

**1998 PACIFIC NORTHWEST LOADS AND RESOURCES STUDY**

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***THE WHITE BOOK***

**BONNEVILLE POWER ADMINISTRATION**  
**December 1998**

## **Cover: Ice Harbor Dam**

Spanning the Snake River just east of Pasco, Washington, Ice Harbor Dam was completed in December 1961. This run-of-river dam is operated by the U.S. Army Corps of Engineers and boasts an instantaneous generating capacity of 603 megawatts.

BPA Photo

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## **ACKNOWLEDGMENTS**

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

**Generation Supply**

Regional Coordination Group

**Pacific Northwest Utilities Conference Committee**

Loads and Resources Data Collection

# 1998 Pacific Northwest Loads and Resources Study

## TABLE OF CONTENTS

	<b>Page</b>
<b>Section 1: Introduction</b>	<b>1</b>
Description of the White Book	1
<b>Section 2: Background</b>	<b>3</b>
Pacific Northwest Planning Area	3
Hydro System Operations Under the 1995 and 1998 NMFS Biological Opinions	3
Load Forecasting	3
Pacific Northwest Hydro and Thermal Resources	3
Analysis of Federal System Firm Loads and Resources	4
Analysis of Regional Firm Loads and Resources	5
Canadian Treaty Downstream Benefits	5
Canadian Entitlement to Columbia Storage Power Exchange (CSPE)	
Through March 31, 2003	5
Canadian Entitlement to Canada, Beginning April 1, 1998	5
Major Sources of Uncertainty	6
<b>Section 3: Changes in the 1998 Pacific Northwest Loads and Resources Study</b>	<b>8</b>
Firm Load Changes	8
Firm Resource Changes	8
Firm Contract Changes	8
Public Agency Power Sales Contract Diversification	10
<b>Section 4: Federal System Analysis</b>	<b>12</b>
Federal Firm Energy Loads	12
Federal Firm Peak Loads	14
Existing Federal Firm Resources	15
Federal Firm Energy Surplus/Deficit Projections	18
<b>Section 5: Resource Planning Alternatives</b>	<b>22</b>
BPA's Resource Strategy	22
Federal Firm Capacity Surplus/Deficit Projections	24
Federal Loads and Resources Comparison—Energy	27
Federal Loads and Resources Comparison—Capacity	31
<b>Section 6: Regional Analysis</b>	<b>33</b>
Regional Firm Energy Loads	33
Regional Firm Peak Loads	35
Regional Firm Resources	36
Regional Firm Energy Surplus/Deficit Projections	36
Regional Firm Capacity Surplus/Deficit Projections	38

	<b>Page</b>
<b>Section 7: Federal System Exhibits</b>	<b>41</b>
Federal System Annual Energy Analysis Under 1937 Water Conditions for 10 Operating Years	43
Exhibit 1. Medium Load	44
Federal System Monthly Energy Analysis Under Medium Loads for 1937 Water Conditions	47
Exhibit 2. OY 1999-2000	48
Exhibit 3. OY 2003-04	50
Exhibit 4. OY 2008-09	52
Federal System Monthly 50-Hour Capacity Surplus/Deficit Under Medium Loads for 1937 Water Conditions	55
Exhibit 5. Medium Loads	56
Federal System Monthly Capacity Analysis Under Medium Loads for 1937 Water Conditions	57
Exhibit 6. OY 1999-2000	58
Exhibit 7. OY 2003-04	60
Exhibit 8. OY 2008-09	62
Footnotes for Exhibits 1 through 8	64
Federal System Energy Surpluses and Deficits for 50 Historical Water Conditions	67
Exhibit 9. OY 1999-2000	68
Exhibit 10. OY 2001-02	69
Exhibit 11. OY 2002-03	70
Exhibit 12. OY 2003-04	71
Exhibit 13. OY 2004-05	72
Exhibit 14. OY 2005-06	73
Exhibit 15. OY 2006-07	74
Exhibit 16. OY 2007-08	75
Exhibit 17. OY 2009-10	76
Exhibit 18. OY 2010-11	77
<b>Section 8: Pacific Northwest Regional Exhibits</b>	<b>79</b>
Regional Annual Energy Analysis Under 1937 Water Conditions for 10 Operating Years	81
Exhibit 19. Medium Loads	82
Regional Monthly Energy Analysis Under Medium Loads for 1937 Water Conditions	85
Exhibit 20. OY 1999-2000	86
Exhibit 21. OY 2003-04	88
Exhibit 22. OY 2008-09	90

	<b>Page</b>
Regional Monthly 50-Hour Capacity Surpluses and Deficits Under Medium Loads for 1937 Water Conditions	93
Exhibit 23. Medium Loads	94
Regional Monthly Capacity Analysis Under Medium Loads for 1937 Water Conditions	95
Exhibit 24. OY 1999-2000	96
Exhibit 25. OY 2003-04	98
Exhibit 26. OY 2008-09	100
Footnotes For Exhibits 19 through 26	102
Regional Energy Surpluses and Deficits for 50 Historical Water Conditions	105
Exhibit 27. OY 1999-2000	106
Exhibit 28. OY 2000-01	107
Exhibit 29. OY 2001-02	108
Exhibit 30. OY 2002-03	109
Exhibit 31. OY 2003-04	110
Exhibit 32. OY 2004-05	111
Exhibit 33. OY 2005-06	112
Exhibit 34. OY 2006-07	113
Exhibit 35. OY 2007-08	114
Exhibit 36. OY 2008-09	115
<b>Section 9: Administrator’s Record of Decision on the 1998 Pacific Northwest Loads and Resources Study (The White Book)</b>	<b>117</b>
<b>Section 10: Glossary and Acronyms</b>	<b>123</b>

<b>FIGURES</b>		<b>Page</b>
<b>Figure 1.</b>	Federal Firm Hydro Energy, Monthly Variability for OY 1999-2000	<b>9</b>
<b>Figure 2.</b>	Federal Energy Load Projections, 1998 BPA Forecast	<b>13</b>
<b>Figure 3.</b>	Federal Monthly Firm Peak Load Projections Under Extreme Weather Conditions for OY 1999-2000, 2003-04, and 2008-09	<b>15</b>
<b>Figure 4.</b>	Federal Firm Annual Energy Surplus/Deficit Projections	<b>20</b>
<b>Figure 5.</b>	Federal Monthly Firm Energy Loads and Resources for OY 1998-99 Assuming 1936-37 Water Conditions	<b>21</b>
<b>Figure 6.</b>	Federal Monthly Capacity Loads and Resources Under Extreme Weather Conditions for OY 1999-2000	<b>25</b>
<b>Figure 7.</b>	Federal Monthly Capacity Surplus/Deficit Projections Under Extreme Weather Conditions	<b>26</b>
<b>Figure 8.</b>	Regional Firm Annual Energy Loads, 1998 BPA Forecast	<b>34</b>
<b>Figure 9.</b>	Regional Firm Peak Loads for OY 1999-2000, 2003-04, and 2008-09 Under Extreme Weather Conditions	<b>35</b>
<b>Figure 10.</b>	Regional Firm Annual Energy Surplus/Deficit Projections	<b>37</b>
<b>Figure 11.</b>	Regional Monthly Firm Capacity Surplus/Deficit Projections Under Extreme Weather Conditions	<b>39</b>
<b>TABLES</b>		
<b>Table 1.</b>	Canadian Entitlement to Canada, Energy and Capacity Obligations Beginning April 1, 1998	<b>6</b>
<b>Table 2.</b>	Public Agency Power Sales Contract Diversification	<b>11</b>
<b>Table 3.</b>	Federal System Hydroelectric Projects	<b>16</b>
<b>Table 4.</b>	Non-Federally Owned BPA Resources and Contracts	<b>17</b>
<b>Table 5.</b>	Federal System Firm Resources for OY 1999-2000 Based on 1936-37 Water Conditions	<b>18</b>
<b>Table 6.</b>	Federal Firm Energy Surplus/Deficit Projections Assuming Existing Loads, Resources, and Contracts Under 1936-37 Water Conditions	<b>19</b>
<b>Table 7.</b>	Alternate Federal Contractual Resources	<b>25</b>
<b>Table 8.</b>	Federal Firm Energy Surplus/Deficit Projections—Difference Between the 1998 Final White Book and the 1997 White Book for OY 1999-2000 Under 1937 Water Conditions	<b>30</b>
<b>Table 9.</b>	Federal Firm Capacity Surplus/Deficit Projections—Difference Between the 1998 Final White Book and the 1997 White Book for OY 1999-2000 Under 1937 Water Conditions	<b>32</b>
<b>Table 10.</b>	Regional Firm Resources for OY 1999-2000 Based on 1936-37 Water Conditions	<b>36</b>
<b>Table 11.</b>	Regional Firm Energy Surplus/Deficit Projections Assuming Existing Loads, Resources, and Contracts	<b>37</b>

# Section 1: Introduction

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## ***Description of the White Book***

The Pacific Northwest Loads and Resources Study (White Book) is published annually by BPA and establishes the planning basis for supplying electricity to customers. It serves a dual purpose.

First, the White Book presents projections of regional and Federal system load and resource capabilities, along with relevant definitions and explanations.

Second, the White Book serves as a benchmark for annual BPA determinations made pursuant to the 1981 regional power sales contracts.<sup>1</sup> Specifically, BPA uses the information in the White Book for determining the notice required when customers request to increase or decrease the amount of power purchased from BPA.

The White Book compiles information obtained from several formalized resource planning reports and data submittals, including those from the Northwest Power Planning Council (Council) and the Pacific Northwest Utilities Conference Committee (PNUCC).

The White Book is not an operational planning guide, nor is it used for inventory planning to determine BPA revenues. Operation of the Federal Columbia River Power System (FCRPS) is based on a set of criteria different from that used for resource planning decisions. Operational planning is dependent upon real-time or near-term knowledge of system conditions, including expectations of river flows and runoff, market opportunities, availability of reservoir storage, energy exchanges, and other factors affecting the dynamics of operating a power system.

The 1998 White Book is presented in two documents: 1) this summary of Federal system and Pacific Northwest region loads and resources; and 2) a technical appendix detailing the loads and resources for each major Pacific Northwest generating utility. This analysis updates the December 1997 Pacific Northwest Loads and Resources Study.

The load forecast is derived by using economic planning models to predict the loads that will be placed on electric utilities in the region. This study incorporates information on contract obligations and contract resources, combined with the resource capabilities obtained from public utility and investor-owned utility (IOU) customers through their annual data submittals to the PNUCC, from BPA's Firm Resource Exhibit (FRE Exhibit 1) submittals, and through analysis of the Federal hydroelectric power system. The 1998 study uses the same economic forecast used for the 1997 study.

In this loads and resources study, resource availability is compared with a medium forecast of electricity consumption. The forecasted future electricity demands—firm loads—are subtracted from the projected capability of existing and “contracted for” resources to determine whether BPA and the region will be surplus or deficit. If Federal system resources are greater than loads in any particular year or month, there is a surplus of energy and/or capacity, which BPA may use or market to increase revenues. Conversely, if Federal system firm loads exceed available resources, there is a deficit of energy and/or capacity and BPA would add conservation or contract purchases as needed to meet its firm loads.

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<sup>1</sup> BPA's 1981 power sales contracts expire between June 30 and September 30, 2001.

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

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

This study presents the Federal system and regional analyses for the medium load forecast. This analysis projects the yearly average energy consumption and resource availability for Operating Years (OY)<sup>1</sup> 1999-2000 through 2008-09. The study shows the Federal system's and the region's monthly estimated maximum electricity demand, monthly energy demand, and monthly maximum generating capability—capacity—for OY 1999-2000, 2003-04, and 2008-09. The Federal system and regional monthly capacity surplus/deficit projections are summarized for 10 operating years.

The hydroregulation study used in this analysis simulates operation of the system under the 1995 National Marine Fisheries Services (NMFS) Biological Opinion for Salmon (1995 BO) dated March 2, 1995, and the 1998 Supplemental NMFS Biological Opinion covering steelhead (1998 BO) dated May 14, 1998. These NMFS opinions provide:

Snake River flow augmentation April 3 through August 31;

Storage of water January through mid-April for lower-Columbia River flow augmentation April 20 through August 31; and

Mid-Columbia flow augmentation April 10 through June 30.

This analysis includes the monthly Federal system and regional firm energy surpluses and deficits for OYs 2000 through 2009 for each of the 50 historical water years on record. These are found in section 7, exhibits 9 through 18, pages 68 through 77, for the Federal system, and in section 8, exhibits 27 through 36, pages 106 through 115, for the region.

The Federal system analysis is presented in section 4, beginning on page 12. The analysis for the Pacific Northwest region is presented in section 6, page 33.

The Administrator's Record of Decision (ROD) for the 1998 White Book is contained in section 9, page 117.

The glossary of terms and a list of acronyms are included in section 10, page 123.

Beginning with this year's analysis, the Pacific Northwest Loads and Resources Study Technical Appendix will be made available as an electronic rather than a printed document. The 1998 Pacific Northwest Loads and Resources Study Technical Appendix and this 1998 Pacific Northwest Loads and Resources Study summary document are available on BPA's external web site at <http://www.bpa.gov/power/whitebook98>.

Additional copies of this summary are also available from BPA's Public Involvement Office, toll-free, 1-800-622-4520.

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<sup>1</sup> Operating Year (OY) is the 12-month period August 1 through July 31. For example, OY 1999-2000 is August 1, 1999, through July 31, 2000.

## Section 2: Background

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### ***Pacific Northwest Planning Area***

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

### ***Hydro System Operations Under the 1995 and 1998 NMFS Biological Opinions***

The NMFS 1995 and 1998 BOs further changed the focus of hydro system operation for fish passage to monthly flow-based targets from storage-based targets. These changes emphasized monthly flows at hydro projects, thereby limiting the ability of the hydro system to shift and shape flows in any one month to meet firm system energy needs.

To demonstrate the variability of the hydro system under the NMFS 1995 and 1998 BOs, this document presents the Federal system and regional firm surpluses and deficits for OYs 2000 through 2009 for each of the 50 historical water conditions on record (1929 through 1978). The results are shown in exhibits 9 through 18, pages 67 through 77, for the Federal system, and in exhibits 27 through 36, pages 105 through 115, for the region. The information presented in these tables shows the monthly variability of the surpluses and deficits over the 50 water conditions.

Traditional annual energy loads and resources studies have been produced using a specific set of assumptions and serve as the base case for calculating the load-resource balance in sections 4 and 6.

### ***Load Forecasting***

This analysis uses the same load forecast as did the 1997 White Book. This forecast is based on BPA's 1996 Final Rate Filing for all but the direct service industries (DSIs). The DSI load forecast reflects BPA's actual industrial contracts and was updated for the 1998 analysis. Loads for each of the customer groups were estimated separately: non-generating public agencies, DSIs, IOUs, Federal agencies, and the U.S. Bureau of Reclamation (USBR). In general, BPA's load forecasts are designed to respond to and reflect factors such as employment, electricity prices, aluminum prices, smelter production costs, and planned conservation actions.

### ***Pacific Northwest Hydro and Thermal Resources***

#### **Hydro Resources**

**Energy Capability.** This study uses 1937 water conditions (the 12-month period from August 1936 through July 1937) to estimate the firm hydro capability in a historical sequence of low water conditions. The critical period represents the period of adverse water conditions

during which the hydro system produced the maximum amount of firm energy by drafting the reservoirs from maximum required content to minimum required content.

**Capacity.** The monthly instantaneous capacity of hydro projects is defined as the full-gate-flow maximum available generation at each project, based on the average monthly elevation resulting from 1936-37 water reservoir levels. BPA assumes 1936-37 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.

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

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

**Multiple-Use Planning.** Pacific Northwest hydro projects have many uses besides power generation. The projects may provide flood control, supply irrigation for farming, assist in river navigation and recreation, and contribute to municipal water supplies. In addition, constraints also are in place to protect and enhance resident and anadromous fish populations. These nonpower uses place operating requirements on the reservoirs and may reduce or increase hydroelectric power production. BPA's resource planning takes into account all presently known nonpower operating requirements in assessing regional hydro system capability.

The Council, BPA, and other Pacific Northwest entities will continue to evaluate ways to enhance fisheries and wildlife. Future proposals could include additional amendments to the Council's Columbia River Basin Fish and Wildlife Program, revision of the Pacific Northwest Coordination Agreement, renegotiation of Canadian Entitlement allocation agreements, and/or implementation of additional programs in support of the Endangered Species Act. The impacts of future proposals are unknown. These proposals, however, most likely will increase nonpower requirements on the hydro system and change operating flexibility, change the monthly shape of streamflows, and change the availability of sustained Federal capacity. Future studies will incorporate any known impacts.

### **Thermal Resources**

The expected output of regional thermal resources is based on the energy and capacity capabilities submitted to BPA by the project owners. The output of all thermal plants is reduced to allow for scheduled maintenance, spinning reserves, and forced outage reserves.

## ***Analysis of Federal System Firm Loads and Resources***

BPA is a power and transmission marketing agency, responsible for acquiring and delivering sufficient power to serve the firm electric load needs of its customers. BPA does not own generating resources. BPA's customer loads and contractual obligations, combined with the Federal and non-Federal resources from which BPA acquires the power it sells, are collectively called 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, its regional public agencies, and other firm contractual obligations to deliver power.

The hydro resources of the Federal system include 30 dams owned and operated by the USBR and the Corps, plus hydroelectric projects owned by the City of Idaho Falls, Energy Northwest (ENW) (formerly Washington Public Power Supply System), and Lewis County Public Utility District (PUD). BPA has the exclusive right to sell power generated by USBR and Corps hydroelectric projects. BPA also markets the thermal generation from the WNP-2 nuclear plant, operated by ENW.

The Federal system analysis is shown in section 4, beginning on page 12.

### ***Analysis of Regional Firm Loads and Resources***

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

The regional analysis is presented in section 6, beginning on page 33.

### ***Canadian Treaty Downstream Benefits***

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

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

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

### ***Canadian Entitlement to Canada, Beginning April 1, 1998***

A portion of the Canadian share of downstream power benefits began to return to Canada April 1, 1998, 30 years after the first Treaty Project was completed. All remaining Canadian downstream power benefits will revert to Canada by April 1, 2003, 30 years after the third Treaty Project was completed. This analysis assumes Canadian Entitlement deliveries to Canada under the long-standing Canadian Entitlement between British Columbia and the United States. The delivery of Canadian Entitlement to Canada that started April 1, 1998, is included in each participating utility's loads and resources balance. BPA delivers the total Canadian Entitlement, shown in table 1, page 6, and it is included as a Federal export.

**Table 1**

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

ENERGY IN AVERAGE MEGAWATTS										
OPERATING YEAR	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Investor-Owned Utilities	48	45	44	56	80	82	69	66	65	65
Public Agencies	30	31	31	39	56	57	66	69	69	69
Federal System	224	196	212	274	385	380	381	378	376	374
Other Entities	5	5	5	6	9	9	9	9	9	9
<b>Total Energy Obligation</b>	<b>307</b>	<b>277</b>	<b>292</b>	<b>375</b>	<b>530</b>	<b>528</b>	<b>525</b>	<b>522</b>	<b>519</b>	<b>517</b>

JANUARY CAPACITY										
OPERATING YEAR	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Investor-Owned Utilities	80	75	74	74	135	135	112	112	112	112
Public Agencies	59	57	55	55	96	96	119	119	119	119
Federal System	654	653	645	657	1,201	1,201	1,201	1,201	1,201	1,201
Other Entities	9	9	9	8	15	15	15	15	15	15
<b>Total Capacity Obligation</b>	<b>802</b>	<b>794</b>	<b>783</b>	<b>794</b>	<b>1,447</b>	<b>1,447</b>	<b>1,447</b>	<b>1,447</b>	<b>1,447</b>	<b>1,447</b>

### **Major Sources of Uncertainty**

#### **Loads and Resources Uncertainty**

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

- Changes and uncertainties regarding deregulation of retail sales in the electrical power industry;
- BPA's future marketing efforts, including conservation;
- Possible increases or decreases in BPA's public agency, IOU, and DSI load obligations that could result from BPA's subscription process and execution of new contracts replacing BPA's current power sales contracts expiring between June 30 and September 30, 2001;
- Deviation from the forecasted rate of load growth;
- Failure of existing or contracted generating resources to operate at anticipated times and levels; and
- Additional changes in existing hydro system operation in response to programs developed to address the Endangered Species Act or other environmental considerations.

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

#### **Contractual Uncertainty**

Given the changes in the wholesale electric utility industry that have taken place over the last several years and the reductions in public agency and DSI firm requirements, the extent of Federal obligations to these customers after the current contracts expire in 2001 is somewhat uncertain. The extent of BPA's firm obligations after these contracts expire may affect the Federal system and regional loads and resources balances during the 10-year period examined in this study.

This study assumes that the following contracts, though they are subject to change as noted, will extend throughout the 10-year study period:

- BPA's power sales contracts with its public agency and IOU customers, which expire between June 30 and September 30, 2001, and its contracts with its DSI customers, which expire on September 30, 2001, will be replaced in the subscription process and may result in different Federal obligations to these customers.
- The Pacific Northwest Coordination Agreement will expire June 30, 2003. BPA expects that 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.

## Section 3: Changes in the 1998 Pacific Northwest Loads and Resources Study

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This section describes the major changes in the assumptions of the 1998 Pacific Northwest Loads and Resources Study compared to the 1997 study. Other changes are reflected in the data for each utility contained in the 1998 Pacific Northwest Loads and Resources Study Technical Appendix. The 1998 Technical Appendix is available on BPA's external web site at <http://www.bpa.gov/power/whitebook98>.

### ***Firm Load Changes***

The 1998 White Book analysis uses load projections that incorporate the following changes since last year's analysis:

- **1998 BPA Load Forecast:** This analysis uses the same medium load forecast of Federal agencies, public agencies, and IOUs that was used in BPA's 1996 Rate Filing. This is the same forecast that was used in the 1997 study.
- **DSI Power Sales Contracts:** This study includes BPA's DSI power sales contracts and DSI block sales agreements signed through December 31, 1996. The DSI contracts were updated from the 1997 study and expire September 30, 2001, but are assumed to remain at the OY 2001 level through the remainder of the study period.

### ***Firm Resource Changes***

The 1998 White Book analysis reflects the following resource changes compared to last year's study:

- **The NMFS 1995 and 1998 Biological Opinions:** The hydroregulation study used in this analysis incorporates the streamflow requirements of these opinions.

Figure 1, page 9, shows the monthly variation of the Federal system hydro energy capability for OY 1999-2000 under the NMFS 1995 and 1998 BOs, assuming 1937 water conditions.

### ***Firm Contract Changes***

To provide for diurnal shaping of capacity and capacity-for-energy exchange contracts, BPA now shows on-peak energy deliveries with these types of contracts. In addition, the assumption of off-peak return of replacement energy is included. In past analyses, these energy deliveries were assumed to cancel out and were not shown.

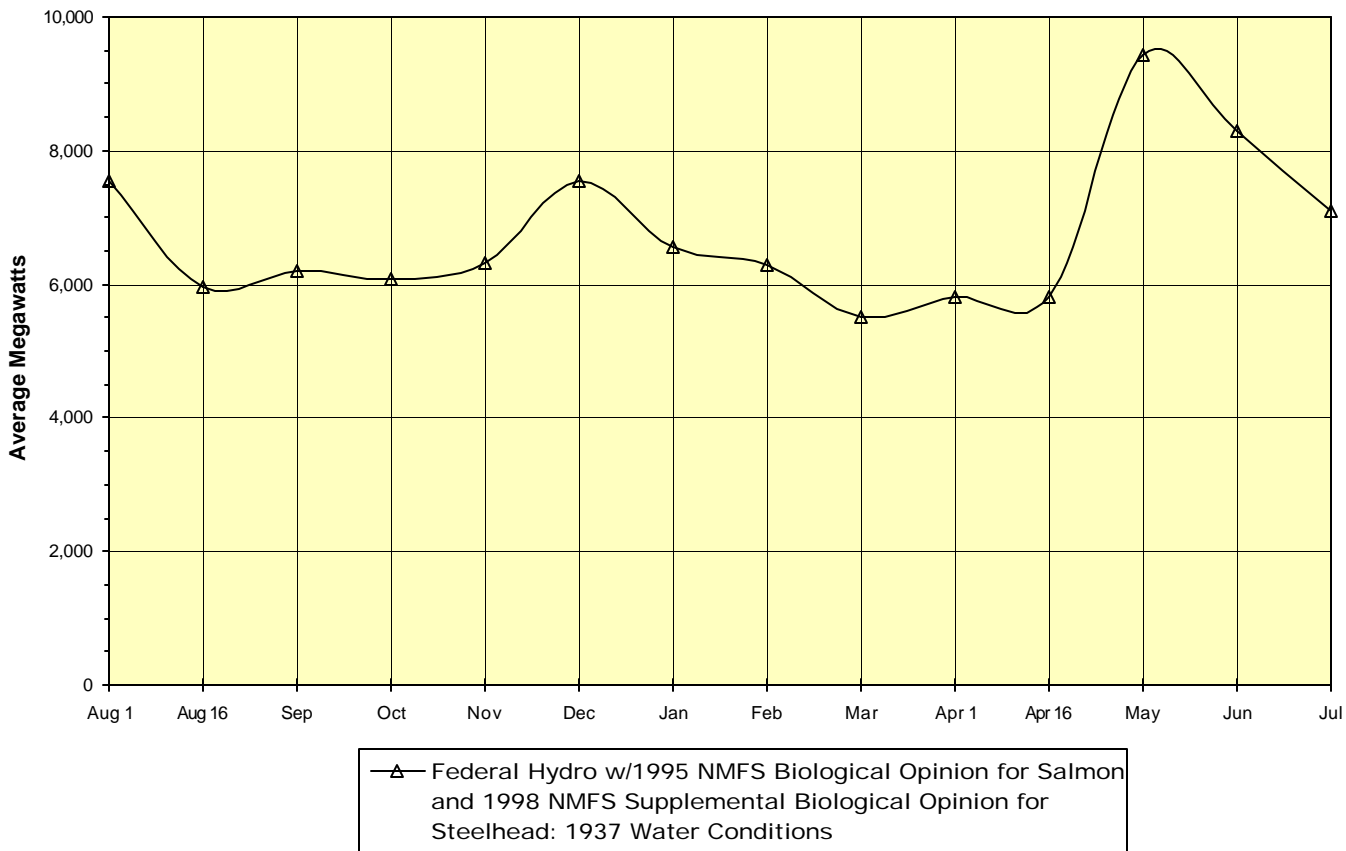
The 1998 White Book analysis uses the following contract changes versus last year's study:

**Exports:** The 1998 White Book analysis includes the following new or changed Federal export transactions: BPA to Anaheim, capacity/energy exchange and capacity sale; BPA to Azusa, power exchange and capacity sale, with power sale and energy sale ended; BPA to Banning, power exchange and capacity sale, with energy sale and power sale ended; BPA to BART, power sale; BPA to Colton, power exchange and capacity sale, with energy sale and power sale ended; BPA to Farmington, power sale; BPA to Federal agencies, power sale; BPA to New Energy Ventures, power sale ended; BPA to New Energy Ventures-SP, power sale ended; BPA to other entities, power sale; BPA to Palo Alto, capacity sale and seasonal

energy exchange; BPA to Pasadena, capacity/energy exchange and seasonal exchange, with power sale ended; BPA to Riverside, capacity/energy exchange, capacity sale, and

**Figure 1**

**Federal Firm Hydro Energy: Monthly Variability for OY 1999-2000**



capacity/diversity exchange; BPA to SCE, power sale, capacity/energy exchange, and option capacity; and BPA to SCE Source, power sale.

BPA's power sale and capacity/energy agreements with the cities of Burbank, Glendale, and Pasadena, and to SCE, are shown in power sales mode through the study horizon. BPA to SCE option capacity is shown through OY 2004. BPA renegotiated its contract with the M-S-R Public Agency (M-S-R), whose members include the Modesto Irrigation District and the cities of Santa Clara and Redding, California, to continue as a power sale through April 15, 2013.

**Contracts Out:** This analysis has the following new or changed BPA intraregional contracts out: BPA to AVC (formerly WWP), supplemental and entitlement capacity, WNP-3 settlement, and deferred power exchange; BPA to Bandon, power sale; BPA to Benton County PUD, power sale ended; BPA to Big Bend Electric Cooperative, summer seasonal product; BPA to Chelan, supplemental and entitlement capacity; BPA to Clatskanie, power sale; BPA to Colockum, supplemental and entitlement capacity; BPA to Columbia River PUD, power

sale; BPA to Cowlitz County PUD presubscription power sale, power sale, and supplemental and entitlement capacity; BPA to Douglas County PUD, power sale and supplemental and entitlement capacity; BPA to EWEB, presubscription power sale and supplemental and entitlement capacity; BPA to City of Forest Grove, power sale and supplemental and entitlement capacity; BPA to Grant County PUD, power sale and supplemental and entitlement capacity; BPA to Kittitas County PUD, supplemental and entitlement capacity; BPA to Lewis County PUD, power sale; BPA to Lower Valley Electric Cooperative, power sale; BPA to Mason County PUD, power sale; BPA to the City of McMinnville, power sale and supplemental and entitlement capacity; BPA to the City of Monmouth, power sale; BPA to MPC, power sale; BPA to Nespelem Valley Electric Cooperative, summer seasonal product; BPA to Northern Wasco PUD, power sale; BPA to Okanogan, supplemental and entitlement capacity; BPA to other entities, various agreements; BPA to small, nongenerating public utilities, presubscription power sales, with Hungry Horse power sales ending; BPA to PGE, supplemental and entitlement capacity; BPA to PP&L, supplemental and entitlement capacity, capacity sale, power sale for Southern Oregon, and Centralia standby; BPA to PGE, power sale and capacity sale; BPA to PSE, supplemental and entitlement capacity, WNP-3 settlement changed, and power exchange ended; BPA to Raft River Electric Cooperative ended; BPA to Richland, Ormet power sale; BPA to Salem, power sale; BPA to SCL, supplemental and entitlement capacity; BPA to Snohomish County PUD, power sale; BPA to Springfield Utility Board, presubscription power sale and power sale; BPA to Tillamook County PUD, power sale; BPA to TPU, supplemental and entitlement capacity; and BPA to United Electric Cooperative, power sale.

