1991 Pacific Northwest Loads and Resources Study

Bonneville
Bonneville Dam Project

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1991 PACIFIC NORTHWEST LOADS AND RESOURCES STUDY

BONNEVILLE POWER ADMINISTRATION
DECEMBER 1991

MASTER

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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

BPA's Power Systems Branch

Completion of the hydro system
regulation and data collection

Pacific Northwest Utilities Conference Committee

Load and resource data collection

Energy Resources Development and Implementation Process

This document presents the compilation and analysis of information developed during several distinct activities which are part of BPA's Energy Resources Program.

The flow chart below illustrates how the Energy Resources Program works. Broadly speaking, the program has two primary functions--resource planning, and resource management. The first three blocks in the chart cover most of the planning tasks.

What Are the Needs of Our Customers?

To define the overall situation, BPA first assesses what the energy needs of customer utilities are likely to be over a 20-year planning horizon. Projections are developed and published jointly with the Northwest Power Planning Council. Also part of this initial step are forecasts of how much energy is available from existing Federal resources. BPA then compares demand and supply estimates in a Loads and Resources Study (this document), also known as the Whitebook.

What Choices Do We Have to Meet Those Needs?

The second step is to identify all the available alternatives for meeting customer needs. BPA develops resource supply forecasts for both generation and conservation resources. These studies also consider such factors as environmental and regulatory constraints, new technologies, and public opinion. Other efforts include examining opportunities for coordinating hydro system operations with Canada and arranging power purchases and transfers with Canadian and Southwest utilities.

How Can We Best Meet Those Needs?

Step three involves weighing the available alternatives and their consequences to arrive at the most appropriate and cost-effective resource mix for the short-term. Developing the Resource Program is a public review process in which BPA's customer utilities and other interested parties have an opportunity to influence resource decisions. The process focuses on a specific multi-year planning period, i.e., the 1990 Resource Program focuses on Fiscal Years (FY) 1992 and 1993, and the 1992 Resource Program, currently in draft form, focuses on FY 1994 through 2003. Preliminary results of this process are included as planned acquisitions in this document.

What Are We Doing to Meet Customer Needs?

From planning and strategy, BPA then moves to step four--meeting customer power needs. Based upon the policies and directives in the Resource Program, managers draw up an overall plan to capture the conservation available in the region's homes, factories, and offices. This results in many programs and projects, ranging from about 25 to 40 in any year. In the past, BPA teams have designed and managed most conservation programs. Now, utilities and other power producers are sponsoring their own programs with BPA support.

Bonneville is responsible for planning and acquiring generating resources--both conventional and renewable. Another part of step four is BPA's oversight function--seeing that BPA gets value from contracts for generated power.

How Well Did We Meet Those Needs?

Finally, in step five, BPA looks at how well it is doing its job. It is agency policy to evaluate all programs. Evaluation provides a means of comparing initial objectives with actual results. It is essential for verifying the energy savings from conservation programs and understanding the quality of our actions to acquire the energy.

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1991 PACIFIC NORTHWEST LOADS AND RESOURCES STUDY

I. INTRODUCTION

The 1991 Pacific Northwest Loads and Resources Study establishes the Bonneville Power Administration's (BPA) planning basis for supplying electricity to BPA customers. 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 1990 Pacific Northwest Loads and Resources Study, published in December 1990.

BPA's long-range planning incorporates resource availability with a range of forecasted electrical consumption. The forecasted future electrical demands--firm loads--are subtracted from the projected capability of existing 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, then 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 profile, which includes loads and resources in addition to the Federal system.

The loads and resources analysis in this study emulates the operation of the power system under the Pacific Northwest Coordination Agreement (PNCA) produced by the Pacific Northwest Coordinating Group.^{1/}

^{1/} The PNCA operating year is being changed from July 1 through June 30 to August 1 through July 31. This new operating year will be incorporated into the 1992 Pacific Northwest Loads and Resources Study. Using the new operating year will have negligible impacts on future studies.

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) 1992-93 through 2011-12.^{1/} The study shows the Federal system's and the region's monthly estimated maximum electrical demand and monthly maximum generating capability--capacity--for OY 1992-93, 1997-98, 2002-03 and 2011-12. The Federal system and regional monthly capacity surpluses/deficits are summarized for 20 operating years.

With the 1990 loads and resources study, BPA initiated the concept of using resource options to cover firm energy deficits in the near term. This method of accounting for resources continues with this study and is discussed in BPA's Approach to Resource Planning on page 6.

The Federal system analysis is presented in Section IV, beginning on page 13. The analysis for the Pacific Northwest region is presented in Section V, page 42.

A glossary of terms is included in Section VIII, page 103.

Additional copies of this summary, along with copies of the documents listed below, can be obtained from BPA's Public Involvement Office, toll-free, 1-800-624-9495, or in Oregon, 1-800-841-5867:

1991 Pacific Northwest Economic and Electricity Use Forecast Technical Appendix: Volume 1 (available January 1992).

1991 Pacific Northwest Loads and Resources Study Technical Appendix: Volume 2 (available January 1992).

Fiscal Year Loads and Resources Summary for Major Utility Groups in the Pacific Northwest (Load and resource tables for the Pacific Northwest, the Federal System, public agencies, and private utilities in BPA fiscal year format).

Non-Utility Generation Summary. BPA's Loads and Resources Section maintains a non-utility generation database. This database contains regional non-utility generation (NUG), which consists of all PURPA and independent power producers' (IPP) firm resources included in the loads and resources study. These resources are reported by 1) type of resource, i.e., hydro, cogeneration, etc., and 2) all NUGs for each utility in the region. Last year's study lumped all these resources under the PURPA category.

^{1/} Operating Year (OY) is the 12-month period July 1 to June 30.
For example, OY 1992-93 is July 1, 1992 through June 30, 1993.

II. BACKGROUND

Following is general background information on resources and an explanation of the load forecasting techniques used in preparing this study.

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 December 5, 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. The Pacific Northwest region also includes 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.

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 utility contracts.

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 worst low-water period--called the critical period--recorded for the Columbia River Basin. The energy produced by the region's hydro projects during the critical period is calculated using the generation average for the period September 1928 through February 1932, excluding the months of May. This creates a 39-month critical period. May is excluded from the average to avoid overstating the Federal firm hydro energy generation resulting from implementing water budget flows to assist fish migration. The regional hydro system generates approximately 12,400 average megawatts of firm energy under critical water conditions.

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. Additional constraints are also in place to protect and enhance anadromous fish populations. These nonpower uses place operating constraints on the reservoirs and limit hydroelectric power production. BPA's resource planning takes into account all presently known hydro constraints in assessing regional hydro system capability.

The hydro analysis for this year's study used all operating constraints currently adopted by the hydroelectric project owners. Many of these constraints were added to the system in support of the Pacific Northwest Power Planning Council's fish flow program. Constraints placed on the hydro system over the past 10 years to enhance fish flows have decreased the firm energy by approximately 400 average megawatts.

The Pacific Northwest Power Planning Council, BPA, and other Pacific Northwest entities are currently evaluating new ways to enhance fisheries and wildlife. These include 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 Council recently presented an amendment to their Columbia River Basin Fish and Wildlife Program that would reduce regional hydro firm energy by 73 average megawatts. The impacts of future proposals are unknown; they could, however, reduce the generating capability by as little as 50 or as much as several thousand average megawatts. BPA does not expect the potential impacts to approach the high end of the range of estimates. These proposals, however, will most likely increase constraints 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 evaluate these impacts.

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 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 1991 Pacific Northwest Loads and Resources Study Technical Appendix: Volume 2.

The monthly instantaneous capacity is also 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 provides firm hydro capacity estimates 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 is also adjusted to allow for scheduled hydro maintenance, spinning reserves, and forced outage reserves. Sections VI and VII contain tables showing the amount of surplus capacity as defined above. These capacity tables should not be used to determine the amount of capacity to support non-firm sales. Additional information regarding the determination of the region's firm hydro capacity is contained in the loads and resources technical appendix.

Capacity surplus values do not reflect potential nighttime return problems on the system. If peaking replacement energy from capacity sales is returned at night, the output of the hydro system and other regional resources could be greater than the region's nighttime load. Nighttime overgeneration is due to low loads, nonpower hydro constraints that require minimum streamflows, and the inability of thermal resources to cycle from day to night. These constraints 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 the Northwest nighttime loads are low and will greatly reduce sustained capacity surplus availability.

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. This study does not include Washington Public Power Supply System (WPPSS) nuclear plants 1 and 3 (WNP-1, WNP-3) as planned 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, 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 are owned and operated by regional entities; they are fueled by biomass, coal, natural gas, oil, and nuclear power.

The regional analysis is presented in Section V, beginning on page 42.

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. Sales to public agencies and DSIs comprised over 80 percent of the Federal system loads in OY 1990-91.

The hydro resources of the Federal system include 31 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. BPA has the exclusive right to sell power generated by USBR and COE hydroelectric projects. BPA also markets the thermal generation from WNP-2, operated by WPPSS, 30 percent of the output of Portland General Electric's (PGE) Trojan nuclear power plant and a short-term seasonal purchase of about 8 percent of the Boardman coal plant acquired from the Pacific Northwest Generating Company (PNGC).

The Federal system analysis is shown in Section IV, beginning on page 13.

BPA's Approach to Resource Planning

This study treats Federal planned resource acquisitions consistent with BPA's resource planning described in the 1990 Resource Program. This treatment of planned acquisitions started with the 1990 Pacific Northwest Loads and Resources Study. The Resource Program plans for the cost-effective development of an aggressive, steadily increasing conservation program, coupled with the acquisition of a diverse mix of generation resources to meet the power requirements of BPA's customers. BPA has a long-term commitment to acquire cost-effective conservation and generating resources and retain maximum flexibility in its acquisition program.

For the short-term, BPA issued a Request For Proposals (RFP) in 1991 to acquire some of the resources identified in the Resource Program through FY 1992-93. These proposals offer a combination of both conservation and generating resources. BPA is now evaluating these proposals and selecting resources BPA will negotiate to acquire. In the future, the resources to be acquired become even less defined. Because these planned resource acquisitions are not actually on-line or contracted for, they are excluded as firm resources in the loads and resources study. These resources will be counted as firm resources when BPA signs contracts to acquire them. The categories of planned resource acquisitions are included in Table 7, page 27.

To offset possible short-term firm energy deficits, and to meet operational uncertainties such as load overruns or poor thermal performance, BPA has and will continue to acquire firm energy resource options. Some of these resource options guarantee BPA rights to terminate surplus firm power sales or purchase firm power as needed. The generation resource options, if exercised, will have value as cost-effective firm resource additions. These resource options are, however, viewed primarily as insurance against extreme conditions. The value of these options diminishes if they are treated as firm resources in long-range planning. Since these options may or may not be exercised, they are excluded as firm resources in the loads and resources study.

Currently, most of BPA's firm resource options are long-term surplus firm power sales and capacity/energy exchange agreements with Pacific Southwest utilities. These contracts contain provisions by which BPA may completely or partially terminate the power sales and convert the contracts to capacity/energy exchanges. BPA's resource options also include 115 average megawatts of available non-treaty storage in Canada.

BPA's 1992 Resource Program will address how these resource options and planned resource acquisitions should be combined to meet future needs in the most cost-effective manner.

Nonfirm Resources

BPA resource planning uses critical water flows to compute the region's and the Federal system's firm hydro energy. The regional hydro system, however, has historically experienced precipitation levels which produce greater than critical period flows. This excess water is used to produce nonfirm energy.

BPA planning does not include nonfirm energy in the loads and resources balance. Nonfirm energy increases regional resources by about 3,800 average megawatts annually when averaged over 50 years of historical water flows. The Federal share of this nonfirm energy is about 2,400 average megawatts based on 50 years of data. Nonfirm energy is even larger for both systems when based on 102 years of historical water flows. Capacity is generally available to support nonfirm energy sales.

Load Forecasting

The five load forecasts presented in this study were prepared jointly by BPA and the Northwest Power Planning Council (Council) in the spring and summer of 1991. 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 determinants are also considered.

To prepare these five load forecasts, ranges of employment, population, households, and fossil fuel price forecasts are developed. They are based on national economic forecasts and historical relationships between the Pacific Northwest and national economies. These major determinants 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 cost of acquiring new resources to meet increased demand for power--and the resulting increase in electricity prices--are factored into the analysis. 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 determining factors being aluminum prices, electricity costs, and other DSI production costs.

The medium load forecast falls roughly at the center of the distribution of the load projections. The most likely range of loads is between the medium-high and medium-low forecasts. There is a 50 percent probability that loads will be in this range. The probability of loads being between the medium-high and high or between the medium-low and low cases is 20 percent each. The high and low forecasts are unlikely to occur, with probabilities of load being higher than the high case or lower than the low case of 5 percent each.

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, while the Council staff took the lead in developing the other forecasts making up the range.

The high, medium-high, medium-low, and low forecasts were prepared jointly with the Council in the spring of 1991, using the Council's pricing model, as part of the development of their Power Plan. The medium forecast was prepared at the same time, 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. An updated medium forecast was prepared in August 1991, incorporating more recent economic trends and load tracking data. This updated forecast did not differ materially from the medium forecast prepared for the final Council Plan, and BPA elected to use the final Plan forecast for this year's study.

The medium forecast used in this study incorporates a merging of BPA's mid-term public agencies econometric load forecast (prepared in March 1991), with the 1991 Joint Long-Term Forecast. The mid-term and joint 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 1994; the long-term method was used beginning January 1995 and continuing through the remainder of the study period.

Only the public agency medium forecast was merged in this manner. The high, medium-high, medium-low, and low forecasts were produced solely from the long-term forecasting models and are virtually identical to the public agency forecasts presented in the Council's Power Plan. The IOU load forecasts were generated from the long-term forecasting models and were not merged.

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 becomes effective January 1993;
- Conservation savings that have already been achieved, such as weatherization of existing dwellings, construction of Super Good Cents houses, and savings from conservation programs budgeted for

Fiscal Years (FY) 1991-92, 1992-93, and 1993-94.^{1/} These conservation programs were included as reductions in loads, as shown in Table 7, page 27, which presents a reconciliation of the treatment of conservation acquisitions.

- Anticipated savings from aluminum DSIs' contracted-for conservation and modernization measures through July 1991; 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 1991 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.

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 20-year study period. These uncertainties include:

- Differences in the rate of forecasted load growth;
- Changes in conservation program levels, including MCS implementation;
- Failure of generating resources to operate at anticipated times and levels;
- Changes in hydro system operation in response to programs developed to address the Endangered Species Act or other environmental considerations; and
- Possible Loss of Trojan Nuclear Plant -- During the 1991 maintenance outage, operators of Portland General Electric Company's Trojan nuclear plant discovered unexpected corrosion of the mechanisms in the steam generators. PGE is undertaking a study to determine the future of the project, and is contemplating replacing the steam generators during 1995 or 1996. An extended or permanent shutdown

^{1/} Fiscal Year (FY) is the 12-month period October 1 to September 30. For example, FY 1992-93 is October 1, 1992 through September 30, 1993.

of Trojan would cause a loss of 1,104 megawatts of capacity and 717 average megawatts of firm energy in the region. (PGE would lose 745 megawatts of capacity and 483 average megawatts of energy; the Federal system would lose 331 megawatts of capacity and 215 average megawatts of energy; and Pacific Power & Light Company would lose 28 megawatts of capacity and 18 average megawatts of energy.)

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 20-year study period. What occurs when these contracts expire, which will be at varying times during the 20-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 during the last 11 years of the study period.
- 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. Any changes will affect the later years of this analysis.

III. Changes in the 1991 Pacific Northwest Loads and Resources Study

This section describes the major changes in the structure and assumptions of the 1991 Pacific Northwest Loads and Resources Study compared to the 1990 study. Other changes are reflected in the data for each utility contained in the 1991 Pacific Northwest Loads and Resources Study Technical Appendix.

New Federal System Firm Resources

On January 28, 1991, BPA contracted for the output of the Cowlitz Falls hydro project. Cowlitz Falls has a rated capability of 70 megawatts and an annual generation of 22 average megawatts. The project is scheduled to begin operating in April 1994.

BPA acquired the output of PNGC's share of the Boardman coal plant for October through April of OY 1991-92, and September through April for OY 1992-93 through 1994-95. BPA purchased 50 megawatts of capacity and 28 average megawatts of energy.

Trojan Nuclear Power Plant

Recent events at PGE's Trojan nuclear plant have resulted in an adjustment of the capacity factor from 70 percent to 65 percent for this study. This results in a 62-average-megawatt loss to the plant's participants. Trojan operators, during the 1991 maintenance outage, discovered unexpected corrosion of mechanisms in the steam generators. PGE is contemplating replacing the steam generators during 1995 or 1996. The interim period will be marked by uncharacteristic operation and refueling schedules, with extended outages to facilitate steam generator inspection and repairs. This is the same capacity factor assumed for WNP-2, the region's other operating nuclear plant.

Hydro Regulation Study

The hydro regulation study for this year's loads and resources study was designed to simulate the operational hydro study completed for PNCA planning. The changes include the following:

- The adoption of the PNCA maximum shift philosophy in the first two years of the 4-year critical period. This increases loads and hydro resources in the first two years of the critical period and shapes the return of that energy into the last two years of the 4-year critical period, and
- The Corps and Bureau increased the minimum amount of reservoir storage in Libby, Hungry Horse, and Dworshak hydro projects. These new hydro constraints increase the probability that these reservoirs refill each year by limiting the availability of water which may be used from these projects to meet loads.

These changes altered the shape of the monthly energy and sustained capacity of the hydro system from prior studies. PNCA planning resulted in heavier drafting of the hydro system, which increased streamflows and firm energy in the first two years of the critical period study. In this same timeframe, higher reservoir elevations at Hungry Horse, Dworshak, and Libby forced heavier drafts, reducing reservoir elevations at Grand Coulee. Winter elevations at Grand Coulee dropped significantly--to the 1,260-foot range in February (full reservoir occurs at 1,290 feet)--causing substantial sustained capacity losses. This reduced the Federal sustained capacity surplus in the winter and increased the capacity surplus in the summer and fall.

Future hydro regulation studies may contain additional project constraints that could further impact monthly energy and capacity capabilities.

Federal System Long-Term Firm Surplus Energy Deficit

BPA has discontinued its long-term firm energy marketing program. The Federal system firm surpluses which might occur in a given year have declined to such a point that there is no longer any firm energy surplus from a long-term planning perspective, and any potential short-term surplus will be marketed only under existing contracts or short-term contracts.

IV. FEDERAL SYSTEM ANALYSIS

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

- 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 with the cities of Burbank, Glendale and Pasadena, and the Southern California Edison Company (SCE), are shown as power sales through their expiration; the Federal surplus firm power sale with the M-S-R Public Power Agency, whose members include Modesto Irrigation District, and the cities of Santa Clara and Redding, California, is shown as a power sale through October 31, 2009, then converts to a capacity/energy exchange until it expires;
- The IOUs do not make long-term BPA purchases under their power sales contracts; and
- Federal resource acquisitions include the long-term purchase of the Cowlitz Falls hydro project, and the seasonal purchase of PNGC's share of the Boardman coal plant through April 1995.

Federal System Firm Energy Loads

The Federal system firm loads include BPA's firm DSI load, 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, page 14, shows the components of the Federal system firm load for OY 1992-93.

The economic projections of the 1991 Joint Forecast used for this analysis are generally higher than the 1990 Joint Forecast projections used in last year's study. The 1991 forecast contains more optimistic projections of regional employment, slightly lower retail electricity prices, and relatively unchanged fossil fuel price projections. The exception is in the high case, where a slightly lower DSI forecast, coupled with savings attributable to Federal Appliance Standards and the adoption of the Model Conservation Standards (MCS) in Oregon and Washington, result in a slightly lower high case forecast through OY 1999-2000.

Figure 1
Federal System Firm Load
OY 1992-93 Medium Load Forecast
Energy in Average Megawatts

*Columbia Storage Power Exchange

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1/ Operating Year (OY) is the 12-month period July 1 to June 30.
 For example, OY 1992 is July 1, 1992 through June 30, 1993.

The Federal system firm energy loads under the high, medium-high, medium, medium-low, and low load forecasts for OY 1992-93 through 2011-12 are shown in Figure 2, page 15. The loads are based on the long-term 1991 Joint Forecast prepared by BPA and the Council. This study assumes that BPA serves all of the public agencies' net firm load requirements not served by their own resources. Additionally, the Federal loads assume no long-term IOU power sales contract purchases from BPA. This is due to the uncertainty of the IOUs' intentions concerning whether to make long-term BPA purchases under their power sales contracts. BPA believes this decision 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. Currently, only one IOU, Puget Sound Power and Light Company (Puget), is purchasing energy from BPA under their power sales contract. Puget has extended this BPA energy purchase through June 30, 1998. Previously, they were to purchase power through June 30, 1993.

Figure 2
Federal Firm Energy Loads
1991 Joint Forecast

The Federal loads include all intra-regional contracts made within the Pacific Northwest, called contracts out, and inter-regional contracts or exports to Southwest utilities. Below, Table 1 summarizes the Federal system firm energy loads and percentage of load growth under the five load forecasts through the 20-year study period. The Federal firm energy loads under the medium forecast are presented in Exhibit 1, line 15, pages 54 through 57. The Federal firm energy loads under the high, medium-high, medium-low, and low forecasts are shown on line 15 of Exhibits 2 through 5, pages 58 through 73.

Table 1
Federal System Firm Loads ^{1/}
Includes Contractual Obligations
Energy in Average Megawatts

Load Forecast	Operating Year		2/ Load Growth	Load Growth (Avg. %/yr)
	1992-93	2011-12		
High	9,632	13,625	3,993	1.8
Medium-High	9,147	11,570	2,423	1.2
Medium	8,891	10,333	1,442	0.8
Medium-Low	8,243	9,004	761	0.5
Low	7,724	6,767	-957	-0.7

^{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 July 1 to June 30. For example, OY 1993 is July 1, 1992 through June 30, 1993.

Federal System Firm Peak Loads

Figure 3, below, shows the Federal firm peak loads under the medium load forecast for OY 1992-93, 1997-98, 2002-03, and 2011-12, based on the 1991 Joint Forecast. The peak loads project the expected 1-hour maximum demand for each month. There is a 50 percent probability that the actual load will be either higher or lower at some time during that month. 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. The loads also include BPA's inter- and intra-regional contractual on-peak commitments. 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.

Figure 3
Federal Firm Peak Loads
Medium Loads

New Federal System Firm Resources

Cowlitz Falls Hydro Project

Since last year's study, BPA, on January 28, 1991, contracted for the output of the Cowlitz Falls hydro project. Cowlitz Falls has a rated capability of 70 megawatts and an annual generation of 22 average megawatts. The project is scheduled to begin operating in April 1994.

