WAPA); Portland General Electric's power sales to the cities of Burbank and Glendale, Southern California Edison, and WAPA, and seasonal power exchange deliveries to Southern California Edison; Puget Sound Power and Light's seasonal power exchange deliveries to Pacific Gas and Electric; Washington Water Power's seasonal power exchange deliveries to Pacific Gas and Electric; the City of Idaho Falls' contract with Utah Power Company for Gem State Hydro; Seattle City Light's seasonal power exchange deliveries to Northern California Public Agencies; Snohomish County Public Utility District's seasonal power exchange with Sacramento Municipal Utility District, and Tacoma Public Utilities' power sale to WAPA.

Also included in exports are resources purchased by utilities outside the region. These include WAPA's purchase of the output of Longview Fibre, 14.2 percent of the Boardman coal plant sold to San Diego Gas and Electric, and 10 percent of the Boardman coal plant sold to the City of Turlock, CA.

4. Federal diversity is a percentage reduction applied to the Federal system non-coincidental peak utility allocation requirements. This is because all peaking electrical loads do not occur simultaneously throughout the region.

5. Regulated hydro includes those hydro dams where the firm energy generation of the dam is affected by the release of stored water from upstream reservoirs. Regulated hydro generation is determined by completing a hydro regulation study of the Pacific Northwest hydro system.
6. Independent hydro includes those hydro dams where no reservoirs exist upstream to release stored water and the firm energy is based on fixed historical flows. Hydro independents are not changed as a part of the hydro regulation study.
7. May Water Budget is the energy loss due to the overgeneration which may be unusable as a firm resource on the Federal system. This is a new adjustment due to the use of a 42-month critical period average hydro number rather than the 39-month critical period average hydro number used in last year's study.
8. Sustained peaking adjustment is a percentage reduction applied to the Federal hydro system to meet a capacity load of 50 hours per week. This adjustment also includes reductions for Federal hydro maintenance, spinning reserves, forced outage reserves, and summer flow augmentation on the Lower Snake River and John Day hydro projects.
9. Small thermal and miscellaneous resources include City of Idaho Falls' Diesel; Tacoma Public Utilities' Steam Plant No. 2; Idaho Power Company's Energy Management System; Portland General Electric's Summit units; Puget Sound Power and Light's Crystal Mountain and Shuffleton; Montana Power Company's portion of Corette and Bird in the region; and Seattle City Light's Boundary.
10. Combustion turbines include Idaho Power Company's Wood River; Portland General Electric's Bethel and Beaver; Puget Sound Power and Light's Whidbey Island, Whitehorn, Fredrickson, and Fredonia units; and Washington Water Power's Northeast units and Rathdrum units.
11. Renewables include Emerald County PUD's Short Mountain; and Washington Water Power's Kettle Falls.
12. Cogeneration includes Eugene Water and Electric Board's WEYCO Energy Center; Snohomish County PUD's Scott Paper; and Portland General Electric's Coyote Springs. Longview Fibre output is sold outside the region to WAPA.
13. Imports include exchange energy to BPA from the cities of Anaheim and Riverside; exchange energy from the M-S-R Public Power Agency after their surplus firm sale converts to a capacity/energy exchange beginning November 1, 2009; deferred energy returns from Sacramento Municipal Utility District and San Diego Gas and Electric; exchange energy returned from San Diego Gas and Electric; power from Pacific Power and Light's Wyoming Division to serve BPA's Southern Idaho load; Power purchases from Basin Electric Cooperative and Powerex (TransAlta); Pacific Power and Light transfers from their Wyoming division and seasonal power exchange deliveries to Portland General Electric from Southern California Edison; power sale deliveries to Puget Sound Power and Light from BC Hydro, and seasonal power exchange deliveries from Pacific Gas & Electric; Utah Power Company's intra-company transfer; seasonal power exchange deliveries to Washington Water Power

from Pacific Gas and Electric; and power deliveries to Seattle City Light from BC Hydro for Ross replacement, and seasonal power exchange deliveries from Northern California Public Agencies.