**Imports:** This analysis includes the following new or changed interregional contracts: Anaheim to BPA, peak replacement; Azusa to BPA, power exchange and peak replacement; Banning to BPA power exchange and peak replacement; Colton to BPA, power exchange and peak replacement; other entities to BPA, various agreements; Pasadena to BPA, peak replacement; Riverside to BPA, peak replacement; SCE to BPA, peak replacement; PowerEx to BPA for ABC, peak replacement; and PowerEx to BPA for Palo Alto, peak replacement.

**Contracts In:** This analysis includes the following changes in BPA intraregional contracts in: AVC to BPA, supplemental peak replacement, and WNP-3 settlement; Chelan County PUD to BPA, supplemental peak replacement; Colockum County PUD to BPA, supplemental peak replacement; Cowlitz County PUD to BPA, supplemental peak replacement; Douglas County PUD to BPA, supplemental peak replacement; EWEB to BPA, supplemental peak replacement; City of Forest Grove to BPA, supplemental peak replacement; Grant County PUD to BPA, supplemental peak replacement; Kittitas County PUD to BPA, supplemental peak replacement; City of McMinnville to BPA, supplemental peak replacement; MPC to BPA, peak replacement; Okanogan County PUD to BPA, supplemental peak replacement; other utilities to BPA, power sales and supplemental peak replacement; PGE to BPA, supplemental peak replacement, peak replacement, and WNP-3 settlement terminated; PP&L to BPA, peak replacement and supplemental peak replacement; and PSE to BPA, supplemental peak replacement and WNP-3 settlement, with surplus power exchange ended; SCL to BPA, supplemental peak replacement; and TPU to BPA, supplemental peak replacement.

### ***Public Agency Power Sales Contract Diversification***

To maintain BPA revenues and improve its public utility customers' satisfaction with their BPA business relationship, the agency offered these customers a series of amendments to their 1981 power sales contracts. In 1996, BPA offered three forms of amendatory agreements to their customers' 1981 power sales contracts. BPA also negotiated new requirements

power sales contracts with different terms and conditions with those customers who wished to have a larger portion of their firm power load served by firm non-Federal resources than was available under the amended agreements. Finally, some customers elected to continue with their 1981 contracts unamended. All of the agreements—the amendatory agreements, the new contracts, and the unamended 1981 utility power sales contracts—will have expired by September 30, 2001. In exchange for this rate certainty and market access, these customers are required to provide revenue certainty to BPA by making load commitments through September 30, 2001.

Table 2, below, shows the load diversification for the public agencies from BPA’s Load Commitment Exercise. It is shown as a resource called Public Agency Diversification in each utility’s load-resource balance, which reduces each utility’s power sales contract purchase from BPA through September 30, 2001. Public contract diversification has changed since last year’s analysis due to diversity reductions by Pacific Northwest Generating Company (PNGC),<sup>1</sup> Benton County PUD, Franklin County PUD, the City of Richland, and Gray’s Harbor PUD. These adjustments reduce public diversity by about 210 average megawatts in OY 2002.

**Table 2**

<b>Public Agency Power Sales Contract <sup>2</sup> Diversification</b>			
<b>AVERAGE MEGAWATTS</b>			
<b>OPERATING YEAR <sup>3</sup></b>	<b>2000</b>	<b>2001</b>	<b>2002 and beyond</b>
<b>Chelan County PUD</b>	0	0	0
<b>Clark Public Utility</b>	257	270	270
<b>Cowlitz County PUD</b>	104	104	104
<b>Douglas County PUD</b>	0	0	0
<b>EWEB</b>	0	0	0
<b>Grant County PUD</b>	5	5	5
<b>Gray’s Harbor PUD</b>	13	13	13
<b>Okanogan PUD</b>	5	5	5
<b>Pend Oreille PUD</b>	0	0	0
<b>Seattle City Light</b>	47	45	45
<b>Snohomish County PUD</b>	248	263	265
<b>Springfield Utility Board</b>	44	21	21
<b>Tacoma Public Utilities</b>	65	63	64
<b>Non-Generating Public Agencies</b>	380	334	182
<b>TOTAL PUBLIC AGENCY DIVERSIFICATION</b>	1,168	1,136	987

<sup>1</sup> Pacific Northwest Generating Company (PNGC) is a consortium of small generating utilities whose members include Blachly Lane, Consumers Power, Coos-Curry, Douglas Electric, Lane Electric, Central Electric, Lost River, Northern Lights, Oregon Trail, Raft River and Umatilla.

<sup>2</sup> Public agency power sales contracts and amendments to them that allow for load diversification expire September 30, 2001. For OY 2002 and beyond, public agencies may place power sales obligations on BPA through the subscription process.

<sup>3</sup> Operating Year (OY) is the 12-month period August 1 through July 31. For example, OY 1999-2000 is August 1, 1999, through July 31, 2000.

## Section 4: Federal System Analysis

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

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

- Capacity surplus/deficit values do not reflect potential nighttime return problems on the Federal system;
- The 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 contract obligations with Pacific Northwest Federal and public agencies and IOUs, which expire between June 30 and September 30, 2001, are assumed to continue at their FY 2001<sup>1</sup> levels through the remainder of the study period;
- BPA's power sales contract obligations with its DSI customers, which expire September 30, 2001, are assumed to continue at their OY 2001 levels through the remainder of the study period;
- All existing Federal contractual arrangements not included under Pacific Northwest power sales contracts which expire by the terms of their agreements are not renewed;
- Federal surplus firm power sales and capacity/energy exchange agreements with the cities of Burbank, Glendale, and Pasadena, and with SCE, are shown in power sale mode throughout the study period;
- BPA purchases option energy from SCE through OY 2004;
- SCE purchases option capacity from BPA through OY 2004;
- BPA's surplus firm power sale to Puget Sound Power and Light terminates and converts to a seasonal power exchange beginning in OY 2001-02, per the terms of the contract;
- Sustained capacity limits are 50 hours per week;
- Extreme weather adjustments are assumed for capacity in the months of November through February. These adjustments vary monthly from 1,400 to 1,950 peak megawatts under the medium load forecast; and
- The IOUs do not make new long-term general requirements load purchases from BPA.

### ***Federal Firm Energy Loads***

The 1998 study uses the same load forecast used for the 1997 study. The Federal system firm loads include BPA's firm DSI loads,<sup>2</sup> sales to Federal agencies, and current obligations to regional public agencies and IOUs under their power sales contracts,<sup>3</sup> less public agency

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<sup>1</sup> Fiscal Year (FY) is the 12-month period October 1 through September 30. For example FY 2001 is October 1, 2000, through September 30, 2001.

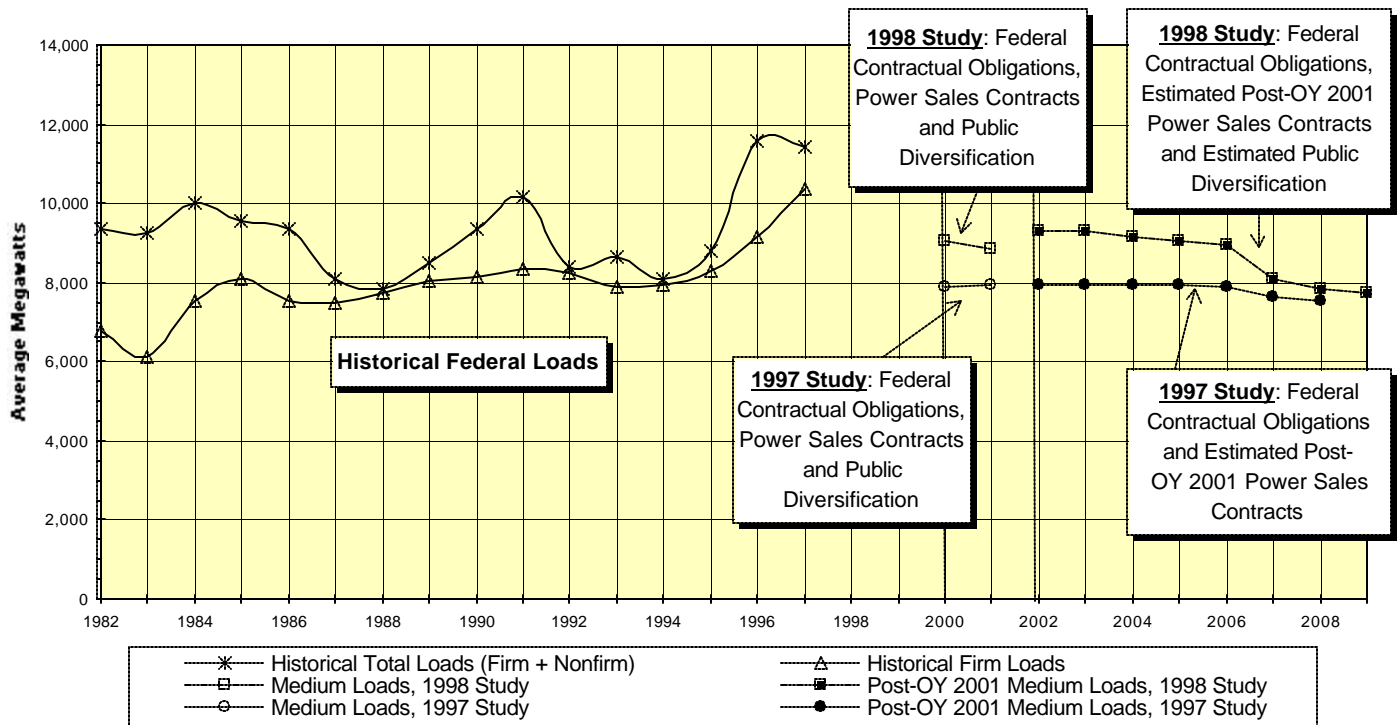
<sup>2</sup> This study includes the Federal DSI firm loads through OY 2001, per contracts signed through December 31, 1996. In OY 2002, and through the remainder of the study period, the Federal DSI loads are assumed to continue at their OY 2001 level.

<sup>3</sup> This study includes Federal, public agency and IOU obligations through OY 2001, per contracts that expire between June 30 and September 30, 2001. BPA's obligations are assumed to continue at the

diversification from BPA's Load Commitment Exercise, which reduced BPA's power sales contract obligations through September 30, 2001. The Federal system firm energy loads under the medium load forecast for OY 1999-2000 through 2008-09 are shown in figure 2, below. The methods and assumptions used to complete this year's load forecast are discussed under Load Forecasting, page 3.

The Federal loads include all intraregional contracts for export of firm surplus power to Southwest utilities. The Federal firm energy loads under the medium load forecast are presented on line 15 of exhibit 1, page 44, and monthly for the medium load forecast for OY 1999-2000, 2003-04, and 2008-09 assuming 1937 water conditions in exhibits 2 through 4, pages 47 through 53.

**Figure 2**  
**Federal Energy Load Projections<sup>1 2</sup>—1998 BPA Forecast**  
**Medium Loads**



FY 2001 level in OY 2002 and through the remainder of the study period under similar contracts for firm load service.

<sup>1</sup> The components of BPA's historical loads are: (1) total loads, which include both firm and nonfirm energy sales, and (2) firm loads, which include only BPA's firm energy sales. BPA's future loads depicted in figure 2, above, include only firm energy obligations.

<sup>2</sup> The Federal firm energy load projections assume that BPA's power sales remain at the OY 2001 level through the remainder of the study period. For OY 2002 and beyond, however, these projections are uncertain because BPA's firm contractual obligations will be negotiated and executed over the next two years and the impacts of deregulating the wholesale and retail electric utility industry are unknown.

### **Federal Firm Peak Loads**

Figure 3, page 15, shows the Federal firm peak loads for OY 1999-2000, 2003-04, and 2008-09 under the medium load forecast.<sup>1</sup> The figure shows the expected 1-hour monthly demand under the 1998 BPA load forecast, and includes extreme weather adjustments. Extreme weather conditions were assumed for the months of November through February and estimate a 5-percent probability that the actual peak load will be exceeded. The extreme weather adjustment includes possible increased obligations on BPA by the public agencies during extreme weather conditions. In the remaining months of March through October, the peak loads estimate normal weather conditions with a 50-percent probability that the actual peak load will be exceeded. The peak load projections are reduced by a diversity component to address the fact that all peak electrical demands do not occur simultaneously throughout the region.

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

The monthly Federal firm peak loads are presented on line 15 and the monthly extreme weather obligations are presented on lines 44 and 47 of exhibits 6 through 8, pages 57 through 63. These forecasts assume Federal obligations under 1937 water conditions.

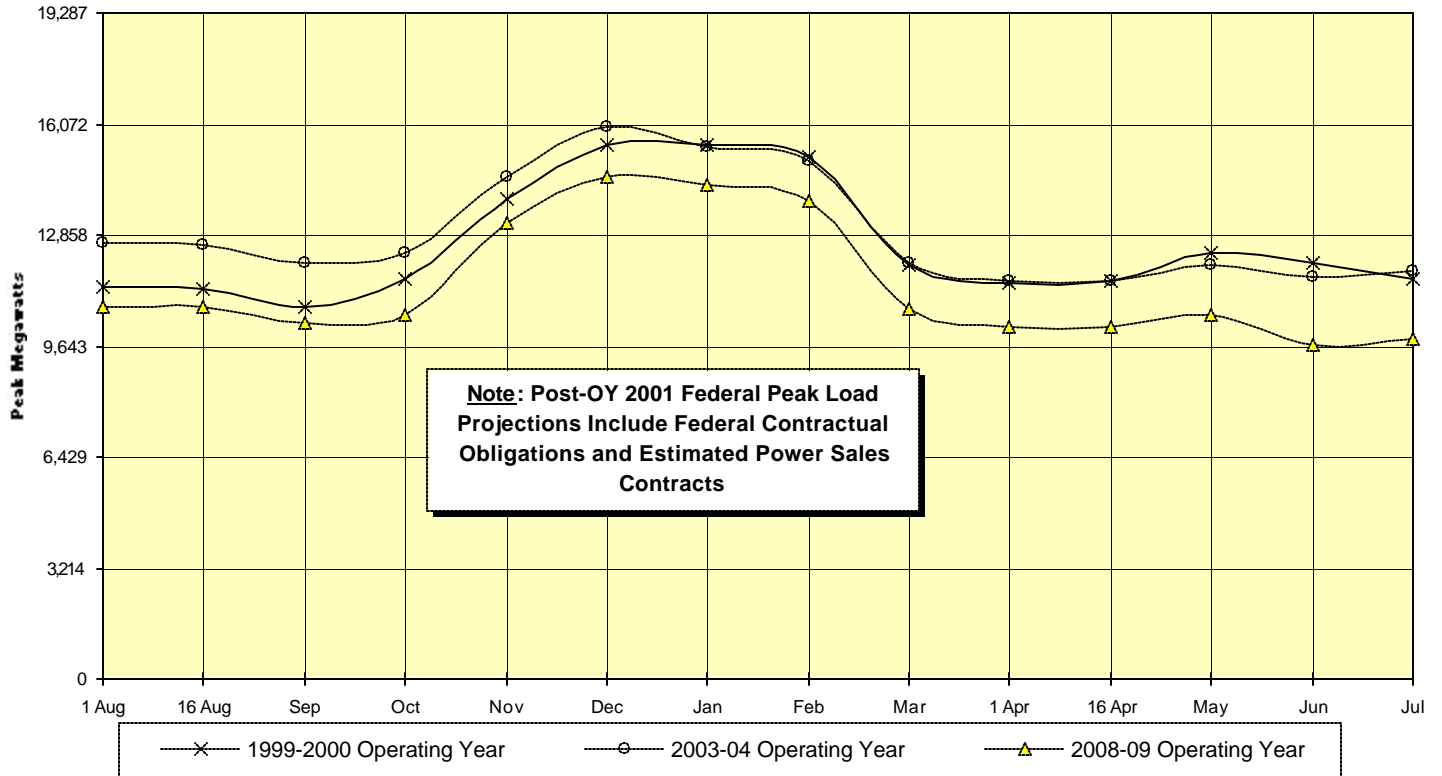
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<sup>1</sup> The Federal peak load projections assume that BPA's power sales contract obligations remain at the FY 2001 level through the remainder of the study period. For OY 2002 and beyond, however, these projections are highly uncertain because BPA's contractual obligations and the impacts of deregulating the wholesale and retail electric utility industry are unknown.

**Figure 3**

**Federal Monthly Firm Peak Load Projections<sup>1</sup> Under Extreme Weather Conditions<sup>2</sup> for OY 1999-2000, 2003-04, and 2008-09**

**Medium Loads**



**Existing Federal Firm Resources**

The Federal system hydro resources from which BPA markets power are shown in table 3, page 16. BPA also markets power purchased from non-Federally owned resources. In addition, BPA’s capacity/energy exchange contracts provide marketable energy to BPA as payment for the capacity BPA delivers.

The non-Federally owned resources, return energy associated with BPA’s existing capacity/energy exchanges, contractual resources, and other BPA hydro-related contracts are shown in table 4, page 17.

Combined, these resources represent BPA’s available firm resources. A detailed listing of all Federal generating resources is contained in the 1998 Pacific Northwest Loads and Resources Study Technical Appendix (available July 1999 on BPA’s external web site at <http://www.bpa.gov/power/whitebook98>).

<sup>1</sup> After OY 2001, BPA’s public and DSI firm load projections assume that BPA’s power sales contract obligations remain at the FY 2001 level through the remainder of the study period. For OY 2002 and beyond, however, these projections are highly uncertain because BPA’s firm contractual obligations and the impacts of deregulating the wholesale and retail electric utility industry are unknown.

<sup>2</sup> Extreme weather conditions in November, December, January, and February assume a 5-percent probability that the peak load will be exceeded.

**Table 3**

**Federal System Hydroelectric Projects**

Project	Initial Year of Service	Number of Units	Nameplate Rating (MW)	Instantaneous Generating Capacity <sup>1</sup> (peak MW)	Firm Energy <sup>2</sup>
<b>U.S. BUREAU OF RECLAMATION HYDROELECTRIC PROJECTS</b>					
Grand Coulee	1941	27	6,465.0	5,419	1,784
Grand Coulee Pump Gen.	1973	6	314.0	314	0
Hungry Horse	1952	4	428.0	344	77
Palisades	1957	4	176.4	122	66
Anderson Ranch	1950	2	27.0	36	16
Minidoka	1909	4	27.7	13	8
Roza	1958	1	11.3	4	6
Black Canyon	1925	2	10.2	9	8
Chandler	1956	2	12.0	10	9
<b>TOTAL USBR PROJECTS</b>		52	7,471.6	6,260	1,974
<b>U.S. ARMY CORPS OF ENGINEERS HYDROELECTRIC PROJECTS</b>					
Chief Joseph	1955	27	2,457.8	2,117	1,103
John Day	1968	16	2,160.0	2,211	807
The Dalles w/fish turbines	1957	24	1,808.0	2,074	516
Bonneville w/fish turbines	1938	20	1,092.9	1,159	457
McNary	1953	14	980.0	992	571
Lower Granite	1975	6	810.0	811	212
Lower Monumental	1969	6	810.0	768	214
Little Goose	1970	6	810.0	771	209
Ice Harbor	1961	6	603.0	589	100
Libby	1975	5	525.0	544	176
Dworshak	1974	3	400.0	417	118
Lookout Point	1954	3	120.0	67	35
Detroit	1953	2	100.0	96	41
Green Peter	1967	2	80.0	79	28
Lost Creek	1975	2	49.0	18	30
Albeni Falls	1955	3	42.6	33	28
Hills Creek	1962	2	30.0	30	18
Cougar	1964	2	25.0	25	16
Foster	1968	2	20.0	22	12
Big Cliff	1954	1	18.0	21	11
Dexter	1955	1	15.0	17	9
<b>TOTAL CORPS OF ENGINEERS PROJECTS</b>		153	12,956.3	12,861	4,711
<b>TOTAL USBR AND CORPS PROJECTS</b>		205	20,427.9	19,121	6,685

<sup>1</sup> Maximum generation under optimum conditions assuming January 1936-37 water conditions. Does not reflect reduction to the peaking capacity of the hydro system due to the drafting of reservoirs and other project constraints.

<sup>2</sup> Firm energy from a 12-month annual average assuming 1936-37 water conditions.

**Table 4**

**Non-Federally Owned BPA Resources and Contracts  
Capacity Based on January 1998**

<b>Project</b>	<b>Type</b>	<b>Operator</b>	<b>Date in Service</b>	<b>OY1999-2000 Capacity (peak MW)</b>	<b>OY 1999-2000 Firm Energy (aMW)</b>
<b>EXISTING NON-FEDERALLY OWNED BPA RESOURCES</b>					
WNP-2	Nuclear	ENW	1984	1,162	885
Packwood Lake	Hydro	ENW	1964	30	10
Idaho Falls Bulb Projects	Hydro	City of Idaho Falls	1982	18	19
Cowlitz Falls	Hydro	Lewis County PUD	1994	13 <sup>1</sup>	26
Big Creek Hydro Unit	Hydro	Mission Valley	1981	1	0
James River Wauna	Cogen	Clatskanie PUD; EWEB	1996	32	29
<b>TOTAL NON-FEDERALLY OWNED BPA RESOURCES</b>				1,256	969
<b>FIRM CONTRACTS</b>					
Canadian Entitlement for CSPE (non-Federal)				46	23
Canadian Entitlement for Canada (non-Federal)				148	83
Restoration, Columbia River Treaty with Canada				0	-26
Canadian Imports				0	1
Pacific Southwest Imports				282	232
Eastern Imports				189	94
Pacific Northwest Purchase				50	573
Non-Utility Generation				1	8
Supplemental & Entitlement Replacement Energy				0	51
<b>TOTAL BPA FIRM CONTRACTED RESOURCES</b>				716	1,038
<b>TOTAL NON-FEDERALLY OWNED BPA RESOURCE CONTRACTS</b>				1,972	2,007

Table 5, page 18, summarizes the Federal system firm energy resources and contracts available to meet Federal firm loads for OY 1999-2000. Federal system firm energy resources are comprised as follows: 77 percent from hydroelectric power, 10 percent from one nuclear power plant, and 13 percent from BPA's firm contracts.

<sup>1</sup> Operational capacity is 70 MW, but is restricted in January.

**Table 5**

**Federal<sup>1</sup> Firm Resources for OY 1999-2000<sup>2</sup> Based on 1936-37 Water Conditions  
Capacity Based on January 2000**

<b>Project Type</b>	<b>Sustained Peak Capacity (MW)</b>	<b>Generating Peaking Capacity % of Total</b>	<b>Firm Energy (aMW) 12-Month Average</b>	<b>Firm Energy % of Total</b>
<b>Hydro</b>	14,694	90	6,819	77
<b>Nuclear</b>	1,162	7	885	10
<b>Firm Contracts</b>	554	3	1,188	13
<b>TOTAL FEDERAL RESOURCES</b>	16,410	100	8,892	100

***Federal Firm Energy Surplus/Deficit Projections***

This analysis includes all operating requirements currently adopted by the hydroelectric project owners and the firm planning assumptions for assured resource capability in the PNCA and from the NMFS 1995 and 1998 BOs.

The Federal firm energy surplus/deficit projections under the medium load forecast for OY 1999-2000 through 2008-09 are presented in table 6, page 19, and graphically shown in figure 4, page 20.

The components of the 10-year critical period average Federal energy loads and resources balances under the medium load scenario are presented in exhibit 1, line 42, page 44.

To show the monthly variability of the loads and resources study, the monthly Federal system energy components assuming medium loads under 1937 water conditions for OY 1999-2000, 2003-04, and 2008-09 are shown in exhibits 2 through 4, pages 47 through 53.

<sup>1</sup> Includes Federally and non-Federally owned projects.

<sup>2</sup> Operating Year (OY) is the 12-month period August 1 through July 31. For example, OY 1999-2000 is August 1, 1999, through July 31, 2000.

**Table 6**

**Federal Firm Energy Surplus/Deficit Projections Assuming Existing Loads,  
Resources, and Contracts Under 1936-37 Water Conditions  
Energy in Average Megawatts**

<b>Medium Load Scenario</b>	<b>Operating Year<sup>1</sup></b>									
	<b>2000</b>	<b>2001</b>	<b>2002<sup>2</sup></b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>
	-358	-266	-622	-785	-499	-609	-383	335	739	701

<sup>1</sup> Operating Year (OY) is the 12-month period August 1 through July 31. For example, OY 1999-2000 is August 1, 1999, through July 31, 2000.

<sup>2</sup> After OY 2001, BPA's public and DSI firm load projections assume that BPA's power sales contract obligations remain at the FY 2001 level through the remainder of the study period. For OY 2002 and beyond, however, these projections are highly uncertain because BPA's firm contractual obligations and the impacts of deregulating the wholesale and retail electric utility industry are unknown.

Figure 4

Federal Firm Annual Energy Surplus/Deficit Projections

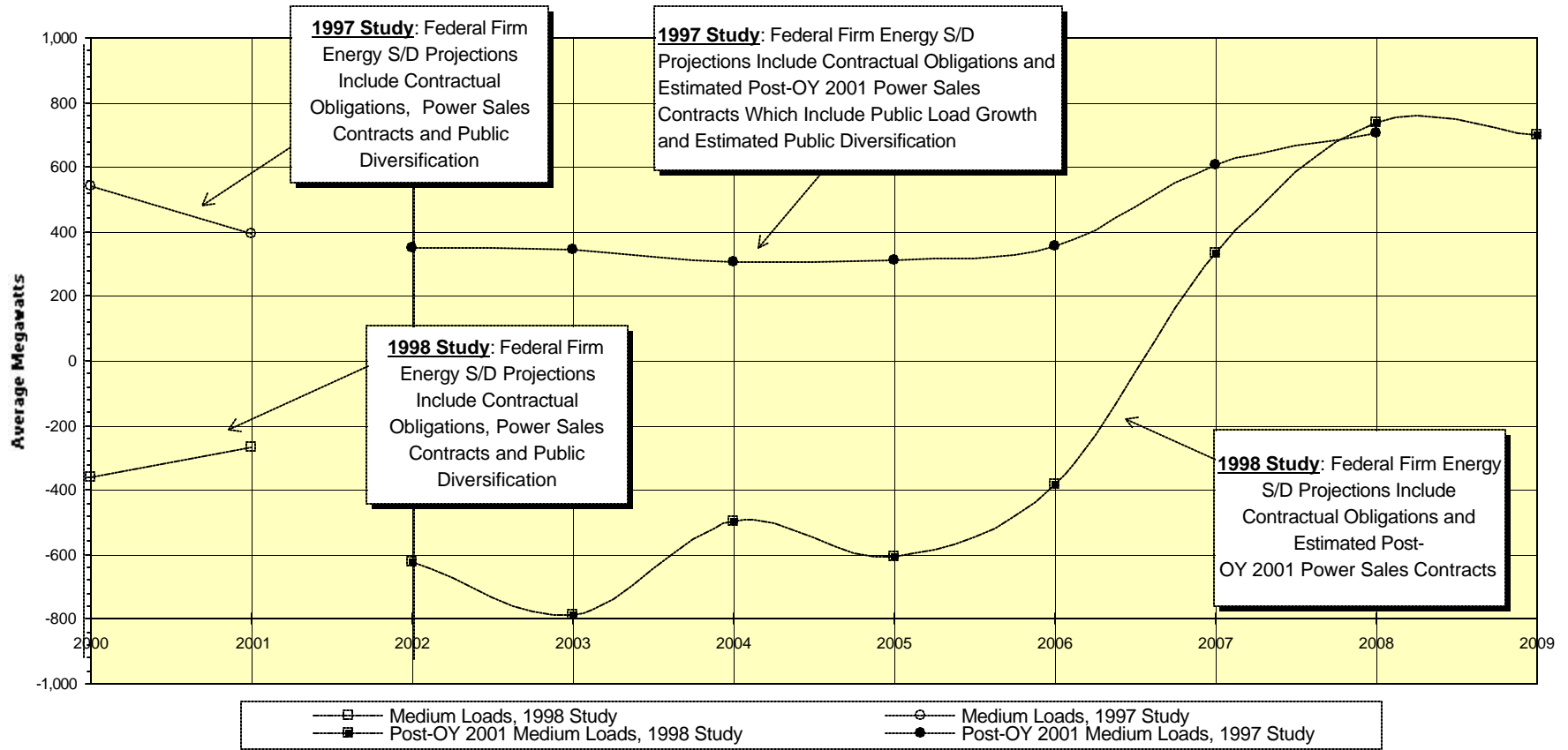
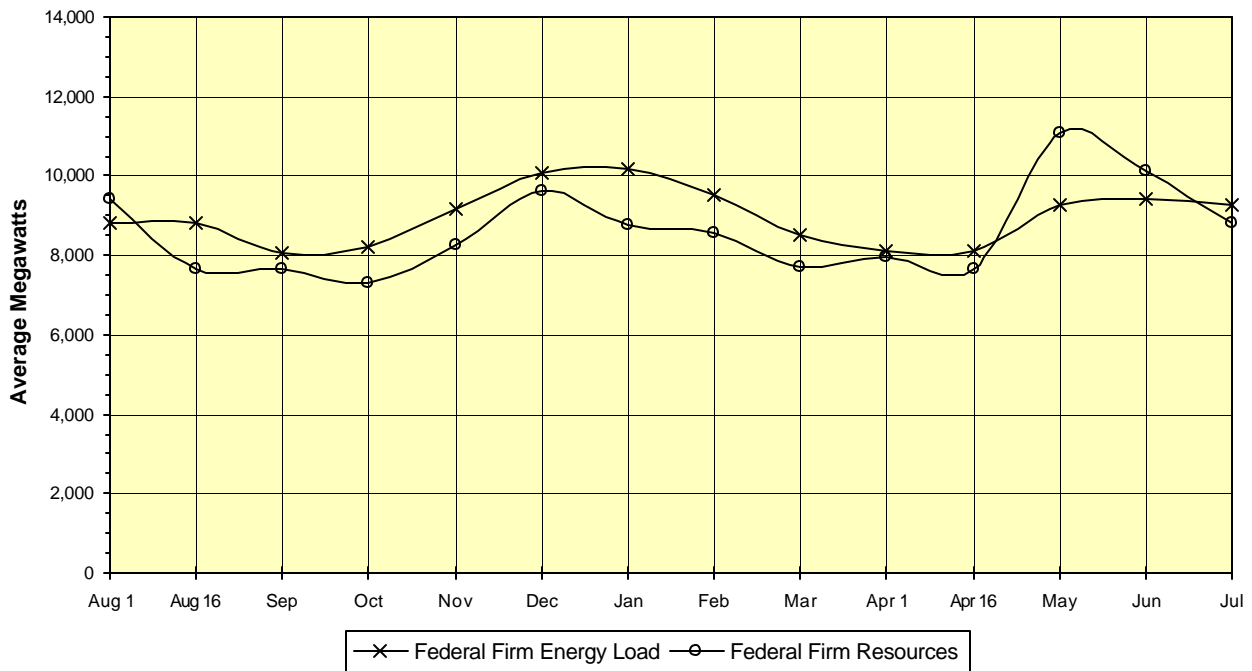


Figure 5, below, shows the monthly Federal system firm energy loads and resources for OY 1999-2000. This figure illustrates the timing of Federal system monthly surpluses and deficits in any operating year created by incorporating the NMFS 1995 and 1998 BOs.