Seasonal Purchase of Boardman Share

BPA seasonally acquired PNGC's share of the Boardman coal plant for October through April, OY 1991-92, and September through April, OY 1992-93 through 1994-95. This purchase increases BPA's available firm resources by 50 megawatts of capacity and 28 average megawatts of annual energy through April 1995.

Table 2

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

Project	Type	Operator	On-line Date	Capacity (peak MW)	Firm Energy (aMW)
PNGC's Boardman Share	Coal	PGE	1992 ^{1/}	50	28
Cowlitz Falls	Hydro	Lewis Co PUD	1994	70	22
Total New Non-Federally Owned BPA Resources				120	50

^{1/} Seasonally acquired by BPA through April 1995

Existing Federal System Firm Resources

The Federal system hydro resources from which BPA markets power are shown in Table 3, page 19. 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, and other BPA hydro-related contracts are shown in Table 4, page 20. The combination of these resources represent BPA's available firm resources.

Table 3
Federal System Hydroelectric Projects
September 30, 1991

Project	Initial Year of Service	Number of Units	Generating Capacity (peak MW)	Firm Energy (aMW)
U.S. Bureau of Reclamation Hydroelectric Projects				
Grand Coulee	1941	30	6,984	1,820
Hungry Horse	1952	4	430	100
Palisades	1957	4	131	61
Anderson Ranch	1950	2	40	11
Minidoka	1909	7	16	9
Roza	1958	1	13	4
Chandler	1956	2	13	7
Black Canyon	1925	2	10	7
Boise River Diversion	1912	3	2	0
Total Bureau of Reclamation Projects		55	7,639	2,019
U.S. Army Corps of Engineers Hydroelectric Projects				
Chief Joseph	1955	27	2,614	1,112
John Day	1968	16	2,484	891
The Dalles	1957	22	2,074	707
Bonneville	1938	18	1,147	565
McNary	1953	14	1,127	623
Lower Granite	1975	6	930	191
Lower Monumental	1969	6	930	195
Little Goose	1970	6	930	191
Ice Harbor	1961	6	693	194
Libby	1975	5	620	185
Dworshak	1974	3	460	155
Lookout Point	1954	3	138	21
Detroit	1953	2	115	28
Green Peter	1967	2	92	19
Lost Creek	1975	2	56	23
Albeni Falls	1955	3	49	28
Hills Creek	1962	2	35	12
Cougar	1964	2	29	11
Foster	1968	2	23	8
Big Cliff	1954	1	21	9
Dexter	1955	1	17	7
Total Corps of Engineers Projects		149	14,584	5,175
Total Bureau of Reclamation and Corps of Engineers Projects		204	22,223	7,194

Table 4
Non-Federally Owned BPA Resources and Contracts

Project	Type	Operator	Date in Service	Capacity (peak MW)	OY 1992-93 Firm Energy (aMW)
Existing Non-Federally Owned BPA Resources					
Trojan (30%)	Nuclear	PGE	1976	331	215
WNP-2	Nuclear	WPPSS	1984	1,095	716
Boardman	Coal	PGE	1992 <u>1/</u>	50	28
Packwood Lake	Hydro	WPPSS	1964	32	6
Idaho Falls	Hydro	City of Idaho Falls	1982	27	18
Total Non-Federally Owned BPA Resources				<u>1,535</u>	<u>983</u>
Firm Contracts					
Canadian Entitlement			--	209	67
Restoration, Columbia River Treaty w/Canada			--	0	-23
Southwest Capacity/Energy Exchange			--	0	6
Montana Power Capacity/Energy Exchange			--	0	29
PP&L (Wyoming) Import for Southern Idaho Load			--	185	93
WNP-3 Exchange Settlement Agreements			--	<u>0</u>	<u>114</u>
Total BPA Firm Contracted Resources				394	286
Future Non-Federally Owned Resources					
Cowlitz Falls	Hydro	Lewis Co PUD	1994	70 <u>2/</u>	22 <u>2/</u>

- 1/ Seasonally acquired by BPA from PNGC, October through April, OY 1991-92 and September through April, OY 1992-93 through 1994-95
- 2/ Acquired by BPA on January 28, 1991 and will become operational April 1, 1994.

Table 5, page 21, summarizes the Federal system firm energy resources and contracts available to meet Federal firm loads for OY 1992-93. Hydroelectric power comprises 86 percent of the Federal system firm energy resources. Of the remaining firm energy resources, 11 percent comes from two nuclear plants, 3 percent is derived from BPA's firm contracts, and less than 1 percent comes from one coal plant.

Table 5
Federal System Firm Energy Resources
for OY 1992-93 1/

Project Type	Generating Peak Capacity (MW)	Generating Peak Capacity % of Total	Firm Energy (aMW)	Firm Energy % of Total
Hydro Resources	20,670	92	7,219	86
Nuclear Plants	1,426	6	931	11
Coal Plants	50	0	28	0
Firm Contracts	<u>394</u>	<u>2</u>	<u>286</u>	<u>3</u>
Total Federal Resources	22,540	100	8.464	100

1/ Operating Year (OY) is the 12-month period July 1 to June 30.
For example, OY 1992 is July 1, 1992 through June 30, 1993.

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 year, 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 by about 2,400 average megawatts. Federal nonfirm energy is even larger when based on historical water flows of the past 102 years.

Federal System Firm Energy Surpluses/Deficits

The hydro analysis for this year's study used all operating constraints currently adopted by the hydroelectric project owners. Many of these constraints were added to the system in support of the Pacific Northwest Power Planning Council's fish flow program. Constraints placed on the hydro system over the past 10 years to enhance fish flows have decreased the firm energy by approximately 400 average megawatts.

The Pacific Northwest Power Planning Council, BPA, and other Pacific Northwest entities are currently evaluating new ways to enhance fisheries and wildlife. These include 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 Council recently presented an amendment to their Columbia River Basin Fish and Wildlife Program that would reduce regional hydro firm energy by 73 average megawatts. The impacts of future proposals are unknown; they could, however, reduce the generating capability by as little as 50 or as much as several thousand average megawatts. These proposals will most likely increase constraints on

the hydro system and reduce operating flexibility, change the monthly shape of streamflows, and change the monthly availability of Federal energy and sustained capacity. However, BPA does not expect the potential impacts to approach the high end of the range of estimates. When specific constraints have been adopted, they will be incorporated in future studies.

Figure 4, page 23, 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 1992-93 through 2011-12 are presented in Table 6, page 24, and graphically shown in Figure 5, page 25. The Federal system would be energy deficit throughout the 20-year study period under the medium, medium-high, or high load forecast, and would become deficit in OY 2003-04 under the medium-low load case. The Federal system would remain firm energy surplus throughout the 20-year study period under the 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 load, are forecasted to decline slightly through OY 1996-97, then remain constant through the balance of the planning period; and
- 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 Federal energy loads and resources balances under the five load scenarios are presented in Exhibits 1 through 5, pages 54 through 73. The Federal system firm energy surpluses/deficits, based on medium loads, are presented in Exhibit 1, line 41, pages 54 through 57. The 20-year Federal system firm energy surpluses/deficits under the high, medium-high, medium-low, and low load forecasts are shown on line 41 of Exhibits 2 through 5, pages 58 through 73.

Figure 4
Federal Firm Energy Loads and Resources
Includes Inter- and Intra-Regional Contracts

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Table 6
Federal System Firm Energy Surpluses/Deficits
Assuming Existing Loads, Resources, and Contracts^{1/}

Energy In Average Megawatts

OPERATING YEAR 2/	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
High Loads	-1169	-1425	-1669	-1912	-1810	-2030	-2232	-2553	-2745	-2818
Medium-High Loads	-684	-860	-988	-1155	-979	-1126	-1269	-1515	-1635	-1676
Medium Loads	-427	-613	-581	-630	-386	-485	-585	-796	-877	-915
Medium-Low Loads	220	285	385	342	592	520	456	282	233	227
Low Loads	739	943	1219	1261	1568	1545	1533	1449	1680	1945

OPERATING YEAR 2/	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
High Loads	-3059	-3400	-3636	-3961	-4238	-4470	-4685	-4789	-4864	-5119
Medium-High Loads	-1852	-2115	-2257	-2488	-2672	-2805	-2925	-2933	-2908	-3064
Medium Loads	-1048	-1261	-1362	-1549	-1691	-1784	-1858	-1809	-1732	-1829
Medium-Low Loads	129	-60	-144	-309	-434	-513	-572	-518	-426	-499
Low Loads	1891	1750	1719	1605	1535	1514	1507	1615	1756	1737

^{1/} The load forecasts on which this study is based were reduced by budgeted conservation acquisitions for FY 1990-91 through 1993-94.

^{2/} Operating Year (OY) is the 12-month period July 1 to June 30. For example, OY 1993 is July 1, 1992 through June 30, 1993.

Figure 5
Federal Firm Energy Surpluses/Deficits

Planned Federal System Resource Acquisitions

BPA plans to acquire resources during the 1990s to offset projected energy deficits. These planned Federal resource acquisitions include those generation and conservation resources being budgeted or planned through FY 1996-97, as discussed in BPA's 1990 Resource Program. Table 7, page 27, shows Resource Program conservation and planned generation resource acquisitions, plus other planned resources. It also details that portion of the planned Federal conservation acquisitions included as a load reduction in the load forecasts used in this year's study; the remainder is available now if needed to meet future deficits. Since FY 1996-97 extends 3 months into OY 1997-98, a portion of these acquisitions is shown in OY 1997-98.

BPA issued two requests for proposals (RFPs) to provide some of these resources. BPA is now in the process of evaluating these proposals and selecting the resources BPA will negotiate to acquire. This acquisition process, including negotiating contracts, awarding bids, and evaluating possible environmental impacts, requires considerable time. Consequently, all planned acquisitions scheduled for OY 1992, and most of the OY 1992-93 acquisitions, were delayed and are included in OY 1993-94.

These resources are not yet actually on-line or contracted for; therefore, they are not included as firm resources in this study. Federal planned resource acquisitions will become firm resources only after BPA signs contracts to acquire them.

BPA is in the process of developing the Draft 1992 Resource Program. This draft program will be completed and issued for public review by the end of 1991. BPA's proposed course of action is to acquire an accelerated level of conservation above that identified in the 1990 Resource Program. This proposed "accelerated pathway" was outlined in the Draft Conservation Implementation Plan issued by the Office of Energy Resources on September 16, 1991. To avoid double-counting, the proposed program levels from this plan are reduced by the conservation program levels contained in BPA's 1990 Resource Program. The resulting net conservation level is included as a planned acquisition in Table 7.

The strategy of acquiring 250 average megawatts of additional generation resources by 1998, plus another 250 average megawatts of resource options, is included in this study, and is one of four strategies detailed in the Draft 1992 Resource Program. WPPSS is in the process of signing contracts to increase the operating efficiency of the WNP-2 nuclear project. This efficiency improvement is included in the 1992 Resource Program.

Table 7
Planned Federal System Resource Acquisitions ^{1/}
Energy in Average Megawatts

Operating Year ^{2/}	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
<u>1990 RESOURCE PROGRAM ^{3/}</u>											
Conservation	63	96	131	169	212	223	223	223	223	223	223
Generation	0	74	101	115	125	127	127	127	127	127	127
All Sources	<u>20</u>	<u>74</u>	<u>114</u>	<u>139</u>	<u>149</u>	<u>150</u>	<u>150</u>	<u>150</u>	<u>150</u>	<u>150</u>	<u>150</u>
Total 1990 Resource Program	83	244	346	423	486	500	500	500	500	500	500
<u>Less Conservation Included in Load Forecast as a Load Reduction</u>											
Washington MCS	-7	-10	-14	-17	-21	-24	-24	-24	-24	-24	-24
Oregon MCS	-2	-2	-3	-4	-5	-6	-6	-6	-6	-6	-6
Super Good Cents and Northwest Energy Codes ^{4/}	-4	-4	-5	-6	-7	-7	-7	-7	-7	-7	-7
Other Residential	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16
DSI Conservation/Modernization	0	0	0	0	0	0	0	0	0	0	0
Other Industrial	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12
Commercial	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18
Agricultural	<u>-2</u>	<u>-2</u>	<u>-2</u>	<u>-2</u>	<u>-2</u>	<u>-2</u>	<u>-2</u>	<u>-2</u>	<u>-2</u>	<u>-2</u>	<u>-2</u>
Total Conservation Included as a Load Reduction	-61	-64	-70	-75	-81	-85	-85	-85	-85	-85	-85
Total Net 1990 Resource Program Planned Acquisitions	22	180	276	348	405	415	415	415	415	415	415
Post-1990 Resource Program	200	200	200	200	200	200	200	200	200	200	200
<u>1992 PRELIMINARY RESOURCE PROGRAM</u>											
Conservation Implementation Plan ^{5/}	0	0	4	20	37	91 ^{6/}	160	229	296	360	424
Generation Resource Acquisitions	0	0	0	0	0	250	250	250	250	250	250
WNP-2 Efficiency Improvements	<u>0</u>	<u>14</u>	<u>47</u>	<u>47</u>	<u>47</u>	<u>47</u>	<u>47</u>	<u>47</u>	<u>47</u>	<u>47</u>	<u>47</u>
Total Additional 1992 Resource Program Acquisitions	0	14	51	67	84	393	457	526	593	657	721
<u>TOTAL PLANNED ACQUISITIONS</u>	222	394	527	615	689	1003	1072	1141	1208	1272	1336

- 1/ The resources shown for each year are cumulative, not incremental, additions in that year. Resources in any given year differ from those in the 1990 Resource Program due to the difference between Fiscal Year and Operating Year calculations.
- 2/ Operating Year (OY) is the 12-month period July 1 to June 30. For example, OY 1993 is July 1, 1992 to June 30, 1993.
- 3/ The 1990 Resource Program conservation and generation for OYs 1990 through 1991 are not included in this table. Programs for OY 1992 and most of OY 1993 were delayed and are included in OY 1994.
- 4/ Incentive payments end January 1994.
- 5/ Additional conservation beyond 1990 Resource Program planned acquisitions.
- 6/ The 1990 Resource Program estimated conservation acquisitions through FY 1997. When converted to operating year, a portion of FY 1997 is shown in OY 1998. Similarly, the Draft Conservation Implementation Plan targets acquisitions through FY 2003. Converting conservation acquisitions to OY makes values in OYs 1998 through 2003 increase slightly from FY conservation program estimates.

Federal System Resource Options

To offset possible short-term firm energy deficits, load overruns, or poor resource performance, BPA has and will continue to acquire firm energy resource options. Some of these resource options guarantee BPA rights to terminate surplus firm power sales or purchase firm power as needed. These generating resource options, with low capital costs and high operating costs, have value as cost-effective firm resources in long-range planning. Since these options may or may not be exercised in a given operating year, they are excluded as firm resources in the loads and resources study.

Currently, most of BPA's firm resource options are long-term surplus firm power sales and capacity/energy exchange agreements with Pacific Southwest utilities. These contracts contain provisions by which BPA may completely or partially terminate the power sales and convert the contracts to capacity/energy exchanges. BPA's resource options also include 115 average megawatts of available non-treaty storage.

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 Irrigation 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. However, the M-S-R contract contains provisions for complete or partial termination of energy deliveries through October 31, 2009, then converts to a capacity/energy exchange until it expires.

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 8, lines 1 and 2, page 31.

Supplemental Energy. If BPA terminates Southwest sales and convert them to capacity/energy exchange contracts, BPA may elect to purchase supplemental energy in that same operating year. The additional resources that would become available upon early conversion of these contracts and purchase of supplemental energy is shown in Table 8, line 3, page 31.

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 1992-93. BPA considers this contract as a resource option, which BPA may elect to purchase; it is not considered a firm resource in this study. BPA included Southern California Edison option energy as a firm resource in the 1990-91 Pacific Northwest Coordination Agreement operating plan. The total optional energy available to BPA under this contract is shown in Table 8, line 4, page 31.

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 1997-98. 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 8, line 5, page 31.

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, 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 firm 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 8, line 6, page 31.

Table 8
Federal System Resource Options
Energy In Average Megawatts

OPERATING YEAR 1/	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
1. Termination of PSW Surplus Power Sales	169	212	212	212	234	237	237	237	237	237
2. Exchange Energy from PSW	53	69	69	68	71	77	73	71	70	69
3. Supplemental Energy from PSW	35	35	36	37	38	39	40	42	43	44
4. Optional Energy from PSW	71	71	71	71	71	0	0	0	0	0
5. Termination of PNW Surplus Power Sale	0	0	0	0	0	75	75	75	75	0
6. Non-Treaty Storage	<u>115</u>	<u>115</u>	<u>115</u>	<u>115</u>	<u>115</u>	<u>115</u>	<u>115</u>	<u>115</u>	<u>115</u>	<u>115</u>
7. Total Resource Options	443	502	503	503	529	543	540	540	540	465

OPERATING YEAR 1/	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
1. Termination of PSW Surplus Power Sales	237	237	237	237	237	227	198	53	0	0
2. Exchange Energy from PSW	68	67	66	64	64	63	53	25	0	0
3. Supplemental Energy from PSW	46	47	48	49	49	49	46	0	0	0
4. Optional Energy from PSW	0	0	0	0	0	0	0	0	0	0
5. Termination of PNW Surplus Power Sale	0	0	0	0	0	0	0	0	0	0
6. Non-Treaty Storage	<u>115</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
7. Total Resource Options	466	351	351	350	351	339	297	78	0	0

1/ Operating Year (OY) is the 12-month period July 1 to June 30.
For example, OY 1993 is July 1, 1992 through June 30, 1993.

Planning to Meet Forecasted Deficits

By selecting from among BPA's possible resource options, a number of differing load and resource scenarios can be constructed in response to projected firm energy deficits. BPA will choose from these planned resource options and acquisitions as energy needs arise. This gives BPA the flexibility to pick the resource that is most likely to be ready and which offers the best resource value at the time it is needed.

Figure 6, page 33, depicts the resource options and the acquisitions targeted under BPA's 1990 Resource Program and subsequent updates that BPA might use to satisfy firm energy deficits. As BPA signs contracts to acquire new resources, the projected deficit will be reduced. Table 7, page 27, identifies 22 to 415 average megawatts of planned acquisitions and billing credits from the 1990 Resource Program. In addition, BPA subsequently increased the resource acquisition by 200 average megawatts. The 1990 Resource Program also included 800 average megawatts of contingency resource options, to be converted to firm resources when needed to serve projected Federal system firm energy deficits. BPA is in the process of acquiring these options.

It is important to note that BPA is in the process of developing the Draft 1992 Resource Program, and is evaluating resources and billing credits to acquire additional firm resources. The Draft 1992 Resource Program will also update plans for meeting future deficits for the Federal system. BPA completed the Draft Conservation Implementation Plan and intends to purchase, under its aggressive level, a total of 663 average megawatts of conservation by OY 2002-03. This amount is reduced by the conservation included in the 1990 Resource Program. The Draft 1992 Resource Program includes the acquisition of 250 average megawatts of generation resources by OY 1997-98, along with 47 average megawatts of operating efficiency improvements at the WNP-2 nuclear plant. BPA also has approximately 500 average megawatts of resource options that may be exercised to meet deficits.

Figure 6
Forecasted Deficits and Plans to Meet Load

Source: Deficits from Table 6, 1991 Whitebook.
 1990 and 1992 Resource Program from Table 7 and Resource Options from Table 8, 1991 Whitebook.
 Additional Acquisitions - increased amounts in competitive bidding process.
 Contingency Resources - Additional options to be acquired under Resource Contingency Plan.

Federal System Firm Capacity Surpluses/Deficits

Figures 7 through 10, pages 35 and 36, show the Federal firm capacity surpluses/deficits under the high, medium-high, medium, medium-low, and low load forecasts for OY 1992-93, 1997-98, 2002-03, and 2011-12. The monthly capacity surpluses assume that the Federal system has the ability to meet a peak load of 50 hours per week with surplus capacity that is available after serving all Federal capacity needs with 1929-30 water levels.

Portland General Electric Company (PGE) has requested capacity service from BPA under its requirements power sales contract. The capacity sale will begin August 1, 1992 with deliveries of 100 peak megawatts and increases to 150 peak megawatts on August 1, 1993 through June 30, 1999. BPA has told PGE they have the right to place this capacity load on BPA based on BPA's current surplus capacity. When PGE submits this load in the annual Firm Resource Exhibit of its power sales contract, it will be included as a firm obligation on the Federal system.

BPA is currently preparing an Environmental Impact Statement (EIS) for a long-term follow-on capacity sale contract for 1,400 peak megawatts with Pacific Power and Light Company (PP&L) for the period of September 1, 1991, or when the EIS is completed, through August 31, 2010. The current capacity contract of 1,127 peak megawatts expired August 31, 1991. If BPA signs the PP&L contract after completing the EIS, it will be included as a firm BPA obligation and reduce available surplus capacity. BPA is currently supplying 1,100 peak megawatts of capacity to PP&L under a 1-year agreement.

These projections estimate the capacity that is surplus to the Federal system requirements. The figures assume that contractual or other provisions would be made to relieve off-peak problems when energy is returned under future capacity sales. Federal hydro constraints and low Federal nighttime loads limit the system's ability to store return energy. Depending on energy return provisions, these contracts could create forced energy sales and may reduce the Federal system's ability to meet firm loads. These potential problems are presented in the Federal System Marketable Capacity section on page 37. See the 1991 Pacific Northwest Loads and Resources Technical Appendix: Volume 2 for more information regarding energy return considerations.

BPA is acquiring future resources as targeted in Table 7. The quantity will be determined as the new acquisitions are contracted for. This additional capacity gain will increase the quantity of surplus capacity available to be marketed.

The 20-year summary of Federal capacity surpluses/deficits, based on medium loads, is shown in Exhibit 6, page 77. The Federal system 20-year summary of capacity surpluses/deficits under high, medium-high, medium-low, and low loads is presented in Exhibits 7 through 10, pages 78 through 81.

Figure 7
1992-93 Federal Firm Capacity Surpluses/Deficits

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Figure 8
1997-98 Federal Firm Capacity Surpluses/Deficits

RPCE:11/91

Figure 9
2002-03 Federal Firm Capacity Surpluses/Deficits

RPCE:11/91

Figure 10
2011-12 Federal Firm Capacity Surpluses/Deficits

RPCE:11/91

Federal System Marketable Capacity

Despite the lack of long-term firm energy surpluses, the Federal system has surplus firm capacity lasting through the 20-year study period. Beginning with this analysis, new hydro constraints changed the monthly shape and sustained capacity of the hydro system. The changes include the following:

- The Corps and Bureau increased the minimum amount of reservoir storage in Libby, Hungry Horse, and Dworshak hydro projects. These new hydro constraints increase the probability that these reservoirs refill each year by limiting the availability of water which may be used from these projects to meet loads; and
- The adoption of the PNCA maximum shift philosophy in the first two years of the 4-year critical period. This increases loads and hydro resources in the first two years of the critical period and shapes the return of that energy into the last two years of the 4-year critical period.

These constraints decreased the flexibility of the hydro system during the critical period and changed the monthly shape of the Federal firm capacity surplus under 1929-30 water conditions.