14. Resource acquisitions are resources BPA has identified and contracted for future purchase. When new Federal resource acquisitions are contracted for and/or on-line, they will be included in the loads and resources balance.
15. Non-utility generation (NUG) resources include generation provided to utilities by independent power producers and resources included under the Public Utility Regulatory Policies Act (PURPA). This study included 180 Individual NUGs.
16. Hydro, small thermal and miscellaneous resources, and combustion turbine reserve requirements are estimated at 5 percent of the capacity of these resources for all utilities in the region.
17. Large thermal reserves requirements are estimated at 15 percent of the total capacity of the Pacific Power and Light thermal import into the region plus the large thermal resources owned by utilities in the region.
18. Federal spinning reserves equal the reserve generating capacity maintained to provide a regulating margin for the automatic generation and frequency control of power generation.
19. Direct service industry reserve requirements are estimated at one-third of the industrial firm load, or the sum of the reserve requirements for Federal hydro, small thermal and miscellaneous resources, combustion turbines, and large thermal, whichever is smaller.
20. Hydro maintenance is the sum of individual Federal system, public agency, and IOU hydro project maintenance, based on the average of the 1983-84 through 1988-89 schedules submitted to the Northwest Power Pool.
21. Extreme weather adjustment is the sum of all utility load responses with Pacific Northwest cold weather, and has a 5 percent chance of being exceeded.

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SECTION IX GLOSSARY

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GLOSSARY

- Average Megawatts** - A unit of electrical consumption or production over a year. It is equivalent to the energy produced by the continuous use of 1 megawatt of capacity served over a period of 1 year. (Equivalent to 8.76 gigawatt hours, 8,760 megawatt hours, or 8,760,000 kilowatt hours.)
- Biomass** - Any organic matter that is available on a renewable basis, including forest residues, agricultural crops and waste, wood and wood wastes, animal wastes, livestock operation residue, aquatic plants, and municipal wastes.
- Boiling Water Reactor (BWR)** - A nuclear power plant in which steam from the reactor is fed directly into the steam turbine.
- Bonneville Power Administration (BPA)** - BPA is a power marketing agency, responsible for acquiring and delivering sufficient power to meet its contractual obligations to serve the electrical needs of its customers. BPA does not own generating resources.
- Calendar Year** - Calendar year (CY) is the 12-month period January 1 through December 31. For example, CY 1994 is January 1, 1994 through December 31, 1994.
- Capacity** - The maximum power that an electrical system or machine such as a hydro powered or thermal powered generating plant can produce under specified conditions.
- Capacity Factor** - The ratio of the average load on a machine or piece of equipment over a given period to the maximum power rating of the machine or equipment.
- Cogeneration** - The simultaneous production of electricity and useful heat energy from a fuel source. Often this is accomplished by the recovery of waste energy caused by various industrial and commercial operations. This is typically used for industrial processes or space heating applications.
- Conservation** - Any reduction in electrical power consumption as a result of increases in the efficiency of energy use, production, or distribution.
- Critical Period** - That portion of the historical streamflow record during which the recorded streamflows, combined with all available reservoir storage, produced the least amount of energy.
- Dedicated Resources** - Generating resources owned by a utility and used to serve its firm loads. These resources are declared for a rolling 7-year period in Exhibit I of the utilities' power sales contracts with BPA.
- Direct Service Industries (DSI)** - A group of industrial customers that purchase electric power directly from BPA. Most DSIs are aluminum and other primary metal smelting plants.
- Diversity** - An adjustment applied to peak loads to reflect the fact that all peaking electrical demands do not occur simultaneously across the region.
- Energy Load** - The demand for power averaged over a specified period of time.
- Federal Columbia River Power System (FCRPS)** - The FCRPS consists of 30 Federal hydroelectric projects constructed and operated by the U.S. Army Corps of Engineers (COE), U.S. Bureau of Reclamation (USBR), plus BPA's transmission facilities.
- Federal System** - The Federal system is a combination of BPA's customer loads and contractual obligations, and resources from which BPA acquires the power it sells. The

resources include plants operated by the U.S Army Corps of Engineers (COE), U.S. Bureau of Reclamation (USBR), and hydroelectric projects owned by the city of Idaho Falls and WPPSS. BPA markets the thermal generation from WNP-2, operated by WPPSS.