Under critical water conditions, Federal hydro resources are generally operated at lower power production levels during the January through March timeframe because the reservoirs store water then to release in the spring to assist fish passage.

**Figure 5**

**Federal Monthly Firm Energy Loads and Resources for OY 1999-2000<sup>1</sup>  
Assuming 1936-37 Water Conditions  
Medium Load Forecast**



<sup>1</sup> Operating Year (OY) is the 12-month period August 1 through July 31. For example, OY 1999-2000 is August 1, 1999, through July 31, 2000.

## Section 5: Resource Planning Alternatives

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### ***BPA's Resource Strategy***

As previously discussed, Federal hydro system operations have changed to reflect implementation of the NMFS 1995 and 1998 BOs. In response to these changes, BPA has changed its traditional least cost resource planning approach by adopting a new resource strategy. For the immediate future, BPA's resource strategy is to rely on available power purchases, off-system storage, or exchanges to serve any incremental power needs should loads exceed resources within a month. Information on this resource strategy is contained in BPA's Interim Resource Strategy (September 1995). In contrast, the White Book analysis differs from BPA's resource strategy because provisions of the current utility power sales contract do not allow BPA to count "uncommitted" purchase power as a resource available to serve firm load. The following alternatives are being considered as possible means of meeting BPA's future load commitments:

**Probabilistic Analysis.** The hydro system generation varies greatly from one year to another, mainly due to the weather in the Pacific Northwest and Canada. In most years, there is an abundance of water so that hydro generation along with Pacific Northwest thermal resources and contracts can meet all regional energy needs; in other years, lack of water could create shortfalls in some months. Implementing the streamflow requirements of the NMFS 1995 and 1998 BOs changed the shape and ability of the hydro system to meet energy needs in all months.

The region also has experienced a shift in emphasis in power marketing from supply-driven to price-driven. The market changes are dictating changes in resource risk management. One way to manage resource risks is to use probabilistic analyses. Using probabilistic methods in planning allows utilities to evaluate and manage resource risks by using market supply and reducing resource costs, thus helping to provide competitive prices in today's power market.

**Use the Resource Contingency Program (RCP) Option Resources.** This alternative would include the RCP resource options where BPA has non-exclusive contracts for the output of three combustion turbine projects, which carry a combined 854 average megawatts (911 peak megawatts). If these resources are available, they can potentially be obtained within 3 years. Prior to acquiring the output from these projects, BPA must first conduct an administrative hearing and obtain determinations from the Council and the Administrator that the resource is needed and consistent with the Council's Plan. The RCP resources are shown in line 1, table 7, page 24.

**Pacific Southwest Contractual Resource Options.** BPA has long-term firm power sale and capacity/energy exchange contracts with Southern California Edison (SCE) and the cities of Burbank, Glendale, and Pasadena, California.

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

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

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

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

- Energy made available from the termination of energy deliveries under Southwest surplus firm energy sales;
- Exchange energy available upon conversion of the Southwest surplus firm energy sales to capacity/energy exchanges; and
- Under some contracts, 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 to surplus energy sales, depending on the availability of Federal surplus firm energy and certain other conditions.

This study assumes that 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 7, lines 2 and 3, page 24.

**Supplemental Energy.** Under some contracts, if BPA terminates Southwest sales and converts them to capacity/energy exchange contracts, BPA may elect to purchase supplemental energy in that same operating year. The amount of additional resources that would become available upon early conversion of these contracts and purchase of supplemental energy is shown in table 7, line 4.

**Non-Treaty Storage.** On July 9, 1990, BC Hydro and BPA signed an agreement increasing United States-Canadian coordination of the Columbia River system. This agreement cooperatively manages 4.5 million acre-feet of non-treaty hydro storage through June 30, 2003. Studies on the increased coordination indicate a possible increase of 300 average megawatts in firm energy for the combined Canadian and Pacific Northwest systems. Fifty percent of the benefit, 150 average megawatts, is available to the United States. The Federal system share is 115 average megawatts.

This energy, however, is not as valuable as a firm resource because non-treaty storage has a lower refill priority than primary storage reservoirs. Therefore, BPA intends to use the non-treaty storage as a resource that will increase flexibility in operating the hydro system when needed. Since this energy may not be available in every year, BPA needs to use probability methods for its inclusion as a firm resource, but has not done so for this 1998 loads and resources study. However, it may be included as a firm resource in future studies. The Federal system share of non-treaty storage energy is shown in table 7, line 5.

**Table 7**

**Alternate Federal Contractual Resources  
Energy in Average Megawatts**

<b>Operating Year<sup>1</sup></b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>
<b>1. Resource Contingency Program<sup>2</sup></b>	0	0	854	854	854	854	854	854	854	854
<b>2. Termination of PSW Surplus Power Sales</b>	168	168	168	168	168	168	168	168	154	112
<b>3. Exchange Energy from PSW</b>	45	44	43	41	40	38	38	38	38	28
<b>4. Supplemental Energy from PSW</b>	42	43	44	46	47	48	49	49	49	45
<b>5. Non-Treaty Storage</b>	115	115	115	105	0	0	0	0	0	0
<b>Total Contractual Options</b>	370	370	1,224	1,214	1,109	1,108	1,109	1,109	1,095	1,039

***Federal Firm Capacity Surplus/Deficit Projections***

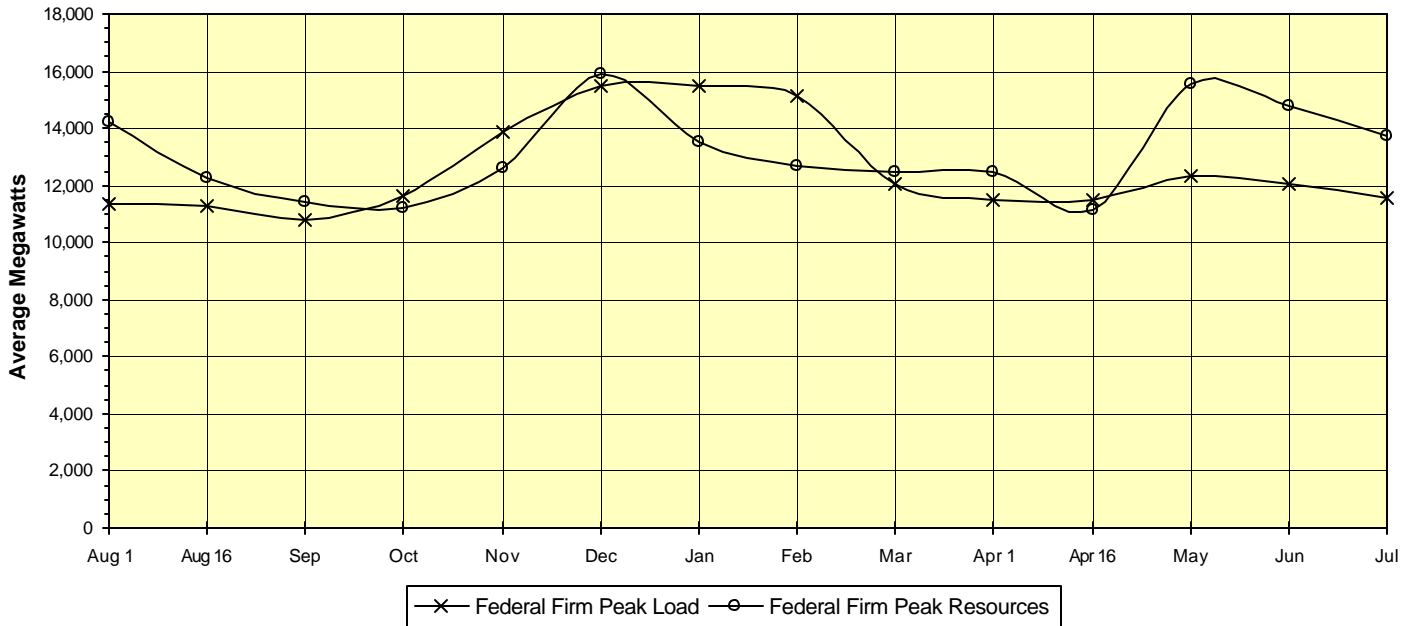
Figure 6, page 25, shows the monthly Federal system peak loads and resources for OY 1999-2000 under 1937 water conditions assuming extreme weather conditions during the months of November through February. This figure illustrates the timing and magnitude of the Federal system capacity surpluses and deficits in any operating year and impacts created during extreme winter weather.

<sup>1</sup> Operating Year (OY) is the 12-month period August 1 through July 31. For example, OY 1999-2000 is August 1, 1999, through July 31, 2000.

<sup>2</sup> These resources could be available as early as August 2001. Resource potential is 854 average megawatts.

Figure 6

**Federal Monthly Capacity Loads and Resources Under Extreme Weather Conditions for OY 1999-2000**



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

- Low Federal system loads;
- Additional nonpower hydro requirements that dictate minimum streamflows; and
- The inability of NWE's WNP-2 nuclear resource to cycle from day to night.

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

- Limit return energy to a percentage of contract demand;
- Defer energy returns to a time more favorable to system operation; 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.

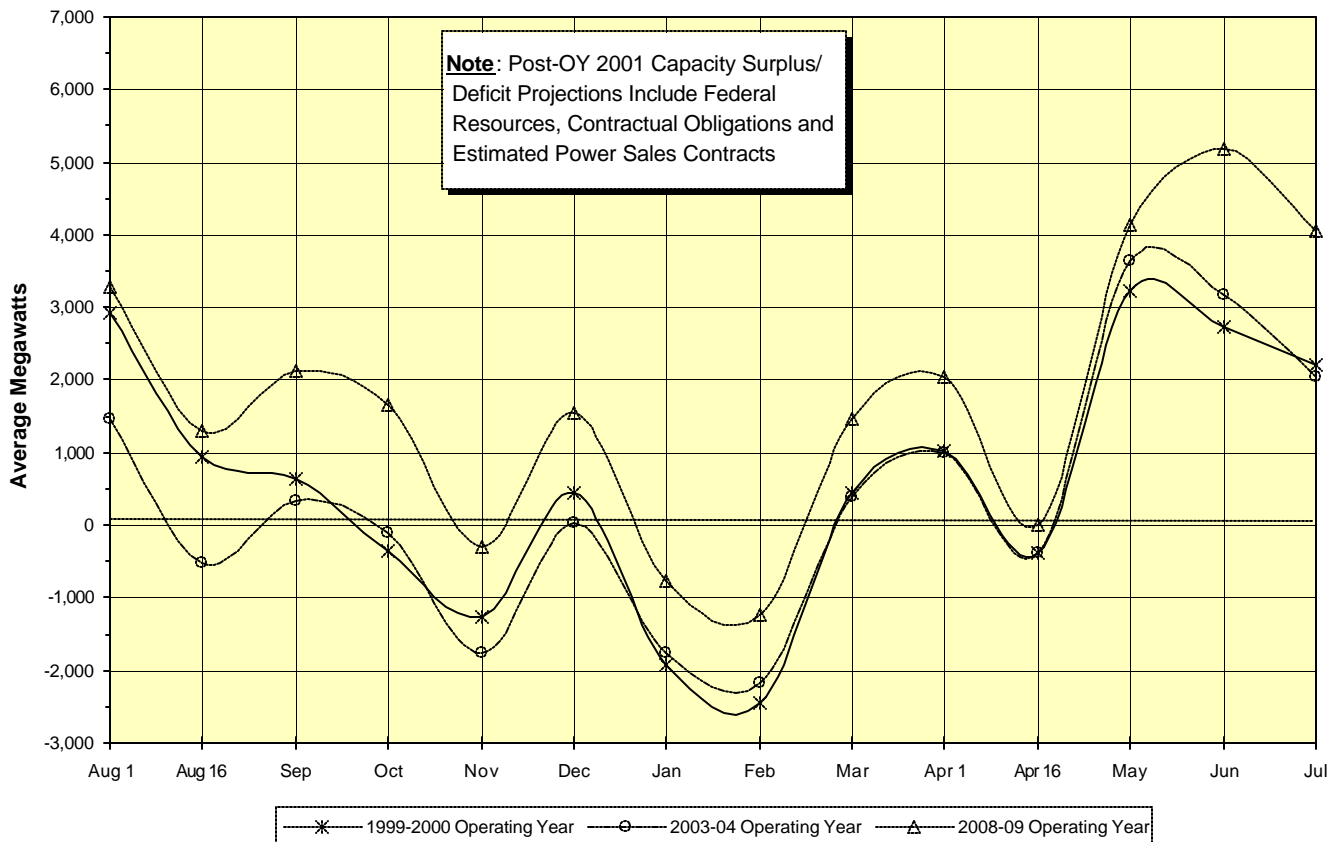
If BPA makes additional market purchases, any added capacity will increase capacity available to the Federal system.

Figure 7, below, shows the Federal firm capacity surplus/deficit projections under the medium load forecast for OY 1999-2000, 2003-04, and 2008-09. This analysis incorporates all operating requirements currently adopted by the hydroelectric project owners and the firm planning assumptions from the NMFS 1995 and 1998 BOs.

A 10-year summary of Federal capacity surplus/deficit projections under the medium load forecast, assuming extreme weather conditions, is presented in exhibit 5, page 55. The monthly variability of the Federal system capacity components that comprise the loads and resources study, and assuming medium loads for extreme weather under 1937 water conditions for OY 1999-2000, 2003-04, and 2008-09, are shown on line 48 in exhibits 6 through 8, pages 57 through 63.

**Figure 7**

**Federal Monthly Capacity Surplus/Deficit Projections Under Extreme Weather Conditions**



## **Federal Loads and Resources Comparison—Energy**

Table 8, page 30, shows changes in the energy analysis of the 1998 Pacific Northwest Loads and Resources Study compared to the 1997 study for OY 1999-2000 through 2008-09. The table lists the Federal firm energy surplus/deficit projections for the 1997 study and changes since last year to obtain the current firm energy surplus under the medium load forecast. For “Load Changes,” table 8, line 2, positive values indicate load increases and negative values show load decreases. Similarly, for “Resource Changes,” table 8, line 3, positive values indicate additional resource availability and negative values show decreases in resource availability. Federal planned resource acquisitions for which BPA has not yet contracted are not included as firm resources. In this analysis, BPA considered its Pacific Southwest contracts in power sales mode through the study horizon.

Additionally, the projections for OY 2002 and beyond are highly uncertain because BPA’s firm contractual obligations and the impacts of deregulating the wholesale and retail electric utility industry are unknown.

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

### **DSI Federal Firm Loads**

This study assumes the current DSI power sales contracts and block sales, which have been updated for this study.

### **Public Agencies’ Power Sales Contract Purchases**

The small and non-generating public agencies’ energy purchases are different due to new public agencies’ contract purchases and variations in the new hydro regulations used in this study.

### **Exports**

The 1998 White Book analysis includes the following new or changed Federal export transactions: BPA to Anaheim, capacity/energy exchange and capacity sale; BPA to Azusa, power exchange and capacity sale, with power sale and energy sale ended; BPA to Banning, power exchange and capacity sale, with energy sale and power sale ended; BPA to BART, power sale; BPA to Colton, power exchange and capacity sale, with energy sale and power sale ended; BPA to Farmington, power sale; BPA to Federal agencies, power sale; BPA to New Energy Ventures, power sale ended; BPA to New Energy Ventures-SP, power sale ended; BPA to other entities, power sale; BPA to Palo Alto, capacity sale and seasonal energy exchange; BPA to Pasadena, capacity/energy exchange and seasonal exchange, with power sale ended; BPA to Riverside, capacity/energy exchange, capacity sale, and capacity/diversity exchange; BPA to SCE, power sale, capacity/energy exchange, and option capacity; and BPA to SCE Source, power sale.

BPA’s power sale and capacity/energy agreements with the cities of Burbank, Glendale, and Pasadena, and to SCE, are shown in power sales mode through the study horizon. BPA to SCE option capacity is shown through OY 2004. BPA renegotiated its contract with the M-S-R Public Agency (M-S-R), whose members include the Modesto Irrigation District and the cities of Santa Clara and Redding, California, to continue as a power sale through April 15, 2013.

### **Contracts Out**

This analysis has the following new or changed BPA intraregional contracts out: BPA to AVC (formerly WWP), supplemental and entitlement capacity, WNP-3 settlement, and deferred power exchange; BPA to Bandon, power sale; BPA to Benton County PUD, power sale ended; BPA to Big Bend Electric Cooperative, summer seasonal product; BPA to

Chelan, supplemental and entitlement capacity; BPA to Clatskanie, power sale; BPA to Colockum, supplemental and entitlement capacity; BPA to Columbia River PUD, power sale; BPA to Cowlitz County PUD presubscription power sale, power sale, and supplemental and entitlement capacity; BPA to Douglas County PUD, power sale and supplemental and entitlement capacity; BPA to EWEB, presubscription power sale and supplemental and entitlement capacity; BPA to City of Forest Grove, power sale and supplemental and entitlement capacity; BPA to Grant County PUD, power sale and supplemental and entitlement capacity; BPA to Kittitas County PUD, supplemental and entitlement capacity; BPA to Lewis County PUD, power sale; BPA to Lower Valley Electric Cooperative, power sale; BPA to Mason County PUD, power sale; BPA to the City of McMinnville, power sale and supplemental and entitlement capacity; BPA to the City of Monmouth, power sale; BPA to MPC, power sale; BPA to Nespelem Valley Electric Cooperative, summer seasonal product; BPA to Northern Wasco PUD, power sale; BPA to Okanogan, supplemental and entitlement capacity; BPA to other entities, power sales; BPA to small, nongenerating public utilities, presubscription power sales, with Hungry Horse power sales ending; BPA to PGE, supplemental and entitlement capacity; BPA to PP&L, supplemental and entitlement capacity, capacity sale, power sale for Southern Oregon, and Centralia standby; BPA to PGE, power sale and capacity sale; BPA to PSE, supplemental and entitlement capacity, WNP-3 settlement changed, and power exchange ended; BPA to Raft River Electric Cooperative ended; BPA to Richland, Ormet power sale; BPA to Salem, power sale; BPA to SCL, supplemental and entitlement capacity; BPA to Snohomish County PUD, power sale; BPA to Springfield Utility Board, presubscription power sale and power sale; BPA to Tillamook County PUD, power sale; BPA to TPU, supplemental and entitlement capacity; and BPA to United Electric Cooperative, power sale.

### **Regulated Hydro**

This year's study assumes the 12-month annual average, consistent with PNCA monthly assured capability for Federal resources, using 1937 water conditions under the NMFS 1995 and 1998 BOs when analyzing the Federal system firm hydro capability. This study produces slightly less energy than the 1997 analysis over the study horizon.

### **Independent Hydro**

Independent hydro generation is generally the same between the two analyses.

### **Imports**

This analysis includes the following new or changed interregional contracts: Anaheim to BPA, peak replacement; Azusa to BPA, power exchange and peak replacement; Banning to BPA power exchange and peak replacement; Colton to BPA, power exchange and peak replacement; other entities to BPA, various agreements; Pasadena to BPA, peak replacement; Riverside to BPA, peak replacement; SCE to BPA, peak replacement; PowerEx to BPA for ABC, peak replacement; and PowerEx to BPA for Palo Alto, peak replacement.

### **Contracts In**

This analysis includes the following changes in BPA intraregional contracts in: AVC to BPA, supplemental peak replacement, and WNP-3 settlement; Chelan County PUD to BPA, supplemental peak replacement; Colockum County PUD to BPA, supplemental peak replacement; Cowlitz County PUD to BPA, supplemental peak replacement; Douglas County PUD to BPA, supplemental peak replacement; EWEB to BPA, supplemental peak replacement; City of Forest Grove to BPA, supplemental peak replacement; Grant County PUD to BPA, supplemental peak replacement; Kittitas County PUD to BPA, supplemental peak replacement; City of McMinnville to BPA, supplemental peak replacement; MPC to BPA, peak replacement; Okanogan County PUD to BPA, supplemental peak replacement; other utilities to BPA, power sales and supplemental peak replacement; PGE to BPA,

supplemental peak replacement, peak replacement, and WNP-3 settlement terminated; PP&L to BPA, peak replacement and supplemental peak replacement; and PSE to BPA, supplemental peak replacement and WNP-3 settlement, with surplus power exchange ended; SCL to BPA, supplemental peak replacement; and TPU to BPA, supplemental peak replacement.

**Table 8**

**Federal Firm Energy Surplus/Deficit Projections, Difference Between the 1998 Final White Book and the 1997 White Book Under 1937 Water Conditions <sup>1</sup> (Energy in Average Megawatts)**

Operating Year <sup>2</sup>	2000	2001	2002 <sup>3</sup>	2003 <sup>3</sup>	2004 <sup>3</sup>	2005 <sup>3</sup>	2006 <sup>3</sup>	2007 <sup>3</sup>	2008 <sup>3</sup>
<b>1. 1997 White Book Federal Firm Surplus/Deficit</b>	540	395	350	346	304	310	357	608	704
<b>2. Firm Load Changes for the 1998 Final White Book (+ indicates load increase; - indicates load decrease)</b>									
a) DSI Loads as of 12/31/97 <sup>4</sup>	-206	-212	-225	-225	-225	-225	-225	-225	-225
b) Small & Non-Gen Public Purchase	0	71	147	147	147	147	147	147	147
c) Exports <sup>5</sup>	310	373	437	410	287	179	149	127	67
d) Contracts Out	1,009	590	890	922	867	871	864	301	197
e) Generating Public Agencies Purchases	64	81	118	118	118	118	118	118	118
f) Miscellaneous	1	0	-1	-1	1	-1	0	1	0
Total Load Change	1,178	903	1,366	1,371	1,195	1,089	1,053	469	304
<b>3. Resource Changes for the 1998 Final White Book (+ indicates resource increase; - indicates resource decrease)</b>									
a) Regulated Hydro (1937 12-Month Average)	-291	-201	-82	-75	-67	-60	-52	-45	-38
b) Independent Hydro (1937 12-Month Average)	-1	-1	13	14	14	14	14	14	14
c) Canadian Entitlement for Canada	0	0	0	0	0	0	0	0	0
d) Imports <sup>6</sup>	69	50	41	41	112	9	18	18	18
e) Contracts In	465	396	299	238	179	179	180	180	192
f) Large Thermal	44	-1	124	-1	124	-1	124	-1	124
f) Renewable Resources	0	0	0	0	0	0	0	0	0
h) Non-Utility Generation	-8	-1	0	22	29	29	29	29	29
g) Miscellaneous	1	0	-1	1	1	1	0	-1	0
Total Resource Changes	279	242	394	240	392	171	313	194	339
<b>4. 1998 Final White Book Federal Firm Surplus/Deficit (line 1 – line 2 + line 3)</b>	-358	-266	-622	-785	-499	-609	-383	335	739

<sup>1</sup> The 1997 and 1998 White Book analyses both assume a 12-month annual average under 1937 water conditions.

<sup>2</sup> Operating Year (OY) is the 12-month period August 1 through July 31. For example, OY 1999-2000 is August 1, 1999, through July 31, 2000.

<sup>3</sup> After OY 2001, BPA's public agency and DSI firm requirements shown on lines 2a, 2b, and 2e assume that BPA's power sales contracts and public agency load diversification remain at the FY 2001 level through the remainder of the study period. In OY 2002 and beyond, however, these projected requirements are highly uncertain because BPA's firm contractual obligations and the impacts of deregulating the wholesale and retail electric utility industry are unknown.

<sup>4</sup> The DSI loads were updated for the 1998 analysis.

<sup>5</sup> Exports include: power sale-capacity/exchange energy contracts with the cities of Burbank, Glendale, and Pasadena, and with SCE, are assumed to be in power sales mode through the study horizon.

<sup>6</sup> Imports include: option energy from SCE through OY 2004. Supplemental energy from the cities of Burbank, Glendale, and Pasadena, and from SCE, are considered to be BPA resource options and are not included in this study.

### **Federal Loads and Resources Comparison—Capacity**

Table 9, page 32, shows changes in the capacity analysis of the 1998 Pacific Northwest Loads and Resources Study compared to the 1997 study for OY 1999-2000. The table lists the Federal system firm 50-hours-per-week capacity surplus/deficit projections for the 1997 study and changes since last year to obtain the current firm 50-hours-per-week capacity surplus/deficit projections under the medium load forecast. For “Load Changes,” table 9, line 2, positive values indicate load increases and negative values show load decreases. Similarly, for “Resource Changes,” table 9, line 3, positive values indicate additional resource availability and negative values show decreases in resource availability.

Changes were based on those previously discussed in “Federal System Loads and Resources Comparison-Energy,” page 27, plus the following changes which pertain only to the capacity analysis.

#### **Federal System Diversity**

The decreases in the obligation of the Federal system to the public agencies and IOUs under their power sales contracts decreased Federal system diversity impacts.

#### **Extreme Weather Adjustment**

The extreme weather adjustments changed slightly compared to the 1997 study mainly due to decreases in BPA’s obligation to public agencies under their power sales contracts.

#### **Sustained Peaking Adjustment**

The 50-hours-per-week sustained peaking adjustment in this year’s analysis decreased the regional capacity surplus in the hydro regulation versus the 1997 study. This is due to changes in the shaping of the hydro system due to Columbia River Flow Augmentation (CRFA). By storing in the months of January through April 15, the availability of sustained peaking diminished dramatically in some months.

#### **Hydro Reserves/Large Thermal Reserves/Spinning Reserves**

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

**Table 9**

**Federal Firm Capacity Surplus/Deficit Projections, Difference Between the 1998 Final White Book and the 1997 White Book for Operating Year 1999-2000 Under 1937 Water Conditions <sup>1</sup> (Peak in Megawatts)**

<b>Operating Year<sup>2</sup> 1999-2000</b>	<b>Aug1</b>	<b>Aug2</b>	<b>Sep</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr1</b>	<b>Apr2</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>
<b>1. 1997 White Book Federal Firm Capacity Surplus/Deficit</b>	5,667	1,648	1,679	1,147	862	453	-2,090	-1,993	878	1,529	2,634	4,873	6,050	884
<b>2. Firm Load Changes for the 1998 Final White Book (+ indicates load increase; - indicates load decrease)</b>														
a) DSI Loads 12/31/97	401	401	-155	-244	-59	358	-588	-974	-1,135	-1,133	-1,133	12	12	354
b) Small & Non-Gen Public Purchase	17	17	9	21	38	35	68	45	22	13	12	12	-7	10
c) Exports <sup>3</sup>	76	76	77	285	279	279	280	281	279	432	431	231	230	88
d) Contracts Out	199	199	198	212	97	162	927	925	973	953	953	961	960	398
e) Generating Public Agencies Purchase	233	216	142	167	155	226	223	222	225	133	158	330	203	209
f) Federal Diversity	-59	-56	-46	-48	-29	-30	-85	-84	-122	-110	-113	-156	-150	-80
g) Federal Losses	0	0	0	0	0	0	0	0	0	0	0	0	0	0
h) Federal Extreme Weather Adj.	0	0	0	0	-24	3	59	40	0	0	0	0	0	0
i) Miscellaneous	1	0	1	0	0	0	0	2	-1	0	0	0	1	0
Total Load Change	868	853	226	393	457	1,033	884	457	241	288	308	1,390	1,249	979
<b>3. Resource Changes for the 1998 Final White Book (+ indicates resource increase; - indicates resource decrease)</b>														
a) Regulated Hydro (1937 12-Month Avg.)	-2,766	-2,336	-3,030	-3,057	-3,727	-2,347	-2,420	-2,570	-2,435	-1,658	-1,432	-1,353	-1,411	-2,618
b) Independent Hydro (1937 12-Month Avg.)	-2	-2	-2	-2	-2	-1	-2	0	-1	-2	-2	-1	-2	-1
c) Sustained Peaking Adjustment	471	2,125	2,778	2,701	1,804	3,249	3,126	2,397	2,051	1,297	-2,433	0	-828	4,785
d) Canadian Entitlement for Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0
e) Imports <sup>4</sup>	200	200	200	0	0	0	0	0	0	0	0	0	0	0
f) Contracts In	25	25	25	25	25	25	50	50	50	50	50	50	50	50
g) Renewable Resources	0	0	0	0	0	0	0	0	0	0	0	0	0	0
h) Large Thermal	0	0	-1,162	-1,162	0	0	0	0	0	0	1,162	1,162	0	0
i) Non-Utility Generation	0	0	0	0	0	0	0	0	0	0	0	0	0	0
j) Hydro Reserves	138	117	151	153	186	117	121	128	122	83	72	68	71	131
k) Large Thermal Reserves	0	0	174	174	0	0	0	0	0	0	-174	-174	0	0
l) Spinning Reserves	45	3	43	45	42	-25	-21	1	7	7	52	-9	53	-56
m) Miscellaneous	0	-1	1	1	-1	0	2	1	-1	0	-1	0	1	0
Total Resource Change	-1,889	131	-822	-1,122	-1,673	1,018	856	7	-207	-223	-2,706	-257	-2,066	2,291
<b>4. 1998 Final White Book Federal Firm Capacity Surplus/Deficit (line 1 – line 2 + line 3)</b>	2,911	927	630	-368	-1,268	439	-1,918	-2,443	430	1,018	-380	3,227	2,735	2,196

<sup>1</sup> 1997 and 1998 White Book analyses both assume 12-month annual average water conditions.