Exhibit 6, page 77, shows the long-term 50-hours-per-week Federal surplus firm capacity under the medium load forecast. Currently, PGE has requested capacity service from BPA under its requirements power sales contract. BPA is also preparing an Environmental Impact Statement (EIS) for a long-term follow-on capacity sale contract with PP&L. When PGE submits this load in its annual Firm Resource Exhibit of their power sales contract, and if BPA signs the PP&L contract after completing the EIS, these contracts will become firm BPA obligations. Long-term annual surplus capacity sales will most likely be depleted with the completion of these contracts. Future BPA marketing may focus on seasonal contracts instead of annual sales. The diversity of loads in the Pacific Northwest and Southwest could allow BPA to develop a variety of capacity products to fit Southwest needs. These products may include seasonal capacity sales from 70 hours per week to only a few hours per year.

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

- The region experiences medium load growth;
- The Pacific Northwest Coordination Agreement, which expires June 30, 2003, is replaced with a like agreement;
- 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 with Southern California Edison, Burbank, Glendale, and Pasadena remain as power sales for the duration of the contracts;

- BPA's surplus firm power sale with 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 with 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 IOUs do not make long-term BPA purchases under their power sales contracts;
- Federal resource acquisitions include the Cowlitz Falls hydro project beginning in April 1994, and a seasonal purchase of PNGC's share of the Boardman coal plant through April 1995;
- Sustained capacity limits are 50 hours per week; and
- Surplus firm capacity availability does not reflect nighttime return problems.

It is important to note that the capacity surplus values do not reflect potential nighttime return problems on the Federal system. If peaking replacement energy from capacity sales is returned at night, the output of the hydro system and other Federal resources could be greater than BPA's nighttime load. Nighttime overgeneration is due to low Federal system loads, nonpower hydro constraints that require minimum streamflows, and the inability of BPA's thermal resources to cycle from day to night. These constraints 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 and will greatly reduce sustained capacity surplus availability. Depending on provisions for return energy, capacity agreements could create forced energy sales, which may reduce the Federal system's ability to meet firm energy loads. 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 are currently evaluating new ways to enhance fisheries and wildlife. These include 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 Council recently presented an amendment to their Columbia River Basin Fish and Wildlife Program that would reduce operational firm energy load carrying capability (FELCC) by 73 average megawatts. The impacts of future proposals are unknown; they could, however, reduce the generating capability by as little as 50 or as much as several thousand average megawatts. These proposals will most likely 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

Table 9, page 41, shows changes in the 1991 Pacific Northwest Loads and Resources Study compared to the 1990 Pacific Northwest Loads and Resources Study for OY 1992-93 through 2010-11. The table lists the Federal firm energy surpluses/deficits for the 1990 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 the 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:

DSI Firm Loads

The DSI aluminum loads assume favorable economic trends and a strong aluminum market. The near-term portion of the forecast reflects the temporary shutdown of Reynold's aluminum plant at Troutdale, Oregon, in the summer of 1991. The long-term DSI load forecast is unchanged compared to last year's study. The non-aluminum loads increased in the short-term, due to the extended operation of Nickel Joint Venture.

Sales to Generating Public Agencies

Sales to the generating public agencies are increased by 215 average megawatts in the first year of the study, OY 1992-93, and increase by 324 average megawatts by OY 2010-11. This is the result of a 146 average megawatt increase in the load forecasts for the early 1990s, and a 286 average megawatt increase for OY 2010-11. The balance of the sales increase is due to decreases in the amount of resources dedicated by the generating public agencies to serve their loads--69 average megawatts in OY 1992-93 to 38 average megawatts by OY 2010-11--which increases BPA sales to these agencies through the 20-year study period.

Sales to Non-Generating Public Agencies

This year's study shows increased sales to small and non-generating public agencies because higher forecasted loads result in these customers placing more load obligation on BPA. Forecasted loads are increased by 46 average megawatts in the first year, increasing by 152 average megawatts in the last year of the study. The resources BPA has estimated the non-generating utilities would use to serve their firm loads have increased by 19 average megawatts in OY 1992-93 and by 8 average megawatts by OY 2011-12 (this decreases BPA's obligation).

Sales to Investor-Owned Utilities

Puget Sound Power and Light Company, in accordance with their power sales contract with BPA, added a cogeneration resource for the period January 1 through June 30 of OY 1992-93, allowing them to reduce their OY 1992-93 purchase. The company added new purchases of 50 average megawatts for OY 1993-94 through 1997-98.

Hydro Firm Energy

Two events have changed the Federal system hydro firm energy from last year's study. First, a lower estimate of water drawn for irrigation increased streamflows, adding 39 average megawatts to Federal system firm energy. In addition, On January 28, 1991, BPA contracted for the output of the Cowlitz Falls hydro project. Cowlitz Falls has a rated capability of 70 megawatts and an annual generation of 22 average megawatts. The project is scheduled to begin operating in April 1994. The above increases were offset by decreased generation resulting from new constraints on the hydro system.

Seasonal Purchase of Boardman Share

BPA seasonally acquired the output of PNGC's share of the Boardman coal plant for October through April of OY 1991-92, and September through April for OY 1992-93 through 1994-95. BPA purchased 50 megawatts of capacity and 28 average megawatts of energy.

Trojan Nuclear Power Plant

The capacity factor on the Trojan nuclear plant was reduced from 70 percent to 65 percent for this study. This results in a 19-average-megawatt loss of BPA's 30-percent share of the plant. During the 1991 maintenance outage, Trojan operators discovered unexpected corrosion of mechanisms in the steam generators. Portland General Electric Company is contemplating replacing the steam generators during 1995 or 1996. The interim period will be marked by uncharacteristic operation and refueling schedules, with extended outages to facilitate steam generator inspection and repairs.

Miscellaneous Changes

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

Table 9
Changes in Federal System Firm Surplus/Deficit
Medium Load Forecast

Energy in Average Megawatts

Operating Year 1/	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
1990 Federal Firm Surplus/Deficit 2/	-266	-226	-280	-344	-89	-172	-312	-509	-586	-608
Changes:										
DSI Firm Loads	7	-124	-47	0	0	0	0	0	0	0
Sales to Generating Publics	-215	-212	-202	-209	-218	-226	-230	-236	-236	-246
Sales to Nongen Publics	-27	-18	-30	-27	-31	-37	-45	-51	-56	-62
Sales to IOUs	62	-50	-50	-50	-50	-50	0	0	0	0
Hydro Firm Energy	-1	7	20	20	20	20	20	20	20	20
Boardman	28	28	28	0	0	0	0	0	0	0
Trojan Adjustment	-19	-19	-19	-19	-19	-19	-19	-19	-19	-19
Miscellaneous Changes	<u>4</u>	<u>1</u>	<u>-1</u>	<u>-1</u>	<u>1</u>	<u>-1</u>	<u>1</u>	<u>-1</u>	<u>0</u>	<u>0</u>
TOTAL CHANGES	-161	-387	-301	-286	-297	-313	-273	-287	-291	-307
1991 Federal Firm Surplus/Deficit	-427	-613	-581	-630	-386	-485	-585	-796	-877	-915

Operating Year 1/	2003	2004	2005	2006	2007	2008	2009	2010	2011
1990 Federal Firm Surplus/Deficit 2/	-713	-916	-1007	-1168	-1307	-1386	-1394	-1356	-1329
Changes:									
DSI Firm Load	0	0	0	0	0	0	0	0	0
Sales to Generating Publics	-265	-268	-271	-284	-278	-288	-302	-298	-324
Sales to Nongen Publics	-71	-78	-87	-96	-106	-112	-114	-114	-144
Sales to IOUs	0	0	0	0	0	0	0	0	0
Hydro Firm Energy	20	20	20	20	20	20	20	20	20
Boardman	0	0	0	0	0	0	0	0	0
Trojan Adjustment	-19	-19	-19	-19	-19	-19	-19	-19	-19
Miscellaneous Changes	<u>0</u>	<u>-1</u>	<u>2</u>	<u>-2</u>	<u>-1</u>	<u>1</u>	<u>-49</u>	<u>-42</u>	<u>64</u>
TOTAL CHANGES	-335	-346	-355	-381	-384	-398	-464	-453	-403
1991 Federal Firm Surplus/Deficit	-1048	-1262	-1362	-1549	-1691	-1784	-1858	-1809	-1732

1/ Operating Year (OY) is the 12-month period July 1 to June 30.
For example, OY 1992 is July 1, 1991 through June 30, 1992.

2/ 1990 Pacific Northwest Loads and Resources Executive Summary,
Table 6, page 26.

V. REGIONAL ANALYSIS

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

- 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; and
- All Federal Southwest surplus firm power sales, except M-S-R, are shown as power sales through their expiration. M-S-R is shown as a power sale through October 31, 2009, then converts to a capacity/energy exchange until it expires.

Regional Firm Energy Loads

The regional firm energy load projections for OY 1992-93 through 2011-12 under the high, medium-high, medium, medium-low, and low load growth scenarios are shown in Figure 11, page 43. The load forecast is based on the 1991 Joint Forecast prepared by BPA and the Council. The 1991 Joint Forecast reflects updated long-range projections of economic activity, fuel and electricity prices, and other factors influencing electricity use. The 1991 Joint Forecast contains more optimistic projections of regional employment, slightly lower retail electricity prices, and relatively unchanged fossil fuel price projections, and is generally higher than the 1990 Joint Forecast. The exception is in the high case, where a slightly lower DSI forecast, coupled with savings attributable to Federal Appliance Standards and the adoption of the Model Conservation Standards (MCS) in Oregon and Washington, result in a slightly lower high case forecast through 2000. 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 1992-93 through 2011-2012 are summarized in Table 10, page 44. The regional firm energy loads for the medium forecast are presented in Exhibit 11, line 5, pages 84 and 85. The regional firm energy loads under the high, medium-high, medium-low, and low forecasts are presented on line 5 of Exhibits 12 through 15, pages 86 through 93.

Figure 11
Regional Firm Loads
1991 Joint Forecast

Table 10

Regional Firm Loads

Energy in Average Megawatts

Load Forecast	OY 1992-93			OY 2011-12			System Firm Load Growth (Avg %/yr)
	System Loads	Firm Exports	Firm Loads	System Loads	Firm Exports	Firm Loads	
High	21,144	796	21,940	32,395	798	33,193	2.2
Medium-High	20,117	796	20,913	27,357	798	28,155	1.3
Medium	19,627	796	20,423	24,388	798	25,186	1.1
Medium-Low	18,455	796	19,251	21,484	798	22,282	0.8
Low	17,598	796	18,394	17,263	798	18,061	-0.1

1/ Operating Year (OY) is the 12-month period July 1 to June 30.
For example, OY 1993 is July 1, 1992 through June 30, 1993.

Regional Firm Peak Loads

Figure 12, page 45, illustrates the regional firm peak loads under the medium load forecast for OY 1992-93, 1997-98, 2002-03, and 2011-12, based on the 1991 Draft Joint Forecast. The forecasted peak load is the expected maximum 1-hour peak demand for each month. There is a 50 percent probability that the actual load will be either higher or lower at some time during the month. The projected regional peak loads include all intra-regional contracts made by Pacific Northwest utilities, including the Federal system. The peak projections are decreased by a diversity factor due to the fact that all peak electrical demands do not occur simultaneously throughout the region.

Figure 12
Regional Firm Peak Loads
Medium Loads

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Regional Firm Resources

Table 11, page 46, summarizes the regional system resources for OY 1992-93. Hydro-electric 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 utilities in the region. These thermal resources are composed primarily of IOU-owned coal and nuclear plants. A detailed listing of all regional generating resources is contained in the 1991 Pacific Northwest Loads and Resources Technical Appendix: Volume 2.

Table 11
Regional Firm Resources
for OY 1992-93 1/

Project Type	Generating Peak Capacity (MW)	Generating Peak Capacity % of Total	Firm Energy (aMW)	Firm Energy % of Total
Hydro	32,071	74	12,442	62
Coal	4,384	10	3,670	18
Nuclear	2,199	5	1,433	7
Imports	2,453	6	1,597	8
Combustion Turbines	1,466	3	485	2
Miscellaneous	799	2	594	3
Total Resources	43,372	100	20,221	100

1/ Operating Year (OY) is the 12-month period July 1 to June 30.
For example, OY 1993 is July 1, 1992 through June 30, 1993.

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 region'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 average megawatts when averaged over 50 years of historical water flows, and is larger when averaged over 102 years of historical water flows.

Regional Firm Energy Surpluses/Deficits

Figure 13, shown below, 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.

The regional firm energy surpluses/deficits for the various load forecasts for OY 1992-93 through 2011-12 are presented in Table 12, page 48, and graphically in Figure 14, page 49. The region experiences firm energy deficits in OY 1992-93 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.

Figure 13
Regional Firm Energy Loads and Resources

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The components of the regional energy loads and resources balances for the five load scenarios are presented in Exhibits 11 through 15, pages 84 through 93. The regional firm energy surpluses/deficits, based on the medium forecast, are presented in Exhibit 11, line 34, pages 84 and 85. The 20-year regional firm energy surpluses/deficits under the high, medium-high, medium-low, and low load forecasts are shown on line 34 of Exhibits 12 through 15, pages 86 through 93.

Table 12
Regional Firm Energy Surpluses/Deficits
Assuming Existing Contracts
Energy in Average Megawatts

OPERATING YEAR 1/	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
High Loads	-1678	-2301	-2932	-3632	-4100	-4621	-5315	-6017	-6557	-7137
Medium-High Loads	-688	-1116	-1495	-1972	-2234	-2587	-3129	-3635	-3963	-4384
Medium Loads	-214	-599	-750	-1033	-1162	-1403	-1844	-2259	-2495	-2849
Medium-Low Loads	922	873	858	640	575	429	99	-210	-350	-615
Low Loads	1755	1927	2157	2088	2148	2120	1915	1772	1987	2067

OPERATING YEAR 1/	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
High Loads	-7780	-8502	-9199	-9844	-10416	-11110	-11706	-12126	-12668	-13363
Medium-High Loads	-4853	-5395	-5874	-6303	-6667	-7142	-7534	-7745	-8043	-8502
Medium Loads	-3215	-3631	-3978	-4272	-4507	-4868	-5118	-5176	-5319	-5635
Medium-Low Loads	-879	-1222	-1507	-1748	-1939	-2248	-2444	-2473	-2569	-2821
Low Loads	1924	1709	1567	1477	1436	1278	1228	1336	1394	1284

1/ Operating Year (OY) is the 12-month period July 1 to June 30.
For example, OY 1993 is July 1, 1992 through June 30, 1993.

Figure 14
Regional Firm Energy Surpluses/Deficits

Regional Firm Capacity Surpluses/Deficits

Figures 15 through 18, pages 51 and 52, show the region's firm 50-hour-per-week capacity surpluses/deficits under the high, medium-high, medium, medium-low, and low load forecasts for OY 1992-93, 1997-98, 2002-03, and 2011-12. 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.

These projections estimate the 50-hours-per-week capacity that is surplus to regional requirements. The figures assume that contractual or other provisions would be made to relieve off-peak problems when energy is returned under future capacity sales. Regional hydro constraints and low nighttime loads limit the system's ability to store return energy. One of the most frequent constraints on capacity sales is the nighttime return of energy when the hydro system is forced to maintain minimum streamflows. This is especially critical during summer and early fall months, when regional loads are low. Depending on energy return provisions, these contracts could create low-priced forced energy sales and may reduce the region's ability to meet firm loads.

The hydro analysis for this year's study used all operating constraints currently adopted by the hydroelectric project owners. Many of these constraints were added to the system in support of the Pacific Northwest Power Planning Council's fish flow program. Constraints placed on the hydro system over the past 10 years to enhance fish flows have decreased the firm energy by approximately 400 average megawatts.

The Pacific Northwest Power Planning Council, BPA, and other Pacific Northwest entities are currently evaluating new ways to enhance fisheries and wildlife. These include 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 Council recently presented an amendment to their Columbia River Basin Fish and Wildlife Program that would reduce operational firm energy load carrying capability (FELCC) by 73 average megawatts. The outcome of future proposals are unknown; they could, however, reduce the generating capability by as little as 50 or as much as several thousand average megawatts. BPA does not expect the potential impacts to approach the high end of the range of estimates. These proposals, however, will most likely increase constraints on the hydro system and reduce operating flexibility, change the monthly shape of sustained capacity availability. These impacts would be presented in future analyses.

The 20-year summary of regional capacity surpluses/deficits, based on medium loads, is shown in Exhibit 16, page 97. The regional 20-year summaries of capacity surpluses/deficits under high, medium-high, medium-low, and low loads are presented in Exhibits 17 through 20, pages 98 through 101.

Figure 15
1992-93 Regional Firm Capacity Surpluses/Deficits

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Figure 16
1997-98 Regional Firm Capacity Surpluses/Deficits

RPCE:11/91

Figure 17
2002-03 Regional Firm Capacity Surpluses/Deficits

RPCE:11/91

Figure 18
2011-12 Regional Firm Capacity Surpluses/Deficits

RPCE:11/91

SECTION VI
FEDERAL SYSTEM EXHIBITS

TABLE 2: FEDERAL SYSTEM

EXHIBIT 1

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	M E D I U M L O A D S										1991 WHITEBOOK:	
	OPERATING YEAR										RUN DATE:	
	1992-93 AVG	1993-94 AVG	1994-95 AVG	1995-96 AVG	1996-97 AVG	1997-98 AVG	1998-99 AVG	1999-00 AVG	2000-01 AVG	2001-02 AVG	11/20/91	11/22/91
MEGAWATTS												
1 FEDERAL AGENCIES	142	142	143	144	145	146	147	148	149	149		
2 FEDERAL & GEN PUBLIC LOSSES	163	160	162	165	159	162	163	163	165	168		
3 USBR	67	67	67	67	67	67	67	67	67	68		
4 DSI ALUMINUM FIRM	2022	2087	1997	1959	1951	1951	1951	1951	1951	1951		
5 DSI NON-ALUM FIRM	228	229	204	180	181	182	182	183	184	184		
6 DSI FIRM LOSSES	60	60	57	56	56	55	56	56	56	56		
7 SM & NON GEN PUB PURCH	3149	3195	3261	3304	3349	3393	3442	3496	3536	3577		
8 FIRM SYSTEM LOAD	5831	5940	5891	5875	5908	5956	6008	6064	6108	6153		
TRANSFERS OUT												
9 EXPORTS	176	220	220	220	243	260	367	564	560	557		
10 CONTRACTS OUT	622	622	623	688	351	356	357	357	356	331		
11 CSPE TO WEST GROUP UTIL	302	289	276	264	252	238	187	102	98	94		
12 GEN PUBLIC AGEN PURCH	1910	1955	1993	2039	2088	2135	2191	2262	2305	2351		
13 GEN PRIVATE UTIL PURCH	50	50	50	50	50	50	0	0	0	0		
14 FED DIVERSITY	0	0	0	0	0	0	0	0	0	0		
15 FIRM LOADS	8891	9077	9054	9137	8893	8996	9110	9349	9427	9486		
16 DSI ALUM TOP QUARTILE	674	696	665	653	650	650	650	650	650	650		
17 DSI NON-ALUM TOP QUARTILE	76	76	68	60	60	60	61	61	61	61		
18 TOP QUARTILE LOSSES	20	20	19	19	19	19	19	19	19	19		
19 TOTAL LOADS	9662	9869	9806	9868	9622	9725	9839	10079	10157	10216		
RESOURCES												
20 REGULATED HYDRO	6963	6962	6962	6962	6962	6962	6962	6963	6962	6963		
21 INDEPENDENT HYDRO	256	265	278	278	278	278	278	278	278	278		
22 SUS. PKNG. ADJUSTMENT	0	0	0	0	0	0	0	0	0	0		
23A CAN. ENT. NON-FED(CSPE)	67	62	58	55	54	50	40	23	22	21		
23B CAN. ENT. NON-FED(CNDA)	0	0	0	0	0	3	27	72	71	70		
24 RESTORATION	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23		
25 TOTAL HYDRO	7263	7266	7275	7272	7271	7270	7284	7313	7310	7309		
26 SMALL THERMAL & MISC	0	0	0	0	0	0	0	0	0	0		
27 COMBUSTION TURBINES	0	0	0	0	0	0	0	0	0	0		
28 RENEWABLES	0	0	0	0	0	0	0	0	0	0		
29 COGENERATION	0	0	0	0	0	0	0	0	0	0		
30 IMPORTS	99	99	99	99	99	99	99	99	99	99		
31 CONTRACTS IN	143	143	143	208	209	214	214	214	214	236		
32 LARGE THERMAL	959	955	955	927	927	927	927	927	927	927		
33 RESOURCE ACQUISITIONS	0	0	0	0	0	0	0	0	0	0		
34 TOTAL RESOURCES	8464	8463	8472	8506	8506	8510	8524	8553	8550	8571		

EXHIBIT 1 (continued)

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

MEGAWATTS	M E D I U M L O A D S										1991 WHITEBOOK:	
	OPERATING YEAR										RUN DATE:	
	1992-93 AVG	1993-94 AVG	1994-95 AVG	1995-96 AVG	1996-97 AVG	1997-98 AVG	1998-99 AVG	1999-00 AVG	2000-01 AVG	2001-02 AVG	11/20/91	11/22/91
35 HYD, SM THRM & MISC RES	16/	0	0	0	0	0	0	0	0	0	0	0
36 LARGE THERMAL RESERVES	17/	0	0	0	0	0	0	0	0	0	0	0
37 SPINNING RESERVES	18/	0	0	0	0	0	0	0	0	0	0	0
38 DSI RESERVES	19/	0	0	0	0	0	0	0	0	0	0	0
39 FEDERAL HYDRO MAINT	20/	0	0	0	0	0	0	0	0	0	0	0
40 NET RESOURCES	8464	8463	8472	8506	8506	8510	8524	8553	8550	8571		
41 FIRM SURPLUS/DEFICIT	-427	-613	-581	-630	-386	-485	-585	-796	-877	-915		
42 TOTAL SURPLUS/DEFICIT	-1198	-1406	-1334	-1362	-1115	-1214	-1315	-1525	-1607	-1645		

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

EXHIBIT 1 (continued)