50-Hour Peak Capacity - The amount of capacity that can be sustained for 10 hours a day during peak-load hours for a 5-day week.

Firm Capacity - Maximum on-peak electrical energy which is considered assurable to the customer to meet all contractual peak load requirements over a defined period.

Firm Energy - Electric power which is considered assurable to the customer to meet all contractual energy load requirements over a defined period.

Firm Energy Load Carrying Capability (FELCC) - The amount of electrical energy load that a hydro system could serve on a firm basis under critical-period streamflows.

Fiscal Year - In this study, fiscal year (FY) is the 12 month period October 1 to September 30. For example FY 1994-95 is October 1, 1994 to September 30, 1995.

Forced Outage Reserve - Capacity that is held in reserve, for use in case a generating unit malfunctions.

Forced Energy Sale (Spill) - Electrical energy that cannot be accepted into the system and must either be sold or spilled due to constraints and limitations of hydro projects.

Forebay - The portion of the reservoir at a hydroelectric plant that is immediately upstream of the generating station.

Historical Streamflow Record - The unregulated streamflow database of the 50 years from July 1928 to June 1978.

Hydroregulation - A study simulating operation of the Pacific Northwest electric power system that incorporates the historical streamflow record, monthly loads, thermal and other non-hydro resources, hydroelectric plant data for each project, and the constraints limiting each project's operation.

Interruptible Loads - Loads that can be interrupted in the event of a power deficiency on the supplying system.

Megawatts - A unit of electrical power equal to 1 million watts or 1,000 kilowatts.

Model Conservation Standards (MCS) - A set of energy-efficient building standards for new electrically heated commercial and residential buildings. It also includes standards for residential and commercial buildings that have been changed to electric space heating.

Nondedicated Resources - Resources brought into service after June 1980 by BPA customers who choose not to use them to serve their own firm loads.

Nonfirm Energy - Electrical power produced by the hydro system that is available with water conditions better than those of the critical period without appreciably jeopardizing reservoir refill. It is available in varying amounts depending upon season and weather conditions.

Nonfirm Energy Loads - Loads that are served with nonfirm energy whenever it is available.

Obligation - Capacity and energy the Federal system is required to provide to public agencies and IOUs under their power sales contracts with BPA.

Operating Year - For this study, operating year (OY) is the 12-month period August 1 through July 31. For example, OY 1994-95 is August 1, 1994 through July 31, 1995.

Peak Load - The maximum demand for power during a specified period of time.

Programs In Perspective - An annual program conducted by BPA to take the agency's proposed programs and budgets before the public, both to explain the agency's plans and to get constructive feedback.

PURPA Resources - Resources declared by utilities according to the Public Utility Regulatory Policies Act of 1978 (Public Law 95-617).

Region - The geographic area defined by the Pacific Northwest Electric Power Planning and Conservation Act. It includes Oregon, Washington, Idaho, Montana west of the Continental Divide, portions of Nevada, Utah, and Wyoming that lie within the Columbia River drainage basin, and any rural electric cooperative customer not in the geographic area described above but served by BPA on the effective date of the Northwest Power Planning Act.

Resource Acquisitions - Conservation or generating resources acquired in order to meet projected firm energy deficits.

Spinning Reserves - Reserve generating capacity which is maintained for immediate response to load variations. This provides a regulating margin for controlling the automatic generation and frequency of power in the Federal system.

Surplus Firm Capacity - The maximum amount of assured electrical power above the firm peak loads served by the power system.

Surplus Firm Energy - The amount of assured electrical energy above the firm energy loads served by the power system.

Sustained Peak - The peaking capacity necessary to sustain a load for a given period of time.

Water Budget - A part of the Pacific Northwest Power Planning Council's Fish and Wildlife Program that calls for a quantity of water to be released in order to assist in the downstream migration of juvenile salmon and steelhead.

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