<sup>2</sup> Operating Year (OY) is the 12-month period August 1 through July 31. For example, OY 1999-2000 is August 1, 1999, through July 31, 2000.

<sup>3</sup> Exports include: power sales-capacity/energy exchange contracts with the cities of Burbank, Glendale, and Pasadena, and with SCE.

<sup>4</sup> Imports include: option energy from SCE through OY 2004. Supplemental energy from the cities of Burbank, Glendale, and Pasadena, and from SCE, are considered to be BPA resource options and are not included in this study.

## Section 6: Regional Analysis

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

- Capacity surplus/deficit values do not reflect potential nighttime return problems on regional entities;
- The region experiences medium load growth;
- The Pacific Northwest Coordination Agreement, which expires June 30, 2003, is replaced with a like agreement;
- Federal surplus firm power sales and capacity/energy exchange agreements with the cities of Burbank, Glendale, and Pasadena, and with SCE, are shown in power sales mode throughout the study period;
- BPA purchases option energy from SCE through 2004;
- SCE purchases option capacity from BPA through 2004;
- Sustained capacity limits are 50 hours per week; and
- Extreme weather adjustments are assumed for capacity in the months of November through February. These adjustments vary monthly from 3,700 to 4,400 peak megawatts under the medium load forecast.

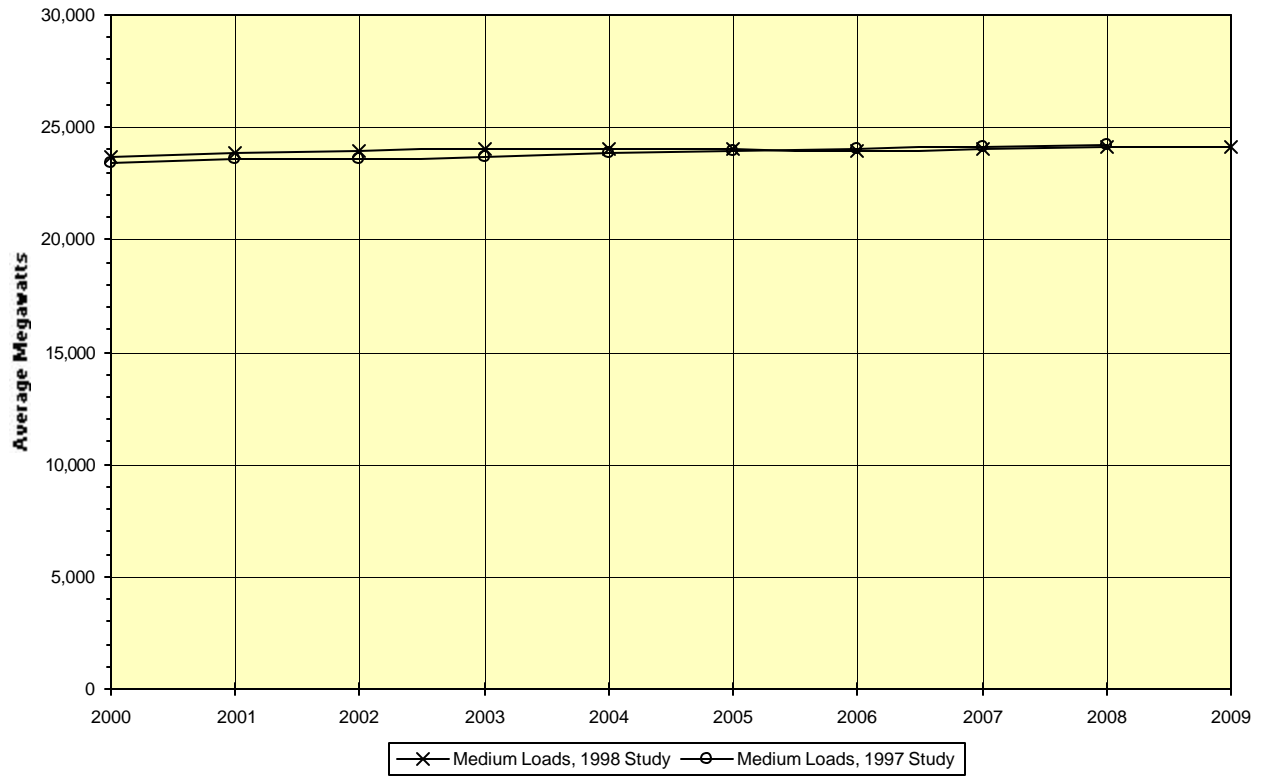
This analysis includes current operating requirements adopted by the hydroelectric project owners and incorporates the NMFS 1995 and 1998 BOs.

### ***Regional Firm Energy Loads***

Regional firm energy loads for OY 1999-2000 through 2008-09 based on BPA's 1998 White Book forecast are shown in figure 8, page 34. The load projections also include all intraregional contracts made by Pacific Northwest utilities and the Federal system. The regional firm energy load for the medium load forecast is presented on line 4 in exhibit 19, page 82, and the monthly firm loads for OY 1999-2000, 2003-04, and 2008-09 under the medium load forecast are presented in exhibits 20 through 22, pages 86 through 91.

Figure 8

Regional Firm Annual Energy Loads  
1998 BPA Forecast



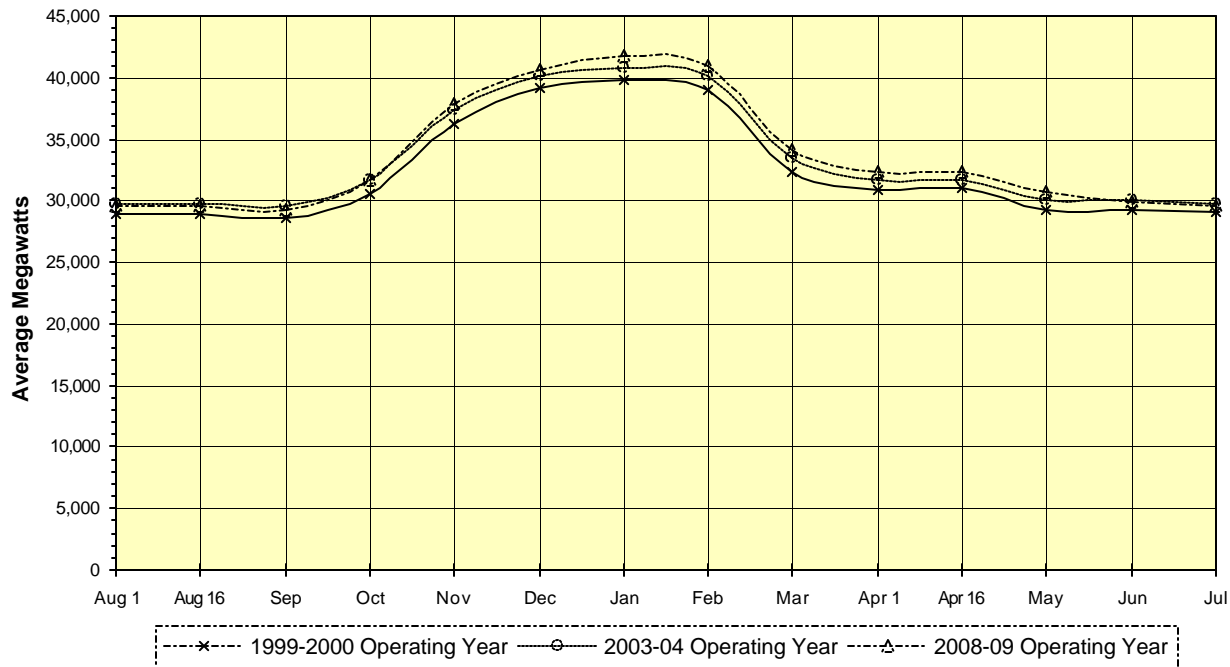
### Regional Firm Peak Loads

Figure 9, below, illustrates the regional firm peak loads under the medium load forecast for OY 1999-2000, 2003-04, and 2008-09. The figures show the expected 1-hour monthly demand under BPA's 1998 White Book load forecast and include extreme weather adjustments for capacity. Extreme weather conditions were assumed for the months of November through February and estimate a 5-percent probability that the forecasted peak load will be exceeded. In the months of March through October, the peak loads estimate normal weather conditions with a 50-percent probability that the forecasted peak load will be exceeded. The projected regional peak loads include all intraregional contracts made by Pacific Northwest utilities, including the Federal system. The peak load projections are decreased by a diversity factor due to the fact that all peak electrical demands do not occur simultaneously throughout the region.

The monthly regional firm peak loads are presented on line 4 and the extreme weather adjustments to the regional peak loads are presented on line 34 of exhibits 24 through 26, pages 96 through 101 for the medium load forecast.

**Figure 9**

**Regional Firm Peak Loads for OY 1999-2000, 2003-04, and 2008-09  
Under Extreme Weather Conditions<sup>1</sup>**



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

## **Regional Firm Resources**

Table 10, below, summarizes the regional system resources for OY 1999-2000.

Hydroelectric resources make up a smaller percentage of the regional resources than of the Federal system resources because most of the thermal resources are owned by investor-owned utilities in the region. These thermal resources are composed primarily of IOU-owned coal, gas, and oil-fired projects and NWE's WNP-2 nuclear plant. A detailed listing of all regional generating resources is contained in the 1998 Pacific Northwest Loads and Resources Study Technical Appendix (available July 1999 on BPA's external web site at <http://www.bpa.gov/power/whitebook98>).

**Table 10**

**Regional Firm Resources for OY 1999-2000<sup>1</sup> Based on 1936-37 Water Conditions  
Capacity Based on January 2000**

<b>Project Type</b>	<b>Sustained Peak Capacity (MW)</b>	<b>Generating Peak Capacity % of Total</b>	<b>Firm Energy (aMW) 12-Month Average</b>	<b>Firm Energy % of Total</b>
Hydro	25,988	68	11,853	56
Coal	4,556	12	3,981	19
Nuclear	1,162	3	885	4
Imports	2,874	7	1,714	8
Combustion Turbines	1,637	4	754	4
Non-Utility Generation	1,164	3	1,056	5
Miscellaneous	1,019	3	829	4
<b>Total Resources</b>	<b>38,400</b>	<b>100</b>	<b>21,072</b>	<b>100</b>

## **Regional Firm Energy Surplus/Deficit Projections**

This study includes all operating requirements currently adopted by the hydroelectric project owners and the firm planning assumptions from the NMFS 1995 and 1998 BOs.

The regional firm energy surplus/deficit projections for the medium load forecast for OY 1999-2000 through 2008-09 assuming 1936-37 water conditions are presented in table 11 and depicted graphically in figure 10, page 37. The region experiences firm energy deficits in all study years under the medium load forecast.

The regional energy surpluses/deficits for the medium load scenario are presented on line 35 in exhibit 19, page 82. Monthly regional firm energy loads and resources balances under the medium load forecast for OY 1999-2000, 2003-04, and 2008-09 are presented in exhibits 20 through 22, on pages 86 through 91.

<sup>1</sup> Operating Year (OY) is the 12-month period August 1 through July 31. For example, OY 1999-2000 is August 1, 1999, through July 31, 2000.

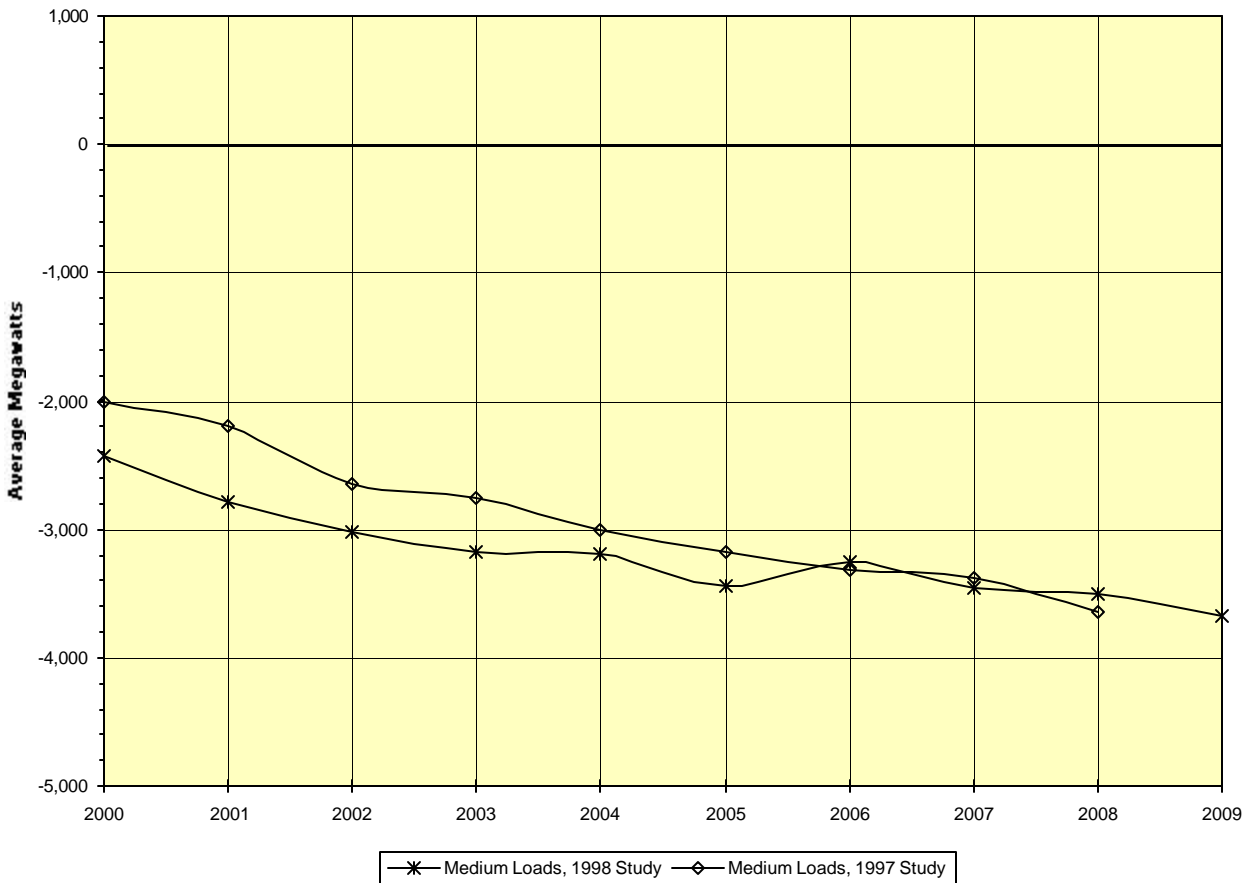
**Table 11**

**Regional Firm Energy Surplus/Deficit Projections Assuming Existing Loads, Resources, and Contracts  
Energy in Average Megawatts**

Medium Load Scenario	Operating Year										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	
	-2,631	-2,807	-2,977	-3,131	-3,134	-3,399	-3,202	-3,413	-3,452	-3,626	

**Figure 10**

**Regional Firm Annual Energy Surplus/Deficit Projections**



### ***Regional Firm Capacity Surplus/Deficit Projections***

Figure 11, page 39, shows the region's firm 50-hours-per-week capacity surplus/deficit projections under the medium load forecast for OY 1999-2000, 2003-04, and 2008-09. This analysis incorporates all operating restrictions currently adopted by the hydroelectric project owners and the firm planning assumptions from the NMFS 1995 and 1998 BOs.

The regional firm capacity surpluses/deficits incorporate the regional assumptions on page 33.

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

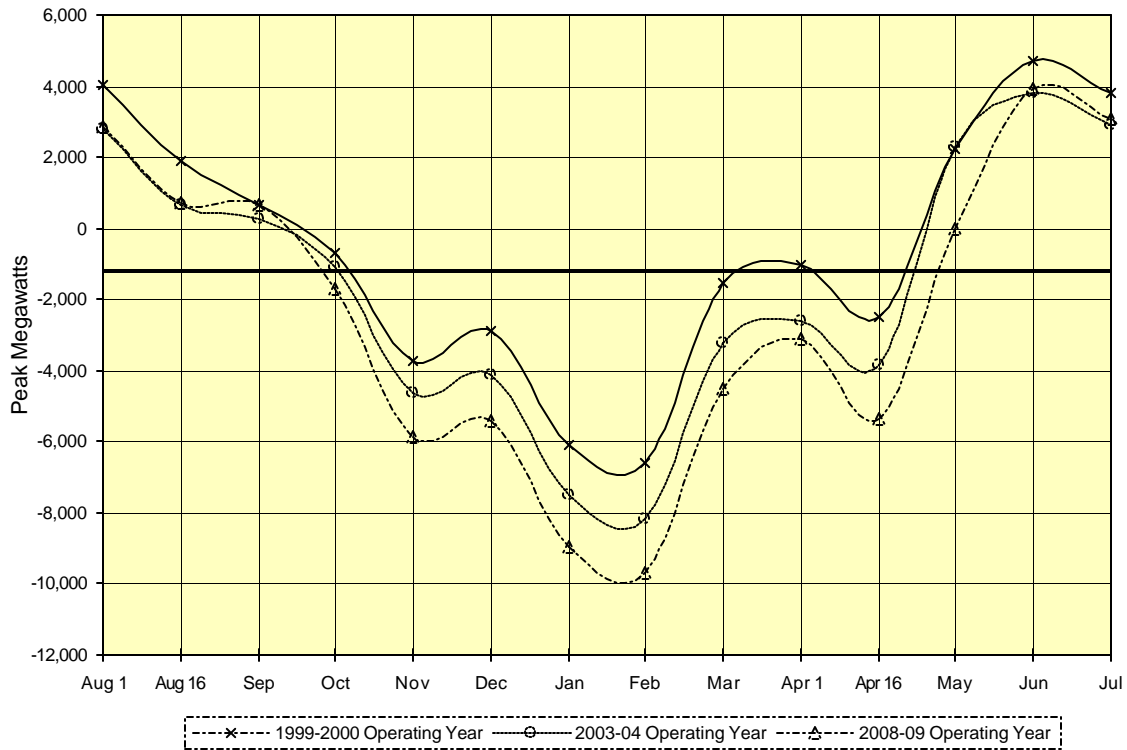
- Low regional system loads;
- Nonpower hydro requirements that dictate minimum streamflows; and
- The inability of the region's thermal resources to cycle from day to night.

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

A 10-year summary of regional firm capacity surplus/deficit projections for the medium load forecast is shown in exhibit 23, page 93. Monthly firm capacity surpluses/deficits under the medium forecast for OY 1999-2000, 2003-04, and 2008-09 are presented in exhibits 24 through 26 on pages 96 through 101.

Figure 11

Regional Monthly Firm Capacity Surplus/Deficit Projections Under Extreme Weather Conditions<sup>1</sup>



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

## **Section 7: Federal System Exhibits**

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*Exhibit 1*

*Federal System Annual Energy Analysis Under 1937 Water Conditions for  
10 Operating Years*

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

MEDIUM LOADS										
1998 WHITE BOOK: 12/31/98										
OPERATING YEAR										
	1999- 0	2000- 1	2001- 2	2002- 3	2003- 4	2004- 5	2005- 6	2006- 7	2007- 8	2008- 9
MEGAWATTS	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG	AVG
	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
LOADS										
1 FEDERAL AGENCIES	148	149	150	151	152	153	153	155	155	156
2 FEDERAL GPU TRANS LOSSES	61	62	28	25	24	24	22	20	19	19
3 FEDERAL NGP TRANS LOSSES	107	108	108	109	110	111	111	112	113	114
4 USBR	67	67	68	68	68	68	68	68	68	68
5 DSI FIRM LOAD	1884	1952	1952	1952	1952	1952	1952	1952	1952	1952
6 DSI FIRM LOSSES	53	55	55	55	55	55	55	55	55	55
7 SM & NON GEN PUB PURCH 1/	2128	2188	2264	2264	2264	2264	2264	2264	2264	2264
8 FIRM SYSTEM LOAD	4448	4582	4625	4624	4625	4627	4626	4626	4627	4629
TRANSFERS OUT										
9 EXPORTS 2/	1174	1263	1314	1239	1178	1060	1030	1009	935	848
10 CONTRACTS OUT 3/	2012	1379	1676	1807	1753	1759	1692	878	677	676
11 CSPE TO WEST GROUP UTIL 4/	102	98	94	61	0	0	0	0	0	0
12 GEN PUB AGEN PSC PURCH 5/	1315	1541	1578	1578	1578	1578	1578	1578	1578	1578
13 IOU PSC PURCHASE 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	9051	8862	9287	9309	9135	9023	8926	8091	7817	7731
HYDRO RESOURCES										
16 REGULATED HYDRO	6361	6361	6375	6382	6390	6397	6405	6412	6419	6422
17 INDEPENDENT HYDRO	379	379	393	394	394	394	394	394	394	394
18 SUS. PKNG. ADJUSTMENT 8/	0	0	0	0	0	0	0	0	0	0
19 NON-FED CER(CSPE) TO BPA 9/	23	22	21	14	0	0	0	0	0	0
20 NON-FED CER(CAN) TO BPA 10/	83	81	80	100	145	148	144	144	143	143
21 RESTORATION 11/	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26
22 TOTAL HYDRO	6819	6817	6842	6865	6903	6914	6917	6925	6931	6934
OTHER RESOURCES										
23 SMALL THERMAL & MISC	0	0	0	0	0	0	0	0	0	0
24 COMBUSTION TURBINES	0	0	0	0	0	0	0	0	0	0
25 RENEWABLES 12/	29	29	29	29	29	29	29	29	29	29
26 COGENERATION	0	0	0	0	0	0	0	0	0	0
27 IMPORTS 13/	327	308	299	299	299	192	192	192	192	190
28 CONTRACTS IN 14/	624	552	479	418	359	359	359	359	359	359
29 LARGE THERMAL 15/	885	875	1000	875	1000	875	1000	875	1000	875
30 NON-UTILITY GENERATION 16/	8	15	16	38	45	45	45	45	45	45
31 RESOURCE ACQUISITIONS 17/	0	0	0	0	0	0	0	0	0	0
32 TOTAL RESOURCES	8692	8596	8665	8524	8636	8415	8543	8425	8556	8432

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

MEDIUM LOADS										
1998 WHITE BOOK: 12/31/98										
OPERATING YEAR										
RUN DATE: 12/31/98										
MEGAWATTS	1999-0 AVG	2000-1 AVG	2001-2 AVG	2002-3 AVG	2003-4 AVG	2004-5 AVG	2005-6 AVG	2006-7 AVG	2007-8 AVG	2008-9 AVG
RESERVES & MAINTENANCE										
33 HYD SM THRM & MISC RES 18/	0	0	0	0	0	0	0	0	0	0
34 LARGE THERMAL RESERVES 19/	0	0	0	0	0	0	0	0	0	0
35 SPINNING RESERVES 20/	0	0	0	0	0	0	0	0	0	0
36 FEDERAL HYDRO MAINT 21/	0	0	0	0	0	0	0	0	0	0
37 NET RESOURCES	8692	8596	8665	8524	8636	8415	8543	8425	8556	8432
SURPLUS/DEFICITS										
38 FIRM SURPLUS/DEFICIT	-358	-266	-622	-785	-499	-609	-383	335	739	701
39 EXTREME WEATHER ADJ. 22/	0	0	0	0	0	0	0	0	0	0
40 FIRM S/D W/EXT WEATHER ADJ.	-358	-266	-622	-785	-499	-609	-383	335	739	701
41 POSS FED EXT WTHR. OBLG 23/	0	0	0	0	0	0	0	0	0	0
42 FIRM S/D W/EXT WTHR. OBLIG	-358	-266	-622	-785	-499	-609	-383	335	739	701

NOTE: 1. THE FOLLOWING CONTRACTS ARE SHOWN AS POWER SALES THROUGH THE STUDY HORIZON.

- A. BPA TO BURBANK: PS & C/N/X      C. BPA TO PASADENA: PS & C/N/X  
B. BPA TO GLENDALE: PS & C/N/X      D. BPA TO SCE: PS & C/N/X

2. BPA TO PSP&L: PS & SPX CONVERTS TO A SEASONAL POWER EXCHANGE OY 2002.

3. SCE TO BPA: OPTION ENERGY IS INCLUDED THROUGH OY 2004.

4. BPA TO SCE: OPTION CAPACITY IS INCLUDED THROUGH OY 2004.

5. THE FOLLOWING CONTRACTS ARE RESOURCE OPTIONS AND NOT INCLUDED THROUGH THE STUDY HORIZON.

- A. BGP TO BPA: SUPPLEMENTAL ENERGY      B. SCE TO BPA: SUPPLEMENTAL ENERGY

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Exhibits 2 - 4

*Federal System Monthly Energy Analysis Under Medium Loads for  
1937 Water Conditions*

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

MEDIUM LOADS															
1998 WHITE BOOK: 12/31/98															
1999-0 OPERATING YEAR															
RUN DATE: 12/31/98															
1937 WATER YEAR	AUG	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	APR	MAY	JUN	JUL	12 MO
ENERGY IN AVERAGE MEGAWATTS	1-15	16-31								1-15	16-30				AVG
	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
<b>LOADS</b>															
1 FEDERAL AGENCIES	146	146	138	142	150	167	161	162	154	142	142	136	135	144	148
2 FEDERAL GPU TRANS LOSSES	41	42	49	75	84	90	81	67	56	56	50	48	44	40	61
3 FEDERAL NGP TRANS LOSSES	95	95	89	93	113	132	135	127	110	103	103	97	97	97	107
4 USBR	161	161	109	42	2	2	2	2	4	49	49	117	151	168	67
5 DSI FIRM LOAD	2484	2484	1945	1911	2088	2489	1578	1209	1051	1051	1051	2156	2155	2487	1884
6 DSI FIRM LOSSES	65	65	51	52	61	77	49	37	30	29	29	58	58	65	53
7 SM & NON GEN PUB PURCH 1/	2088	2088	1908	1887	2215	2397	2538	2364	2143	2079	2082	1904	1962	2054	2128
	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
8 FIRM SYSTEM LOAD	5080	5081	4289	4202	4713	5354	4544	3968	3548	3509	3506	4516	4602	5055	4448
<b>TRANSFERS OUT</b>															
9 EXPORTS 2/	1225	1225	1238	1178	1057	1072	1059	1063	997	1104	1138	1226	1443	1406	1174
10 CONTRACTS OUT 3/	1247	1247	1299	1493	1814	1967	2730	2658	2464	2199	2199	2289	2304	1683	2012
11 CSPE TO WEST GROUP UTIL 4/	103	103	103	103	103	103	103	103	103	99	99	99	99	99	102
12 GEN PUB AGEN PSC PURCH 5/	1166	1180	1145	1225	1493	1590	1723	1722	1424	1174	1167	1131	962	1020	1315
13 IOU PSC PURCHASE 6/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14 FED DIVERSITY 7/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
15 FIRM LOADS	8820	8835	8074	8201	9180	10087	10159	9513	8535	8086	8110	9261	9410	9263	9051
<b>HYDRO RESOURCES</b>															
16 REGULATED HYDRO	7062	5459	5761	5622	5928	7254	6310	6006	5163	5307	5222	8668	7494	6599	6361
17 INDEPENDENT HYDRO	409	407	345	370	296	225	166	187	265	419	498	685	719	423	379
18 SUS. PKNG. ADJUSTMENT 8/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 NON-FED CER(CSPE) TO BPA 9/	23	23	23	23	23	23	23	23	23	22	22	22	22	22	23
20 NON-FED CER(CAN) TO BPA 10/	83	83	83	83	83	83	83	83	83	82	82	82	82	82	83
21 RESTORATION 11/	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26
	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
22 TOTAL HYDRO	7551	5946	6186	6072	6304	7559	6556	6273	5508	5804	5798	9431	8291	7100	6819
<b>OTHER RESOURCES</b>															
23 SMALL THERMAL & MISC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24 COMBUSTION TURBINES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25 RENEWABLES 12/	27	27	27	28	29	31	32	31	31	30	30	27	27	27	29
26 COGENERATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27 IMPORTS 13/	323	323	348	268	282	351	468	566	498	499	177	89	181	212	327
28 CONTRACTS IN 14/	536	536	648	648	648	668	693	693	673	639	639	527	639	475	624
29 LARGE THERMAL 15/	1000	820	433	277	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	885
30 NON-UTILITY GENERATION 16/	5	5	5	7	11	13	13	12	9	8	8	6	6	5	8
31 RESOURCE ACQUISITIONS 17/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
32 TOTAL RESOURCES	9442	7657	7648	7301	8274	9622	8762	8575	7720	7980	7652	11080	10144	8819	8692

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

MEDIUM LOADS															
1998 WHITE BOOK: 12/31/98															
1999-0 OPERATING YEAR															
RUN DATE: 12/31/98															
1937 WATER YEAR															
ENERGY IN AVERAGE MEGAWATTS	AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN	JUL	12 MO AVG
RESERVES & MAINTENANCE	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
33 HYD SM THRM & MISC RES 18/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
34 LARGE THERMAL RESERVES 19/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35 SPINNING RESERVES 20/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36 FEDERAL HYDRO MAINT 21/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
37 NET RESOURCES	9442	7657	7648	7301	8274	9622	8762	8575	7720	7980	7652	11080	10144	8819	8692
SURPLUS/DEFICITS															
38 FIRM SURPLUS/DEFICIT	622	-1178	-426	-900	-907	-465	-1397	-938	-816	-106	-458	1820	734	-445	-358
39 EXTREME WEATHER ADJ. 22/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40 FIRM S/D W/EXT WEATHER ADJ.	622	-1178	-426	-900	-907	-465	-1397	-938	-816	-106	-458	1820	734	-445	-358
41 POSS FED EXT WTHR. OBLG 23/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
42 FIRM S/D W/EXT WTHR. OBLIG	622	-1178	-426	-900	-907	-465	-1397	-938	-816	-106	-458	1820	734	-445	-358

NOTE: 1. THE FOLLOWING CONTRACTS ARE SHOWN AS POWER SALES THROUGH THE STUDY HORIZON.