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	MEGAWATTS	M E D I U M L O A D S	OPERATING YEAR										1991 WHITEBOOK:	
			RUN DATE:										11/20/91	
			2002-3	2003-4	2004-5	2005-6	2006-7	2007-8	2008-9	2009-10	2010-11	2011-12	11/22/91	
			AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG		
1	FEDERAL AGENCIES		150	150	152	152	153	153	154	154	155	156		
2	FEDERAL & GEN PUBLIC LOSSES		169	171	173	178	181	183	184	188	189	190		
3	USER		68	68	68	68	68	68	68	68	68	68		
4	DSI ALUMINUM FIRM		1951	1951	1951	1951	1951	1951	1951	1951	1951	1951		
5	DSI NON-ALUM FIRM		184	184	184	184	184	185	185	185	185	185		
6	DSI FIRM LOSSES		56	56	56	56	56	56	56	56	56	56		
7	SM & NON GEN PUB PURCH	1/	3625	3679	3730	3790	3848	3898	3946	3997	4052	4107		
8	FIRM SYSTEM LOAD		6203	6259	6314	6379	6441	6494	6544	6599	6656	6713		
9	EXPORTS	2/	614	794	788	783	777	760	725	553	507	502		
10	CONTRACTS OUT	3/	331	331	331	331	331	331	281	281	94	94		
11	CSPE TO WEST GROUP UTIL	4/	70	0	0	0	0	0	0	0	0	0		
12	GEN PUBLIC AGEN PURCH	1/	2408	2482	2532	2656	2741	2797	2854	2920	2983	3024		
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		9626	9866	9965	10149	10290	10382	10404	10353	10240	10333		
16	DSI ALUM TOP QUARTILE	8/	650	650	650	650	650	650	650	650	650	650		
17	DSI NON-ALUMINUM IQ	8/	61	61	61	61	61	61	61	61	61	61		
18	TOP QUARTILE LOSSES	8/	19	19	19	19	19	19	19	19	19	19		
19	TOTAL LOADS		10356	10596	10695	10879	11020	11112	11134	11083	10970	11063		
20	REGULATED HYDRO		6962	6963	6963	6962	6962	6963	6963	6962	6962	6962		
21	INDEPENDENT HYDRO		278	278	278	278	278	278	278	278	278	278		
22	SUS. PKNG. ADJUSTMENT	9/	0	0	0	0	0	0	0	0	0	0		
23A	CAN. ENT. NON-FED(CSPE)	10/	16	0	0	0	0	0	0	0	0	0		
23B	CAN. ENT. NON-FED(CNDA)	10/	83	124	122	121	120	118	117	116	115	113		
24	RESTORATION	11/	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23		
25	TOTAL HYDRO		7316	7342	7340	7338	7337	7336	7335	7333	7332	7330		
26	SMALL THERMAL & MISC		0	0	0	0	0	0	0	0	0	0		
27	COMBUSTION TURBINES		0	0	0	0	0	0	0	0	0	0		
28	RENEWABLES		0	0	0	0	0	0	0	0	0	0		
29	COGENERATION		0	0	0	0	0	0	0	0	0	0		
30	IMPORTS	12/	99	99	99	99	99	99	99	99	119	117		
31	CONTRACTS IN	13/	236	236	236	235	236	236	185	185	130	130		
32	LARGE THERMAL	14/	927	927	927	927	927	927	927	927	927	927		
33	RESOURCE ACQUISITIONS	15/	0	0	0	0	0	0	0	0	0	0		
34	TOTAL RESOURCES		8578	8604	8602	8599	8599	8598	8546	8544	8508	8504		

TABLE 2: FEDERAL SYSTEM (CONTINUED)

EXHIBIT 1 (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

MEGAWATTS	M E D I U M L O A D S										1991 WHITEBOOK:	
	OPERATING YEAR										RUN DATE:	
	2002-3 AVG	2003-4 AVG	2004-5 AVG	2005-6 AVG	2006-7 AVG	2007-8 AVG	2008-9 AVG	2009-10 AVG	2010-11 AVG	2011-12 AVG		
35 HYD, SM THRM & MISC RES	0	0	0	0	0	0	0	0	0	0	0	0
36 LARGE THERMAL RESERVES	0	0	0	0	0	0	0	0	0	0	0	0
37 SPINNING RESERVES	0	0	0	0	0	0	0	0	0	0	0	0
38 DSI RESERVES	0	0	0	0	0	0	0	0	0	0	0	0
39 FEDERAL HYDRO MAINT	0	0	0	0	0	0	0	0	0	0	0	0
40 NET RESOURCES	8578	8604	8602	8599	8599	8598	8546	8544	8508	8504		
41 FIRM SURPLUS/DEFICIT	-1048	-1261	-1362	-1549	-1691	-1784	-1858	-1809	-1732	-1829		
42 TOTAL SURPLUS/DEFICIT	-1778	-1991	-2093	-2279	-2421	-2514	-2588	-2539	-2462	-2559		

NOTE: 1. BPA SURPLUS POWER SALES CONTRACTS WITH THE PSW AFE 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 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

LOADS	MEGAWATTS	H I G H L O A D S										1991 WHITEBOOK:	
		OPERATING YEAR										RUN DATE:	
		1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	11/20/91	11/22/91
		AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG		
1 FEDERAL AGENCIES		142	142	143	144	145	146	147	148	149	149		
2 FEDERAL & GEN PUBLIC LOSSES		179	181	186	191	188	194	198	201	206	212		
3 USBR		67	67	67	67	67	67	67	67	68	68		
4 DSI ALUMINUM FIRM		2160	2160	2160	2160	2160	2160	2160	2160	2160	2160		
5 DSI NON-ALUM FIRM		316	316	316	316	316	316	316	316	316	241		
6 DSI FIRM LOSSES		65	64	65	65	65	65	65	65	64	62		
7 SM & NON GEN PUB PURCH	1/	3426	3532	3665	3776	3884	3984	4080	4185	4280	4376		
8 FIRM SYSTEM LOAD		6355	6462	6602	6719	6825	6932	7033	7142	7243	7268		
TRANSFERS OUT													
9 EXPORTS		176	220	220	220	243	260	367	564	560	557		
10 CONTRACTS OUT	2/	622	622	623	698	351	356	357	357	356	331		
11 CSPE TO WEST GROUP UTIL	4/	302	289	276	264	252	238	187	102	98	94		
12 GEN PUBLIC AGEN PURCH	1/	2127	2244	2370	2477	2595	2704	2812	2942	3038	3140		
13 GEN PRIVATE UTIL PURCH	6/	50	50	50	50	50	50	0	0	0	0		
14 FED DIVERSITY	7/	0	0	0	0	0	0	0	0	0	0		
15 FIRM LOADS		9632	9888	10141	10419	10316	10540	10756	11107	11295	11390		
16 DSI ALUM TOP QUARTILE	8/	720	720	720	720	720	720	720	720	720	720		
17 DSI NON-ALUMINUM TQ	8/	105	105	105	105	105	105	105	105	105	80		
18 TOP QUARTILE LOSSES	8/	22	22	22	22	22	22	22	22	22	21		
19 TOTAL LOADS		10478	10734	10987	11265	11163	11387	11603	11953	12142	12211		
RESOURCES													
20 REGULATED HYDRO		5962	6962	6962	6962	6962	6962	6962	6963	6962	6963		
21 INDEPENDENT HYDRO		256	265	278	278	278	278	278	278	278	278		
22 SUS. PKRG. ADJUSTMENT	9/	0	0	0	0	0	0	0	0	0	0		
23A CAN. ENT. NON-FED(CSPE)	10/	67	62	58	55	54	50	40	23	22	21		
23B CAN. ENT. NON-FED(CRDA)	10/	0	0	0	0	0	3	27	72	71	70		
24 RESTORATION	11/	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23		
25 TOTAL HYDRO		7262	7266	7275	7272	7271	7270	7284	7313	7310	7309		
26 SMALL THERMAL & MISC		0	0	0	0	0	0	0	0	0	0		
27 COMBUSTION TURBINES		0	0	0	0	0	0	0	0	0	0		
28 RENEWABLES		0	0	0	0	0	0	0	0	0	0		
29 COGENERATION		0	0	0	0	0	0	0	0	0	0		
30 IMPORTS		99	99	99	99	99	99	99	99	99	99		
31 CONTRACTS IN	12/	143	143	143	208	209	214	214	214	214	236		
32 LARGE THERMAL	13/	959	955	955	927	927	927	927	927	927	927		
33 RESOURCE ACQUISITIONS	15/	0	0	0	0	0	0	0	0	0	0		
34 TOTAL RESOURCES		8463	8463	8472	8506	8506	8510	8524	8553	8550	8571		

EXHIBIT 2 (continued)

SHEET 2 OF 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

MEGAWATTS	H I G H L O A D S										1991 WHITEBOOK:	
	OPERATING YEAR										RUN DATE:	
	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	11/20/91	11/22/91
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG		
35 HYD, SM THRM & MISC RES	0	0	0	0	0	0	0	0	0	0	0	0
36 LARGE THERMAL RESERVES	0	0	0	0	0	0	0	0	0	0	0	0
37 SPINNING RESERVES	0	0	0	0	0	0	0	0	0	0	0	0
38 DSI RESERVES	0	0	0	0	0	0	0	0	0	0	0	0
39 FEDERAL HYDRO MAINT	0	0	0	0	0	0	0	0	0	0	0	0
40 NET RESOURCES	8463	8463	8472	8506	8506	8510	8524	8553	8550	8571		
41 FIRM SURPLUS/DEFICIT	-1169	-1425	-1669	-1912	-1810	-2030	-2232	-2553	-2745	-2818		
42 TOTAL SURPLUS/DEFICIT	-2016	-2271	-2515	-2759	-2656	-2876	-3078	-3400	-3591	-3639		

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 2 (continued)

SHEET 1 OF 2

TABLE 2: FEDERAL SYSTEM

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

LOADS	MEGAWATTS	H I G H L O A D S										1991 WHITEBOOK:	
		OPERATING YEAR										RUN DATE:	
		2002-3	2003-4	2004-5	2005-6	2006-7	2007-8	2008-9	2009-10	2010-11	2011-12		
		AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG		
1	FEDERAL AGENCIES	150	151	151	152	153	153	154	154	155	156		
2	FEDERAL & GEN PUBLIC LOSSES	216	220	227	234	241	246	251	258	261	265		
3	USBR	68	68	68	68	68	68	68	68	68	68		
4	DSI ALUMINUM FIRM	2160	2160	2160	2160	2160	2160	2160	2160	2160	2160		
5	DSI NON-ALUM FIRM	241	241	241	241	241	241	241	241	241	241		
6	DSI FIRM LOSSES	62	63	63	63	62	63	63	63	63	62		
7	SM & NON GEN PUB PURCH	4477	4589	4704	4828	4945	5056	5168	5286	5411	5538		
8	FIRM SYSTEM LOAD	7374	7492	7614	7746	7870	7987	8105	8230	8359	8490		
9	TRANSFERS OUT												
10	EXPORTS	614	794	788	783	777	760	725	553	507	502		
11	CONTRACTS OUT	331	331	331	331	331	331	281	281	94	94		
12	CSPE TO WEST GROUP UTIL	70	0	0	0	0	0	0	0	0	0		
13	GEN PUBLIC AGEN PURCH	3249	3386	3504	3700	3859	3989	4121	4269	4413	4539		
14	GEN PRIVATE UTIL PURCH	0	0	0	0	0	0	0	0	0	0		
15	FED DIVERSITY	0	0	0	0	0	0	0	0	0	0		
16	FIRM LOADS	11638	12003	12237	12560	12837	13067	13232	13333	13373	13625		
17	DSI ALUM TOP QUARTILE	720	720	720	720	720	720	720	720	720	720		
18	DSI NON-ALUMINUM TQ	80	80	80	80	80	80	80	80	80	80		
19	TOP QUARTILE LOSSES	21	21	21	21	21	21	21	21	21	21		
20	TOTAL LOADS	12459	12824	13058	13381	13658	13888	14053	14154	14194	14446		
21	RESOURCES												
22	REGULATED HYDRO	6963	6962	6962	6962	6962	6962	6962	6962	6962	6962		
23	INDEPENDENT HYDRO	278	278	278	278	278	278	278	278	278	278		
24	SUS. PKNG. ADJUSTMENT	0	0	0	0	0	0	0	0	0	0		
25	CAN. ENT. NON-FED(CSPE)	16	0	0	0	0	0	0	0	0	0		
26	CAN. ENT. NON-FED(CSPE)	83	124	122	121	120	118	117	116	115	113		
27	RESTORATION	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23		
28	TOTAL HYDRO	7317	7341	7339	7338	7337	7335	7335	7333	7332	7330		
29	SMALL THERMAL & MISC	0	0	0	0	0	0	0	0	0	0		
30	COMBUSTION TURBINES	0	0	0	0	0	0	0	0	0	0		
31	RENEWABLES	0	0	0	0	0	0	0	0	0	0		
32	COGENERATION	0	0	0	0	0	0	0	0	0	0		
33	IMPORTS	99	99	99	99	99	99	99	99	119	118		
34	CONTRACTS IN	236	236	236	235	236	236	185	185	130	130		
35	LARGE THERMAL	927	927	927	927	927	927	927	927	927	927		
36	RESOURCE ACQUISITIONS	0	0	0	0	0	0	0	0	0	0		
37	TOTAL RESOURCES	8579	8603	8601	8599	8599	8597	8546	8544	8508	8505		

TABLE 2: FEDERAL SYSTEM (CONTINUED)

EXHIBIT 2 (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

H I G H L O A D S																		
OPERATING YEAR																		
1991 WHITEBOOK: 11/20/91 RUN DATE: 11/22/91																		
	2002- AVG	3 AVG	2003- AVG	4 AVG	2004- AVG	5 AVG	2005- AVG	6 AVG	2006- AVG	7 AVG	2007- AVG	8 AVG	2008- AVG	9 AVG	2009-10 AVG	2010-11 AVG	2011-12 AVG	
MEGAWATTS																		
35 HYD,SM THRM & MISC RES	16/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36 LARGE THERMAL RESERVES	17/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
37 SPINNING RESERVES	18/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
38 DSI RESERVES	19/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
39 FEDERAL HYDRO MAINT	20/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40 NET RESOURCES		8579	8603	8601	8599	8599	8599	8599	8599	8597	8597	8546	8544	8508	8505			
41 FIRM SURPLUS/DEFICIT		-3059	-3400	-3636	-3961	-4238	-4470	-4685	-4789	-4864	-5119	-5940						
42 TOTAL SURPLUS/DEFICIT		-3880	-4221	-4456	-4782	-5058	-5290	-5506	-5609	-5685	-5940							

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

EXHIBIT 3

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

MEGAWATTS		M E D I U M - H I G H L O A D S										1991 WHITEBOOK:	
		OPERATING YEAR										RUN DATE:	
		1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	11/20/91	11/22/91
		AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG		
LOADS													
1	FEDERAL AGENCIES	142	142	143	145	145	146	147	148	149	149		
2	FEDERAL & GEN PUBLIC LOSSES	169	169	172	175	171	175	177	179	181	185		
3	USER	67	67	67	67	68	67	67	67	68	68		
4	DSI ALUMINUM FIRM	2123	2123	2098	2087	2087	2087	2087	2087	2087	2087		
5	DSI NON-ALUM FIRM	247	247	247	248	248	249	249	249	250	212		
6	DSI FIRM LOSSES	62	62	61	61	61	61	61	61	61	60		
7	SM & NON GEN PUB PURCH	3255	3324	3417	3490	3562	3632	3701	3771	3830	3891		
8	FIRM SYSTEM LOAD	6065	6134	6205	6273	6342	6417	6489	6562	6626	6652		
TRANSFERS OUT													
9	EXPORTS	176	220	220	220	243	260	367	564	560	557		
10	CONTRACTS OUT	622	622	623	688	351	356	357	357	356	331		
11	CSPE TO WEST GROUP UTIL	302	289	276	264	252	238	187	102	98	94		
12	GEN PUBLIC AGEN PURCH	1932	2007	2086	2166	2247	2315	2394	2482	2545	2612		
13	GEN PRIVATE UTIL PURCH	50	50	50	50	50	50	0	0	0	0		
14	FED DIVERSITY	0	0	0	0	0	0	0	0	0	0		
15	FIRM LOADS	9147	9323	9460	9662	9486	9637	9794	10067	10185	10246		
16	DSI ALUM TOP QUARTILE	708	708	699	696	696	696	696	696	696	696		
17	DSI NON-ALUMINUM TO	82	82	82	83	83	83	83	83	83	71		
18	TOP QUARTILE LOSSES	21	21	20	20	20	20	20	20	20	20		
19	TOTAL LOADS	9958	10134	10262	10461	10285	10436	10593	10867	10984	11033		
RESOURCES													
20	REGULATED HYDRO	6962	6962	6962	6962	6962	6962	6962	6962	6962	6962		
21	INDEPENDENT HYDRO	256	265	278	278	278	278	278	278	278	278		
22	SUS. PKNG. ADJUSTMENT	0	0	0	0	0	0	0	0	0	0		
23A	CAN. ENT. NON-FED(CSPE)	67	62	58	55	54	50	40	23	22	21		
23B	CAN. ENT. NON-FED(CNDA)	0	0	0	0	0	3	27	72	71	70		
24	RESTORATION	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23		
25	TOTAL HYDRO	7262	7266	7275	7272	7271	7270	7284	7312	7310	7308		
26	SMALL THERMAL & MISC	0	0	0	0	0	0	0	0	0	0		
27	COMBUSTION TURBINES	0	0	0	0	0	0	0	0	0	0		
28	RENEWABLES	0	0	0	0	0	0	0	0	0	0		
29	COGENERATION	0	0	0	0	0	0	0	0	0	0		
30	IMPORTS	99	99	99	99	99	99	99	99	99	99		
31	CONTRACTS IN	143	143	143	208	209	214	214	214	214	236		
32	LARGE THERMAL	959	955	955	927	927	927	927	927	927	927		
33	RESOURCE ACQUISITIONS	0	0	0	0	0	0	0	0	0	0		
34	TOTAL RESOURCES	8463	8463	8472	8506	8506	8510	8524	8552	8550	8570		

TABLE 2: FEDERAL SYSTEM (CONTINUED)

EXHIBIT 3 (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

MEGAWATTS	M E D I U M - H I G H L O A D S										1991 WHITEBOOK:	
	OPERATING YEAR										RUN DATE:	
	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	11/20/91	11/22/91
	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG		
35 HYD, SM THRM & MISC RES	16/	0	0	0	0	0	0	0	0	0	0	0
36 LARGE THERMAL RESERVES	17/	0	0	0	0	0	0	0	0	0	0	0
37 SPINNING RESERVES	18/	0	0	0	0	0	0	0	0	0	0	0
38 DSI RESERVES	19/	0	0	0	0	0	0	0	0	0	0	0
39 FEDERAL HYDRO MAINT	20/	0	0	0	0	0	0	0	0	0	0	0
40 NET RESOURCES	8463	8463	8472	8506	8506	8510	8524	8552	8550	8570		
41 FIRM SURPLUS/DEFICIT	-684	-860	-988	-1155	-979	-1126	-1269	-1515	-1635	-1676		
42 TOTAL SURPLUS/DEFICIT	-1495	-1670	-1790	-1954	-1779	-1926	-2069	-2314	-2434	-2462		

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 - H I G H L O A D S										1991 WHITEBOOK: RUN DATE:	
		OPERATING YEAR										11/20/91 11/22/91	
MEGAWATTS		2002-3	2003-4	2004-5	2005-6	2006-7	2007-8	2008-9	2009-10	2010-11	2011-12	AVG	
		AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG		
LOADS													
1	FEDERAL AGENCIES	150	151	151	152	153	153	154	155	155	156		
2	FEDERAL & GEN PUBLIC LOSSES	188	190	194	200	204	207	209	214	216	218		
3	USBR	68	68	68	68	68	68	68	68	68	68		
4	DSI ALUMINUM FIRM	2087	2087	2087	2087	2087	2087	2087	2087	2087	2087		
5	DSI NON-ALUM FIRM	212	212	213	212	212	213	213	213	213	213		
6	DSI FIRM LOSSES	60	60	60	60	60	60	60	60	60	60		
7	SM & NON GEN PUB PURCH	3960	4037	4109	4191	4268	4337	4408	4486	4567	4646		
8	FIRM SYSTEM LOAD	6725	6805	6882	6970	7052	7125	7199	7283	7366	7448		
TRANSFERS OUT													
9	EXPORTS	614	794	788	783	777	760	725	553	507	502		
10	CONTRACTS OUT	331	331	331	331	331	331	281	281	94	94		
11	CSPE TO WEST GROUP UTIL	70	0	0	0	0	0	0	0	0	0		
12	GEN PUBLIC AGEN PURCH	2690	2788	2859	3004	3111	3186	3265	3360	3450	3526		
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	10430	10718	10860	11088	11271	11402	11470	11477	11417	11570		
16	DSI ALUM TOP QUARTILE	696	696	696	696	696	696	696	696	696	696		
17	DSI NON-ALUMINUM IQ	71	71	71	71	71	71	71	71	71	71		
18	TOP QUARTILE LOSSES	20	20	20	20	20	20	20	20	20	20		
19	TOTAL LOADS	11217	11505	11647	11875	12059	12190	12258	12264	12204	12357		
RESOURCES													
20	REGULATED HYDRO	6962	6962	6963	6962	6962	6962	6962	6962	6962	6962		
21	INDEPENDENT HYDRO	278	278	278	278	278	278	278	278	278	278		
22	SUS. PKING. ADJUSTMENT	0	0	0	0	0	0	0	0	0	0		
23A	CAN. ENT. NON-FED(CSPE)	16	0	0	0	0	0	0	0	0	0		
23B	CAN. ENT. NON-FED(CNDA)	83	124	122	121	120	118	117	116	115	113		
24	RESTORATION	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23		
25	TOTAL HYDRO	7316	7341	7340	7338	7337	7335	7334	7333	7332	7330		
26	SMALL THERMAL & MISC	0	0	0	0	0	0	0	0	0	0		
27	COMBUSTION TURBINES	0	0	0	0	0	0	0	0	0	0		
28	RENEWABLES	0	0	0	0	0	0	0	0	0	0		
29	COGENERATION	0	0	0	0	0	0	0	0	0	0		
30	IMPORTS	99	99	99	99	99	99	99	99	119	118		
31	CONTRACTS IN	236	236	236	235	236	236	185	185	130	130		
32	LARGE THERMAL	927	927	927	927	927	927	927	927	927	927		
33	RESOURCE ACQUISITIONS	0	0	0	0	0	0	0	0	0	0		
34	TOTAL RESOURCES	8578	8603	8602	8599	8599	8597	8545	8544	8508	8505		

EXHIBIT 3 (continued)

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

MEGAWATTS	M E D I U M - H I G H L O A D S											1991 WHITEBOOK:	
	OPERATING YEAR											RUN DATE:	
	2002-3 AVG	2003-4 AVG	2004-5 AVG	2005-6 AVG	2006-7 AVG	2007-8 AVG	2008-9 AVG	2009-10 AVG	2010-11 AVG	2011-12 AVG		11/20/91	11/22/91
35 HYD, SM THRM & MISC RES 16/	0	0	0	0	0	0	0	0	0	0	0		
36 LARGE THERMAL RESERVES 17/	0	0	0	0	0	0	0	0	0	0	0		
37 SPINNING RESERVES 18/	0	0	0	0	0	0	0	0	0	0	0		
38 DSI RESERVES 19/	0	0	0	0	0	0	0	0	0	0	0		
39 FEDERAL HYDRO MAINT 20/	0	0	0	0	0	0	0	0	0	0	0		
40 NET RESOURCES	8578	8603	8602	8599	8599	8597	8545	8544	8508	8505			
41 FIRM SURPLUS/DEFICIT	-1852	-2115	-2257	-2488	-2672	-2805	-2925	-2933	-2908	-3064			
42 TOTAL SURPLUS/DEFICIT	-2639	-2901	-3044	-3275	-3459	-3592	-3712	-3720	-3696	-3852			