A. BPA TO BURBANK: PS & C/N/X      C. BPA TO PASADENA: PS & C/N/X

B. BPA TO GLENDALE: PS & C/N/X      D. BPA TO SCE: PS & C/N/X

2. BPA TO PSP&L: PS & SPX CONVERTS TO A SEASONAL POWER EXCHANGE OY 2002.

3. SCE TO BPA: OPTION ENERGY IS INCLUDED THROUGH OY 2004.

4. BPA TO SCE: OPTION CAPACITY IS INCLUDED THROUGH OY 2004.

5. THE FOLLOWING CONTRACTS ARE RESOURCE OPTIONS AND NOT INCLUDED THROUGH THE STUDY HORIZON.

A. BGP TO BPA: SUPPLEMENTAL ENERGY      B. SCE TO BPA: SUPPLEMENTAL ENERGY

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

## MEDIUM LOADS

1998 WHITE BOOK: 12/31/98

2003- 4 OPERATING YEAR

RUN DATE: 12/31/98

## 1937 WATER YEAR

ENERGY IN AVERAGE MEGAWATTS	AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN	JUL	12 MO AVG
LOADS	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
1 FEDERAL AGENCIES	149	149	141	145	154	171	165	166	158	145	145	139	138	148	152
2 FEDERAL GPU TRANS LOSSES	14	14	16	33	38	39	34	24	23	23	15	16	15	15	24
3 FEDERAL NGP TRANS LOSSES	98	98	92	96	116	134	138	130	113	106	106	100	100	99	110
4 USBR	162	162	109	42	2	2	2	2	4	50	50	118	152	169	68
5 DSI FIRM LOAD	2486	2486	1962	2078	2088	2488	1922	1382	1199	1049	1049	2156	2156	2464	1952
6 DSI FIRM LOSSES	65	65	51	56	61	77	60	43	35	29	29	58	58	64	55
7 SM & NON GEN PUB PURCH 1/	2518	2518	2359	1872	2291	2470	2685	2513	2292	2233	2236	1910	1967	2056	2264
8 FIRM SYSTEM LOAD	5492	5492	4730	4322	4750	5381	5006	4260	3824	3635	3630	4497	4586	5015	4625
TRANSFERS OUT															
9 EXPORTS 2/	1395	1395	1412	1341	1233	1252	1032	1033	964	949	946	1037	1246	1248	1178
10 CONTRACTS OUT 3/	1623	1623	1510	1557	1887	2037	2034	1969	1756	1718	1717	1596	1659	1696	1753
11 CSPE TO WEST GROUP UTIL 4/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12 GEN PUB AGEN PSC PURCH 5/	1441	1459	1453	1493	1764	1865	1990	1989	1683	1452	1445	1352	1190	1261	1578
13 IOU PSC PURCHASE 6/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14 FED DIVERSITY 7/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15 FIRM LOADS	9951	9969	9105	8713	9634	10535	10062	9251	8227	7754	7738	8482	8681	9220	9135
HYDRO RESOURCES															
16 REGULATED HYDRO	7101	5487	5787	5649	5960	7289	6347	6029	5184	5340	5254	8702	7521	6620	6390
17 INDEPENDENT HYDRO	431	429	366	384	304	236	175	195	273	433	512	707	741	445	394
18 SUS. PKNG. ADJUSTMENT 8/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 NON-FED CER(CSPE) TO BPA 9/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 NON-FED CER(CAN) TO BPA 10/	143	143	143	143	143	143	143	143	143	150	150	150	150	150	145
21 RESTORATION 11/	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26
22 TOTAL HYDRO	7649	6033	6270	6150	6381	7642	6639	6341	5574	5897	5890	9533	8386	7189	6903
OTHER RESOURCES															
23 SMALL THERMAL & MISC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24 COMBUSTION TURBINES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25 RENEWABLES 12/	27	27	27	28	29	31	32	31	31	30	30	27	27	27	29
26 COGENERATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27 IMPORTS 13/	204	204	237	268	266	321	437	535	498	499	177	89	181	212	299
28 CONTRACTS IN 14/	275	275	387	387	387	387	387	387	387	387	387	275	387	275	359
29 LARGE THERMAL 15/	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
30 NON-UTILITY GENERATION 16/	43	43	44	42	47	50	50	49	48	46	46	37	47	44	45
31 RESOURCE ACQUISITIONS 17/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32 TOTAL RESOURCES	9198	7582	7965	7875	8110	9431	8545	8343	7538	7859	7530	10962	10028	8747	8636

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

## MEDIUM LOADS

1998 WHITE BOOK: 12/31/98

2003- 4 OPERATING YEAR

RUN DATE: 12/31/98

1937 WATER YEAR

ENERGY IN AVERAGE MEGAWATTS	AUG 1-15 ----	AUG 16-31 ----	SEP ----	OCT ----	NOV ----	DEC ----	JAN ----	FEB ----	MAR ----	APR 1-15 ----	APR 16-30 ----	MAY ----	JUN ----	JUL ----	12 MO AVG ----
RESERVES & MAINTENANCE															
33 HYD SM THRM & MISC RES 18/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
34 LARGE THERMAL RESERVES 19/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35 SPINNING RESERVES 20/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36 FEDERAL HYDRO MAINT 21/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
37 NET RESOURCES	9198	7582	7965	7875	8110	9431	8545	8343	7538	7859	7530	10962	10028	8747	8636
SURPLUS/DEFICITS															
38 FIRM SURPLUS/DEFICIT	-753	-2387	-1140	-838	-1525	-1104	-1517	-908	-689	105	-208	2479	1347	-473	-499
39 EXTREME WEATHER ADJ. 22/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40 FIRM S/D W/EXT WEATHER ADJ.	-753	-2387	-1140	-838	-1525	-1104	-1517	-908	-689	105	-208	2479	1347	-473	-499
41 POSS FED EXT WTHR. OBLG 23/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
42 FIRM S/D W/EXT WTHR. OBLIG	-753	-2387	-1140	-838	-1525	-1104	-1517	-908	-689	105	-208	2479	1347	-473	-499

NOTE: 1. THE FOLLOWING CONTRACTS ARE SHOWN AS POWER SALES THROUGH THE STUDY HORIZON.

A. BPA TO BURBANK: PS &amp; C/N/X      C. BPA TO PASADENA: PS &amp; C/N/X

B. BPA TO GLENDALE: PS &amp; C/N/X      D. BPA TO SCE: PS &amp; C/N/X

2. BPA TO PSP&amp;L: PS &amp; SPX CONVERTS TO A SEASONAL POWER EXCHANGE OY 2002.

3. SCE TO BPA: OPTION ENERGY IS INCLUDED THROUGH OY 2004.

4. BPA TO SCE: OPTION CAPACITY IS INCLUDED THROUGH OY 2004.

5. THE FOLLOWING CONTRACTS ARE RESOURCE OPTIONS AND NOT INCLUDED THROUGH THE STUDY HORIZON.

A. BGP TO BPA: SUPPLEMENTAL ENERGY      B. SCE TO BPA: SUPPLEMENTAL ENERGY

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

## MEDIUM LOADS

1998 WHITE BOOK: 12/31/98

2008- 9 OPERATING YEAR

RUN DATE: 12/31/98

## 1937 WATER YEAR

ENERGY IN AVERAGE MEGAWATTS	AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN	JUL	12 MO AVG
LOADS	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1 FEDERAL AGENCIES	154	154	145	149	159	177	170	171	162	150	150	143	142	152	156
2 FEDERAL GPU TRANS LOSSES	10	10	12	29	33	34	29	20	19	19	10	11	11	11	19
3 FEDERAL NGP TRANS LOSSES	101	101	96	100	119	137	141	134	117	109	109	104	104	103	114
4 USBR	162	162	109	42	2	2	2	2	4	50	50	118	152	170	68
5 DSI FIRM LOAD	2486	2486	1962	2078	2088	2488	1922	1382	1199	1049	1049	2156	2156	2464	1952
6 DSI FIRM LOSSES	65	65	51	56	61	77	60	43	35	29	29	58	58	64	55
7 SM & NON GEN PUB PURCH 1/	2518	2518	2359	1872	2291	2470	2685	2513	2292	2233	2236	1910	1967	2056	2264
8 FIRM SYSTEM LOAD	5496	5496	4734	4326	4753	5385	5009	4265	3828	3639	3633	4500	4590	5020	4629
TRANSFERS OUT															
9 EXPORTS 2/	906	906	924	878	854	878	863	865	794	776	772	852	793	793	848
10 CONTRACTS OUT 3/	529	529	533	571	848	917	898	859	701	693	693	495	522	550	676
11 CSPE TO WEST GROUP UTIL 4/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12 GEN PUB AGEN PSC PURCH 5/	1441	1459	1453	1493	1764	1865	1990	1989	1683	1452	1445	1352	1190	1261	1578
13 IOU PSC PURCHASE 6/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14 FED DIVERSITY 7/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15 FIRM LOADS	8372	8390	7644	7268	8219	9045	8760	7978	7006	6560	6543	7199	7095	7624	7731
HYDRO RESOURCES															
16 REGULATED HYDRO	7144	5519	5815	5678	5996	7328	6388	6052	5209	5377	5289	8742	7552	6644	6422
17 INDEPENDENT HYDRO	431	429	366	384	304	236	175	195	273	433	512	707	741	445	394
18 SUS. PKNG. ADJUSTMENT 8/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 NON-FED CER(CSPE) TO BPA 9/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 NON-FED CER(CAN) TO BPA 10/	143	143	143	143	143	143	143	143	143	143	143	143	143	143	143
21 RESTORATION 11/	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26
22 TOTAL HYDRO	7692	6065	6298	6179	6417	7681	6680	6364	5599	5927	5918	9566	8410	7206	6934
OTHER RESOURCES															
23 SMALL THERMAL & MISC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24 COMBUSTION TURBINES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25 RENEWABLES 12/	27	27	27	28	29	31	32	31	31	30	30	27	27	27	29
26 COGENERATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27 IMPORTS 13/	117	117	150	194	259	313	287	243	213	215	177	89	93	124	190
28 CONTRACTS IN 14/	275	275	387	387	387	387	387	387	387	387	387	275	387	275	359
29 LARGE THERMAL 15/	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	0	0	1000	1000	875
30 NON-UTILITY GENERATION 16/	43	43	44	42	47	50	50	49	48	46	46	37	47	44	45
31 RESOURCE ACQUISITIONS 17/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32 TOTAL RESOURCES	9154	7527	7906	7830	8139	9462	8436	8074	7278	7605	6558	9995	9964	8676	8432

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

MEDIUM LOADS

1998 WHITE BOOK: 12/31/98

2008- 9 OPERATING YEAR

RUN DATE: 12/31/98

1937 WATER YEAR

ENERGY IN AVERAGE MEGAWATTS	AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN	JUL	12 MO AVG
RESERVES & MAINTENANCE	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
33 HYD SM THRM & MISC RES 18/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
34 LARGE THERMAL RESERVES 19/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35 SPINNING RESERVES 20/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36 FEDERAL HYDRO MAINT 21/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
37 NET RESOURCES	9154	7527	7906	7830	8139	9462	8436	8074	7278	7605	6558	9995	9964	8676	8432
SURPLUS/DEFICITS															
38 FIRM SURPLUS/DEFICIT	782	-863	262	562	-81	417	-324	96	272	1045	15	2795	2869	1052	701
39 EXTREME WEATHER ADJ. 22/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40 FIRM S/D W/EXT WEATHER ADJ.	782	-863	262	562	-81	417	-324	96	272	1045	15	2795	2869	1052	701
41 POSS FED EXT WTHR. OBLG 23/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
42 FIRM S/D W/EXT WTHR. OBLIG	782	-863	262	562	-81	417	-324	96	272	1045	15	2795	2869	1052	701

NOTE: 1. THE FOLLOWING CONTRACTS ARE SHOWN AS POWER SALES THROUGH THE STUDY HORIZON.

- A. BPA TO BURBANK: PS & C/N/X      C. BPA TO PASADENA: PS & C/N/X
- B. BPA TO GLENDALE: PS & C/N/X      D. BPA TO SCE: PS & C/N/X

2. BPA TO PSP&L: PS & SPX CONVERTS TO A SEASONAL POWER EXCHANGE OY 2002.

3. SCE TO BPA: OPTION ENERGY IS INCLUDED THROUGH OY 2004.

4. BPA TO SCE: OPTION CAPACITY IS INCLUDED THROUGH OY 2004.

5. THE FOLLOWING CONTRACTS ARE RESOURCE OPTIONS AND NOT INCLUDED THROUGH THE STUDY HORIZON.

- A. BGP TO BPA: SUPPLEMENTAL ENERGY      B. SCE TO BPA: SUPPLEMENTAL ENERGY

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***Exhibit 5***

***Federal System Monthly 50-Hour Capacity Surplus/Deficit Under Medium Loads  
for 1937 Water Conditions***

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TABLE F-1: FEDERAL 50-HOUR SUSTAINED PEAKING

BASE CASE: EXISTING FEDERAL CONTRACTS

FEDERAL SYSTEM FIRM 50-HOUR CAPACITY SURPLUS/DEFICIT

INCLUDING EXTREME WEATHER ADJUSTMENTS DURING NOVEMBER THROUGH FEBRUARY

10 YEAR MONTHLY SUMMARY

ASSUMING NO NIGHTTIME RETURN CONSTRAINTS

EXISTING FEDERAL CONTRACTS AND NO NEW RESOURCE ACQUISITIONS

M E D I U M   L O A D S

1998 WHITE BOOK: 12/31/98

RUN DATE: 12/31/98

1937 WATER YEAR

	AUG 1-15 ----	AUG 16-31 ----	SEP ----	OCT ----	NOV ----	DEC ----	JAN ----	FEB ----	MAR ----	APR 1-15 ----	APR 16-30 ----	MAY ----	JUN ----	JUL ----
PEAK IN MEGAWATTS														
1999-00	2911	927	630	-368	-1268	439	-1918	-2443	430	1018	-380	3227	2735	2196
2000-01	2689	712	1337	631	-1429	316	-1714	-2094	1019	1552	-765	3012	3446	2356
2001-02	2423	428	1125	164	-1388	396	-1762	-2184	293	891	-469	3552	3089	1942
2002-03	1613	-388	456	28	-1559	223	-1515	-1960	547	761	-1546	2467	2928	1804
2003-04	1474	-510	334	-107	-1763	28	-1749	-2181	385	982	-378	3644	3182	2049
2004-05	1929	-54	810	341	-1587	204	-2005	-2461	98	696	-1338	2685	3433	2303
2005-06	1916	-67	820	329	-1572	249	-1840	-2292	230	874	-212	3807	3615	2485
2006-07	2104	121	1033	1303	-624	1233	-893	-1351	1350	1908	-125	3972	4702	3562
2007-08	3108	1125	1938	1474	-437	1417	-784	-1213	1480	2037	951	5087	4876	3748
2008-09	3282	1299	2119	1645	-306	1546	-758	-1229	1472	2031	-3	4134	5179	4049

NOTE: 1. THE FOLLOWING CONTRACTS ARE SHOWN AS POWER SALES THROUGH THE STUDY HORIZON.

A. BPA TO BURBANK: PS & C/N/X      C. BPA TO PASADENA: PS & C/N/X

B. BPA TO GLENDALE: PS & C/N/X      D. BPA TO SCE: PS & C/N/X

2. BPA TO PSP&L: PS & SPX CONVERTS TO A SEASONAL POWER EXCHANGE OY 2002.

3. SCE TO BPA: OPTION ENERGY IS INCLUDED THROUGH OY 2004.

4. BPA TO SCE: OPTION CAPACITY IS INCLUDED THROUGH OY 2004.

5. THE FOLLOWING CONTRACTS ARE RESOURCE OPTIONS AND NOT INCLUDED THROUGH THE STUDY HORIZON.

A. BGP TO BPA: SUPPLEMENTAL ENERGY      B. SCE TO BPA: SUPPLEMENTAL ENERGY

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***Exhibits 6 – 8***

***Federal System Monthly Capacity Analysis Under Medium Loads for  
1937 Water Conditions***

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

MEDIUM LOADS

1998 WHITE BOOK: 12/31/98

1999-0 OPERATING YEAR

RUN DATE: 12/31/98

1937 WATER YEAR	AUG	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	APR	MAY	JUN	JUL
PEAK IN MEGAWATTS	1-15	16-31								1-15	16-30			
LOADS														
1 FEDERAL AGENCIES	196	196	186	197	205	235	219	227	215	199	199	189	190	192
2 FEDERAL GPU TRANS LOSSES	72	83	107	144	158	184	158	140	118	117	105	88	72	66
3 FEDERAL NGP TRANS LOSSES	146	146	153	172	205	234	252	250	218	197	197	183	156	149
4 USBR	199	199	157	76	7	4	4	3	8	100	100	170	198	204
5 DSI FIRM LOAD	2494	2494	1953	1917	2096	2499	1587	1215	1057	1057	1057	2165	2165	2497
6 DSI FIRM LOSSES	72	72	59	61	73	92	62	46	38	36	36	71	65	72
7 SM & NON GEN PUB PURCH 1/	3117	3117	3095	3258	3616	3834	4050	4127	3708	3582	3582	3269	3068	3046
8 FIRM SYSTEM LOAD	6296	6307	5710	5825	6360	7082	6332	6008	5362	5288	5276	6135	5914	6226
TRANSFERS OUT														
9 EXPORTS 2/	2259	2259	2245	2202	1846	1846	1847	1848	1846	1999	2050	2164	2470	2483
10 CONTRACTS OUT 3/	2248	2248	2308	2670	3035	3269	4015	3937	3706	3222	3222	3267	3274	2540
11 CSPE TO WEST GROUP UTIL 4/	200	200	200	200	200	200	200	200	200	192	192	192	192	192
12 GEN PUB AGEN PSC PURCH 5/	1271	1223	1290	1701	1903	2131	2196	2270	1907	1680	1676	1637	1235	1062
13 IOU PSC PURCHASE 6/	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14 FED DIVERSITY 7/	-942	-938	-954	-1001	-932	-706	-776	-781	-1007	-919	-917	-1059	-1064	-942
15 FIRM LOADS	11331	11299	10799	11597	12412	13822	13814	13482	12014	11461	11498	12336	12021	11561
HYDRO RESOURCES														
16 REGULATED HYDRO	16563	16604	16690	16785	17094	18551	18570	18443	17958	17835	17705	17692	17890	16598
17 INDEPENDENT HYDRO	707	719	701	716	691	650	613	741	800	817	816	846	847	725
18 SUS. PKNG. ADJUSTMENT 8/	-100	-2714	-2649	-2792	-2716	-1597	-4683	-5033	-4863	-4578	-5811	-1200	-2359	-928
19 NON-FED CER(CSPE) TO BPA 9/	46	46	46	46	46	46	46	46	46	43	43	43	43	43
20 NON-FED CER(CAN) TO BPA 10/	155	142	144	148	144	143	148	144	143	142	154	141	142	147
21 RESTORATION 11/	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 TOTAL HYDRO	17371	14797	14932	14903	15259	17793	14694	14341	14084	14259	12907	17522	16563	16585
OTHER RESOURCES														
23 SMALL THERMAL & MISC	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24 COMBUSTION TURBINES	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25 RENEWABLES 12/	27	27	27	28	29	31	32	31	31	30	30	27	27	27
26 COGENERATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27 IMPORTS 13/	310	310	339	153	213	267	471	427	435	438	165	75	93	109
28 CONTRACTS IN 14/	25	25	25	25	25	25	50	50	50	50	50	50	50	50
29 LARGE THERMAL 15/	1162	1162	0	0	1162	1162	1162	1162	1162	1162	1162	1162	1162	1162
30 NON-UTILITY GENERATION 16/	1	1	1	1	1	1	1	1	1	1	1	1	1	1
31 RESOURCE ACQUISITIONS 17/	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32 TOTAL RESOURCES	18896	16322	15324	15110	16689	19279	16410	16012	15763	15940	14315	18837	17896	17934

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

MEDIUM LOADS														
1998 WHITE BOOK: 12/31/98														
1999-0 OPERATING YEAR														
RUN DATE: 12/31/98														
1937 WATER YEAR	AUG		SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	APR	MAY	JUN	JUL
PEAK IN MEGAWATTS	1-15	16-31								1-15	16-30			
RESERVES & MAINTENANCE	----	----	----	----	----	----	----	----	----	----	----	----	----	----
33 HYD SM THRM & MISC RES 18/	-865	-867	-871	-876	-891	-962	-961	-961	-939	-934	-927	-928	-938	-867
34 LARGE THERMAL RESERVES 19/	-174	-174	0	0	-174	-174	-174	-174	-174	-174	-174	-174	-174	-174
35 SPINNING RESERVES 20/	-352	-293	-254	-253	-304	-385	-322	-298	-290	-291	-291	-416	-393	-351
36 FEDERAL HYDRO MAINT 21/	-3263	-2761	-2770	-2752	-2705	-1866	-1408	-1883	-1915	-2061	-1805	-1756	-1635	-2785
37 NET RESOURCES	14242	12226	11429	11229	12615	15891	13546	12695	12444	12479	11118	15562	14755	13757
SURPLUS/DEFICITS														
38 FIRM SURPLUS/DEFICIT	2911	927	630	-368	203	2069	-268	-786	430	1018	-380	3227	2735	2196
39 EXTREME WEATHER ADJ. 22/	0	0	0	0	-4	-5	-4	-5	0	0	0	0	0	0
40 FIRM S/D W/EXT WEATHER ADJ.	2911	927	630	-368	199	2064	-272	-791	430	1018	-380	3227	2735	2196
41 POSS FED EXT WTHR. OBLG 23/	0	0	0	0	-1466	-1626	-1646	-1652	0	0	0	0	0	0
42 FIRM S/D W/EXT WTHR. OBLIG	2911	927	630	-368	-1268	439	-1918	-2443	430	1018	-380	3227	2735	2196

NOTE: 1. THE FOLLOWING CONTRACTS ARE SHOWN AS POWER SALES THROUGH THE STUDY HORIZON.

A. BPA TO BURBANK: PS &amp; C/N/X C. BPA TO PASADENA: PS &amp; C/N/X

B. BPA TO GLENDALE: PS &amp; C/N/X D. BPA TO SCE: PS &amp; C/N/X

2. BPA TO PSP&amp;L: PS &amp; SPX CONVERTS TO A SEASONAL POWER EXCHANGE OY 2002.

3. SCE TO BPA: OPTION ENERGY IS INCLUDED THROUGH OY 2004.

4. BPA TO SCE: OPTION CAPACITY IS INCLUDED THROUGH OY 2004.

5. THE FOLLOWING CONTRACTS ARE RESOURCE OPTIONS AND NOT INCLUDED THROUGH THE STUDY HORIZON.

A. BGP TO BPA: SUPPLEMENTAL ENERGY B. SCE TO BPA: SUPPLEMENTAL ENERGY

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

MEDIUM LOADS														
1998 WHITE BOOK: 12/31/98														
2003- 4 OPERATING YEAR                      RUN DATE: 12/31/98														
1937 WATER YEAR	AUG		SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	APR	MAY	JUN	JUL
PEAK IN MEGAWATTS	1-15	16-31								1-15	16-30			
LOADS	----	----	----	----	----	----	----	----	----	----	----	----	----	----
1 FEDERAL AGENCIES	200	200	190	201	210	241	224	232	220	204	204	194	195	196
2 FEDERAL GPU TRANS LOSSES	37	40	45	78	82	85	77	59	57	56	45	44	41	38
3 FEDERAL NGP TRANS LOSSES	151	151	157	178	210	239	257	256	223	203	203	188	160	153
4 USBR	200	200	158	76	7	4	4	3	9	100	100	170	198	205
5 DSI FIRM LOAD	2496	2496	1970	2086	2096	2498	1930	1389	1216	1056	1056	2166	2166	2474
6 DSI FIRM LOSSES	72	72	59	67	73	92	75	53	44	36	36	72	65	72
7 SM & NON GEN PUB PURCH 1/	3562	3562	3565	3250	3696	3910	4202	4285	3866	3745	3745	3284	3091	3053
8 FIRM SYSTEM LOAD	6718	6721	6144	5936	6374	7069	6769	6277	5635	5400	5389	6118	5916	6191
TRANSFERS OUT														
9 EXPORTS 2/	2864	2864	2858	2803	2461	2470	2266	2270	2257	2235	2235	2357	2638	2653
10 CONTRACTS OUT 3/	2554	2554	2434	2537	2894	3058	3097	3067	2829	2759	2759	2635	2628	2637
11 CSPE TO WEST GROUP UTIL 4/	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12 GEN PUB AGEN PSC PURCH 5/	1542	1499	1641	2038	2335	2619	2679	2728	2306	2037	2034	1869	1469	1297
13 IOU PSC PURCHASE 6/	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14 FED DIVERSITY 7/	-1056	-1050	-1054	-1004	-953	-719	-746	-752	-960	-910	-908	-996	-996	-969
15 FIRM LOADS	12622	12588	12023	12311	13111	14498	14065	13590	12067	11521	11508	11983	11656	11810
HYDRO RESOURCES														
16 REGULATED HYDRO	16563	16604	16690	16785	17094	18551	18570	18443	17958	17835	17705	17692	17890	16598
17 INDEPENDENT HYDRO	740	752	733	740	711	673	644	760	819	842	841	879	880	758
18 SUS. PKNG. ADJUSTMENT 8/	-100	-2746	-2530	-2815	-2616	-1518	-4580	-4962	-4881	-4603	-5834	-1200	-2331	-875
19 NON-FED CER(CSPE) TO BPA 9/	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 NON-FED CER(CAN) TO BPA 10/	248	264	248	246	258	246	246	259	246	259	259	268	259	258
21 RESTORATION 11/	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 TOTAL HYDRO	17451	14874	15141	14956	15447	17952	14880	14500	14142	14333	12971	17639	16698	16739
OTHER RESOURCES														
23 SMALL THERMAL & MISC	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24 COMBUSTION TURBINES	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25 RENEWABLES 12/	27	27	27	28	29	31	32	31	31	30	30	27	27	27
26 COGENERATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27 IMPORTS 13/	110	110	139	153	213	267	471	427	435	438	165	75	93	109
28 CONTRACTS IN 14/	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29 LARGE THERMAL 15/	1162	1162	1162	1162	1162	1162	1162	1162	1162	1162	1162	1162	1162	1162
30 NON-UTILITY GENERATION 16/	1	1	1	1	1	1	1	1	1	1	1	1	1	1
31 RESOURCE ACQUISITIONS 17/	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32 TOTAL RESOURCES	18751	16174	16470	16300	16852	19413	16546	16121	15771	15964	14329	18904	17981	18038

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

MEDIUM LOADS														
1998 WHITE BOOK: 12/31/98														
2003- 4 OPERATING YEAR														
RUN DATE: 12/31/98														
1937 WATER YEAR														
PEAK IN MEGAWATTS	AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN	JUL
RESERVES & MAINTENANCE	----	----	----	----	----	----	----	----	----	----	----	----	----	----
33 HYD SM THRM & MISC RES 18/	-866	-869	-872	-878	-892	-963	-962	-962	-940	-935	-929	-930	-940	-869
34 LARGE THERMAL RESERVES 19/	-174	-174	-174	-174	-174	-174	-174	-174	-174	-174	-174	-174	-174	-174
35 SPINNING RESERVES 20/	-352	-293	-297	-293	-306	-387	-324	-300	-290	-290	-290	-416	-394	-352
36 FEDERAL HYDRO MAINT 21/	-3263	-2761	-2770	-2752	-2705	-1866	-1408	-1883	-1915	-2061	-1805	-1756	-1635	-2785
	----	----	----	----	----	----	----	----	----	----	----	----	----	----
37 NET RESOURCES	14096	12077	12357	12203	12775	16023	13678	12801	12451	12503	11130	15628	14837	13858
SURPLUS/DEFICITS														
38 FIRM SURPLUS/DEFICIT	1474	-510	334	-107	-337	1525	-387	-789	385	982	-378	3644	3182	2049
39 EXTREME WEATHER ADJ. 22/	0	0	0	0	-4	-5	-5	-5	0	0	0	0	0	0
40 FIRM S/D W/EXT WEATHER ADJ.	1474	-510	334	-107	-341	1520	-392	-794	385	982	-378	3644	3182	2049
41 POSS FED EXT WTHR. OBLG 23/	0	0	0	0	-1422	-1492	-1357	-1387	0	0	0	0	0	0
42 FIRM S/D W/EXT WTHR. OBLIG	1474	-510	334	-107	-1763	28	-1749	-2181	385	982	-378	3644	3182	2049

NOTE: 1. THE FOLLOWING CONTRACTS ARE SHOWN AS POWER SALES THROUGH THE STUDY HORIZON.