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

EXHIBIT 4

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	MEGAWATTS	M E D I U M - L O W L O A D S										1991 WHITEBOOK:	
		OPERATING YEAR										RUN DATE:	
		1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02		
		AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	11/20/91	11/22/91
1	FEDERAL AGENCIES	142	142	143	145	145	146	147	148	148	149		
2	FEDERAL & GEN PUBLIC LOSSES	156	153	154	156	150	152	152	153	154	155		
3	USBR	67	67	67	67	68	67	68	67	68	68		
4	DSI ALUMINUM FIRM	1798	1654	1492	1439	1439	1439	1439	1439	1439	1439		
5	DSI NON-ALUM FIRM	139	139	140	140	140	141	141	141	142	142		
6	DSI FIRM LOSSES	50	47	42	41	41	41	41	41	41	41		
7	SM & NON GEN PUB PURCH	3042	3068	3119	3153	3191	3225	3257	3294	3319	3346		
8	FIRM SYSTEM LOAD	5394	5270	5157	5141	5174	5211	5245	5283	5311	5340		
9	TRANSFERS OUT												
10	EXPORTS	176	220	220	220	243	260	367	564	560	557		
11	CONTRACTS OUT	622	622	623	688	351	356	357	357	356	331		
12	CSPE TO WEST GROUP UTIL	302	289	276	264	252	238	187	102	98	94		
13	GEN PUBLIC AGEN PURCH	1698	1727	1761	1801	1844	1875	1913	1965	1992	2021		
14	GEN PRIVATE UTIL PURCH	50	50	50	50	50	50	0	0	0	0		
15	FED DIVERSITY	0	0	0	0	0	0	0	0	0	0		
16	FIRM LOADS	8243	8179	8088	8165	7915	7991	8069	8271	8317	8343		
17	DSI ALUM TOP QUARTILE	599	552	497	480	480	480	480	480	480	480		
18	DSI NON-ALUMINUM TQ	46	46	46	47	47	47	47	47	47	47		
19	TOP QUARTILE LOSSES	17	16	14	14	14	14	14	14	14	14		
20	TOTAL LOADS	8905	8792	8646	8705	8455	8532	8610	8812	8858	8884		
21	RESOURCES												
22	REGULATED HYDRO	6962	6962	6962	6962	6962	6962	6962	6963	6962	6962		
23	INDEPENDENT HYDRO	256	265	278	278	278	278	278	278	278	278		
24	SUS. PKNG. ADJUSTMENT	0	0	0	0	0	0	0	0	0	0		
25	CAN. ENT. NON-FED(CSPE)	67	62	58	55	54	50	40	23	22	21		
26	CAN. ENT. NON-FED(CNDA)	0	0	0	0	0	3	27	72	71	70		
27	RESTORATION	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23		
28	TOTAL HYDRO	7262	7266	7275	7272	7271	7270	7284	7313	7310	7308		
29	SMALL THERMAL & MISC	0	0	0	0	0	0	0	0	0	0		
30	COMBUSTION TURBINES	0	0	0	0	0	0	0	0	0	0		
31	RENEWABLES	0	0	0	0	0	0	0	0	0	0		
32	COGENERATION	0	0	0	0	0	0	0	0	0	0		
33	IMPORTS	99	99	99	99	99	99	99	99	99	99		
34	CONTRACTS IN	143	143	143	208	209	214	214	214	214	236		
35	LARGE THERMAL	959	955	955	927	927	927	927	927	927	927		
36	RESOURCE ACQUISITIONS	0	0	0	0	0	0	0	0	0	0		
37	TOTAL RESOURCES	8463	8463	8472	8506	8506	8510	8524	8553	8550	8570		

EXHIBIT 4 (continued)

SHEET 2 OF 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 - L O W L O A D S											1991 WHITEBOOK:	
OPERATING YEAR											RUN DATE:	
	1992-93 AVG	1993-94 AVG	1994-95 AVG	1995-96 AVG	1996-97 AVG	1997-98 AVG	1998-99 AVG	1999-00 AVG	2000-01 AVG	2001-02 AVG	11/20/91	11/22/91
MEGAWATTS												
35 HYD, SM THRM & MISC RES	0	0	0	0	0	0	0	0	0	0	0	0
36 LARGE THERMAL RESERVES	0	0	0	0	0	0	0	0	0	0	0	0
37 SPINNING RESERVES	0	0	0	0	0	0	0	0	0	0	0	0
38 DSI RESERVES	0	0	0	0	0	0	0	0	0	0	0	0
39 FEDERAL HYDRO MAINT	0	0	0	0	0	0	0	0	0	0	0	0
40 NET RESOURCES	8463	8463	8472	8506	8506	8510	8524	8553	8550	8570	8570	
41 FIRM SURPLUS/DEFICIT	220	285	385	342	592	520	456	282	233	227		227
42 TOTAL SURPLUS/DEFICIT	-442	-329	-173	-199	51	-21	-85	-259	-308	-314		-314

- 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

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

1991 WHITEBOOK: 11/20/91
RUN DATE: 11/22/91

OPERATING YEAR

MEGAWATTS		2002-3 AVG	2003-4 AVG	2004-5 AVG	2005-6 AVG	2006-7 AVG	2007-8 AVG	2008-9 AVG	2009-10 AVG	2010-11 AVG	2011-12 AVG
LOADS											
1	FEDERAL AGENCIES	150	150	152	152	153	154	154	155	155	156
2	FEDERAL & GEN PUBLIC LOSSES	156	157	158	163	166	167	168	171	172	173
3	USBR	68	68	68	68	68	68	68	68	68	68
4	DSI ALUMINUM FIRM	1439	1439	1439	1439	1439	1439	1439	1439	1439	1439
5	DSI NON-ALUM FIRM	142	142	142	142	142	142	143	143	143	143
6	DSI FIRM LOSSES	41	41	41	41	41	41	41	41	41	41
7	SM & NON GEN PUB PURCH 1/	3378	3421	3463	3515	3564	3608	3650	3699	3747	3792
8	FIRM SYSTEM LOAD	5374	5418	5463	5520	5573	5619	5663	5716	5765	5812
TRANSFERS OUT											
9	EXPORTS	614	794	788	783	777	760	725	553	507	502
10	CONTRACTS OUT	331	331	331	331	331	331	281	281	94	94
11	CSPE TO WEST GROUP UTIL	70	0	0	0	0	0	0	0	0	0
12	GEN PUBLIC AGEN PURCH 1/	2060	2122	2163	2275	2352	2400	2449	2512	2568	2596
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
FIRM LOADS											
15	FIRM LOADS	8449	8665	8745	8909	9033	9110	9118	9062	8934	9004
16	DSI ALUM TOP QUARTILE	480	480	480	480	480	480	480	480	480	480
17	DSI NON-ALUMINUM TQ	47	47	47	47	47	47	47	47	47	47
18	TOP QUARTILE LOSSES 8/	14	14	14	14	14	14	14	14	14	14
19	TOTAL LOADS	8990	9206	9286	9450	9574	9651	9659	9603	9475	9545
RESOURCES											
20	REGULATED HYDRO	6962	6963	6962	6962	6962	6962	6963	6962	6962	6962
21	INDEPENDENT HYDRO	278	278	278	278	278	278	278	278	278	278
22	SUS. PKNG. ADJUSTMENT 9/	0	0	0	0	0	0	0	0	0	0
23A	CAN. ENT. NON-FED(CSPE)10/	16	0	0	0	0	0	0	0	0	0
23B	CAN. ENT. NON-FED(CNDA)10/	83	124	122	121	120	118	117	116	115	113
24	RESTORATION 11/	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23
25	TOTAL HYDRO	7316	7342	7339	7338	7337	7335	7335	7333	7332	7330
26	SMALL THERMAL & MISC	0	0	0	0	0	0	0	0	0	0
27	COMBUSTION TURBINES	0	0	0	0	0	0	0	0	0	0
28	RENEWABLES	0	0	0	0	0	0	0	0	0	0
29	COGENERATION	0	0	0	0	0	0	0	0	0	0
30	IMPORTS	99	99	99	99	99	99	99	99	119	118
31	CONTRACTS IN	236	236	236	235	236	236	185	185	130	130
32	LARGE THERMAL	927	927	927	927	927	927	927	927	927	927
33	RESOURCE ACQUISITIONS 15/	0	0	0	0	0	0	0	0	0	0
34	TOTAL RESOURCES	8578	8604	8601	8599	8599	8597	8546	8544	8508	8505

TABLE 2: FEDERAL SYSTEM (CONTINUED)

SHEET 2 OF 2

EXHIBIT 4 (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																			
OPERATING YEAR																			
1991 WHITEBOOK: RUN DATE:																			
11/20/91 11/22/91																			
2011-12 AVG																			
2010-11 AVG																			
2009-10 AVG																			
2008- 9 AVG																			
2007- 8 AVG																			
2006- 7 AVG																			
2005- 6 AVG																			
2004- 5 AVG																			
2003- 4 AVG																			
2002- 3 AVG																			
MEGAWATTS																			
35	HYD,SM THRM & MISC RES	16/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	LARGE THERMAL RESERVES	17/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
37	SPINNING RESERVES	18/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
38	DSI RESERVES	19/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
39	FEDERAL HYDRO MAINT	20/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40	NET RESOURCES		8578	8604	8601	8599	8599	8599	8597	8546	8544	8508	8505						
41	FIRM SURPLUS/DEFICIT		129	-60	-144	-309	-434	-513	-518	-572	-518	-426	-499						
42	TOTAL SURPLUS/DEFICIT		-412	-601	-685	-850	-975	-1054	-1059	-1113	-1059	-967	-1040						

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

EXHIBIT 5

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

L O W L O A D S													
OPERATING YEAR													
1991 WHITEBOOK: RUN DATE:													
MEGAWATTS													
1992-93 1993-94 1994-95 1995-96 1996-97 1997-98 1998-99 1999-00 2000-01 2001-02													
AVG AVG AVG AVG AVG AVG AVG AVG AVG													
LOADS													
1	FEDERAL AGENCIES	142	142	144	144	145	146	147	148	149	149	149	
2	FEDERAL & GEN PUBLIC LOSSES	148	144	143	144	136	137	136	135	135	135	135	
3	USER	67	67	67	68	68	68	68	67	67	67	68	
4	DSI ALUMINUM FIRM	1597	1379	1108	1027	1027	1027	1027	993	771	549	549	
5	DSI NON-ALUM FIRM	100	100	100	100	100	100	100	100	100	100	100	
6	DSI FIRM LOSSES	44	38	31	29	29	29	29	29	23	17	17	
7	SM & NON GEN PUB PURCH	2915	2912	2933	2940	2953	2963	2971	2982	2984	2989	2989	
8	FIRM SYSTEM LOAD	5013	4782	4526	4452	4458	4470	4478	4454	4229	4007	4007	
TRANSFERS OUT													
9	EXPORTS	176	220	220	220	243	260	367	564	560	557	557	
10	CONTRACTS OUT	622	622	623	688	351	356	357	357	356	331	331	
11	CSPE TO WEST GROUP UTIL	302	289	276	264	252	238	187	102	98	94	94	
12	GEN PUBLIC AGEN PURCH	1560	1557	1558	1572	1584	1591	1603	1627	1629	1636	1636	
13	GEN PRIVATE UTIL PURCH	50	50	50	50	50	50	0	0	0	0	0	
14	FED DIVERSITY	0	0	0	0	0	0	0	0	0	0	0	
15	FIRM LOADS	7724	7521	7254	7247	6939	6966	6992	7104	6872	6625	6625	
16	DSI ALUM TOP QUARTILE	532	460	369	342	342	342	342	331	257	183	183	
17	DSI NON-ALUMINUM TQ	33	33	33	33	33	33	33	33	33	33	33	
18	TOP QUARTILE LOSSES	15	13	10	10	10	10	10	9	8	6	6	
19	TOTAL LOADS	8304	8026	7666	7631	7323	7350	7376	7477	7169	6847	6847	
RESOURCES													
20	REGULATED HYDRO	6962	6962	6962	6963	6962	6962	6962	6963	6963	6962	6962	
21	INDEPENDENT HYDRO	256	265	278	278	278	278	278	278	278	278	278	
22	SUS. PKNG. ADJUSTMENT	0	0	0	0	0	0	0	0	0	0	0	
23A	CAN. ENT. NON-FED(CSPE)	67	62	58	55	54	50	40	23	22	21	21	
23B	CAN. ENT. NON-FED(CNDA)	0	0	0	0	0	3	27	72	71	70	70	
24	RESTORATION	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	
25	TOTAL HYDRO	7262	7266	7275	7273	7271	7270	7284	7313	7311	7308	7308	
26	SMALL THERMAL & MISC	0	0	0	0	0	0	0	0	0	0	0	
27	COMBUSTION TURBINES	0	0	0	0	0	0	0	0	0	0	0	
28	RENEWABLES	0	0	0	0	0	0	0	0	0	0	0	
29	COGENERATION	0	0	0	0	0	0	0	0	0	0	0	
30	IMPORTS	99	99	99	99	99	99	99	99	99	99	99	
31	CONTRACTS IN	143	143	143	208	209	214	214	214	214	236	236	
32	LARGE THERMAL	959	955	955	927	927	927	927	927	927	927	927	
33	RESOURCE ACQUISITIONS	0	0	0	0	0	0	0	0	0	0	0	
34	TOTAL RESOURCES	8463	8463	8472	8507	8506	8510	8524	8553	8551	8570	8570	

EXHIBIT 5 (continued)

SHEET 2 OF 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

L O W L O A D S												
OPERATING YEAR												
1991 WHITEBOOK: RUN DATE:												
11/20/91 11/22/91												
MEGAWATTS												
	1992-93 AVG	1993-94 AVG	1994-95 AVG	1995-96 AVG	1996-97 AVG	1997-98 AVG	1998-99 AVG	1999-00 AVG	2000-01 AVG	2001-02 AVG		
35 HYD, SM THRM & MISC RES	16/	0	0	0	0	0	0	0	0	0	0	0
36 LARGE THERMAL RESERVES	17/	0	0	0	0	0	0	0	0	0	0	0
37 SPINNING RESERVES	18/	0	0	0	0	0	0	0	0	0	0	0
38 DSI RESERVES	19/	0	0	0	0	0	0	0	0	0	0	0
39 FEDERAL HYDRO MAINT	20/	0	0	0	0	0	0	0	0	0	0	0
40 NET RESOURCES	8463	8463	8472	8507	8506	8510	8524	8553	8551	8570		
41 FIRM SURPLUS/DEFICIT	739	943	1219	1261	1568	1545	1533	1449	1680	1945		
42 TOTAL SURPLUS/DEFICIT	159	437	806	876	1183	1160	1148	1076	1382	1724		

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)

SHEET 1 OF 2

TABLE 2: FEDERAL SYSTEM

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

LOADS	L O W L O A D S										1991 WHITEBOOK:	
	OPERATING YEAR										RUN DATE:	
	2002-3 AVG	2003-4 AVG	2004-5 AVG	2005-6 AVG	2006-7 AVG	2007-8 AVG	2008-9 AVG	2009-10 AVG	2010-11 AVG	2011-12 AVG		
MEGAWATTS												
1 FEDERAL AGENCIES	150	150	151	152	153	153	154	155	155	156		
2 FEDERAL & GEN PUBLIC LOSSES	135	135	136	138	139	140	139	141	142	142		
3 USER	68	68	68	68	68	68	68	68	68	68		
4 DSI ALUMINUM FIRM	549	549	549	549	549	549	549	549	549	549		
5 DSI NON-ALUM FIRM	100	100	100	100	100	100	100	100	100	100		
6 DSI FIRM LOSSES	17	17	17	17	17	17	17	17	17	17		
7 SH & NON GEN PUB PURCH	3001	3021	3039	3066	3090	3107	3124	3147	3172	3190		
8 FIRM SYSTEM LOAD	4020	4040	4060	4090	4116	4134	4151	4177	4203	4222		
TRANSFERS OUT												
9 EXPORTS	614	794	788	783	777	760	725	553	507	502		
10 CONTRACTS OUT	331	331	331	331	331	331	281	281	94	94		
11 CSPE TO WEST GROUP UTIL	70	0	0	0	0	0	0	0	0	0		
12 GEN PUBLIC AGEN PURCH	1652	1690	1705	1791	1840	1858	1881	1918	1948	1949		
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	6687	6855	6884	6995	7064	7083	7038	6929	6752	6767		
16 DSI ALUM TOP QUARTILE	183	183	183	183	183	183	183	183	183	183		
17 DSI ALUM MINIMUM TO	33	33	33	33	33	33	33	33	33	33		
18 TOP QUARTILE LOSSES	6	6	6	6	6	6	6	6	6	6		
19 TOTAL LOADS	6909	7076	7105	7216	7286	7305	7260	7151	6974	6989		
RESOURCES												
20 REGULATED HYDRO	6962	6963	6963	6962	6962	6962	6962	6962	6962	6962		
21 INDEPENDENT HYDRO	278	278	278	278	278	278	278	278	278	278		
22 SUS. PRNG. ADJUSTMENT	0	0	0	0	0	0	0	0	0	0		
23A CAN. ENT. NON-FED(CSPE)	16	0	0	0	0	0	0	0	0	0		
23B CAN. ENT. NON-FED(CMND)	83	124	122	121	120	118	117	116	115	113		
24 RESTORATION	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23		
25 TOTAL HYDRO	7316	7342	7340	7338	7337	7335	7334	7333	7332	7330		
26 SMALL THERMAL & MISC	0	0	0	0	0	0	0	0	0	0		
27 COMBUSTION TURBINES	0	0	0	0	0	0	0	0	0	0		
28 RENEWABLES	0	0	0	0	0	0	0	0	0	0		
29 COGENERATION	0	0	0	0	0	0	0	0	0	0		
30 IMPORTS	99	99	99	99	99	99	99	99	99	99		
31 CONTRACTS IN	236	236	236	235	236	236	185	185	130	130		
32 LARGE THERMAL	927	927	927	927	927	927	927	927	927	927		
33 RESOURCE ACQUISITIONS	0	0	0	0	0	0	0	0	0	0		
34 TOTAL RESOURCES	8578	8604	8602	8599	8599	8597	8545	8544	8508	8504		

TABLE 2: FEDERAL SYSTEM (CONTINUED)

EXHIBIT 5 (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

MEGAWATTS	L O W L O A D S										1991 WHITEBOOK:	
	OPERATING YEAR										RUN DATE:	
	2002-3 AVG	2003-4 AVG	2004-5 AVG	2005-6 AVG	2006-7 AVG	2007-8 AVG	2008-9 AVG	2009-10 AVG	2010-11 AVG	2011-12 AVG	11/20/91	11/22/91
35 HYD. SM THRM & MISC RES	16/	0	0	0	0	0	0	0	0	0	0	0
36 LARGE THERMAL RESERVES	17/	0	0	0	0	0	0	0	0	0	0	0
37 SPINNING RESERVES	18/	0	0	0	0	0	0	0	0	0	0	0
38 DSI RESERVES	19/	0	0	0	0	0	0	0	0	0	0	0
39 FEDERAL HYDRO MAINT	20/	0	0	0	0	0	0	0	0	0	0	0
40 NET RESOURCES	8578	8604	8602	8599	8599	8597	8545	8544	8508	8504		
41 FIRM SURPLUS/DEFICIT	1891	1750	1719	1605	1535	1514	1507	1615	1756	1737		
42 TOTAL SURPLUS/DEFICIT	1670	1528	1497	1383	1313	1292	1285	1393	1534	1515		

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

FEDERAL SYSTEM FOOTNOTES

For Exhibits 1 through 5

- 1/ BPA's small and nongenerating 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 requirements not served by its own dedicated resources.
- 2/ BPA's exports include BPA's contracts for a surplus firm power sales to Southern California Edison and the cities of Burbank, Glendale, and Pasadena; BPA's surplus firm power sale with M-S-R Public Power Agency through October 31, 2009, which then converts to a capacity sale; BPA's capacity sales to the cities of Anaheim and Riverside; BPA's contract with BC Hydro for Canadian Entitlement beginning April 1998; and Northwest-Southwest intertie losses.
- 3/ BPA's contracts out include BPA's contracts of Canadian Entitlement capacity and supplemental capacity to public agencies and IOUs; BPA's contracts with Clark County PUD and other public agencies (Packwood Lake); BPA's WNP-1 obligation contract 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 contract with Pacific Power and Light, Portland General Electric, Puget Sound Power and Light, and Washington Water Power; BPA's power transfer for its Southern Idaho load through Pacific Power and Light's system; BPA's capacity sale with Montana Power; BPA's surplus firm power sale to Puget Sound Power and Light, which converts to a seasonal exchange in OY 2001-02; 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 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 requirements not served by its own dedicated resources.
- 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. Puget Sound Power and Light is the only IOU purchasing energy from BPA through June 30, 1998.
- 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/ 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, and forced outage reserves.
- 10/ Canadian Entitlement Return non-Federal (CSPE) reflects the public agencies' and IOUs' obligation of Canadian Entitlement allocation to the Northwest entities of the CSPE, which expires March 31, 2003. Canadian Entitlement Return non-Federal (Canada) reflects the Federal system, public agencies', and IOUs' obligation of Canadian Entitlement allocation to Canada, which begins April 1, 1998.
- 11/ Restoration deals with 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 which lost generation from Canadian storage.
- 12/ BPA's imports include exchange energy from the cities of Anaheim and Riverside, and from M-S-R when its surplus firm power sale converts to a capacity/energy exchange on November 1, 2009; and power from Pacifiac Power and Light's Wyoming Division to serve BPA's Southern Idaho load.
- 13/ Contracts include Montana Power Company's return of exchange energy under its capacity/energy exchange contract with BPA; BPA's WNP-3 settlement contract with Pacific Power and Light, Portland General Electric, Puget Sound Power and Light, and Washington Water Power; and Puget Sound Power and Light's seasonal power exchange after conversion in OY 2001-02.
- 14/ Federal large thermal includes the generation from WNP-2, operated by WPPSS, and 30 percent of Portland General Electric's Trojan nuclear power plant, and a 8% seasonal purchase PNGC share of Bordman through operating year 1994-95.
- 15/ Resource acquisitions are resources which BPA identified for future purchase. When these resources are contracted for and/or on-line, they are included in the loads and resources balance.
- 16/ Hydro, small thermal and miscellaneous resources, and combustion turbine reserve requirements are estimated at 5 percent of the Federal capacity of these resources.
- 17/ Large thermal reserve requirements are estimated at 15 percent of the Federal share of Pacific Northwest thermal resources.
- 18/ Federal spinning reserve is the reserve generating capacity maintained to provide a regulating margin for the automatic generation and frequency control of power generation.

- 19/ Direct service industrial reserve requirements are two-thirds 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 the Federal hydro maintenance based on the mean of the 1983-84 through 1988-89 schedules submitted to the Northwest Power Pool.

EXHIBIT 6

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

FEDERAL SYSTEM FIRM 50-HOUR CAPACITY SURPLUS/DEFICIT

20 YEAR MONTHLY SUMMARY

ASSUMING EXISTING FEDERAL CONTRACTS AND

M E D I U M L O A D S

1991 WHITEBOOK: 11/20/91
RUN DATE: 11/21/91

1950 WATER YEAR	JUL	AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN
PEAK IN MEGAWATTS														
1992-93	5189	5652	4872	4781	4290	4951	5253	5240	3724	5327	5828	5749	6654	5501
1993-94	4952	5388	4624	4540	4035	4709	5007	4982	3500	5148	5736	5658	6675	5530
1994-95	5043	5442	4705	4611	4102	4779	5086	5006	3583	5316	5877	5737	6860	5733
1995-96	5193	5584	4863	4716	4172	4602	4864	4754	3349	5150	5708	5613	6875	5758
1996-97	5578	5871	5179	5028	4463	4857	5118	5009	3597	5408	5798	5838	7100	5986
1997-98	5724	6048	5372	5213	4637	4738	4990	4873	3452	5253	5695	5724	6903	6064
1998-99	5554	5869	5218	5069	4510	4570	4810	4691	3282	5129	5423	5492	6673	5835
1999-00	5296	5583	4972	4797	4217	4221	4461	4342	2941	4812	5336	5422	6617	5782
2000-01	5218	5501	4912	4729	4135	4102	4329	4239	2832	4708	5232	5200	6544	5723
2001-02	5557	5842	5267	5079	4726	4116	4338	4200	2793	4947	5218	5187	6554	5747
2002-03	5472	5759	5200	5008	4619	3985	4198	4061	2656	4827	4660	4747	6157	5366
2003-04	5062	5346	4824	4634	4259	3579	3819	3625	2222	4425	4676	4762	6060	5242
2004-05	4983	5269	4763	4566	4125	3425	3650	3437	2043	4261	4522	4607	5918	5183
2005-06	4858	5171	4664	4454	3988	3037	3241	3021	1637	3895	4165	4230	5565	4895
2006-07	4524	4822	4380	4141	3630	2862	3057	2846	1474	3736	4021	3973	5438	4797
2007-08	4411	4717	4291	4028	3494	2708	2888	2674	1340	3624	3915	3867	5366	4770
2008-09	4064	4369	3954	3675	3122	2864	3041	2833	1470	3480	3665	3734	5244	4946
2009-10	4214	4524	4109	3825	3248	3011	3170	2956	1599	3629	3940	4010	5413	4890
2010-11	4175	4486	4071	3778	3183	3310	3474	3241	1894	3701	4020	4091	5300	4810
2011-12	4110	4422	4007	3711	3098	3208	3357	3122	1777	3605	3940	4009	5226	4749

- 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 7

TABLE F-1: 50-HOUR SUSTAINED PEAKING

BASE CASE: EXISTING FEDERAL CONTRACTS

FEDERAL SYSTEM FIRM 50-HOUR CAPACITY SURPLUS/DEFICIT

20 YEAR MONTHLY SUMMARY

ASSUMING EXISTING FEDERAL CONTRACTS AND

H I G H L O A D S

1991 WHITEBOOK: 11/20/91
RUN DATE: 11/21/91

1930 WATER YEAR

PEAK IN MEGAWATTS

	JUL	AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN
1992-93	4527	4940	4201	4113	3533	4066	4250	3949	2578	4371	4964	4943	5915	4845
1993-94	4328	4686	3983	3882	3271	3722	3878	3517	2161	3993	4669	4710	5811	4763
1994-95	4239	4530	3880	3753	3112	3472	3600	3210	1872	3749	4410	4374	5621	4602
1995-96	4056	4347	3755	3553	2879	2997	3103	2747	1418	3407	4055	4022	5479	4481
1996-97	4239	4480	3933	3725	2972	3066	3152	2766	1433	3464	3953	4036	5517	4571
1997-98	4219	4515	4005	3781	2957	2743	2800	2469	1121	3167	3700	3785	5162	4541
1998-99	3901	4221	3748	3540	2685	2416	2464	2103	780	2900	3273	3355	4749	4200
1999-00	3502	3802	3384	3093	2217	1868	1929	1520	227	2366	3037	3119	4539	4041
2000-01	3287	3597	3189	2868	1960	1592	1624	1235	-72	2110	2772	2739	4296	3862
2001-02	3591	3901	3493	3160	2482	1531	1554	1111	-186	2293	2695	2659	4232	3830
2002-03	3378	3694	3286	2944	2223	1225	1231	802	-483	2010	1985	2068	3670	3286
2003-04	2853	3152	2745	2386	1695	660	642	155	-1120	1410	1829	1909	3414	2992
2004-05	2615	2936	2529	2160	1385	306	259	-257	-1501	1051	1497	1576	3105	2781
2005-06	2342	2694	2283	1897	1063	-282	-371	-882	-2120	500	964	1030	2595	2302
2006-07	1869	2211	1799	1413	535	-643	-756	-1279	-2504	167	653	600	2315	2049
2007-08	1616	1970	1557	1156	234	-982	-1128	-1680	-2855	-129	374	321	2084	1865
2008-09	1131	1487	1073	657	-303	-1019	-1194	-1761	-2961	-483	-62	4	1789	1873
2009-10	1132	1493	1078	650	-356	-1083	-1300	-1892	-3077	-556	18	86	1781	1641
2010-11	928	1296	882	435	-616	-1016	-1247	-1871	-3037	-716	-106	-39	1477	1376
2011-12	717	1089	674	216	-873	-1328	-1598	-2234	-3392	-1023	-374	-307	1233	1161

- 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

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

FEDERAL SYSTEM FIRM 50-HOUR CAPACITY SURPLUS/DEFICIT

20 YEAR MONTHLY SUMMARY

ASSUMING EXISTING FEDERAL CONTRACTS AND

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

1991 WHITEBOOK: 11/20/91
RUN DATE: 11/21/91

1930 WATER YEAR	JUL	AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN
PEAK IN MEGAWATTS														
1992-93	4906	5377	4597	4504	3997	4633	4896	4717	3309	5029	5570	5490	6427	5307
1993-94	4757	5201	4437	4348	3802	4399	4626	4431	3032	4782	5406	5354	6412	5307
1994-95	4744	5143	4415	4325	3755	4306	4527	4308	2919	4706	5297	5203	6349	5263
1995-96	4736	5080	4396	4232	3642	3962	4162	3955	2575	4448	5033	4991	6280	5207
1996-97	5047	5287	4641	4467	3861	4130	4330	4107	2730	4623	5045	5130	6443	5379
1997-98	5119	5402	4780	4596	3971	3930	4108	3898	2516	4407	4879	4966	6198	5414
1998-99	4868	5175	4583	4411	3797	3695	3860	3652	2291	4236	4544	4630	5930	5142
1999-00	4562	4849	4302	4108	3411	3291	3441	3236	1868	3855	4413	4496	5818	5058
2000-01	4438	4729	4208	4004	3265	3112	3268	3074	1696	3698	4249	4217	5667	4955
2001-02	4774	5066	4567	4356	3840	3104	3257	3008	1649	3916	4221	4189	5648	4981
2002-03	4640	4934	4458	4241	3681	2904	3053	2791	1440	3728	3606	3691	5167	4554
2003-04	4166	4467	4035	3763	3251	2435	2575	2275	933	3244	3558	3643	5014	4385
2004-05	4040	4339	3930	3629	3055	2207	2327	2022	690	3025	3354	3437	4823	4293
2005-06	3871	4200	3790	3476	2859	1762	1853	1528	212	2591	2931	2997	4413	3935
2006-07	3485	3803	3389	3078	2437	1520	1595	1288	-17	2378	2734	2685	4238	3778
2007-08	3330	3652	3237	2921	2247	1306	1363	1052	-210	2212	2581	2529	4121	3693
2008-09	2943	3266	2851	2525	1826	1406	1457	1120	-171	1989	2254	2322	3929	3790
2009-10	3033	3360	2946	2612	1883	1471	1498	1148	-132	2058	2455	2523	4028	3658
2010-11	2930	3261	2846	2501	1741	1684	1707	1346	74	2051	2465	2532	3849	3502
2011-12	2816	3148	2734	2381	1595	1511	1515	1148	-126	1889	2321	2387	3717	3385

- 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 9

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

FEDERAL SYSTEM FIRM 50-HOUR CAPACITY SURPLUS/DEFICIT

20 YEAR MONTHLY SUMMARY

ASSUMING EXISTING FEDERAL CONTRACTS AND

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

1991 WHITEBOOK: 11/20/91
RUN DATE: 11/21/91

1990 WATER YEAR

	JUL	AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN
PEAK IN MEGAWATTS														
1992-93	5590	6102	5332	5248	4834	5575	5954	6011	4586	6227	6626	6548	7448	6264
1993-94	5674	6182	5407	5328	4902	5601	5974	6010	4598	6246	6733	6651	7656	6475
1994-95	5856	6313	5530	5423	4983	5686	6063	6059	4668	6339	6886	6747	7835	6666
1995-96	5944	6394	5610	5440	4985	5515	5850	5821	4437	6189	6762	6620	7845	6682
1996-97	6321	6694	5921	5756	5288	5820	6138	6090	4706	6460	6894	6856	8078	6916
1997-98	6474	6830	6121	5957	5471	5731	6024	6017	4622	6359	6846	6785	7923	7031
1998-99	6337	6742	6002	5956	5386	5616	5903	5890	4513	6283	6614	6589	7726	6833
1999-00	6144	6490	5787	5626	5125	5316	5609	5614	4246	6012	6579	6564	7709	6814
2000-01	6113	6448	5761	5599	5086	5251	5536	5540	4164	5943	6509	6437	7663	6778
2001-02	6503	6815	6139	5976	5722	5304	5586	5554	4178	6238	6542	6483	7709	6830
2002-03	6666	6766	6101	5943	5669	5222	5501	5470	4097	6164	6062	6151	7383	6508
2003-04	6148	6412	5779	5621	5382	4895	5167	5090	3710	5803	6098	6162	7322	6407
2004-05	6096	6353	5733	5569	5288	4771	5032	4939	3561	5668	5973	6053	7224	6365
2005-06	6003	6281	5655	5484	5174	4416	4694	4569	3192	5348	5642	5719	6955	6100
2006-07	5700	5961	5398	5238	4922	4270	4539	4414	3047	5208	5515	5480	6863	6016
2007-08	5603	5868	5318	5153	4806	4141	4396	4269	2942	5118	5432	5396	6818	6004
2008-09	5277	5541	5003	4831	4454	4318	4576	4450	3090	4993	5196	5279	6709	6190
2009-10	5439	5705	5180	5007	4596	4485	4725	4578	3225	5148	5477	5561	6885	6137
2010-11	5405	5675	5164	4981	4537	4790	5034	4901	3554	5251	5590	5674	6799	6079
2011-12	5363	5630	5133	4947	4477	4717	4948	4815	3471	5183	5534	5616	6749	6050

- 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 10

TABLE F-1: 50-HOUR SUSTAINED PEAKING

BASE CASE: EXISTING FEDERAL CONTRACTS

FEDERAL SYSTEM FIRM 50-HOUR CAPACITY SURPLUS/DEFICIT

20 YEAR MONTHLY SUMMARY

ASSUMING EXISTING FEDERAL CONTRACTS AND

L O W L O A D S

1991 WHITEBOOK: 11/20/91
RUN DATE: 11/21/91

1930 WATER YEAR	JUL	AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN
PEAK IN MEGAWATTS														
1992-93	5996	6503	5749	5641	5244	6025	6425	6649	5231	6811	7233	7156	8034	6822
1993-94	6090	6552	5798	5690	5291	6069	6476	6701	5288	6868	7356	7412	8391	7080
1994-95	6267	6729	5976	5862	5472	6278	6697	6890	5474	7065	7508	7512	8564	7231
1995-96	6435	6885	6131	5951	5543	6188	6591	6738	5325	7008	7446	7453	8628	7297
1996-97	6856	7248	6491	6311	5908	6556	6976	7091	5677	7352	7664	7749	8916	7581
1997-98	7053	7495	6736	6558	6151	6534	6951	7093	5666	7323	7648	7736	8816	7747
1998-99	6961	7423	6664	6497	6113	6498	6913	7052	5641	7317	7508	7595	8672	7594
1999-00	6808	7253	6496	6314	5915	6303	6727	6859	5462	7137	7568	7655	8742	7667
2000-01	6877	7334	6574	6393	5997	6387	6814	6935	5534	7219	7663	7673	8843	7774
2001-02	7407	7855	7095	6910	6780	6602	7033	7113	5691	7637	7804	7812	8962	7883
2002-03	7408	7857	7099	6913	6776	6593	7022	7098	5678	7624	7444	7531	8686	7601
2003-04	7143	7577	6819	6648	6549	6349	6761	6792	5372	7325	7507	7595	8670	7546
2004-05	7140	7565	6810	6642	6509	6301	6699	6724	5308	7265	7460	7546	8623	7547
2005-06	7106	7552	6780	6608	6458	6108	6472	6498	5067	7069	7278	7352	8459	7380
2006-07	7004	7331	6615	6509	6327	6043	6403	6435	5011	7008	7225	7236	8426	7352
2007-08	6977	7298	6587	6481	6288	5997	6351	6378	4993	6995	7217	7232	8453	7391
2008-09	6715	7028	6322	6211	6018	6258	6621	6643	5219	6944	7047	7191	8412	7623
2009-10	6943	7248	6547	6438	6233	6497	6875	6861	5438	7172	7398	7512	8661	7616
2010-11	6978	7274	6579	6463	6274	6883	7270	7276	5856	7357	7586	7706	8650	7616
2011-12	6993	7281	6591	6478	6282	6832	7264	7273	5855	7360	7596	7722	8668	7630

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

SECTION VII
REGIONAL SYSTEM EXHIBITS

TABLE 1: PACIFIC NORTHWEST REGIONAL AREA

EXHIBIT 11

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												1991 WHITEBOOK:		11/20/91	
OPERATING YEAR												RUN DATE:		11/22/91	
MEGAWATTS		1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02				
		AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG				
LOADS															
1	SYSTEM FIRM LOADS	19627	19911	20015	20164	20359	20606	20861	21091	21334	21570				
2	SYSTEM TOTAL LOADS	20398	20704	20767	20895	21088	21335	21590	21821	22064	22300				
3	EXPORTS	796	851	875	860	870	888	989	1176	1173	1172				
4	FED DIVERSITY	0	0	0	0	0	0	0	0	0	0				
5	FIRM LOADS	20423	20762	20890	21024	21229	21494	21849	22267	22507	22742				
6	TOTAL LOADS	21194	21555	21642	21755	21958	22223	22579	22997	23237	23472				
RESOURCES															
7	MAIN HYDRO	11443	11441	11439	11436	11457	11458	11458	11459	11459	11455				
8	INDEPENDENT HYDRO	999	1008	1019	1018	1035	1035	1035	1036	1037	1032				
9	SUS. PKNG. ADJUSTMENT	0	0	0	0	0	0	0	0	0	0				
10	TOTAL HYDRO	12442	12449	12458	12454	12492	12493	12493	12495	12496	12487				
11	SMALL THERMAL & MISC	104	104	102	100	116	117	116	117	117	114				
12	COMBUSTION TURBINES	485	485	485	485	485	485	485	485	485	485				
13	RENEWABLES	42	42	42	42	42	42	42	42	42	43				
14	COGENERATION	50	50	50	50	50	50	50	50	50	50				
15	IMPORTS	1597	1634	1633	1510	1493	1484	1418	1420	1424	1343				
16	CENTRALIA	1158	1160	1157	1137	1133	1149	1158	1160	1157	1137				
17	IROJAN	717	705	705	705	705	705	705	705	705	705				
18	JIN BRIDGER	584	578	578	584	572	584	584	578	578	584				
19	COLSTRIP 1 & 2	343	343	339	336	366	368	366	367	368	361				
20	BOARDMAN	373	373	373	373	373	373	373	373	373	373				
21	VALMY	195	195	195	195	195	195	195	195	195	195				
22	COLSTRIP 3	457	457	454	452	472	474	472	473	473	469				
23	WNP 2	716	716	716	716	716	715	716	715	716	716				
24	COLSTRIP 4	560	560	560	560	560	560	560	560	560	560				
25	FED RESOURCE ACQUIS	0	0	0	0	0	0	0	0	0	0				
26	NON-UTILITY GENERATION	398	323	303	303	308	308	284	284	284	282				
27	TOTAL RESOURCES	20221	20174	20150	20002	20078	20102	20017	20019	20023	19904				
28	HYD. SM THRM & MISC RES	0	0	0	0	0	0	0	0	0	0				
29	LARGE THERMAL RESERVES	0	0	0	0	0	0	0	0	0	0				
30	BPA SPINNING RESERVES	0	0	0	0	0	0	0	0	0	0				
31	DSI RESERVES	0	0	0	0	0	0	0	0	0	0				
32	HYDRO MAINTENANCE	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11				
33	NET RESOURCES	20209	20163	20139	19991	20067	20091	20006	20008	20012	19893				
34	FIRM SURPLUS/DEFICIT	-214	-599	-750	-1033	-1162	-1403	-1844	-2259	-2495	-2849				
35	TOTAL SURPLUS/DEFICIT	-984	-1391	-1503	-1765	-1891	-2132	-2573	-2989	-3225	-3579				

EXHIBIT 11 (continued)

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										1991 WHITEBOOK: RUN DATE:		11/20/91 11/22/91	
		OPERATING YEAR													
		2002- AVG	2003- AVG	2004- AVG	2005- AVG	2006- AVG	2007- AVG	2008- AVG	2009- AVG	2010- AVG	2011- AVG				
LOADS															
1	SYSTEM FIRM LOADS	21832	22092	22385	22683	22965	23249	23553	23816	24145	24388				
2	SYSTEM TOTAL LOADS	22562	22822	23115	23413	23695	23979	24283	24546	24875	25118				
3	EXPORTS	1230	1411	1388	1366	1316	1269	1202	1021	832	798				
4	FED DIVERSITY	0	0	0	0	0	0	0	0	0	0				
5	FIRM LOADS	23062	23503	23772	24049	24281	24518	24755	24837	24977	25186				
6	TOTAL LOADS	23792	24233	24503	24779	25011	25248	25485	25567	25707	25916				
RESOURCES															
7	MAIN HYDRO	11455	11456	11457	11457	11458	11459	11460	11460	11461	11449				
8	INDEPENDENT HYDRO	1032	1034	1034	1035	1036	1036	1036	1038	1039	1027				
9	SUS. PKNG. ADJUSTMENT	0	0	0	0	0	0	0	0	0	0				
10	TOTAL HYDRO	12487	12490	12491	12492	12494	12495	12496	12498	12500	12476				
11	SMALL THERMAL & MISC	114	115	115	116	116	117	118	118	119	110				
12	COMBUSTION TURBINES	485	485	485	485	485	485	485	485	485	485				
13	RENEWABLES	43	43	43	43	43	43	43	43	43	43				
14	COGENERATION	50	50	32	14	14	14	14	14	14	14				
15	IMPORTS	1367	1359	1289	1292	1297	1187	1185	1178	1165	1142				
16	CENTRALIA	1133	1149	1158	1160	1157	1137	1133	1149	1158	1160				
17	TROJAN	705	705	705	705	705	705	705	705	705	705				
18	JIM BRIDGER	572	584	584	578	578	584	572	584	584	578				
19	COLSTRIP 1 & 2	362	363	364	365	366	367	368	370	371	353				
20	BOARDMAN	373	373	373	373	373	373	373	373	373	373				
21	VALMY	195	195	195	195	195	195	195	195	195	195				
22	COLSTRIP 3	469	470	471	472	472	473	474	475	475	463				
23	WHP 2	716	716	715	716	716	716	716	715	716	715				
24	COLSTRIP 4	560	560	560	560	560	560	560	560	560	560				
25	FED RESOURCE ACQUIS	0	0	0	0	0	0	0	0	0	0				
26	NON-UTILITY GENERATION	227	226	226	222	214	210	211	210	206	190				
27	TOTAL RESOURCES	19858	19883	19806	19788	19785	19661	19648	19672	19669	19562				
28	HYD-SM THRM & MISC RES	0	0	0	0	0	0	0	0	0	0				
29	LARGE THERMAL RESERVES	0	0	0	0	0	0	0	0	0	0				
30	BPA SPINNING RESERVES	0	0	0	0	0	0	0	0	0	0				
31	DSI RESERVES	0	0	0	0	0	0	0	0	0	0				
32	HYDRO MAINTENANCE	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11				
33	NET RESOURCES	19847	19872	19795	19777	19774	19650	19637	19661	19658	19551				
34	FIRM SURPLUS/DEFICIT	-3215	-3631	-3978	-4272	-4507	-4868	-5118	-5176	-5319	-5635				
35	TOTAL SURPLUS/DEFICIT	-3945	-4361	-4708	-5002	-5237	-5598	-5848	-5906	-6049	-6365				