A. BPA TO BURBANK: PS & C/N/X C. BPA TO PASADENA: PS & C/N/X

B. BPA TO GLENDALE: PS & C/N/X D. BPA TO SCE: PS & C/N/X

2. BPA TO PSP&L: PS & SPX CONVERTS TO A SEASONAL POWER EXCHANGE OY 2002.

3. SCE TO BPA: OPTION ENERGY IS INCLUDED THROUGH OY 2004.

4. BPA TO SCE: OPTION CAPACITY IS INCLUDED THROUGH OY 2004.

5. THE FOLLOWING CONTRACTS ARE RESOURCE OPTIONS AND NOT INCLUDED THROUGH THE STUDY HORIZON.

A. BGP TO BPA: SUPPLEMENTAL ENERGY B. SCE TO BPA: SUPPLEMENTAL ENERGY

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

MEDIUM LOADS														
1998 WHITE BOOK: 12/31/98														
2008- 9 OPERATING YEAR                      RUN DATE: 12/31/98														
1937 WATER YEAR														
PEAK IN MEGAWATTS	AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN	JUL
	----	----	----	----	----	----	----	----	----	----	----	----	----	----
<b>LOADS</b>														
1 FEDERAL AGENCIES	206	206	196	207	216	249	231	240	227	210	210	200	200	202
2 FEDERAL GPU TRANS LOSSES	33	35	40	72	76	78	71	53	51	51	39	38	35	33
3 FEDERAL NGP TRANS LOSSES	156	156	163	185	217	245	263	263	230	210	195	167	159	
4 USBR	201	201	158	76	7	4	4	3	9	101	101	171	199	205
5 DSI FIRM LOAD	2496	2496	1970	2086	2096	2498	1930	1389	1216	1056	1056	2166	2166	2474
6 DSI FIRM LOSSES	72	72	59	67	73	92	75	53	44	36	36	72	65	72
7 SM & NON GEN PUB PURCH 1/	3562	3562	3565	3250	3696	3910	4202	4285	3866	3745	3745	3284	3091	3053
8 FIRM SYSTEM LOAD	6726	6728	6151	5943	6381	7076	6776	6286	5643	5409	5397	6126	5923	6198
<b>TRANSFERS OUT</b>														
9 EXPORTS 2/	2167	2167	2158	2131	2088	2097	2101	2105	2089	2062	2062	2147	1871	1889
10 CONTRACTS OUT 3/	1237	1237	1248	1297	1587	1674	1654	1628	1491	1469	1469	1227	1242	1256
11 CSPE TO WEST GROUP UTIL 4/	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12 GEN PUB AGEN PSC PURCH 5/	1542	1499	1641	2038	2335	2619	2679	2728	2306	2037	2034	1869	1469	1297
13 IOU PSC PURCHASE 6/	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14 FED DIVERSITY 7/	-800	-875	-896	-851	-818	-619	-642	-648	-822	-777	-776	-822	-811	-785
15 FIRM LOADS	10792	10756	10302	10558	11573	12848	12568	12099	10706	10200	10186	10547	9694	9855
<b>HYDRO RESOURCES</b>														
16 REGULATED HYDRO	16563	16604	16690	16785	17094	18551	18570	18443	17958	17835	17705	17692	17890	16598
17 INDEPENDENT HYDRO	740	752	733	740	711	673	644	760	819	842	841	879	880	758
18 SUS. PKNG. ADJUSTMENT 8/	-100	-2746	-2442	-2815	-2510	-1433	-4461	-4896	-4881	-4603	-5834	-1200	-2295	-828
19 NON-FED CER(CSPE) TO BPA 9/	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 NON-FED CER(CAN) TO BPA 10/	248	264	248	246	258	246	246	259	246	259	259	268	259	258
21 RESTORATION 11/	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22 TOTAL HYDRO	17451	14874	15229	14956	15553	18037	14999	14566	14142	14333	12971	17639	16734	16786
<b>OTHER RESOURCES</b>														
23 SMALL THERMAL & MISC	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24 COMBUSTION TURBINES	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25 RENEWABLES 12/	27	27	27	28	29	31	32	31	31	30	30	27	27	27
26 COGENERATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27 IMPORTS 13/	88	88	117	153	206	260	234	190	162	165	165	75	93	109
28 CONTRACTS IN 14/	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29 LARGE THERMAL 15/	1162	1162	1162	1162	1162	1162	1162	1162	1162	1162	1162	1162	1162	1162
30 NON-UTILITY GENERATION 16/	1	1	1	1	1	1	1	1	1	1	1	1	1	1
31 RESOURCE ACQUISITIONS 17/	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32 TOTAL RESOURCES	18729	16152	16536	16300	16951	19491	16428	15950	15498	15691	13167	17742	18017	18085

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

MEDIUM LOADS														
1998 WHITE BOOK: 12/31/98														
2008- 9 OPERATING YEAR                      RUN DATE: 12/31/98														
1937 WATER YEAR														
PEAK IN MEGAWATTS	AUG 1-15	AUG 16-31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR 1-15	APR 16-30	MAY	JUN	JUL
RESERVES & MAINTENANCE	----	----	----	----	----	----	----	----	----	----	----	----	----	----
33 HYD SM THRM & MISC RES 18/	-866	-869	-872	-878	-892	-963	-962	-962	-940	-935	-929	-930	-940	-869
34 LARGE THERMAL RESERVES 19/	-174	-174	-174	-174	-174	-174	-174	-174	-174	-174	0	0	-174	-174
35 SPINNING RESERVES 20/	-352	-293	-299	-293	-309	-389	-327	-302	-290	-290	-250	-375	-395	-353
36 FEDERAL HYDRO MAINT 21/	-3263	-2761	-2770	-2752	-2705	-1866	-1408	-1883	-1915	-2061	-1805	-1756	-1635	-2785
	----	----	----	----	----	----	----	----	----	----	----	----	----	----
37 NET RESOURCES	14074	12055	12421	12203	12871	16098	13557	12629	12178	12230	10183	14680	14873	13904
SURPLUS/DEFICITS														
38 FIRM SURPLUS/DEFICIT	3282	1299	2119	1645	1298	3251	989	530	1472	2031	-3	4134	5179	4049
39 EXTREME WEATHER ADJ. 22/	0	0	0	0	-4	-5	-5	-5	0	0	0	0	0	0
40 FIRM S/D W/EXT WEATHER ADJ.	3282	1299	2119	1645	1294	3246	984	525	1472	2031	-3	4134	5179	4049
41 POSS FED EXT WTHR. OBLG 23/	0	0	0	0	-1600	-1700	-1741	-1754	0	0	0	0	0	0
42 FIRM S/D W/EXT WTHR. OBLIG	3282	1299	2119	1645	-306	1546	-758	-1229	1472	2031	-3	4134	5179	4049

NOTE: 1. THE FOLLOWING CONTRACTS ARE SHOWN AS POWER SALES THROUGH THE STUDY HORIZON.

A. BPA TO BURBANK: PS & C/N/X      C. BPA TO PASADENA: PS & C/N/X

B. BPA TO GLENDALE: PS & C/N/X      D. BPA TO SCE: PS & C/N/X

2. BPA TO PSP&L: PS & SPX CONVERTS TO A SEASONAL POWER EXCHANGE OY 2002.

3. SCE TO BPA: OPTION ENERGY IS INCLUDED THROUGH OY 2004.

4. BPA TO SCE: OPTION CAPACITY IS INCLUDED THROUGH OY 2004.

5. THE FOLLOWING CONTRACTS ARE RESOURCE OPTIONS AND NOT INCLUDED THROUGH THE STUDY HORIZON.

A. BGP TO BPA: SUPPLEMENTAL ENERGY      B. SCE TO BPA: SUPPLEMENTAL ENERGY

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## FEDERAL SYSTEM FOOTNOTES

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### For Exhibits 1 through 8

1. BPA's small and nongenerating public agencies' purchases are requirements these agencies place on BPA under their power sales contracts and BPA's partnership program. BPA's obligation is each agency's net firm load requirement not served by its own dedicated resources. These contracts expire between June 30, 2001, and September 30, 2001; however, they are assumed to remain at the OY 2001 level through the study period.
2. BPA's exports include: BPA to Anaheim, capacity/energy exchange and capacity sale; BPA to Azusa, power exchange and capacity sale; BPA to Banning, power exchange and capacity sale; BPA to BART, power sale; BPA to Burbank, power sale and capacity/energy exchange; BPA to Colton, power exchange and capacity sale; BPA to Farmington, power sale; BPA to Federal agencies, power sale; BPA to Glendale, power sale and capacity/energy exchange; BPA to M-S-R, power sale; BPA to other entities, power sales; BPA to Palo Alto, capacity sale and seasonal energy exchange; BPA to Pasadena, power sale, capacity/energy exchange and seasonal energy exchange; BPA to Riverside, capacity/energy exchange, capacity sale and diversity exchange; BPA to SCE, power sale, capacity/energy exchange, environmental storage, and option capacity; BPA to SCE Source, power sale; BPA to BC Hydro for Canadian Entitlement; and BPA's Northwest-Southwest Intertie losses.
3. BPA's contracts out include: BPA to AVC, power sale, supplemental and entitlement capacity, deferred power exchange and WNP-3 settlement; BPA to Bandon, power sale; BPA to Big Bend Electric Cooperative, summer seasonal product; BPA to Central Electric Cooperative, summer seasonal product; BPA to Chelan County PUD, supplemental and entitlement capacity sale; BPA to the city of Ashland, power sale; BPA to the city of Idaho Falls, power sale; BPA to Colockum, supplemental and entitlement capacity; BPA to Columbia Basin Electric Cooperative, summer seasonal product; BPA to Columbia River PUD, power sale; BPA to Columbia Rural Electric Association, summer seasonal product; BPA to Cowlitz County PUD, supplemental and entitlement capacity and power sale; BPA to Douglas County PUD, supplemental and entitlement capacity and power sale; BPA to Eugene Water and Electric Board, supplemental and entitlement capacity and power sale; BPA to city of Forest Grove, supplemental and entitlement capacity and power sale; BPA to Grant County PUD, supplemental and entitlement capacity and power sale; BPA to Harney Electric Cooperative, summer seasonal product; BPA to Idaho Power Company for Harney and Wells; BPA to Inland Power and Light, summer seasonal product; BPA to Kittitas County PUD, supplemental and entitlement capacity; BPA to Lewis County PUD, power sale; BPA to Lower Valley, power sale; BPA to Mason County PUD #3, power sale; BPA to city of McMinnville, supplemental and entitlement capacity and power sale; BPA to Midstate Electric Cooperative, summer seasonal product; BPA to Milton-Freewater, power sale; BPA to Modern Electric Cooperative, power sale; BPA to Monmouth, power sale; BPA to Montana Power Company, capacity/energy exchange; BPA to Nespelem Valley Electric Cooperative, summer seasonal product; BPA to Northern Wasco Electric Cooperative, power sale; BPA to Okanogan, supplemental and entitlement capacity and summer seasonal product; BPA to other entities, power sales; BPA to small and nongenerating public agencies, summer seasonal product and power sales; BPA to PP&L, capacity sale, supplemental and entitlement capacity, Southern Idaho exchange, and Centralia standby; BPA to PGE, capacity sale, supplemental and entitlement capacity, and power sale; BPA to PSE, Baker Head loss, power sale, supplemental and entitlement capacity and WNP-3 settlement; BPA to Ravalli Electric Cooperative, power sale; BPA to Richland, Ormet power sale; BPA to Salem Electric Cooperative, green power sale; BPA to SCL, supplemental and entitlement capacity sale; BPA to Snohomish County PUD, power sale; BPA to Springfield Utility Board, power sale; BPA to Surprise Valley, summer seasonal product; BPA to TPU, supplemental and entitlement capacity and power sale; BPA to Tillamook,

power sale; BPA to United Electric Cooperative, power sale; BPA to Umatilla Electric Cooperative, summer seasonal product; BPA to Vigilante Electric Cooperative, summer seasonal product; BPA to Wasco Electric Cooperative, summer seasonal product; and BPA to Western Oregon Cooperative, power sale.

4. Columbia Storage Power Exchange (CSPE) is the sale of the Canadian share of downstream benefits under the Columbia River Treaty with Canada to a group of Northwest utilities, expiring April 1, 2003.
5. BPA's generating public agencies' purchases are requirements that these agencies place on BPA under their power sales contracts and BPA's partnership program. BPA's obligation is each agency's net firm load requirement not served by its own dedicated resources. These contracts expire between June 30, 2001, and September 30, 2001; however, they are assumed to remain at the OY 2001 level through the study period.
6. No investor-owned utility customers are purchasing power under the 1981 power sales contract.
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. Sustained peaking adjustment is a percentage reduction applied to the Federal hydrosystem to meet a capacity load of 50 hours per week. This adjustment also includes reductions for Federal hydro maintenance, spinning reserves, forced outage reserves, and summer flow augmentation on the Snake River and John Day hydro projects.
9. Canadian Entitlement Return non-Federal to the Columbia River Storage Exchange (CSPE) reflects the public agencies' and IOUs' obligation of Canadian Entitlement allocation to the Northwest entities of the CSPE, which expires March 31, 2003.
10. Canadian Entitlement Return non-Federal to Canada reflects the Federal system, public agencies' and IOUs' obligation of Canadian Entitlement allocation to Canada, which began April 1, 1998.
11. Restoration adjustments for the losses and gains of the hydro system due to Canadian storage under the terms of the Pacific Northwest Coordination Agreement. It is an obligation to those utilities that gained generation from the addition of Canadian storage, and a resource gain to utilities that lost generation from Canadian storage.
12. Federal renewable resources include: James River Wauna.
13. BPA's imports include: Anaheim to BPA, exchange energy and peak replacement energy; Azusa to BPA, power exchange and peak replacement; Banning to BPA, power exchange and peak replacement; BGP to BPA, supplemental energy; Burbank to BPA, exchange energy; Colton to BPA, power exchange and peak replacement; Glendale to BPA, exchange energy; other entities to BPA, power exchange; Pasadena to BPA, exchange energy, peak replacement energy, and seasonal replacement energy; PP&L (Wyoming Division) to BPA for Southern Idaho, power sale; Riverside to BPA, exchange energy, peak replacement energy, diversity exchange energy, and seasonal exchange energy; Sierra to BPA for Harney and Wells; SCE to BPA, exchange energy, supplemental energy, environmental storage, option energy, peak replacement and power sale; and PowerEx to BPA for ABC and Palo Alto, peak replacement energy.
14. Federal contracts include: AVC to BPA, supplemental entitlement peak replacement and WNP-3 settlement; Chelan County PUD to BPA, supplemental entitlement peak replacement; Colockum to BPA, supplemental entitlement peak replacement; Cowlitz County PUD to BPA, supplemental entitlement peak replacement; Douglas County PUD to BPA, supplemental entitlement peak replacement; Eugene Water and Electric Board to BPA, supplemental entitlement peak replacement; Grant County PUD to BPA, supplemental entitlement peak replacement; city of Forest Grove to BPA, supplemental entitlement peak replacement; Kittitas County PUD to BPA, supplemental entitlement peak replacement; city of McMinnville to BPA, supplemental entitlement peak replacement; MPC to BPA, exchange energy and peak replacement; Okanogan County PUD to BPA, supplemental entitlement peak replacement; other entities to BPA, supplemental entitlement peak replacement and power sale; PP&L to BPA, peak replacement and supplemental entitlement peak replacement; PGE to BPA, peak replacement and supplemental entitlement peak replacement; PSE to BPA, supplemental

- entitlement peak replacement and WNP-3 settlement; SCL to BPA, supplemental entitlement peak replacement; and TPU to BPA, supplemental entitlement peak replacement.
15. Federal large thermal includes the generation from WNP-2, operated by WPPSS.
  16. Non-utility generation (NUG) resources include generation provided to BPA by independent power producers and resources included under the Public Utility Regulatory Policies Act (PURPA).
  17. Resource acquisitions are resources BPA has identified and contracted for future purchase. When new Federal resource acquisitions are contracted for and/or on-line, they will be included in the loads and resources balance.
  18. Hydro, small thermal and miscellaneous resources, and combustion turbine reserve requirements are estimated at 5 percent of the Federal capacity of these resources.
  19. Large thermal reserve requirements are estimated at 15 percent of the WNP-2 nuclear project.
  20. Federal spinning reserve is the reserve generating capacity maintained to provide a regulating margin for the automatic generation and frequency control of power generation.
  21. Hydro maintenance is the sum of all Federal hydro project maintenance based on the mean of the 1983-84 through 1988-89 schedules submitted to the Northwest Power Pool.

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*Exhibits 9 – 18*

***Federal System Energy Surpluses and Deficits for 50 Historical Water Conditions***

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FEDERAL SYSTEM ENERGY ANALYSIS  
 FEDERAL SYSTEM ENERGY SURPLUS/DEFICIT  
 FOR THE 50 HISTORICAL WATER YEARS ON RECORD  
 (FEDERAL TABLE 2 LINE 42)

1998 WHITE BOOK: 12/31/98

1999-0 OPERATING YEAR

RUN DATE: 12/31/98

ENERGY IN AVERAGE MEGAWATTS	AUG	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	APR	MAY	JUN	JUL	12 MO
	1-15	16-31								1-15	16-30				AVG
1929 FEDERAL ENERGY S/D	2795	-969	-438	-150	-1251	-781	-1033	177	-641	-265	1163	-593	1405	40	-159
1930 FEDERAL ENERGY S/D	616	-1214	-466	-1051	-813	-10	-1275	-813	-563	1456	4586	-1200	-1069	250	-357
1931 FEDERAL ENERGY S/D	830	-133	-1008	-1180	-672	-255	-1315	-1676	-759	2284	106	1817	-776	995	-274
1932 FEDERAL ENERGY S/D	-268	-1334	-1166	-908	-554	-809	-1938	95	2820	6870	5757	4637	4129	1038	1071
1933 FEDERAL ENERGY S/D	1105	129	-89	-178	-592	-192	4635	4122	130	3377	1724	2870	7348	4552	2148
1934 FEDERAL ENERGY S/D	2461	2658	1049	1172	1504	5395	8174	6890	4093	8031	6769	5030	258	-2200	3444
1935 FEDERAL ENERGY S/D	-683	-1703	-507	-871	-647	-61	4246	3197	1600	3957	2536	2170	2989	1587	1313
1936 FEDERAL ENERGY S/D	1485	-1442	-745	-959	-1320	-278	-1075	384	-144	1064	6770	5035	1381	1574	649
1937 FEDERAL ENERGY S/D	622	-1178	-426	-900	-907	-465	-1397	-938	-816	-106	-458	1820	734	-445	-358
1938 FEDERAL ENERGY S/D	-290	-931	-582	-1220	-325	106	3428	2404	3835	3373	4512	5512	3682	950	1760
1939 FEDERAL ENERGY S/D	711	-1413	-549	-645	-1360	-626	-1302	2502	2230	3512	4005	2287	-1392	2136	557
1940 FEDERAL ENERGY S/D	1368	-1098	-397	-302	-758	-607	-325	1298	3911	3734	3888	1960	-1212	-282	603
1941 FEDERAL ENERGY S/D	-211	-1551	-502	-163	-900	-457	-543	-113	435	548	1473	585	861	-499	-97
1942 FEDERAL ENERGY S/D	-581	-1059	-581	-13	-53	2744	3454	2435	-399	2199	2205	2945	3206	2344	1455
1943 FEDERAL ENERGY S/D	2937	370	-364	-409	-877	-561	3448	5440	3125	8745	6952	5344	4766	1993	2617
1944 FEDERAL ENERGY S/D	2296	911	-15	-149	-1295	-689	-1051	537	-1147	-143	432	136	-171	-722	-235
1945 FEDERAL ENERGY S/D	-428	-1256	-1119	-908	-634	61	-2559	-846	-535	489	1216	3010	2143	1482	9
1946 FEDERAL ENERGY S/D	1532	-498	-259	-1003	-682	471	4416	2820	2488	4147	6027	6103	4071	1605	2136
1947 FEDERAL ENERGY S/D	2269	-832	187	85	-467	2253	6162	6718	1745	3860	4077	5054	4098	956	2623
1948 FEDERAL ENERGY S/D	1309	-1038	14	2748	1222	628	5712	4634	2299	2273	5182	7617	9796	4049	3549
1949 FEDERAL ENERGY S/D	2732	3007	1558	346	-873	-1009	2044	2445	5458	4991	6615	5486	3425	-649	2242
1950 FEDERAL ENERGY S/D	-556	-2111	-991	-1185	-1452	33	4503	5558	4809	6103	5486	6433	7820	3100	2607
1951 FEDERAL ENERGY S/D	2051	2000	755	1154	1588	3889	7200	7705	3534	6880	6218	5998	2607	2811	3818
1952 FEDERAL ENERGY S/D	2853	1785	1352	2037	363	748	5451	4263	1379	7041	6666	7409	4283	1015	3123
1953 FEDERAL ENERGY S/D	1436	-1244	-479	-714	-1165	-528	-73	6361	4066	1249	2145	3710	5618	2269	1738
1954 FEDERAL ENERGY S/D	3164	542	34	231	-561	-280	3421	7215	3067	3484	3809	5209	6449	3742	2836
1955 FEDERAL ENERGY S/D	4126	2929	3747	1330	582	-235	2000	373	-531	5117	2038	1896	6039	4792	2258
1956 FEDERAL ENERGY S/D	2749	1980	816	754	897	3492	7515	6381	3900	6168	8176	8364	7992	2505	4346
1957 FEDERAL ENERGY S/D	3274	1557	381	561	-831	124	1585	4925	3156	6603	3366	8024	5931	-4	2604
1958 FEDERAL ENERGY S/D	943	-1279	-359	-437	-1029	-801	2057	6339	1692	3053	4984	6754	4850	-613	1859
1959 FEDERAL ENERGY S/D	1659	-891	-373	312	67	1483	7257	6528	2507	4296	2652	4431	6115	2395	2882
1960 FEDERAL ENERGY S/D	2887	317	3116	3838	2022	2462	5492	2013	2981	9149	4815	2783	3402	2080	3231
1961 FEDERAL ENERGY S/D	1872	-1199	-671	-140	-365	-1153	3717	6862	3657	4500	1173	5260	6776	446	2297
1962 FEDERAL ENERGY S/D	1957	-671	-548	44	-1248	-766	4000	1050	723	6079	6003	3226	2113	1361	1387
1963 FEDERAL ENERGY S/D	3214	54	-399	869	413	1128	4719	3280	684	3331	2719	2743	3898	1460	1955
1964 FEDERAL ENERGY S/D	2625	-25	348	-282	-1087	-1013	1724	4692	261	4062	1749	3348	7245	3705	1929
1965 FEDERAL ENERGY S/D	2778	1561	1359	1216	261	3353	8290	7352	3650	4553	6956	5804	5432	1504	3845
1966 FEDERAL ENERGY S/D	2838	1159	451	774	-29	-446	3471	4060	684	6234	2626	2295	1121	1942	1729
1967 FEDERAL ENERGY S/D	1865	-871	-327	-312	-1075	-295	5187	6807	2745	2173	-264	3082	6476	3621	2280
1968 FEDERAL ENERGY S/D	2895	1342	615	413	-298	-414	4222	5795	3295	1155	786	812	3486	1687	1892
1969 FEDERAL ENERGY S/D	3192	1472	1734	1718	1232	796	7244	5717	3772	7030	6940	7709	5199	1122	3797
1970 FEDERAL ENERGY S/D	1661	-1148	-369	328	-985	-1038	1653	5281	2119	1898	2116	2769	3688	898	1384
1971 FEDERAL ENERGY S/D	2175	-959	-590	-433	-995	360	6180	8821	4881	5549	5749	8003	7071	3137	3558
1972 FEDERAL ENERGY S/D	3421	2648	1216	228	-418	-255	6724	8116	8369	7655	3193	7700	7732	4619	4374
1973 FEDERAL ENERGY S/D	3899	3146	1518	718	-726	68	1550	1518	640	-137	-99	551	629	-119	813
1974 FEDERAL ENERGY S/D	581	-1999	-1217	-634	-146	2894	8797	8316	5856	7537	7445	7260	8761	5020	4307
1975 FEDERAL ENERGY S/D	3261	3320	1614	-363	-1176	-617	3494	4295	5477	2718	2500	4161	5710	4474	2747
1976 FEDERAL ENERGY S/D	1776	541	-46	566	1092	4564	7345	6388	2637	7718	5298	7033	3083	3721	3671
1977 FEDERAL ENERGY S/D	4139	3227	4661	860	-1301	-734	-948	459	-1392	-323	1255	-279	-744	-676	338
1978 FEDERAL ENERGY S/D	-417	-1233	-1422	-1027	-447	513	2680	2478	3152	5862	3611	3784	1929	1675	1436

FEDERAL SYSTEM ENERGY ANALYSIS  
 FEDERAL SYSTEM ENERGY SURPLUS/DEFICIT  
 FOR THE 50 HISTORICAL WATER YEARS ON RECORD  
 (FEDERAL TABLE 2 LINE 42)

1998 WHITE BOOK: 12/31/98

2000-1 OPERATING YEAR

RUN DATE: 12/31/98

ENERGY IN AVERAGE MEGAWATTS	AUG	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	APR	MAY	JUN	JUL	12 MO
	1-15	16-31								1-15	16-30				AVG
1929 FEDERAL ENERGY S/D	2482	-1106	-196	316	-1543	-1059	-894	469	-191	214	681	-930	2064	32	-66
1930 FEDERAL ENERGY S/D	303	-1351	-224	-585	-1105	-288	-1136	-521	-113	1935	4104	-1537	-410	242	-265
1931 FEDERAL ENERGY S/D	517	-270	-766	-714	-964	-533	-1176	-1384	-309	2763	-376	1480	-117	987	-181
1932 FEDERAL ENERGY S/D	-581	-1471	-924	-442	-846	-1087	-1799	387	3270	7349	5275	4300	4788	1030	1164
1933 FEDERAL ENERGY S/D	792	-8	153	288	-884	-470	4774	4414	580	3856	1242	2533	8007	4544	2240
1934 FEDERAL ENERGY S/D	2148	2521	1291	1638	1212	5117	8313	7182	4543	8510	6287	4693	917	-2208	3536
1935 FEDERAL ENERGY S/D	-996	-1840	-265	-405	-939	-339	4385	3489	2050	4436	2054	1833	3648	1579	1405
1936 FEDERAL ENERGY S/D	1172	-1579	-503	-493	-1612	-556	-936	676	306	1543	6288	4698	2040	1566	742
1937 FEDERAL ENERGY S/D	309	-1315	-184	-434	-1199	-743	-1258	-646	-366	373	-940	1483	1393	-453	-266
1938 FEDERAL ENERGY S/D	-603	-1068	-340	-754	-617	-172	3567	2696	4285	3852	4030	5175	4341	942	1853
1939 FEDERAL ENERGY S/D	398	-1550	-307	-179	-1652	-904	-1163	2794	2680	3991	3523	1950	-733	2128	650
1940 FEDERAL ENERGY S/D	1055	-1235	-155	164	-1050	-885	-186	1590	4361	4213	3406	1623	-553	-290	695
1941 FEDERAL ENERGY S/D	-524	-1688	-260	303	-1192	-735	-404	179	885	1027	991	248	1520	-507	-5
1942 FEDERAL ENERGY S/D	-894	-1196	-339	453	-345	2466	3593	2727	51	2678	1723	2608	3865	2336	1548
1943 FEDERAL ENERGY S/D	2624	233	-122	57	-1169	-839	3587	5732	3575	9224	6470	5007	5425	1985	2710
1944 FEDERAL ENERGY S/D	1983	774	227	317	-1587	-967	-912	829	-697	336	-50	-201	488	-730	-142
1945 FEDERAL ENERGY S/D	-741	-1393	-877	-442	-926	-217	-2420	-554	-85	968	734	2673	2802	1474	101
1946 FEDERAL ENERGY S/D	1219	-635	-17	-537	-974	193	4555	3112	2938	4626	5545	5766	4730	1597	2229
1947 FEDERAL ENERGY S/D	1956	-969	429	551	-759	1975	6301	7010	2195	4339	3595	4717	4757	948	2716
1948 FEDERAL ENERGY S/D	996	-1175	256	3214	930	350	5851	4926	2749	2752	4700	7280	10455	4041	3641
1949 FEDERAL ENERGY S/D	2419	2870	1800	812	-1165	-1287	2183	2737	5908	5470	6133	5149	4084	-657	2334
1950 FEDERAL ENERGY S/D	-869	-2248	-749	-719	-1744	-245	4642	5850	5259	6582	5004	4296	8479	3092	2700
1951 FEDERAL ENERGY S/D	1738	1863	997	1620	1296	3611	7339	7997	3984	7359	5736	5661	3266	2803	3910
1952 FEDERAL ENERGY S/D	2540	1648	1594	2503	71	470	5590	4555	1829	7520	6184	7072	4942	1007	3215
1953 FEDERAL ENERGY S/D	1123	-1381	-237	-248	-1457	-806	66	6653	4516	1728	1663	3373	6277	2261	1831
1954 FEDERAL ENERGY S/D	2851	405	276	697	-853	-558	3560	7507	3517	3963	3327	4872	7108	3734	2928
1955 FEDERAL ENERGY S/D	3813	2792	3989	1796	290	-513	2139	665	-81	5596	1556	1559	6698	4784	2351
1956 FEDERAL ENERGY S/D	2436	1843	1058	1220	605	3214	7654	6673	4350	6647	7694	8027	8651	2497	4438
1957 FEDERAL ENERGY S/D	2961	1420	623	1027	-1123	-154	1724	5217	3606	7082	2884	7687	6590	-12	2697
1958 FEDERAL ENERGY S/D	630	-1416	-117	29	-1321	-1079	2196	6631	2142	3532	4502	6417	5509	-621	1951
1959 FEDERAL ENERGY S/D	1346	-1028	-131	778	-225	1205	7396	6820	2957	4775	2170	4094	6774	2387	2974
1960 FEDERAL ENERGY S/D	2574	180	3358	4304	1730	2184	5631	2305	3431	9628	4333	2446	4061	2072	3323
1961 FEDERAL ENERGY S/D	1559	-1336	-429	326	-657	-1431	3856	7154	4107	4979	691	4923	7435	438	2389
1962 FEDERAL ENERGY S/D	1644	-808	-306	510	-1540	-1044	4139	1342	1173	6558	5521	2889	2772	1353	1479
1963 FEDERAL ENERGY S/D	2901	-83	-157	1335	121	850	4858	3572	1134	3810	2237	2406	4557	1452	2047
1964 FEDERAL ENERGY S/D	2312	-162	590	184	-1379	-1291	1863	4984	711	4541	1267	3011	7904	3697	2021
1965 FEDERAL ENERGY S/D	2465	1424	1601	1682	-31	3075	8429	7644	4100	5032	6474	5467	6091	1496	3938
1966 FEDERAL ENERGY S/D	2525	1022	693	1240	-321	-724	3610	4352	1134	6713	2144	1958	1780	1934	1822
1967 FEDERAL ENERGY S/D	1552	-1008	-85	154	-1367	-573	5326	7099	3195	2652	-746	2745	7135	3613	2372
1968 FEDERAL ENERGY S/D	2582	1205	857	879	-590	-692	4361	6087	3745	1634	304	475	4145	1679	1984
1969 FEDERAL ENERGY S/D	2879	1335	1976	2184	940	518	7383	6009	4222	7509	6458	7372	5858	1114	3889
1970 FEDERAL ENERGY S/D	1348	-1285	-127	794	-1277	-1316	1792	5573	2569	2377	1634	2432	4347	890	1476
1971 FEDERAL ENERGY S/D	1862	-1096	-348	33	-1287	82	6319	9113	5331	6028	5267	7666	7730	3129	3650
1972 FEDERAL ENERGY S/D	3108	2511	1458	694	-710	-533	6863	8408	8819	8134	2711	7363	8391	4611	4466
1973 FEDERAL ENERGY S/D	3586	3009	1760	1184	-1018	-210	1689	1810	1090	342	-581	214	1288	-127	905
1974 FEDERAL ENERGY S/D	268	-2136	-975	-168	-438	2616	8936	8608	6306	8016	6963	6923	9420	5012	4400
1975 FEDERAL ENERGY S/D	2948	3183	1856	103	-1468	-895	3633	4587	5927	3197	2018	3824	6369	4466	2840
1976 FEDERAL ENERGY S/D	1463	404	196	1032	800	4286	7484	6680	3087	8197	4816	6696	3742	3713	3763
1977 FEDERAL ENERGY S/D	3826	3090	4903	1326	-1593	-1012	-809	751	-942	156	773	-616	-85	-684	430
1978 FEDERAL ENERGY S/D	-730	-1370	-1180	-561	-739	235	2819	2770	3602	6341	3129	3447	2588	1667	1528