TABLE 1: PACIFIC NORTHWEST REGIONAL AREA

EXHIBIT 12

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

MEGAWATTS		H I G H L O A D S										1991 WHITEBOOK:		11/20/91	
		OPERATING YEAR										RUN DATE:		11/22/91	
		1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02				
		AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG				
LOADS															
1	SYSTEM FIRM LOADS	21144	21678	22277	22859	23402	23942	24459	24987	25544	26017				
2	SYSTEM TOTAL LOADS	21991	22525	23123	23706	24249	24789	25306	25834	26391	26838				
3	EXPORTS	796	851	875	860	870	888	989	1176	1173	1172				
4	FED DIVERSITY	0	0	0	0	0	0	0	0	0	0				
5	FIRM LOADS	21940	22529	23152	23719	24272	24830	25448	26163	26717	27189				
6	TOTAL LOADS	22786	23376	23998	24565	25119	25677	26294	27010	27564	28010				
RESOURCES															
7	MAIN HYDRO	11446	11447	11446	11445	11466	11468	11469	11471	11472	11469				
8	INDEPENDENT HYDRO	1004	1013	1026	1026	1043	1046	1046	1048	1048	1046				
9	SUS. PKNG. ADJUSTMENT	0	0	0	0	0	0	0	0	0	0				
10	TOTAL HYDRO	12450	12460	12472	12471	12509	12514	12515	12519	12520	12515				
11	SMALL THERMAL & MISC	107	108	107	107	123	125	125	126	128	125				
12	COMBUSTION TURBINES	485	485	485	485	485	485	485	485	485	485				
13	RENEWABLES	42	42	42	42	42	42	42	42	42	42				
14	COGENERATION	50	50	50	50	50	50	50	50	50	50				
15	IMPORTS	1625	1668	1674	1558	1548	1545	1483	1491	1501	1424				
16	CENTRALIA	1158	1160	1157	1137	1133	1149	1158	1160	1157	1137				
17	TROJAN	717	705	705	705	705	705	705	705	705	705				
18	JIM BRIDGER	584	578	578	584	572	584	584	578	578	584				
19	COLSTRIP 1 & 2	351	352	350	349	381	384	383	385	388	383				
20	BOARDMAN	373	373	373	373	373	373	373	373	373	373				
21	VALMY	195	195	195	195	195	195	195	195	195	195				
22	COLSTRIP 3	462	463	461	461	482	484	484	486	487	484				
23	WNP 2	715	716	716	716	716	716	715	716	716	715				
24	COLSTRIP 4	560	560	560	560	560	560	560	560	560	560				
25	FED RESOURCE ACQUIS	0	0	0	0	0	0	0	0	0	0				
26	NON-UTILITY GENERATION	399	324	305	305	310	310	287	287	287	285				
27	TOTAL RESOURCES	20273	20239	20230	20098	20184	20221	20144	20158	20172	20063				
28	HYD-SM THRM & MISC RES	0	0	0	0	0	0	0	0	0	0				
29	LARGE THERMAL RESERVES	0	0	0	0	0	0	0	0	0	0				
30	BPA SPINNING RESERVES	0	0	0	0	0	0	0	0	0	0				
31	DSI RESERVES	0	0	0	0	0	0	0	0	0	0				
32	HYDRO MAINTENANCE	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11				
33	NET RESOURCES	20262	20228	20219	20086	20172	20210	20133	20147	20161	20052				
34	FIRM SURPLUS/DEFICIT	-1678	-2301	-2932	-3632	-4100	-4621	-5315	-6017	-6557	-7137				
35	TOTAL SURPLUS/DEFICIT	-2524	-3147	-3779	-4479	-4946	-5467	-6162	-6863	-7403	-7958				

EXHIBIT 12 (continued)

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											1991 WHITEBOOK:		11/20/91	
		OPERATING YEAR											RUN DATE:		11/22/91	
		2002- AVG	2003- AVG	2004- AVG	2005- AVG	2006- AVG	2007- AVG	2008- AVG	2009- AVG	2010- AVG	2011- AVG	2012- AVG				
MEGAWATTS																
LOADS																
1/	SYSTEM FIRM LOADS	26570	27142	27799	28460	29092	29719	30381	31018	31758	32395					
2/	SYSTEM TOTAL LOADS	27391	27962	28619	29281	29913	30540	31202	31839	32579	33216					
3/	EXPORTS	1230	1411	1388	1366	1316	1269	1202	1021	832	798					
4/	FED DIVERSITY	0	0	0	0	0	0	0	0	0	0					
5	FIRM LOADS	27800	28552	29186	29826	30408	30988	31583	32039	32590	33193					
6	TOTAL LOADS	28621	29373	30007	30647	31229	31808	32404	32860	33411	34014					
RESOURCES																
7	MAIN HYDRO	11471	11472	11474	11476	11478	11480	11482	11484	11486	11475					
8	INDEPENDENT HYDRO	1048	1048	1051	1052	1054	1055	1057	1059	1061	1051					
9	SUS. PKNG. ADJUSTMENT	0	0	0	0	0	0	0	0	0	0					
10	TOTAL HYDRO	12519	12520	12525	12528	12532	12535	12539	12543	12547	12526					
11	SMALL THERMAL & MISC	126	128	129	131	132	134	135	137	138	130					
12	COMBUSTION TURBINES	485	485	485	485	485	485	485	485	485	485					
13	RENEWABLES	43	43	43	43	43	43	43	43	43	43					
14	COGENERATION	50	50	32	14	14	14	14	14	14	14					
15	IMPORTS	1453	1450	1385	1395	1405	1299	1303	1301	1294	1279					
16	CENTRALIA	1133	1149	1158	1160	1157	1137	1133	1149	1158	1160					
17	IRQUAN	705	705	705	705	705	705	705	705	705	705					
18	JIM BRIDGER	572	584	584	578	578	584	572	584	584	578					
19	COLSTRIP 1 & 2	385	388	391	393	397	399	402	405	408	392					
20	BOARDMAN	373	373	373	373	373	373	373	373	373	373					
21	VALMY	195	195	195	195	195	195	195	195	195	195					
22	COLSTRIP 3	485	487	489	491	493	495	497	499	501	490					
23	WRP 2	716	715	715	716	715	716	716	715	716	715					
24	COLSTRIP 4	560	560	560	560	560	560	560	560	560	560					
25	FED RESOURCE ACQUIS	0	0	0	0	0	0	0	0	0	0					
26	NON-UTILITY GENERATION	231	230	230	226	219	215	216	216	212	196					
27	TOTAL RESOURCES	20031	20062	19999	19993	20003	19889	19888	19924	19933	19841					
28	HYD. SM THERM & MISC RES	0	0	0	0	0	0	0	0	0	0					
29	LARGE THERMAL RESERVES	0	0	0	0	0	0	0	0	0	0					
30	P1A SPINNING RESERVES	0	0	0	0	0	0	0	0	0	0					
31	DGI RESERVES	0	0	0	0	0	0	0	0	0	0					
32	HYDRO MAINTENANCE	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11					
33	NET RESOURCES	20020	20051	19988	19982	19992	19878	19877	19913	19922	19830					
34	FIRM SURPLUS/DEFICIT	-7780	-8502	-9199	-9844	-10416	-11110	-11706	-12126	-12668	-13363					
35	TOTAL SURPLUS/DEFICIT	-8601	-9323	-10020	-10665	-11237	-11931	-12527	-12947	-13489	-14184					

EXHIBIT 13

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										1991 WHITEBOOK: RUN DATE:		11/20/91 11/22/91	
		OPERATING YEAR													
		1992-93 AVG	1993-94 AVG	1994-95 AVG	1995-96 AVG	1996-97 AVG	1997-98 AVG	1998-99 AVG	1999-00 AVG	2000-01 AVG	2001-02 AVG				
MEGAWATTS															
LOADS															
1	SYSTEM FIRM LOADS	20117	20447	20782	21133	21465	21830	22188	22511	22850	23153				
2	SYSTEM TOTAL LOADS	20928	21258	21584	21931	22264	22629	22988	23311	23650	23940				
3	EXPORTS	796	851	875	860	870	888	989	1176	1173	1172				
4	FED DIVERSITY	0	0	0	0	0	0	0	0	0	0				
5	FIRM LOADS	20913	21298	21657	21992	22335	22718	23177	23697	24023	24325				
6	TOTAL LOADS	21724	22109	22459	22791	23134	23517	23977	24427	24822	25112				
RESOURCES															
7	MAIN HYDRO	11444	11444	11441	11439	11460	11461	11462	11462	11463	11459				
8	INDEPENDENT HYDRO	1001	1010	1021	1020	1038	1040	1039	1039	1040	1036				
9	SUS. PKNG. ADJUSTMENT	0	0	0	0	0	0	0	0	0	0				
10	TOTAL HYDRO	12445	12454	12462	12459	12498	12501	12501	12501	12503	12495				
11	SMALL THERMAL & MISC	105	105	103	102	118	119	119	120	121	117				
12	COMBUSTION TURBINES	485	485	485	485	485	485	485	485	485	485				
13	RENEWABLES	42	42	42	42	42	42	42	42	42	43				
14	COGENERATION	50	50	50	50	50	50	50	50	50	50				
15	IMPORTS	1606	1644	1645	1525	1511	1504	1439	1444	1449	1369				
16	CENTRALIA	1158	1160	1157	1137	1133	1149	1158	1160	1157	1137				
17	TROJAN	717	705	705	705	705	705	705	705	705	705				
18	JIM BRIDGER	584	578	578	584	572	584	584	578	578	584				
19	COLSTRIP 1 & 2	345	346	343	340	371	373	372	373	374	368				
20	BOARDMAN	373	373	373	373	373	373	373	373	373	373				
21	VALMY	195	195	195	195	195	195	195	195	195	195				
22	COLSTRIP 3	459	459	456	455	475	477	476	477	478	474				
23	WHP 2	715	715	715	716	716	716	715	716	716	715				
24	COLSTRIP 4	560	560	560	560	560	560	560	560	560	560				
25	FED RESOURCE ACQUIS	0	0	0	0	0	0	0	0	0	0				
26	NON-UTILITY GENERATION	398	323	304	304	308	309	285	285	285	283				
27	TOTAL RESOURCES	20237	20194	20173	20032	20112	20142	20059	20064	20071	19953				
28	HYD, SM THRM & MISC RES	0	0	0	0	0	0	0	0	0	0				
29	LARGE THERMAL RESERVES	0	0	0	0	0	0	0	0	0	0				
30	BPA SPINNING RESERVES	0	0	0	0	0	0	0	0	0	0				
31	DSI RESERVES	0	0	0	0	0	0	0	0	0	0				
32	HYDRO MAINTENANCE	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11				
33	NET RESOURCES	20225	20182	20162	20020	20101	20131	20048	20053	20060	19942				
34	FIRM SURPLUS/DEFICIT	-688	-1116	-1495	-1972	-2234	-2587	-3129	-3635	-3963	-4384				
35	TOTAL SURPLUS/DEFICIT	-1499	-1927	-2297	-2771	-3033	-3387	-3929	-4434	-4763	-5170				

EXHIBIT 13 (continued)

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										1991 WHITEBOOK:		11/20/91	
		OPERATING YEAR										RUN DATE:		11/22/91	
		2002-3	2003-4	2004-5	2005-6	2006-7	2007-8	2008-9	2009-10	2010-11	2011-12				
		AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG				
MEGAWATTS															
LOADS															
1/	SYSTEM FIRM LOADS	23526	23915	24346	24785	25201	25603	26052	26476	26966	27357				
2/	SYSTEM TOTAL LOADS	24313	24701	25133	25572	25988	26390	26840	27263	27753	28144				
3/	EXPORTS	1230	1411	1388	1366	1316	1269	1202	1021	832	798				
4/	FED DIVERSITY	0	0	0	0	0	0	0	0	0	0				
5	FIRM LOADS	24756	25326	25734	26151	26517	26872	27254	27497	27798	28155				
6	TOTAL LOADS	25543	26112	26521	26938	27304	27659	28041	28284	28585	28942				
RESOURCES															
7	MAIN HYDRO	11460	11461	11463	11464	11465	11466	11467	11469	11470	11459				
8	INDEPENDENT HYDRO	1037	1039	1039	1041	1042	1043	1044	1045	1047	1035				
9	SUS. PKWG. ADJUSTMENT	0	0	0	0	0	0	0	0	0	0				
10	TOTAL HYDRO	12497	12500	12502	12505	12507	12509	12511	12514	12517	12494				
11	SMALL THERMAL & MISC	118	119	120	121	122	123	124	125	126	117				
12	COMBUSTION TURBINES	485	485	485	485	485	485	485	485	485	485				
13	RENEWABLES	43	43	43	43	43	43	43	43	43	43				
14	COGENERATION	50	50	32	14	14	14	14	14	14	14				
15	IMPORTS	1395	1389	1321	1328	1335	1226	1227	1223	1212	1193				
16	CENTRALIA	1133	1149	1158	1160	1157	1137	1133	1149	1158	1160				
17	TROJAN	705	705	705	705	705	705	705	705	705	705				
18	JIM BRIDGER	572	584	584	578	578	584	572	584	584	578				
19	COLSTRIP 1 & 2	369	371	373	375	377	379	380	382	384	367				
20	BOARDMAN	373	373	373	373	373	373	373	373	373	373				
21	VALMY	195	195	195	195	195	195	195	195	195	195				
22	COLSTRIP 3	475	476	477	478	480	481	482	483	485	473				
23	WHP 2	716	716	716	716	715	715	716	716	716	715				
24	COLSTRIP 4	560	560	560	560	560	560	560	560	560	560				
25	FED RESOURCE ACQUIS	0	0	0	0	0	0	0	0	0	0				
26	NON-UTILITY GENERATION	228	227	227	223	215	212	212	212	209	192				
27	TOTAL RESOURCES	19914	19942	19871	19859	19861	19741	19732	19763	19766	19664				
28	HYD-SM THRM & MISC RES	0	0	0	0	0	0	0	0	0	0				
29	LARGE THERMAL RESERVES	0	0	0	0	0	0	0	0	0	0				
30	BPA SPINNING RESERVES	0	0	0	0	0	0	0	0	0	0				
31	DGI RESERVES	0	0	0	0	0	0	0	0	0	0				
32	HYDRO MAINTENANCE	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11				
33	NET RESOURCES	19903	19931	19860	19848	19850	19730	19721	19752	19755	19653				
34	FIRM SURPLUS/DEFICIT	-4853	-5395	-5874	-6303	-6667	-7142	-7534	-7745	-8043	-8502				
35	TOTAL SURPLUS/DEFICIT	-5640	-6182	-6661	-7090	-7454	-7930	-8321	-8532	-8830	-9289				

TABLE 1: PACIFIC NORTHWEST REGIONAL AREA

EXHIBIT 14

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													1991 WHITEBOOK: RUN DATE:		11/20/91 11/22/91		
MEGAWATTS		OPERATING YEAR										1999- 0		2000- 1		2001- 2	
		1992-93 AVG	1993-94 AVG	1994-95 AVG	1995-96 AVG	1996-97 AVG	1997-98 AVG	1998-99 AVG	1999- 0 AVG	2000- 1 AVG	2001- 2 AVG						
LOADS		1/ 2/ 3/ 4/ 5 6	18455 19118 796 0 19251 19914	18397 19010 851 0 19248 19861	18358 18916 875 0 19233 19791	18440 18980 860 0 19300 19840	18567 19108 870 0 19437 19978	18717 19258 888 0 19605 20146	18856 19397 989 0 19845 20386	18975 19516 1176 0 20151 20692	19118 19659 1173 0 20291 20832	19261 19802 1172 0 20432 20973					
RESOURCES		7/ 8/ 9/ 10/ 11/ 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26	11439 997 0 12436 101 485 42 50 1579 1158 717 584 339 373 195 454 715 560 0 397	11438 1004 0 12442 101 485 42 50 1613 1160 705 578 337 373 195 453 716 560 0 322	11434 1015 0 12449 98 485 42 50 1609 1157 705 578 333 373 195 450 715 560 0 302	11432 1013 0 12445 96 485 42 50 1484 1137 705 584 330 373 195 447 716 560 0 302	11452 1030 0 12482 112 485 42 50 1466 1133 705 572 359 373 195 467 716 560 0 306	11453 1031 0 12484 113 485 42 50 1455 1149 705 584 360 373 195 468 560 0 307	11453 1030 0 12483 112 485 42 50 1386 1158 705 584 357 373 195 467 716 560 0 283	11453 1030 0 12483 112 485 42 50 1386 1160 705 578 358 373 195 467 715 560 0 283	11453 1030 0 12483 112 485 42 50 1389 1157 705 578 358 373 195 467 716 560 0 282	11448 1026 0 12474 109 485 43 50 1305 1137 705 584 351 373 195 462 716 560 0 280					
TOTAL RESOURCES		27	20185	20132	20101	19951	20023	20046	19956	19952	19952	19829					
HYD-SM THRM & MISC RES		14/ 15/ 16/ 17/ 18/ 22	0 0 0 0 -11	0 0 0 0 -11	0 0 0 -11	0 0 0 -11	0 0 0 -11	0 0 0 -11	0 0 0 -11	0 0 0 -11	0 0 0 -11	0 0 0 -11					
NET RESOURCES		33	20174	20120	20090	19940	20012	20035	19945	19941	19941	19818					
FIRM SURPLUS/DEFICIT		34	922	873	858	640	575	429	99	-210	-350	-615					
TOTAL SURPLUS/DEFICIT		35	260	259	299	100	34	-112	-441	-751	-891	-1156					

EXHIBIT 14 (continued)

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										1991 WHITEBOOK:	
		OPERATING YEAR										RUN DATE:	
		2002-3	2003-4	2004-5	2005-6	2006-7	2007-8	2008-9	2009-10	2010-11	2011-12		
		AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG		
MEGAWATTS													
LOADS													
1/	SYSTEM FIRM LOADS	19420	19602	19834	20076	20311	20543	20791	21025	21305	21484		
2/	SYSTEM TOTAL LOADS	19961	20143	20375	20617	20852	21084	21332	21566	21846	22025		
3/	EXPORTS	1230	1411	1388	1366	1316	1269	1202	1021	832	798		
4/	FED DIVERSITY	0	0	0	0	0	0	0	0	0	0		
5	FIRM LOADS	20650	21013	21222	21441	21626	21812	21993	22046	22137	22282		
6	TOTAL LOADS	21191	21554	21763	21983	22168	22353	22534	22587	22678	22823		
RESOURCES													
7	MAIN HYDRO	11448	11449	11449	11450	11450	11451	11452	11452	11453	11441		
8	INDEPENDENT HYDRO	1027	1027	1028	1028	1028	1029	1029	1030	1030	1019		
9	SUS. PKNG. ADJUSTMENT	0	0	0	0	0	0	0	0	0	0		
10	TOTAL HYDRO	12475	12476	12477	12478	12478	12480	12481	12482	12483	12460		
11	SMALL THERMAL & MISC	109	109	110	110	110	111	111	112	112	103		
12	COMBUSTION TURBINES	485	485	485	485	485	485	485	485	485	485		
13	RENEWABLES	43	43	43	43	43	43	43	43	43	43		
14	COGENERATION	50	50	32	14	14	14	14	14	14	14		
15	IMPORTS	1328	1319	1248	1251	1255	1144	1142	1135	1122	1098		
16	CENTRALIA	1133	1149	1158	1160	1157	1137	1133	1149	1158	1160		
17	TROJAN	705	705	705	705	705	705	705	705	705	705		
18	JIM FRIDGER	572	584	584	578	578	584	572	584	584	578		
19	COLSTRIP 1 & 2	351	352	353	354	354	355	356	357	358	340		
20	BOARDMAN	373	373	373	373	373	373	373	373	373	373		
21	VALMY	195	195	195	195	195	195	195	195	195	195		
22	COLSTRIP 3	462	463	463	464	465	465	466	466	467	454		
23	WNP 2	716	715	716	715	715	716	716	716	716	715		
24	COLSTRIP 4	560	560	560	560	560	560	560	560	560	560		
25	FED RESOURCE ACQUIS	0	0	0	0	0	0	0	0	0	0		
26	NON-UTILITY GENERATION	225	224	224	220	212	208	208	208	204	188		
27	TOTAL RESOURCES	19782	19802	19726	19705	19699	19575	19560	19584	19579	19471		
28	HYD.SM THRM & MISC RES	0	0	0	0	0	0	0	0	0	0		
29	LARGE THERMAL RESERVES	0	0	0	0	0	0	0	0	0	0		
30	BPA SPINNING RESERVES	0	0	0	0	0	0	0	0	0	0		
31	DSI RESERVES	0	0	0	0	0	0	0	0	0	0		
32	HYDRO MAINTENANCE	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11		
33	NET RESOURCES	19771	19791	19715	19694	19688	19564	19549	19573	19568	19460		
34	FIRM SURPLUS/DEFICIT	-879	-1222	-1507	-1748	-1939	-2248	-2444	-2473	-2569	-2821		
35	TOTAL SURPLUS/DEFICIT	-1420	-1763	-2048	-2289	-2480	-2789	-2985	-3014	-3110	-3363		

TABLE 1: PACIFIC NORTHWEST REGIONAL AREA

EXHIBIT 15

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

		L O W L O A D S										1991 WHITEBOOK: RUN DATE:		11/20/91 11/22/91	
		OPERATING YEAR										1999- 0		2000- 1	
MEGAWATTS		1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999- 0	2000- 1	2001- 2	AVG		AVG	
		AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG				
LOADS															
1	SYSTEM FIRM LOADS	1/	17598	17313	17025	16955	16953	16978	16988	16937	16721	16514			
2	SYSTEM TOTAL LOADS	2/	18178	17819	17438	17340	17338	17363	17373	17311	17018	16736			
3	EXPORTS	3/	796	851	875	860	870	888	989	1176	1173	1172			
4	FED DIVERSITY	4/	0	0	0	0	0	0	0	0	0	0			
5	FIRM LOADS		18394	18164	17900	17815	17823	17866	17977	18113	17894	17686			
6	TOTAL LOADS		18974	18670	18313	18200	18208	18251	18362	18486	18191	17908			
RESOURCES															
7	MAIN HYDRO	5/	11437	11436	11431	11429	11448	11449	11448	11448	11448	11442			
8	INDEPENDENT HYDRO	5/	994	1002	1012	1010	1027	1027	1026	1025	1025	1020			
9	SUS. PKNG. ADJUSTMENT	6/	0	0	0	0	0	0	0	0	0	0			
10	TOTAL HYDRO		12431	12438	12443	12439	12475	12476	12474	12473	12473	12462			
11	SMALL THERMAL & MISC	7/	100	99	96	94	109	110	108	108	108	104			
12	COMBUSTION TURBINES	8/	485	485	485	485	485	485	485	485	485	485			
13	RENEWABLES	9/	42	42	42	42	42	42	42	42	42	43			
14	COGENERATION	10/	50	50	50	50	50	50	50	50	50	50			
15	IMPORTS	11/	1567	1598	1592	1465	1444	1431	1360	1358	1358	1273			
16	CENTRALIA		1158	1160	1157	1137	1133	1149	1158	1160	1157	1137			
17	TROJAN		717	705	705	705	705	705	705	705	705	705			
18	JIM BRIDGER		584	578	578	584	572	584	584	578	578	584			
19	COLSTRIP 1 & 2		335	333	328	324	353	354	351	350	350	342			
20	BOARDMAN		373	373	373	373	373	373	373	373	373	373			
21	VALMY		195	195	195	195	195	195	195	195	195	195			
22	COLSTRIP 3		452	450	447	444	464	464	462	462	462	456			
23	WHP 2		715	716	716	716	716	715	715	716	715	716			
24	COLSTRIP 4		560	560	560	560	560	560	560	560	560	560			
25	FED RESOURCE ACQUIS	12/	0	0	0	0	0	0	0	0	0	0			
26	NON-UTILITY GENERATION	13/	396	321	301	301	306	305	282	281	281	279			
27	TOTAL RESOURCES		20160	20103	20068	19914	19982	19998	19904	19896	19892	19764			
28	HYD,SM THRM & MISC RES	14/	0	0	0	0	0	0	0	0	0	0			
29	LARGE THERMAL RESERVES	15/	0	0	0	0	0	0	0	0	0	0			
30	BPA SPINNING RESERVES	16/	0	0	0	0	0	0	0	0	0	0			
31	DSI RESERVES	17/	0	0	0	0	0	0	0	0	0	0			
22	HYDRO MAINTENANCE	18/	-11	-11	-11	-11	-11	-11	-11	-11	-11	-11			
33	NET RESOURCES		20149	20092	20057	19903	19971	19987	19893	19885	19881	19753			
34	FIRM SURPLUS/DEFICIT		1755	1927	2157	2088	2148	2120	1915	1772	1987	2067			
35	TOTAL SURPLUS/DEFICIT		1175	1422	1745	1703	1763	1736	1531	1398	1690	1845			

EXHIBIT 15 (continued)

TABLE 1: PACIFIC NORTHWEST REGIONAL AREA

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

		L O W L O A D S										1991 WHITEBOOK:	
		OPERATING YEAR										RUN DATE:	
		2002-	2003-	2004-	2005-	2006-	2007-	2008-	2009-	2010-	2011-	2010-11	2011-12
		AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG
MEGAWATTS													
LOADS													
1/	SYSTEM FIRM LOADS	16548	16596	16679	16766	16848	16921	17018	17110	17232	17263		
2/	SYSTEM TOTAL LOADS	16770	16818	16900	16988	17070	17142	17240	17331	17454	17484		
3/	EXPORTS	1230	1411	1388	1366	1316	1269	1202	1021	832	798		
4/	FED DIVERSITY	0	0	0	0	0	0	0	0	0	0		
5	FIRM LOADS	17778	18007	18066	18132	18164	18190	18220	18131	18064	18061		
6	TOTAL LOADS	18000	18229	18288	18354	18386	18411	18442	18352	18285	18282		
RESOURCES													
7	MAIN HYDRO	11442	11442	11442	11442	11442	11442	11442	11442	11443	11430		
8	INDEPENDENT HYDRO	1020	1020	1020	1020	1020	1020	1020	1020	1021	1009		
9	SUS. PRNG. ADJUSTMENT	0	0	0	0	0	0	0	0	0	0		
10	TOTAL HYDRO	12462	12462	12462	12462	12462	12462	12462	12462	12464	12439		
11	SMALL THERMAL & MISC	104	104	104	104	104	104	104	104	104	95		
12	CONSUMPTION TURBINES	485	485	485	485	485	485	485	485	485	485		
13	RENEWABLES	43	43	43	43	43	43	43	43	43	43		
14	COGENERATION	50	50	32	14	14	14	14	14	14	14		
15	IMPORTS	1293	1282	1208	1209	1211	1097	1093	1084	1068	1041		
16	CENTRALIA	1133	1149	1158	1160	1157	1137	1133	1149	1158	1160		
17	LEOJAN	705	705	705	705	705	705	705	705	705	705		
18	JIM BRIDGER	572	584	584	578	578	584	572	584	584	578		
19	COLSTRIP 1 & 2	342	342	342	342	342	342	342	342	343	323		
20	BOARDMAN	373	373	373	373	373	373	373	373	373	373		
21	VALLEY	195	195	195	195	195	195	195	195	195	195		
22	COLSTRIP 3	456	456	456	456	456	456	456	456	456	443		
23	WHP 2	716	715	715	716	716	716	716	716	715	716		
24	COLSTRIP 4	560	560	560	560	560	560	560	560	560	560		
25	FED RESOURCE ACQUIS	0	0	0	0	0	0	0	0	0	0		
26	NON-UTILITY GENERATION	224	222	222	218	210	206	206	206	202	185		
27	TOTAL RESOURCES	19713	19727	19644	19620	19611	19479	19459	19478	19469	19355		
28	HYD SM THERM & MISC RES	14/	0	0	0	0	0	0	0	0	0		
29	LARGE THERMAL RESERVES	15/	0	0	0	0	0	0	0	0	0		
30	FAST SPINNING RESERVES	16/	0	0	0	0	0	0	0	0	0		
31	NET RESERVES	17/	0	0	0	0	0	0	0	0	0		
32	HYDRO MAINTENANCE	18/	-11	-11	-11	-11	-11	-11	-11	-11	-11		
33	NET RESOURCES		19702	19716	19633	19609	19468	19448	19467	19458	19344		
34	FIRM SURPLUS/DEFICIT		1924	1709	1567	1477	1278	1228	1336	1394	1284		
35	TOTAL SURPLUS/DEFICIT		1702	1487	1345	1255	1057	1006	1115	1173	1062		

REGIONAL FOOTNOTES

For Exhibits 11 through 15

- 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.
- 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 contracts for BPA's 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 capacity sale on November 1, 2009; BPA's capacity sales to 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; Montana Power's power sale to the Los Angeles Department of Water and Power; Pacific Power and Light's transfer to its Northern California load and its contracts with Pacific Gas and Electric, Southern California Edison, Sacramento Municipal Utility District, and Utah Power Company; Portland General Electric's contracts with City of Burbank, City of Glendale, Southern California Edison, and Western Area Power Administration (WAPA); Puget Sound Power and Light's contract purchased Pacific Gas and Electric; Seattle City Light's contract with Pacific Gas and Electric; Tacoma City Light's contract with WAPA; and Washington Water Power's contract with Pacific Gas and Electric.

Also included in exports are resources purchased by utilities outside the region. These include the WAPA's purchase of Longview Fibre and of San Diego Gas and Electric's purchase of 14.2 percent of Boardman.
- 4/ Federal diversity is a percentage reduction applied to the Federal system non-coincidental peak utility allocation requirements. This is due to the fact that all peaking electrical loads do not occur simultaneously throughout the region.
- 5/ Hydro resources are the sum of all utilities' regulated and independent hydro projects for Pacific Northwest regional utilities, except for Utah Power Company.
- 6/ 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, and forced outage reserves.

- 7/ Small thermal and miscellaneous resources include Bonners Ferry's Diesel No. 1, Diesel No. 2, and No Name; City of Idaho Falls' Diesel; Tacoma Public Utilities Steam Plant 2; Idaho Power's Energy Management System; Portland General Electric's Summit plants; 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.
- 8/ Combustion turbines include Idaho'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.
- 9/ Renewables include Emerald County PUD's Short Mountain; and Washington Water Power's Kettle Falls.
- 10/ Cogeneration includes Eugene Water and Electric Board's WEYCO Energy Center and Willamette Steam Plant.

Longview Fibre is sold outside the region to WAPA.

- 11/ Imports include exchange energy to BPA from M-S-R Public Power Agency after the surplus firm sale converts to a capacity/energy exchange beginning November 1, 2009; Anaheim and Riverside exchange energy to BPA; the cities of Burbank and Glendale contracts with Portland General Electric; Southern California Edison's contracts with Pacific Power and Light, Portland General Electric; Pacific Power and Light's transfers from Pacific Power and Light's Wyoming Division; BC Hydro and Pacific Gas and Electric's contracts with Puget Sound Power and Light; BC Hydro and Pacific Gas and Electric's contracts with Seattle City Light; Utah Power Company's intra-company transfer; and Pacific Gas and Electric's contract with Washington Water Power.
- 12/ Resource acquisitions are resources which BPA identified for future purchase. When these resources are not yet contracted for or on-line, they are not in this loads and resources balance.
- 13/ Non-Utility Generation are resources provided to utilities by independent power producers and may be included under the Public Utility Regulatory Policies Act (PURPA).
- 14/ 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.
- 15/ 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.
- 16/ Federal spinning reserves equal the reserve generating capacity maintained to provide a regulating margin for the automatic generation and frequency control of power generation.

- 17/ Direct service industry reserve requirements are estimated at two-thirds 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.
- 18/ Hydro maintenance is the sum of individual Federal system, public agencies, and IOUs hydro maintenance, based on the average of the 1983-84 through 1988-89 schedules submitted to the Northwest Power Pool.

EXHIBIT 16

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

REGIONAL FIRM 50-HOUR CAPACITY SURPLUS/DEFICIT

20 YEAR MONTHLY SUMMARY

ASSUMING EXISTING REGIONAL CONTRACTS AND
NO RESOURCE ACQUISITIONS

M E D I U M L O A D S

1991 WHITEBOOK: 11/20/91
RUN DATE: 11/21/91

1930 WATER YEAR	JUL	AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN
PEAK IN MEGAWATTS														
1992-93	7371	7511	7112	6822	6072	7216	6919	6469	5083	6215	5913	5165	7303	7414
1993-94	6704	6866	6466	6447	5699	6926	6611	6025	4674	5709	5355	4606	6429	6803
1994-95	6256	6432	6028	5790	5430	6382	6408	5724	4438	5844	5311	4023	6753	6714
1995-96	6191	6343	5936	5549	5070	5877	6081	5353	4104	5335	5031	3739	6185	6454
1996-97	5925	6051	5639	5555	4835	6151	5824	5073	3813	4994	4034	3376	6119	6108
1997-98	5857	6002	5588	5271	4887	5762	5414	4693	3421	4861	3954	3194	5615	5880
1998-99	5251	5455	5038	4753	4202	4774	4933	4088	2840	4161	3182	2420	4760	5205
1999-00	4591	4781	4358	4327	3550	4090	4022	3191	1998	3248	2994	2227	4052	4879
2000-01	4290	4460	4033	3778	3174	3671	3564	2829	1602	3193	2694	1398	4205	4617
2001-02	4129	4298	3869	3520	2782	3226	3302	2488	1271	2675	2316	1123	3652	4377
2002-03	3695	3883	3452	3415	2361	3276	2818	1998	797	2146	748	-16	3023	3469
2003-04	2874	3069	2633	2401	1670	2415	1930	1039	-123	1489	1025	260	2679	3089
2004-05	2556	2750	2311	1998	1060	1477	1457	525	-640	840	703	-64	2289	2767
2005-06	2190	2386	1948	1903	850	1246	992	55	-1096	353	314	-447	1490	2427
2006-07	1887	2061	1613	1343	581	3867	596	-333	-1463	294	-84	-1274	1663	2249
2007-08	1682	1886	1435	1110	27	188	40	-1209	-2265	-296	-569	-1863	1045	2253
2008-09	1658	1852	1399	1352	-324	-51	-723	-1657	-2758	-802	-1384	-2148	976	2176
2009-10	1613	1809	1356	1115	-298	-39	-756	-1677	-2766	-496	-691	-1454	1062	2245
2010-11	1878	2075	1621	1377	-310	-540	-1278	-2408	-3472	-921	-1083	-1843	738	2101
2011-12	1770	1971	1517	1267	-579	-984	-1747	-3068	-4118	-1519	-1517	-2177	342	1720

EXHIBIT 17

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

REGIONAL FIRM 50-HOUR CAPACITY SURPLUS/DEFICIT

20 YEAR MONTHLY SUMMARY

ASSUMING EXISTING REGIONAL CONTRACTS AND
NO RESOURCE ACQUISITIONS

H I G H L O A D S

1991 WHITEBOOK: 11/20/91
RUN DATE: 11/21/91

1930 WATER YEAR

PEAK IN MEGAWATTS

	JUL	AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN
1992-93	5800	5969	5565	5262	4335	5299	4841	3835	2641	4065	3891	3137	5417	5656
1993-94	4959	5151	4742	4709	3721	4698	4167	2893	1732	3078	2893	2130	4134	4663
1994-95	4051	4263	3845	3592	2917	3543	3289	1907	773	2485	2140	842	3740	3875
1995-96	3378	3562	3136	2718	1919	2408	2323	981	-92	1495	1401	105	2736	3205
1996-97	2710	2871	2437	2329	1253	2200	1555	154	-914	677	-55	-717	2239	2450
1997-98	2248	2425	1986	1635	855	1308	604	-594	-1662	214	-447	-1213	1443	1943
1998-99	1373	1613	1169	854	-123	-11	-233	-1664	-2689	-883	-1585	-2352	254	959
1999-00	409	629	177	121	-1146	-1102	-1587	-3046	-3993	-2218	-2168	-2934	-820	271
2000-01	-241	-42	-496	-788	-1924	-1977	-2535	-3907	-4877	-2715	-2879	-4175	-1050	-351
2001-02	-665	-470	-924	-1316	-2635	-2782	-3197	-4644	-5592	-3570	-3568	-4760	-1888	-848
2002-03	-1455	-1234	-1689	-1760	-3446	-3168	-4149	-5568	-6485	-4484	-5496	-6261	-2849	-2068
2003-04	-2586	-2350	-2805	-3078	-4478	-4415	-5451	-7077	-7926	-5621	-5661	-6425	-3609	-2851
2004-05	-3287	-3051	-3506	-3866	-5535	-5850	-6460	-8188	-9029	-6799	-6476	-7239	-4460	-3592
2005-06	-4079	-3840	-4293	-4386	-6229	-6621	-7504	-9212	-10014	-7766	-7313	-8075	-5686	-4323
2006-07	-4772	-4556	-5009	-5347	-6945	-3623	-8446	-10159	-10918	-8311	-8169	-9361	-5937	-4896
2007-08	-5376	-5129	-5582	-5969	-7951	-8679	-9544	-11571	-12227	-9370	-9097	-10388	-6969	-5275
2008-09	-5715	-5552	-6005	-6125	-8742	-9402	-10830	-12600	-13294	-10388	-10391	-11151	-7487	-5766
2009-10	-6243	-5999	-6452	-6768	-9187	-9915	-11430	-13227	-13882	-10613	-10195	-10955	-7866	-6130
2010-11	-6413	-6169	-6622	-6945	-9698	-10963	-12546	-14657	-15267	-11651	-11162	-11922	-8735	-6783
2011-12	-6919	-6666	-7119	-7453	-10420	-11914	-13564	-15963	-16535	-12812	-12123	-12783	-9624	-7627

EXHIBIT 18

TABLE R-1: 50-HOUR SUSTAINED PEAKING

BASE CASE: EXISTING REGIONAL CONTRACTS

REGIONAL FIRM 50-HOUR CAPACITY SURPLUS/DEFICIT

20 YEAR MONTHLY SUMMARY

ASSUMING EXISTING REGIONAL CONTRACTS AND
NO RESOURCE ACQUISITIONS

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

1991 WHITEBOOK: 11/20/91
RUN DATE: 11/21/91

1930 WATER YEAR

JUL	AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN

PEAK IN MEGAWATTS

1992-93	6859	7007	6608	6320	5516	6600	6249	5540	4279	5563	5304	4553	6755	6915
1993-94	6215	6384	5983	5961	5126	6244	5839	4969	3725	4899	4608	3857	5757	6192
1994-95	5572	5763	5357	5121	4640	5445	5350	4401	3172	4674	4205	2914	5700	5719
1995-96	5199	5364	4951	4549	3969	4663	4762	3795	2612	3966	3727	2431	4940	5280
1996-97	4750	4897	4479	4387	3551	4739	4299	3312	2124	3450	2562	1899	4716	4783
1997-98	4540	4704	4282	3953	3436	4169	3689	2767	1569	3166	2339	1571	4073	4429
1998-99	3817	4036	3609	3316	2616	3026	3046	1998	832	2329	1441	677	3102	3648
1999-00	3051	3254	2821	2779	1832	2201	1982	967	-136	1293	1142	376	2294	3222
2000-01	2653	2836	2400	2126	1348	1654	1386	439	-691	1090	707	-589	2322	2840
2001-02	2422	2601	2161	1792	864	1106	1007	-28	-1147	466	233	-960	1683	2522
2002-03	1863	2066	1622	1567	305	1002	359	-694	-1791	-219	-1481	-2245	920	1483
2003-04	917	1127	677	433	-526	-15	-698	-1878	-2927	-1073	-1389	-2153	407	932
2004-05	440	650	196	-127	-1320	-1160	-1394	-2599	-3646	-1905	-1882	-2644	-145	464
2005-06	-74	137	-317	-372	-1695	-1577	-2057	-3310	-4328	-2598	-2463	-3225	-1127	-47
2006-07	-549	-358	-811	-1103	-2158	1133	-2690	-3882	-4875	-2819	-3015	-4204	-1094	-355
2007-08	-884	-666	-1118	-1464	-2863	-3020	-3425	-4950	-5857	-3576	-3655	-4948	-1861	-487
2008-09	-1054	-839	-1292	-1363	-3371	-3429	-4373	-5658	-6610	-4312	-4686	-5447	-2133	-749
2009-10	-1282	-1068	-1520	-1785	-3558	-3652	-4659	-5928	-6855	-4225	-4198	-4959	-2240	-856
2010-11	-1194	-979	-1433	-1706	-3775	-4378	-5427	-6921	-7817	-4879	-4803	-5563	-2766	-1192
2011-12	-1450	-1233	-1686	-1964	-4214	-5015	-6102	-7825	-8694	-5689	-5436	-6096	-3349	-1745

EXHIBIT 19

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

REGIONAL FIRM 50-HOUR CAPACITY SURPLUS/DEFICIT

20 YEAR MONTHLY SUMMARY

ASSUMING EXISTING REGIONAL CONTRACTS AND
NO RESOURCE ACQUISITIONS

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

1991 WHITEBOOK: 11/20/91
RUN DATE: 11/21/91

1930 WATER YEAR

PEAK IN MEGAWATTS

	JUL	AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN
1992-93	8456	8616	8216	7961	7347	8614	8400	8150	6818	7918	7560	6812	8910	8969
1993-94	8260	8434	8035	8052	7437	8749	8503	8078	6762	7714	7301	6552	8326	8638
1994-95	8006	8139	7737	7519	7275	8300	8389	7914	6615	7872	7338	6074	8714	8595
1995-96	7922	8022	7620	7244	6924	7874	8177	7654	6388	7458	7138	5868	8218	8399
1996-97	7722	7797	7392	7323	6776	8244	8037	7484	6200	7214	6231	5596	8241	8139
1997-98	7734	7830	7423	7124	6924	7959	7738	7290	5990	7244	6308	5571	7885	8050
1998-99	7274	7421	7013	6740	6391	7140	7438	6864	5582	6702	5685	4944	7169	7498
1999-00	6733	6868	6454	6437	5877	6616	6697	6150	4910	5941	5643	4900	6600	7310
2000-01	6562	6682	6266	6027	5655	6364	6423	5914	4643	5995	5446	4166	6851	7139
2001-02	6488	6606	6188	5858	5368	6033	6286	5737	4466	5630	5203	4024	6422	7019
2002-03	5173	5312	5892	5872	5081	6231	5961	5402	4142	5235	3760	3008	5911	6222
2003-04	5454	5606	5182	4965	4511	5504	5221	4537	3311	4663	4116	3364	5642	5914
2004-05	5204	5355	4928	4630	3977	4654	4845	4120	2889	4099	3872	3119	5320	5657
2005-06	4904	5058	4632	4605	3848	4510	4468	3727	2511	3679	3549	2796	4573	5374
2006-07	4652	4790	4354	4099	3630	6853	4149	3411	2211	3685	3209	2029	4801	5251
2007-08	4503	4664	4227	3912	3138	3588	3668	2632	1502	3179	2803	1519	4256	5324
2008-09	4550	4705	4266	4225	2865	3438	2998	2261	1081	2738	2049	1297	4245	5303
2009-10	4555	4712	4271	4038	2952	3516	3038	2262	1097	3063	2760	2007	4347	5389
2010-11	4839	4994	4551	4313	2959	3037	2539	1660	513	2755	2478	1726	4126	5339
2011-12	4794	4951	4505	4262	2761	2669	2155	1107	-27	2249	2129	1480	3813	5037

EXHIBIT 20

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

REGIONAL FIRM 50-HOUR CAPACITY SURPLUS/DEFICIT															
20 YEAR MONTHLY SUMMARY															
ASSUMING EXISTING REGIONAL CONTRACTS AND NO RESOURCE ACQUISITIONS															
L O W L O A D S															
1930 WATER YEAR	JUL	AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN	1991 WHITEBOOK: RUN DATE: 11/20/91 11/21/91
PEAK IN MEGAWATTS															
1992-93	9279	9435	9027	8764	8224	9547	9383	9399	8066	9080	8733	7984	10031	10040	
1993-94	9216	9340	8933	8942	8426	9841	9665	9515	8174	9020	8621	8007	9718	9877	
1994-95	9081	9216	8809	8612	8502	9656	9837	9580	8231	9353	8744	7622	10185	9877	
1995-96	9160	9254	8848	8493	8318	9408	9808	9530	8201	9119	8717	7595	9847	9832	
1996-97	9112	9174	8768	8719	8336	9963	9864	9560	8212	9051	7977	7493	10030	9720	
1997-98	9271	9351	8945	8673	8650	9865	9768	9557	8186	9253	8218	7632	9832	9778	
1998-99	8955	9083	8677	8429	8275	9218	9654	9348	7987	8698	7766	7181	9278	9374	
1999-00	8559	8668	8262	8274	7931	8882	9116	8847	7528	8338	7925	7339	8909	9388	
2000-01	8601	8695	8288	8089	7953	8900	9127	8883	7531	8651	7981	6860	9410	9463	
2001-02	8772	8862	8456	8161	7926	8840	9271	8989	7619	8516	7940	6922	9164	9501	
2002-03	8603	8709	8303	8315	7796	9211	9135	8854	7486	8296	6658	6072	8811	8850	
2003-04	8027	8140	7734	7550	7384	8659	8588	8210	6864	7919	7196	6611	8708	8709	
2004-05	7933	8045	7638	7375	7034	8010	8429	8042	6683	7573	7154	6570	8578	8625	
2005-06	7808	7923	7519	7523	7107	8080	8291	7882	6534	7358	7019	6434	8014	8509	
2006-07	7704	7820	7407	7185	7076	10278	8207	7818	6475	7583	6885	5866	8431	8566	
2007-08	7735	7871	7457	7174	6788	7599	7969	7292	6008	7299	6685	5564	8082	8824	
2008-09	7963	8096	7682	7674	6720	7677	7545	7140	5801	7054	6113	5521	8238	8960	
2009-10	8120	8253	7839	7642	6986	7952	7799	7374	6040	7582	7014	6427	8518	9213	
2010-11	8572	8703	8288	8089	7182	7684	7530	7042	5717	7508	6954	6364	8505	9365	
2011-12	8673	8808	8392	8191	7151	7506	7348	6730	5408	7214	6802	6314	8376	9237	

SECTION VIII

GLOSSARY

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 one megawatt of capacity served over a period of one year. (Equivalent to 8.76 gigawatt hours, 8,760 megawatt hours, or 8,760,000 kilowatt hours.)

Biomass - Any organic matter which 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 1993 is January 1, 1993 through December 31, 1993.

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 DSI's 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 and 30 percent of the output of Portland General Electric's Trojan nuclear power plant.

50-Hour Peak Capacity - The amount of capacity that can be sustained for 10 hours a day during peak-load hours for a five-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 1992-93 is October 1, 1992 to September 30, 1993.

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.

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 one million watts or one thousand kilowatts.

Model Conservation Standards (MCS) - A set of energy efficient building standards for new electrically heated residential and 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 IOU's under their power sales contracts with BPA.

Operating Year - For this study, operating year (OY) is the 12-month period July 1 to June 30. For example, OY 1992-93 is July 1, 1992 to June 30, 1993.

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

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 which 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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