FEDERAL SYSTEM ENERGY ANALYSIS  
 FEDERAL SYSTEM ENERGY SURPLUS/DEFICIT  
 FOR THE 50 HISTORICAL WATER YEARS ON RECORD  
 (FEDERAL TABLE 2 LINE 42)

1998 WHITE BOOK: 12/31/98

2001-2 OPERATING YEAR

RUN DATE: 12/31/98

ENERGY IN AVERAGE MEGAWATTS	AUG		SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	APR	MAY	JUN	JUL	12 MO
	1-15	16-31								1-15	16-30				AVG
1929 FEDERAL ENERGY S/D	2020	-1581	-662	-68	-1840	-1399	-1530	-164	-881	-433	1039	-316	1659	-345	-418
1930 FEDERAL ENERGY S/D	-168	-1827	-691	-972	-1406	-626	-1778	-1160	-804	1289	4467	-916	-817	-134	-618
1931 FEDERAL ENERGY S/D	50	-743	-1233	-1101	-1268	-875	-1822	-2025	-1009	2112	-20	2102	-523	612	-537
1932 FEDERAL ENERGY S/D	-1049	-1947	-1396	-825	-1150	-1434	-2445	-253	2574	6704	5631	4924	4395	661	810
1933 FEDERAL ENERGY S/D	322	-481	-313	-95	-1186	-814	4137	3786	-111	3212	1588	3154	7619	4188	1891
1934 FEDERAL ENERGY S/D	1684	2054	827	1258	912	4779	7688	6561	3860	7878	6649	5326	517	-2584	3190
1935 FEDERAL ENERGY S/D	-1469	-2317	-737	-790	-1242	-686	3749	2859	1359	3794	2397	2451	3251	1213	1053
1936 FEDERAL ENERGY S/D	705	-2057	-977	-879	-1918	-902	-1581	42	-396	889	6639	5325	1644	1195	387
1937 FEDERAL ENERGY S/D	-159	-1790	-651	-819	-1502	-1086	-1900	-1286	-1068	-280	-595	2101	988	-831	-622
1938 FEDERAL ENERGY S/D	-1074	-1543	-807	-1141	-921	-513	2929	2066	3594	3205	4377	5805	3944	572	1501
1939 FEDERAL ENERGY S/D	-73	-2027	-774	-566	-1952	-1244	-1802	2168	1993	3347	3879	2574	-1137	1757	298
1940 FEDERAL ENERGY S/D	589	-1710	-622	-223	-1350	-1229	-823	953	3664	3566	3760	2244	-958	-665	341
1941 FEDERAL ENERGY S/D	-995	-2165	-728	-84	-1496	-1078	-1045	-462	187	376	1347	870	1116	-884	-360
1942 FEDERAL ENERGY S/D	-1365	-1673	-809	66	-649	-2132	2954	2098	-646	2027	2078	3228	3467	1969	1195
1943 FEDERAL ENERGY S/D	2160	-242	-589	-328	-1471	-1182	2946	5102	2902	8591	6831	5637	5028	1616	2361
1944 FEDERAL ENERGY S/D	1517	301	-239	-62	-1883	-1303	-1540	196	-1388	-310	308	415	81	-1109	-494
1945 FEDERAL ENERGY S/D	-1212	-1869	-1345	-828	-1226	-556	-3067	-1192	-776	321	1086	3292	2401	1102	-253
1946 FEDERAL ENERGY S/D	750	-1110	-481	-919	-1267	-142	3927	2493	2259	3986	5905	6398	4336	1231	1884
1947 FEDERAL ENERGY S/D	1491	-1445	-38	167	-1053	1638	5671	6396	1521	3700	3952	5344	4365	579	2370
1948 FEDERAL ENERGY S/D	527	-1652	-210	2835	638	12	5221	4310	2071	2109	5059	7912	10077	3681	3298
1949 FEDERAL ENERGY S/D	1954	2403	1338	428	-1459	-1628	1546	2114	5229	4829	6496	5773	3689	-1031	1987
1950 FEDERAL ENERGY S/D	-1341	-2726	-1215	-1108	-2046	-584	4005	5233	4587	5943	5364	4921	8095	2728	2353
1951 FEDERAL ENERGY S/D	1271	1394	534	1243	1007	3279	6720	7385	3312	6723	6099	6292	2867	2439	3569
1952 FEDERAL ENERGY S/D	2076	1177	1130	2127	-222	134	4966	3935	1154	6883	6543	7705	4548	639	2871
1953 FEDERAL ENERGY S/D	655	-1859	-704	-635	-1753	-1144	-578	6034	3842	1092	2014	3998	5883	1895	1483
1954 FEDERAL ENERGY S/D	2387	-68	-190	312	-1153	-898	2923	6893	2843	3319	3680	5501	6721	3373	2582
1955 FEDERAL ENERGY S/D	3353	2326	3533	1413	-11	-854	1502	31	-777	4957	1911	2178	6307	4427	2002
1956 FEDERAL ENERGY S/D	1972	1373	594	838	303	2878	7031	6063	3673	6010	8059	8661	8266	2132	4096
1957 FEDERAL ENERGY S/D	2496	949	157	643	-1417	-494	1099	4599	2922	6453	3236	8322	6198	-384	2351
1958 FEDERAL ENERGY S/D	160	-1894	-584	-360	-1617	-1420	1565	6012	1462	2888	4860	7046	5116	-995	1603
1959 FEDERAL ENERGY S/D	877	-1504	-597	394	-528	869	6763	6198	2273	4136	2524	4722	6387	2022	2627
1960 FEDERAL ENERGY S/D	2111	-292	2900	3925	1432	1848	4997	1685	2751	9003	4694	3068	3664	1706	2978
1961 FEDERAL ENERGY S/D	1094	-1812	-896	-60	-961	-1776	3220	6533	3420	4342	1039	5553	7051	68	2040
1962 FEDERAL ENERGY S/D	1176	-1283	-779	124	-1843	-1388	3502	713	485	5919	5881	3512	2374	983	1128
1963 FEDERAL ENERGY S/D	2438	-556	-624	950	-180	512	4222	2943	450	3166	2597	3027	4159	1084	1697
1964 FEDERAL ENERGY S/D	1846	-637	125	-198	-1680	-1632	1226	4365	30	3895	1618	3632	7516	3337	1674
1965 FEDERAL ENERGY S/D	2000	954	1138	1302	-328	2738	7812	7033	3423	4388	6836	6096	5697	1128	3594
1966 FEDERAL ENERGY S/D	2062	551	228	865	-612	-1059	2984	3734	453	6076	2501	2581	1384	1565	1477
1967 FEDERAL ENERGY S/D	1086	-1484	-551	-231	-1669	-915	4692	6475	2511	2014	-397	3367	6746	3254	2024
1968 FEDERAL ENERGY S/D	2117	734	393	497	-885	-1032	3734	5474	3071	993	659	1092	3749	1312	1638
1969 FEDERAL ENERGY S/D	2416	865	1516	1810	647	185	6761	5401	3543	6865	6814	8006	5467	746	3547
1970 FEDERAL ENERGY S/D	880	-1760	-594	411	-1578	-1657	1153	4952	1892	1737	1990	3051	3948	519	1127
1971 FEDERAL ENERGY S/D	1396	-1572	-815	-350	-1582	-256	5694	8504	4653	5394	5628	8299	7339	2765	3306
1972 FEDERAL ENERGY S/D	2646	2044	995	318	-1004	-869	6240	7799	8156	7503	3068	7995	8004	4255	4127
1973 FEDERAL ENERGY S/D	3126	2544	1299	808	-1311	-546	1059	1187	406	-304	-224	831	884	-501	557
1974 FEDERAL ENERGY S/D	-201	-2612	-1443	-554	-732	2284	8324	8005	5631	7380	7328	7555	9037	4655	4059
1975 FEDERAL ENERGY S/D	2484	2717	1394	-275	-1763	-1232	3008	3967	5255	2554	2371	4448	5975	4106	2496
1976 FEDERAL ENERGY S/D	996	-69	-270	654	511	3956	6865	6069	2412	7562	5177	7327	3343	3355	3421
1977 FEDERAL ENERGY S/D	3368	2626	4449	950	-1888	-1352	-1439	118	-1633	-490	1134	4	-489	-1061	82
1978 FEDERAL ENERGY S/D	-1200	-1845	-1655	-952	-1042	-108	2179	2137	2907	5707	3486	4073	2187	1300	1175

FEDERAL SYSTEM ENERGY ANALYSIS  
 FEDERAL SYSTEM ENERGY SURPLUS/DEFICIT  
 FOR THE 50 HISTORICAL WATER YEARS ON RECORD  
 (FEDERAL TABLE 2 LINE 42)

1998 WHITE BOOK: 12/31/98

2002- 3 OPERATING YEAR RUN DATE: 12/31/98

ENERGY IN AVERAGE MEGAWATTS	AUG		SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	APR	MAY	JUN	JUL	12 MO
	1-15	16-31								1-15	16-30				AVG
1929 FEDERAL ENERGY S/D	1278	-2323	-1295	-230	-1977	-1536	-1263	97	-616	-275	198	-1169	1779	-216	-582
1930 FEDERAL ENERGY S/D	-914	-2570	-1324	-1135	-1541	-763	-1513	-897	-538	1446	3628	-1767	-698	-3	-782
1931 FEDERAL ENERGY S/D	-695	-1486	-1867	-1265	-1404	-1012	-1558	-1762	-743	2270	-859	1252	-403	744	-700
1932 FEDERAL ENERGY S/D	-1794	-2688	-2029	-988	-1286	-1571	-2180	10	2843	6867	4792	4075	4521	796	648
1933 FEDERAL ENERGY S/D	-422	-1222	-946	-256	-1323	-951	4407	4055	159	3373	743	2305	7749	4329	1730
1934 FEDERAL ENERGY S/D	940	1316	196	1098	777	4647	7964	6836	4136	8044	5814	4481	639	-2452	3032
1935 FEDERAL ENERGY S/D	-2215	-3060	-1370	-953	-1379	-823	4019	3129	1630	3958	1553	1600	3374	1349	891
1936 FEDERAL ENERGY S/D	-38	-2800	-1611	-1041	-2055	-1039	-1317	308	-130	1045	5798	4476	1768	1328	224
1937 FEDERAL ENERGY S/D	-902	-2533	-1284	-982	-1638	-1223	-1634	-1024	-801	-124	-1439	1249	1108	-699	-785
1938 FEDERAL ENERGY S/D	-1820	-2286	-1440	-1303	-1058	-651	3197	2334	3864	3366	3534	4959	4068	706	1340
1939 FEDERAL ENERGY S/D	-818	-2772	-1407	-727	-2089	-1381	-1535	2435	2259	3505	3036	1724	-1017	1890	136
1940 FEDERAL ENERGY S/D	-154	-2453	-1254	-384	-1486	-1366	-553	1217	3933	3725	2919	1393	-838	-534	179
1941 FEDERAL ENERGY S/D	-1740	-2908	-1363	-245	-1632	-1215	-779	-200	453	532	506	19	1236	-755	-524
1942 FEDERAL ENERGY S/D	-2110	-2415	-1442	-96	-786	1999	3221	2367	-378	2184	1237	2377	3591	2104	1034
1943 FEDERAL ENERGY S/D	1417	-984	-1223	-489	-1608	-1321	3213	5369	3175	8753	5991	4792	5153	1750	2200
1944 FEDERAL ENERGY S/D	774	-440	-873	-223	-2019	-1442	-1272	458	-1123	-154	-533	-438	200	-979	-657
1945 FEDERAL ENERGY S/D	-1957	-2613	-1977	-991	-1362	-693	-2805	-930	-510	478	241	2442	2523	1235	-416
1946 FEDERAL ENERGY S/D	6	-1853	-1115	-1081	-1404	-279	4194	2761	2529	4145	5065	5553	4460	1365	1722
1947 FEDERAL ENERGY S/D	747	-2187	-671	6	-1190	1502	5942	6665	1794	3860	3111	4496	4490	713	2209
1948 FEDERAL ENERGY S/D	-217	-2395	-844	2677	503	-124	5491	4579	2343	2268	4218	7067	10212	3820	3139
1949 FEDERAL ENERGY S/D	1212	1664	706	267	-1596	-1767	1814	2383	5499	4989	5657	4925	3812	-899	1826
1950 FEDERAL ENERGY S/D	-2088	-3470	-1850	-1270	-2184	-721	4275	5502	4861	6104	4524	4073	8223	2865	2193
1951 FEDERAL ENERGY S/D	527	655	-98	1084	872	3143	6993	7657	3587	6886	5262	5447	2990	2576	3410
1952 FEDERAL ENERGY S/D	1333	436	498	1969	-358	-2	5236	4202	1427	7044	5703	6860	4673	773	2711
1953 FEDERAL ENERGY S/D	-90	-2603	-1337	-797	-1889	-1281	-314	6302	4114	1254	1170	3148	6009	2031	1321
1954 FEDERAL ENERGY S/D	1643	-810	-824	152	-1289	-1035	3191	7164	3117	3477	2836	4655	6851	3512	2422
1955 FEDERAL ENERGY S/D	2614	1590	2905	1254	-147	-991	1771	297	-510	5118	1068	1326	6434	4569	1842
1956 FEDERAL ENERGY S/D	1229	634	-40	677	168	2743	7304	6337	3944	6172	7222	7819	8396	2269	3937
1957 FEDERAL ENERGY S/D	1754	208	-476	483	-1554	-632	1367	4867	3191	6619	2391	7477	6326	-251	2190
1958 FEDERAL ENERGY S/D	-586	-2637	-1217	-521	-1754	-1559	1833	6282	1733	3046	4018	6199	5242	-863	1441
1959 FEDERAL ENERGY S/D	133	-2247	-1231	233	-664	732	7036	6470	2546	4297	1681	3874	6516	2158	2467
1960 FEDERAL ENERGY S/D	1368	-1033	2272	3769	1299	1713	5267	1954	3022	9168	3854	2219	3789	1843	2819
1961 FEDERAL ENERGY S/D	350	-2556	-1529	-221	-1097	-1913	3488	6806	3692	4504	196	4707	7182	202	1880
1962 FEDERAL ENERGY S/D	433	-2025	-1414	-37	-1980	-1526	3770	981	753	6080	5041	2663	2497	1116	966
1963 FEDERAL ENERGY S/D	1696	-1299	-1257	790	-316	376	4492	3211	719	3325	1758	2176	4282	1219	1536
1964 FEDERAL ENERGY S/D	1103	-1380	-508	-360	-1818	-1770	1494	4634	299	4053	772	2781	7643	3476	1512
1965 FEDERAL ENERGY S/D	1259	213	507	1143	-464	2602	8085	7305	3695	4548	5998	5249	5822	1263	3435
1966 FEDERAL ENERGY S/D	1320	-191	-405	705	-748	-1196	3254	4003	722	6238	1660	1730	1508	1700	1316
1967 FEDERAL ENERGY S/D	343	-2227	-1185	-392	-1806	-1053	4962	6747	2785	2175	-1243	2518	6874	3394	1864
1968 FEDERAL ENERGY S/D	1375	-7	-239	337	-1022	-1169	4001	5744	3344	1152	-184	239	3874	1449	1477
1969 FEDERAL ENERGY S/D	1674	124	885	1650	511	48	7033	5675	3815	7027	5977	7163	5594	882	3388
1970 FEDERAL ENERGY S/D	136	-2504	-1227	250	-1715	-1796	1419	5218	2164	1897	1148	2200	4070	653	965
1971 FEDERAL ENERGY S/D	652	-2316	-1449	-511	-1719	-393	5963	8777	4924	5557	4789	7456	7467	2902	3147
1972 FEDERAL ENERGY S/D	1904	1305	362	156	-1140	-1007	6509	8071	8435	7667	2227	7151	8133	4396	3968
1973 FEDERAL ENERGY S/D	2385	1807	667	647	-1448	-684	1326	1453	673	-148	-1065	-21	1005	-369	395
1974 FEDERAL ENERGY S/D	-948	-3357	-2077	-717	-869	2149	8599	8281	5904	7543	6489	6711	9168	4797	3901
1975 FEDERAL ENERGY S/D	1742	1979	764	-437	-1901	-1370	3276	4234	5529	2713	1528	3598	6101	4245	2335
1976 FEDERAL ENERGY S/D	251	-811	-903	493	375	3821	7138	6341	2684	7725	4336	6483	3465	3494	3262
1977 FEDERAL ENERGY S/D	2627	1889	3823	789	-2025	-1490	-1172	381	-1369	-334	295	-847	-370	-931	-81
1978 FEDERAL ENERGY S/D	-1945	-2588	-2289	-1114	-1179	-247	2446	2403	3177	5871	2645	3224	2309	1434	1013

FEDERAL SYSTEM ENERGY ANALYSIS  
 FEDERAL SYSTEM ENERGY SURPLUS/DEFICIT  
 FOR THE 50 HISTORICAL WATER YEARS ON RECORD  
 (FEDERAL TABLE 2 LINE 42)

1998 WHITE BOOK: 12/31/98

2003- 4 OPERATING YEAR RUN DATE: 12/31/98

ENERGY IN AVERAGE MEGAWATTS	AUG		SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR		MAY	JUN	JUL	12 MO
	1-15	16-31								1-15	16-30				AVG
1929 FEDERAL ENERGY S/D	1429	-2177	-1152	-85	-1865	-1418	-1143	212	-504	-46	1431	59	2019	10	-296
1930 FEDERAL ENERGY S/D	-767	-2423	-1181	-991	-1429	-644	-1397	-782	-425	1675	4862	-536	-460	224	-496
1931 FEDERAL ENERGY S/D	-547	-1339	-1723	-1122	-1291	-892	-1441	-1647	-630	2501	375	2485	-165	973	-413
1932 FEDERAL ENERGY S/D	-1645	-2541	-1886	-845	-1173	-1452	-2063	124	2959	7101	6028	5309	4765	1025	936
1933 FEDERAL ENERGY S/D	-274	-1075	-801	-112	-1210	-833	4529	4176	278	3606	1973	3538	7996	4566	2020
1934 FEDERAL ENERGY S/D	1091	1467	341	1244	892	4770	8091	6962	4258	8283	7051	5719	880	-2225	3323
1935 FEDERAL ENERGY S/D	-2068	-2914	-1227	-809	-1266	-705	4140	3249	1748	4195	2783	2833	3616	1582	1180
1936 FEDERAL ENERGY S/D	112	-2654	-1467	-898	-1942	-919	-1201	426	-18	1275	7031	5712	2010	1556	512
1937 FEDERAL ENERGY S/D	-753	-2387	-1140	-838	-1525	-1104	-1517	-908	-689	105	-208	2479	1347	-473	-499
1938 FEDERAL ENERGY S/D	-1674	-2140	-1297	-1161	-945	-532	3317	2455	3982	3600	4766	6197	4311	936	1628
1939 FEDERAL ENERGY S/D	-671	-2627	-1264	-585	-1977	-1263	-1416	2554	2373	3734	4268	2958	-778	2119	423
1940 FEDERAL ENERGY S/D	-4	-2306	-1112	-240	-1373	-1248	-433	1333	4047	3957	4153	2625	-598	-307	466
1941 FEDERAL ENERGY S/D	-1593	-2761	-1218	-101	-1520	-1097	-660	-85	567	761	1740	1253	1475	-529	-237
1942 FEDERAL ENERGY S/D	-1962	-2269	-1300	48	-673	2120	3341	2488	-262	2413	2470	3609	3833	2335	1322
1943 FEDERAL ENERGY S/D	1567	-837	-1080	-345	-1496	-1204	3331	5488	3296	8990	7225	6028	5397	1981	2489
1944 FEDERAL ENERGY S/D	924	-293	-730	-80	-1908	-1323	-1152	573	-1011	75	700	792	438	-753	-371
1945 FEDERAL ENERGY S/D	-1810	-2467	-1835	-848	-1249	-574	-2690	-815	-398	708	1471	3674	2765	1464	-130
1946 FEDERAL ENERGY S/D	153	-1707	-971	-939	-1291	-160	4314	2880	2646	4378	6299	6791	4704	1596	2011
1947 FEDERAL ENERGY S/D	898	-2041	-527	150	-1078	1622	6064	6788	1914	4093	4343	5732	4735	944	2499
1948 FEDERAL ENERGY S/D	-69	-2250	-700	2825	617	-5	5612	4701	2461	2501	5451	8305	10464	4056	3429
1949 FEDERAL ENERGY S/D	1362	1815	852	412	-1484	-1650	1934	2502	5616	5221	6892	6159	4055	-671	2114
1950 FEDERAL ENERGY S/D	-1942	-3324	-1705	-1128	-2074	-601	4395	5623	4983	6338	5758	5308	8473	3098	2482
1951 FEDERAL ENERGY S/D	676	804	45	1229	985	3264	7118	7781	3709	7122	6498	6685	3233	2810	3701
1952 FEDERAL ENERGY S/D	1483	585	644	2114	-247	117	5357	4322	1546	7279	6937	8099	4916	1004	3001
1953 FEDERAL ENERGY S/D	58	-2458	-1195	-654	-1778	-1162	-198	6422	4235	1489	2399	4382	6253	2263	1609
1954 FEDERAL ENERGY S/D	1794	-662	-679	296	-1176	-917	3312	7288	3237	3707	4066	5892	7099	3745	2713
1955 FEDERAL ENERGY S/D	2767	1741	3054	1399	-33	-872	1891	414	-397	5351	2298	2557	6679	4805	2131
1956 FEDERAL ENERGY S/D	1379	782	105	822	282	2863	7429	6462	4063	6407	8459	9059	8644	2501	4229
1957 FEDERAL ENERGY S/D	1904	357	-332	627	-1442	-513	1488	4988	3306	6857	3620	8715	6572	-24	2480
1958 FEDERAL ENERGY S/D	-438	-2491	-1074	-378	-1641	-1442	1953	6403	1851	3278	5250	7436	5487	-635	1730
1959 FEDERAL ENERGY S/D	281	-2101	-1087	378	-552	851	7158	6595	2668	4531	2913	5110	6764	2391	2757
1960 FEDERAL ENERGY S/D	1519	-886	2420	3917	1414	1834	5390	2075	3139	9409	5089	3452	4031	2076	3110
1961 FEDERAL ENERGY S/D	498	-2411	-1386	-76	-985	-1796	3609	6931	3811	4739	1424	5944	7431	431	2170
1962 FEDERAL ENERGY S/D	582	-1879	-1270	107	-1868	-1407	3891	1101	868	6314	6274	3897	2740	1346	1254
1963 FEDERAL ENERGY S/D	1846	-1151	-1114	934	-203	496	4612	3331	836	3555	2991	3408	4524	1450	1825
1964 FEDERAL ENERGY S/D	1253	-1233	-363	-217	-1706	-1652	1614	4756	416	4284	2001	4014	7892	3711	1802
1965 FEDERAL ENERGY S/D	1410	361	653	1289	-352	2722	8211	7431	3815	4779	7233	6487	6067	1494	3726
1966 FEDERAL ENERGY S/D	1471	-42	-261	850	-635	-1077	3375	4125	837	6472	2892	2963	1751	1931	1605
1967 FEDERAL ENERGY S/D	492	-2081	-1040	-249	-1693	-934	5084	6871	2907	2408	-14	3752	7121	3629	2154
1968 FEDERAL ENERGY S/D	1526	141	-94	481	-910	-1051	4121	5867	3464	1385	1047	1470	4117	1680	1766
1969 FEDERAL ENERGY S/D	1824	272	1031	1796	626	168	7155	5801	3931	7263	7213	8402	5841	1112	3679
1970 FEDERAL ENERGY S/D	284	-2358	-1083	394	-1602	-1678	1537	5337	2282	2131	2379	3432	4311	881	1252
1971 FEDERAL ENERGY S/D	800	-2171	-1306	-369	-1606	-274	6085	8904	5043	5795	6024	8695	7714	3135	3437
1972 FEDERAL ENERGY S/D	2056	1455	508	301	-1028	-889	6630	8196	8560	7905	3459	8390	8383	4632	4260
1973 FEDERAL ENERGY S/D	2538	1958	813	791	-1335	-566	1445	1571	788	83	166	1209	1245	-141	683
1974 FEDERAL ENERGY S/D	-800	-3211	-1933	-574	-757	2270	8726	8409	6024	7779	7725	7949	9419	5033	4193
1975 FEDERAL ENERGY S/D	1893	2130	909	-293	-1788	-1253	3397	4354	5649	2946	2760	4832	6345	4481	2625
1976 FEDERAL ENERGY S/D	400	-663	-760	637	489	3942	7262	6465	2803	7961	5570	7720	3707	3729	3552
1977 FEDERAL ENERGY S/D	2780	2041	3973	933	-1913	-1371	-1053	496	-1256	-104	1530	384	-132	-705	207
1978 FEDERAL ENERGY S/D	-1797	-2441	-2147	-972	-1067	-129	2564	2522	3292	6107	3878	4459	2551	1665	1301

FEDERAL SYSTEM ENERGY ANALYSIS  
 FEDERAL SYSTEM ENERGY SURPLUS/DEFICIT  
 FOR THE 50 HISTORICAL WATER YEARS ON RECORD  
 (FEDERAL TABLE 2 LINE 42)

1998 WHITE BOOK: 12/31/98

2004- 5 OPERATING YEAR

RUN DATE: 12/31/98

ENERGY IN AVERAGE MEGAWATTS	AUG		SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR		MAY	JUN	JUL	12 MO
	1-15	16-31								1-15	16-30				AVG
1929 FEDERAL ENERGY S/D	1646	-1965	-941	129	-1658	-1212	-1281	-77	-784	-334	431	-948	2015	2	-405
1930 FEDERAL ENERGY S/D	-554	-2211	-970	-778	-1220	-437	-1536	-1070	-706	1388	3863	-1539	-465	219	-605
1931 FEDERAL ENERGY S/D	-333	-1126	-1513	-908	-1083	-685	-1582	-1936	-910	2213	-626	1483	-168	967	-523
1932 FEDERAL ENERGY S/D	-1431	-2328	-1676	-632	-965	-1245	-2204	-165	2681	6819	5030	4309	4767	1022	828
1933 FEDERAL ENERGY S/D	-61	-862	-591	103	-1002	-626	4394	3894	1	3324	968	2537	8001	4570	1914
1934 FEDERAL ENERGY S/D	1307	1684	553	1460	1102	4981	7962	6684	3988	8006	6054	4723	879	-2231	3219
1935 FEDERAL ENERGY S/D	-1855	-2702	-1016	-595	-1058	-498	4005	2966	1473	3916	1779	1829	3617	1581	1073
1936 FEDERAL ENERGY S/D	328	-2443	-1257	-683	-1735	-712	-1342	140	-297	987	6030	4711	2011	1552	403
1937 FEDERAL ENERGY S/D	-539	-2174	-930	-625	-1316	-897	-1656	-1199	-969	-182	-1212	1474	1343	-479	-609
1938 FEDERAL ENERGY S/D	-1460	-1927	-1086	-946	-737	-326	3180	2171	3707	3316	3764	5198	4311	934	1521
1939 FEDERAL ENERGY S/D	-459	-2416	-1054	-370	-1771	-1057	-1553	2269	2093	3448	3265	1957	-782	2116	314
1940 FEDERAL ENERGY S/D	211	-2094	-901	-25	-1165	-1040	-569	1046	3770	3671	3152	1622	-601	-313	358
1941 FEDERAL ENERGY S/D	-1379	-2550	-1008	114	-1312	-891	-799	-374	288	473	740	250	1471	-537	-346
1942 FEDERAL ENERGY S/D	-1749	-2056	-1089	262	-466	2329	3203	2203	-540	2126	1469	2606	3832	2334	1214
1943 FEDERAL ENERGY S/D	1784	-624	-869	-131	-1288	-997	3193	5203	3023	8710	6226	5031	5397	1978	2382
1944 FEDERAL ENERGY S/D	1139	-80	-520	135	-1701	-1118	-1289	282	-1291	-213	-301	-212	432	-760	-481
1945 FEDERAL ENERGY S/D	-1597	-2255	-1625	-634	-1042	-367	-2831	-1104	-678	421	466	2671	2763	1459	-239
1946 FEDERAL ENERGY S/D	367	-1495	-760	-726	-1084	47	4177	2595	2369	4094	5299	5795	4706	1594	1904
1947 FEDERAL ENERGY S/D	1113	-1829	-316	364	-870	1830	5929	6506	1640	3810	3342	4732	4738	940	2393
1948 FEDERAL ENERGY S/D	145	-2039	-489	3043	826	203	5477	4418	2186	2215	4451	7309	10473	4058	3324
1949 FEDERAL ENERGY S/D	1578	2032	1064	626	-1276	-1445	1797	2218	5342	4936	5893	5158	4055	-677	2007
1950 FEDERAL ENERGY S/D	-1731	-3114	-1495	-915	-1867	-395	4259	5340	4712	6055	4759	4309	8479	3098	2376
1951 FEDERAL ENERGY S/D	892	1020	257	1445	1195	3471	6985	7501	3437	6840	5500	5688	3232	2810	3596
1952 FEDERAL ENERGY S/D	1700	799	855	2332	-39	324	5222	4037	1272	6996	5937	7103	4918	1000	2895
1953 FEDERAL ENERGY S/D	273	-2248	-984	-440	-1570	-955	-340	6138	3961	1207	1395	3381	6255	2263	1502
1954 FEDERAL ENERGY S/D	2010	-449	-469	512	-968	-711	3175	7008	2965	3422	3063	4894	7106	3748	2607
1955 FEDERAL ENERGY S/D	2985	1958	3270	1616	175	-665	1755	128	-677	5068	1295	1555	6681	4810	2025
1956 FEDERAL ENERGY S/D	1596	997	318	1039	490	3071	7297	6182	3788	6125	7462	8064	8651	2501	4124
1957 FEDERAL ENERGY S/D	2120	572	-121	843	-1235	-307	1351	4705	3028	6580	2616	7720	6575	-27	2373
1958 FEDERAL ENERGY S/D	-225	-2280	-864	-164	-1434	-1236	1816	6120	1576	2992	4249	6438	5489	-641	1622
1959 FEDERAL ENERGY S/D	496	-1889	-876	593	-344	1060	7025	6315	2394	4249	1910	4111	6769	2390	2652
1960 FEDERAL ENERGY S/D	1736	-672	2634	4136	1626	2042	5255	1792	2864	9131	4089	2450	4031	2074	3004
1961 FEDERAL ENERGY S/D	714	-2199	-1175	138	-777	-1591	3473	6652	3538	4459	421	4947	7438	427	2064
1962 FEDERAL ENERGY S/D	797	-1665	-1059	323	-1661	-1201	3754	818	590	6030	5275	2896	2739	1341	1147
1963 FEDERAL ENERGY S/D	2063	-938	-903	1149	6	704	4477	3048	559	3269	1990	2405	4524	1449	1718
1964 FEDERAL ENERGY S/D	1468	-1021	-150	-2	-1499	-1447	1477	4473	139	3996	996	3013	7896	3714	1695
1965 FEDERAL ENERGY S/D	1626	575	865	1505	-144	2930	8079	7152	3540	4493	6234	5488	6068	1492	3620
1966 FEDERAL ENERGY S/D	1688	172	-50	1066	-428	-871	3239	3842	561	6191	1890	1962	1753	1928	1498
1967 FEDERAL ENERGY S/D	706	-1869	-830	-34	-1486	-728	4949	6590	2635	2125	-1020	2750	7126	3632	2048
1968 FEDERAL ENERGY S/D	1744	356	117	695	-702	-845	3984	5587	3192	1101	45	466	4118	1680	1660
1969 FEDERAL ENERGY S/D	2041	487	1245	2012	835	376	7021	5523	3657	6982	6216	7406	5843	1110	3574
1970 FEDERAL ENERGY S/D	499	-2146	-872	610	-1394	-1473	1399	5051	2007	1847	1378	2429	4310	877	1144
1971 FEDERAL ENERGY S/D	1015	-1960	-1096	-155	-1401	-68	5949	8626	4768	5513	5025	7699	7717	3135	3331
1972 FEDERAL ENERGY S/D	2273	1671	719	516	-821	-683	6495	7917	8293	7626	2457	7394	8388	4636	4156
1973 FEDERAL ENERGY S/D	2756	2177	1026	1005	-1128	-360	1306	1286	510	-204	-836	205	1242	-147	574
1974 FEDERAL ENERGY S/D	-587	-3000	-1723	-361	-550	2479	8596	8133	5751	7497	6727	6952	9426	5037	4088
1975 FEDERAL ENERGY S/D	2110	2347	1122	-79	-1582	-1047	3261	4069	5378	2660	1756	3831	6347	4482	2518
1976 FEDERAL ENERGY S/D	615	-450	-549	852	698	4151	7130	6185	2530	7680	4570	6724	3707	3731	3447
1977 FEDERAL ENERGY S/D	2999	2260	4191	1148	-1706	-1166	-1190	206	-1537	-392	530	-620	-136	-711	98
1978 FEDERAL ENERGY S/D	-1583	-2229	-1937	-758	-859	76	2426	2236	3016	5827	2876	3458	2548	1664	1193

FEDERAL SYSTEM ENERGY ANALYSIS  
 FEDERAL SYSTEM ENERGY SURPLUS/DEFICIT  
 FOR THE 50 HISTORICAL WATER YEARS ON RECORD  
 (FEDERAL TABLE 2 LINE 42)

1998 WHITE BOOK: 12/31/98

2005- 6 OPERATING YEAR

RUN DATE: 12/31/98

ENERGY IN AVERAGE MEGAWATTS	AUG		SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR		MAY	JUN	JUL	12 MO
	1-15	16-31								1-15	16-30				AVG
1929 FEDERAL ENERGY S/D	1643	-1973	-947	125	-1662	-1215	-1134	65	-642	-133	1634	254	2213	197	-180
1930 FEDERAL ENERGY S/D	-561	-2219	-975	-783	-1223	-440	-1392	-927	-563	1588	5069	-334	-268	415	-379
1931 FEDERAL ENERGY S/D	-338	-1133	-1519	-914	-1086	-688	-1439	-1793	-768	2416	580	2689	30	1163	-297
1932 FEDERAL ENERGY S/D	-1436	-2337	-1681	-636	-968	-1249	-2060	-22	2826	7025	6236	5515	4971	1222	1055
1933 FEDERAL ENERGY S/D	-68	-868	-595	99	-1005	-630	4543	4044	150	3527	2169	3742	8208	4776	2143
1934 FEDERAL ENERGY S/D	1303	1681	549	1458	1101	4983	8116	6839	4141	8216	7263	5934	1080	-2036	3450
1935 FEDERAL ENERGY S/D	-1862	-2710	-1021	-600	-1060	-502	4154	3116	1621	4123	2981	3033	3820	1782	1301
1936 FEDERAL ENERGY S/D	323	-2451	-1262	-688	-1739	-716	-1198	287	-155	1189	7233	5918	2215	1750	630
1937 FEDERAL ENERGY S/D	-544	-2183	-935	-629	-1319	-899	-1511	-1055	-826	18	-11	2678	1542	-285	-383
1938 FEDERAL ENERGY S/D	-1467	-1935	-1092	-952	-740	-329	3327	2320	3855	3521	4967	6408	4514	1133	1749
1939 FEDERAL ENERGY S/D	-466	-2425	-1059	-375	-1775	-1060	-1407	2416	2237	3650	4467	3163	-583	2314	540
1940 FEDERAL ENERGY S/D	207	-2102	-906	-30	-1168	-1044	-422	1191	3915	3874	4357	2826	-402	-117	584
1941 FEDERAL ENERGY S/D	-1387	-2558	-1012	110	-1316	-894	-654	-231	432	672	1945	1455	1671	-341	-120
1942 FEDERAL ENERGY S/D	-1756	-2065	-1096	258	-469	2329	3350	2353	-394	2326	2674	3810	4035	2534	1442
1943 FEDERAL ENERGY S/D	1780	-631	-874	-135	-1292	-1003	3338	5350	3174	8918	7431	6240	5600	2178	2610
1944 FEDERAL ENERGY S/D	1135	-87	-525	130	-1705	-1122	-1143	426	-1149	-12	903	990	630	-566	-255
1945 FEDERAL ENERGY S/D	-1604	-2263	-1631	-640	-1044	-370	-2689	-960	-535	622	1665	3874	2964	1657	-14
1946 FEDERAL ENERGY S/D	361	-1502	-765	-731	-1088	43	4323	2744	2516	4297	6506	7005	4910	1795	2132
1947 FEDERAL ENERGY S/D	1109	-1837	-320	359	-875	1828	6077	6658	1790	4014	4547	5939	4942	1140	2621
1948 FEDERAL ENERGY S/D	140	-2047	-494	3042	825	200	5625	4568	2333	2418	5654	8520	10686	4261	3554
1949 FEDERAL ENERGY S/D	1575	2028	1061	622	-1280	-1449	1944	2367	5489	5140	7100	6364	4258	-481	2235
1950 FEDERAL ENERGY S/D	-1739	-3123	-1502	-921	-1873	-398	4407	5489	4864	6260	5964	5516	8688	3300	2604
1951 FEDERAL ENERGY S/D	886	1015	253	1441	1192	3470	7136	7654	3589	7047	6707	6898	3434	3012	3826
1952 FEDERAL ENERGY S/D	1696	794	851	2330	-42	323	5371	4185	1421	7202	7141	8314	5122	1200	3124
1953 FEDERAL ENERGY S/D	267	-2257	-991	-445	-1573	-959	-197	6286	4111	1413	2594	4587	6461	2463	1729
1954 FEDERAL ENERGY S/D	2007	-456	-475	508	-971	-714	3323	7160	3115	3624	4264	6103	7314	3951	2836
1955 FEDERAL ENERGY S/D	2983	1956	3271	1613	173	-668	1902	275	-534	5273	2497	2758	6887	5016	2254
1956 FEDERAL ENERGY S/D	1592	993	314	1036	488	3070	7448	6337	3937	6331	8670	9277	8860	2703	4355
1957 FEDERAL ENERGY S/D	2117	566	-126	839	-1238	-311	1499	4854	3173	6790	3817	8931	6781	171	2602
1958 FEDERAL ENERGY S/D	-232	-2288	-868	-169	-1438	-1241	1963	6270	1725	3194	5452	7647	5694	-445	1850
1959 FEDERAL ENERGY S/D	490	-1897	-883	589	-347	1057	7176	6469	2545	4454	3113	5317	6977	2592	2881
1960 FEDERAL ENERGY S/D	1733	-679	2634	4136	1624	2041	5404	1943	3011	9343	5294	3656	4235	2277	3234
1961 FEDERAL ENERGY S/D	709	-2208	-1181	134	-780	-1595	3621	6806	3687	4665	1620	6155	7647	626	2293
1962 FEDERAL ENERGY S/D	793	-1673	-1064	318	-1665	-1206	3902	967	736	6235	6479	4102	2941	1540	1374
1963 FEDERAL ENERGY S/D	2060	-945	-909	1146	2	702	4626	3198	705	3471	3195	3609	4726	1649	1945
1964 FEDERAL ENERGY S/D	1465	-1029	-156	-7	-1503	-1451	1624	4623	285	4198	2196	4217	8104	3918	1922
1965 FEDERAL ENERGY S/D	1623	569	862	1503	-147	2927	8231	7305	3689	4696	7441	6696	6273	1692	3850
1966 FEDERAL ENERGY S/D	1684	167	-56	1061	-431	-874	3387	3992	707	6396	3094	3168	1956	2127	1726
1967 FEDERAL ENERGY S/D	701	-1877	-834	-38	-1489	-732	5098	6744	2787	2330	179	3956	7332	3837	2277
1968 FEDERAL ENERGY S/D	1741	349	113	691	-705	-848	4131	5738	3341	1304	1247	1669	4321	1881	1888
1969 FEDERAL ENERGY S/D	2038	482	1242	2010	832	374	7171	5677	3804	7188	7423	8618	6050	1310	3805
1970 FEDERAL ENERGY S/D	494	-2154	-878	606	-1398	-1477	1544	5198	2155	2052	2580	3633	4512	1076	1371
1971 FEDERAL ENERGY S/D	1010	-1968	-1102	-160	-1404	-72	6097	8780	4916	5722	6230	8910	7924	3336	3560
1972 FEDERAL ENERGY S/D	2270	1667	715	512	-825	-688	6644	8071	8449	7836	3660	8605	8597	4842	4387
1973 FEDERAL ENERGY S/D	2755	2174	1022	1001	-1132	-363	1451	1432	654	-3	367	1407	1442	50	801
1974 FEDERAL ENERGY S/D	-593	-3008	-1729	-367	-555	2479	8751	8290	5901	7704	7935	8163	9637	5243	4319
1975 FEDERAL ENERGY S/D	2107	2344	1120	-84	-1586	-1052	3408	4217	5528	2863	2958	5038	6551	4686	2747
1976 FEDERAL ENERGY S/D	609	-456	-555	848	695	4150	7281	6338	2679	7887	5775	7934	3908	3936	3677
1977 FEDERAL ENERGY S/D	2999	2258	4193	1145	-1711	-1170	-1044	348	-1395	-191	1736	584	63	-516	325
1978 FEDERAL ENERGY S/D	-1589	-2235	-1943	-763	-862	72	2571	2384	3162	6033	4080	4666	2750	1864	1421

FEDERAL SYSTEM ENERGY ANALYSIS

FEDERAL SYSTEM ENERGY SURPLUS/DEFICIT  
FOR THE 50 HISTORICAL WATER YEARS ON RECORD  
(FEDERAL TABLE 2 LINE 42)

1998 WHITE BOOK: 12/31/98

2006- 7 OPERATING YEAR

RUN DATE: 12/31/98

ENERGY IN AVERAGE MEGAWATTS	AUG	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	APR	MAY	JUN	JUL	12 MO
	1-15	16-31								1-15	16-30				AVG
1929 FEDERAL ENERGY S/D	1862	-1759	-725	980	-756	-229	-75	1092	329	759	1530	221	3217	1206	538
1930 FEDERAL ENERGY S/D	-347	-2006	-753	70	-316	547	-336	100	408	2482	4967	-364	734	1424	339
1931 FEDERAL ENERGY S/D	-123	-920	-1297	-61	-179	300	-384	-765	204	3309	477	2660	1032	2175	421
1932 FEDERAL ENERGY S/D	-1222	-2123	-1459	217	-61	-262	-1004	1006	3801	7922	6135	5488	5980	2235	1775
1933 FEDERAL ENERGY S/D	148	-654	-374	953	-98	357	5603	5077	1126	4424	2060	3713	9221	5796	2864
1934 FEDERAL ENERGY S/D	1521	1898	773	2315	2010	5975	9184	7877	5121	9119	7163	5911	2086	-1025	4173
1935 FEDERAL ENERGY S/D	-1647	-2497	-799	254	-154	485	5214	4149	2597	5024	2874	3003	4826	2797	2021
1936 FEDERAL ENERGY S/D	540	-2238	-1040	165	-832	272	-143	1317	816	2081	7130	5892	3221	2762	1349
1937 FEDERAL ENERGY S/D	-329	-1970	-714	224	-412	88	-455	-28	146	911	-118	2647	2546	725	335
1938 FEDERAL ENERGY S/D	-1252	-1720	-870	-97	167	659	4385	3353	4832	4418	4861	6383	5522	2146	2470
1939 FEDERAL ENERGY S/D	-252	-2213	-838	479	-869	-74	-349	3448	3210	4544	4362	3135	420	3326	1259
1940 FEDERAL ENERGY S/D	423	-1888	-685	825	-260	-57	638	2219	4889	4769	4253	2797	602	894	1303
1941 FEDERAL ENERGY S/D	-1172	-2345	-792	964	-409	92	404	795	1405	1565	1841	1426	2673	668	598
1942 FEDERAL ENERGY S/D	-1541	-1851	-875	1112	439	-3320	4408	3386	580	3219	2570	3781	5042	3549	2162
1943 FEDERAL ENERGY S/D	1997	-417	-653	719	-387	-17	4395	6382	4153	9817	7329	6215	6608	3191	3331
1944 FEDERAL ENERGY S/D	1351	128	-304	984	-800	-136	-85	1451	-178	880	799	958	1632	443	462
1945 FEDERAL ENERGY S/D	-1391	-2050	-1410	214	-138	617	-1635	66	436	1514	1558	3845	3969	2669	704
1946 FEDERAL ENERGY S/D	575	-1289	-544	122	-181	1030	5382	3776	3492	5194	6402	6980	5919	2809	2852
1947 FEDERAL ENERGY S/D	1325	-1624	-99	1214	32	2816	7138	7692	2769	4911	4442	5913	5952	2153	3342
1948 FEDERAL ENERGY S/D	354	-1834	-272	3900	1733	1188	6687	5602	3311	3313	5550	8496	11703	5280	4277
1949 FEDERAL ENERGY S/D	1792	2246	1285	1477	-374	-463	3003	3399	6465	6035	6998	6336	5266	531	2955
1950 FEDERAL ENERGY S/D	-1526	-2911	-1280	-68	-967	588	5467	6522	5845	7157	5861	5489	9701	4317	3325
1951 FEDERAL ENERGY S/D	1102	1232	475	2298	2101	4459	8200	8690	4570	7946	6606	6873	4440	4028	4548
1952 FEDERAL ENERGY S/D	1913	1009	1075	3188	864	1309	6431	5217	2399	8100	7038	8291	6131	2212	3846
1953 FEDERAL ENERGY S/D	483	-2045	-769	409	-667	28	859	7319	5090	2311	2487	4559	7469	3478	2449
1954 FEDERAL ENERGY S/D	2224	-241	-252	1362	-64	272	4382	8196	4095	4518	4157	6078	8326	4968	3558
1955 FEDERAL ENERGY S/D	3204	2174	3498	2470	1079	320	2962	1304	439	6170	2391	2727	7897	6036	2975
1956 FEDERAL ENERGY S/D	1809	1208	535	1892	1395	4058	8512	7374	4914	7228	8570	9254	9873	3718	5078
1957 FEDERAL ENERGY S/D	2334	781	96	1694	-332	675	2560	5887	4147	7692	3709	8908	7791	1182	3322
1958 FEDERAL ENERGY S/D	-17	-2076	-647	685	-531	-255	3022	7304	2702	4088	5348	7621	6703	566	2570
1959 FEDERAL ENERGY S/D	704	-1684	-660	1444	559	2045	8238	7505	3523	5351	3006	5291	7989	3607	3603
1960 FEDERAL ENERGY S/D	1950	-465	2861	4997	2534	3030	6465	2975	3988	10246	5192	3627	5241	3292	3956
1961 FEDERAL ENERGY S/D	925	-1996	-959	989	127	-608	4681	7844	4665	5564	1514	6130	8661	1639	3014
1962 FEDERAL ENERGY S/D	1009	-1459	-843	1173	-759	-220	4960	1999	1710	7131	6376	4073	3948	2553	2094
1963 FEDERAL ENERGY S/D	2278	-731	-687	2001	909	1690	5685	4230	1680	4364	3092	3579	5732	2663	2665
1964 FEDERAL ENERGY S/D	1681	-816	67	848	-597	-465	2683	5656	1260	5091	2088	4188	9115	4936	2643
1965 FEDERAL ENERGY S/D	1841	785	1086	2360	759	3915	9295	8341	4667	5590	7338	6671	7282	2706	4572
1966 FEDERAL ENERGY S/D	1902	382	166	1917	476	112	4447	5025	1681	7294	2989	3139	2963	3141	2446
1967 FEDERAL ENERGY S/D	918	-1664	-613	816	-583	255	6159	7779	3767	3226	70	3927	8344	4855	2998
1968 FEDERAL ENERGY S/D	1959	565	336	1547	200	138	5189	6773	4321	2199	1141	1637	5329	2896	2608
1969 FEDERAL ENERGY S/D	2256	698	1467	2867	1740	1361	8233	6716	4780	8086	7322	8596	7061	2324	4527
1970 FEDERAL ENERGY S/D	709	-1941	-656	1460	-491	-492	2601	6228	3133	2948	2475	3603	5518	2088	2091
1971 FEDERAL ENERGY S/D	1226	-1756	-881	694	-498	914	7158	9819	5893	6621	6128	8888	8934	4352	4282
1972 FEDERAL ENERGY S/D	2489	1885	937	1366	81	299	7703	9108	9434	8736	3555	8581	9610	5862	5110
1973 FEDERAL ENERGY S/D	2974	2392	1246	1857	-225	622	2508	2462	1628	890	263	1376	2446	1060	1520
1974 FEDERAL ENERGY S/D	-380	-2796	-1508	487	352	3468	9817	9330	6880	8603	7833	8139	10651	6263	5042
1975 FEDERAL ENERGY S/D	2325	2563	1342	770	-680	-66	4468	5248	6509	3757	2852	5010	7560	5704	3468
1976 FEDERAL ENERGY S/D	824	-243	-333	1703	1603	5139	8344	7374	3657	8786	5672	7910	4914	4954	4399
1977 FEDERAL ENERGY S/D	3218	2477	4421	2001	-804	-184	14	1375	-423	701	1633	554	1066	493	1044
1978 FEDERAL ENERGY S/D	-1373	-2022	-1722	90	43	1058	3628	3414	4137	6933	3976	4637	3755	2878	2140

FEDERAL SYSTEM ENERGY ANALYSIS  
 FEDERAL SYSTEM ENERGY SURPLUS/DEFICIT  
 FOR THE 50 HISTORICAL WATER YEARS ON RECORD  
 (FEDERAL TABLE 2 LINE 42)

1998 WHITE BOOK: 12/31/98

2007- 8 OPERATING YEAR

RUN DATE: 12/31/98

ENERGY IN AVERAGE MEGAWATTS	AUG	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	APR	MAY	JUN	JUL	12 MO
	1-15	16-31								1-15	16-30				AVG
1929 FEDERAL ENERGY S/D	2817	-810	99	1188	-547	-19	39	1217	457	891	2665	1363	3368	1360	942
1930 FEDERAL ENERGY S/D	604	-1056	70	279	-107	757	-224	225	536	2614	6105	781	885	1580	743
1931 FEDERAL ENERGY S/D	829	31	-473	148	30	510	-272	-641	333	3442	1613	3807	1184	2332	826
1932 FEDERAL ENERGY S/D	-269	-1172	-636	426	149	-52	-893	1130	3931	8059	7272	6634	6137	2392	2180
1933 FEDERAL ENERGY S/D	1099	298	450	1161	110	566	5720	5209	1259	4560	3193	4860	9380	5961	3271
1934 FEDERAL ENERGY S/D	2475	2853	1598	2526	2220	6188	9304	8013	5258	9260	8303	7062	2240	-869	4582
1935 FEDERAL ENERGY S/D	-697	-1547	25	462	55	695	5330	4280	2730	5164	4006	4148	4981	2958	2427
1936 FEDERAL ENERGY S/D	1493	-1288	-216	374	-624	482	-31	1445	944	2213	8265	7040	3377	2919	1754
1937 FEDERAL ENERGY S/D	625	-1019	111	432	-203	297	-342	97	274	1044	1015	3792	2697	881	739
1938 FEDERAL ENERGY S/D	-302	-770	-46	110	376	868	4500	3483	4964	4554	5995	7533	5676	2304	2876
1939 FEDERAL ENERGY S/D	698	-1265	-14	688	-661	135	-235	3576	3338	4678	5495	4282	571	3484	1664
1940 FEDERAL ENERGY S/D	1376	-937	140	1034	-51	152	753	2345	5019	4904	5389	3943	753	1049	1709
1941 FEDERAL ENERGY S/D	-221	-1396	32	1173	-200	302	516	920	1534	1697	2977	2572	2825	822	1002
1942 FEDERAL ENERGY S/D	-590	-902	-52	1321	647	3533	4522	3516	711	3351	3705	4926	5196	3710	2568
1943 FEDERAL ENERGY S/D	2951	533	171	928	-178	191	4509	6510	4288	9955	8465	7366	6763	3350	3738
1944 FEDERAL ENERGY S/D	2304	1079	520	1193	-591	73	30	1576	-50	1012	1934	2102	1783	598	867
1945 FEDERAL ENERGY S/D	-440	-1100	-586	422	71	827	-1526	191	564	1646	2689	4990	4123	2826	1108
1946 FEDERAL ENERGY S/D	1527	-340	280	330	28	1239	5496	3904	3624	5329	7538	8132	6075	2969	3259
1947 FEDERAL ENERGY S/D	2278	-673	725	1421	240	3027	7255	7824	2903	5047	5577	7062	6109	2311	3749
1948 FEDERAL ENERGY S/D	1306	-886	552	4113	1943	1398	6803	5733	3443	3448	6686	9646	11866	5444	4685
1949 FEDERAL ENERGY S/D	2745	3201	2111	1686	-166	-255	3118	3528	6597	6169	8135	7484	5421	687	3361
1950 FEDERAL ENERGY S/D	-576	-1962	-456	139	-760	798	5583	6652	5979	7293	6997	6638	9862	4478	3732
1951 FEDERAL ENERGY S/D	2055	2184	1299	2509	2310	4670	8318	8823	4705	8083	7744	8024	4593	4190	4956
1952 FEDERAL ENERGY S/D	2867	1961	1900	3399	1073	1519	6548	5346	2532	8237	8174	9442	6286	2372	4253
1953 FEDERAL ENERGY S/D	1435	-1097	55	617	-458	238	969	7448	5224	2448	3619	5706	7626	3638	2856
1954 FEDERAL ENERGY S/D	3178	710	571	1572	144	481	4498	8328	4229	4652	5289	7228	8488	5132	3966
1955 FEDERAL ENERGY S/D	4160	3128	4327	2680	1289	530	3077	1432	568	6306	3524	3872	8054	6202	3383
1956 FEDERAL ENERGY S/D	2763	2161	1360	2102	1605	4269	8631	7508	5047	7365	9709	10407	10034	3879	5487
1957 FEDERAL ENERGY S/D	3288	1734	921	1903	-124	884	2674	6017	4277	7833	4842	10060	7949	1339	3729
1958 FEDERAL ENERGY S/D	933	-1127	176	893	-322	-47	3137	7435	2834	4222	6481	8771	6859	724	2976
1959 FEDERAL ENERGY S/D	1657	-735	164	1653	768	2255	8355	7639	3659	5488	4140	6440	8149	3768	4010
1960 FEDERAL ENERGY S/D	2904	487	3689	5209	2745	3241	6582	3107	4120	10387	6328	4774	5398	3453	4364
1961 FEDERAL ENERGY S/D	1879	-1047	-136	1198	336	-399	4796	7978	4799	5702	2645	7281	8822	1798	3422
1962 FEDERAL ENERGY S/D	1962	-510	-19	1382	-551	-11	5076	2129	1841	7267	7512	5221	4103	2712	2500
1963 FEDERAL ENERGY S/D	3231	220	136	2211	1118	1901	5802	4359	1812	4499	4227	4725	5887	2824	3072
1964 FEDERAL ENERGY S/D	2634	135	892	1057	-389	-257	2798	5787	1392	5224	3219	5335	9275	5101	3050
1965 FEDERAL ENERGY S/D	2795	1736	1911	2571	968	4126	9414	8475	4800	5725	8476	7821	7438	2866	4980
1966 FEDERAL ENERGY S/D	2857	1333	990	2126	684	322	4562	5156	1812	7431	4124	4285	3119	3301	2853
1967 FEDERAL ENERGY S/D	1871	-715	212	1025	-375	464	6276	7912	3902	3363	1201	5074	8503	5019	3406
1968 FEDERAL ENERGY S/D	2913	1517	1161	1756	410	349	5304	6905	4455	2335	2275	2781	5485	3057	3015
1969 FEDERAL ENERGY S/D	3210	1650	2293	3077	1949	1572	8351	6851	4914	8224	8461	9748	7219	2482	4936
1970 FEDERAL ENERGY S/D	1662	-991	167	1670	-282	-283	2714	6356	3266	3083	3609	4748	5671	2247	2496
1971 FEDERAL ENERGY S/D	2179	-807	-58	903	-291	1123	7274	9953	6026	6759	7265	10039	9093	4513	4689
1972 FEDERAL ENERGY S/D	3444	2838	1763	1574	290	507	7820	9242	9573	8876	4690	9732	9770	6027	5519
1973 FEDERAL ENERGY S/D	3930	3347	2071	2066	-17	832	2621	2590	1757	1023	1397	2519	2598	1216	1925
1974 FEDERAL ENERGY S/D	572	-1847	-684	695	559	3681	9938	9467	7015	8740	8972	9290	10813	6429	5452
1975 FEDERAL ENERGY S/D	3279	3517	2169	978	-472	142	4583	5377	6643	3891	3984	6156	7717	5868	3875
1976 FEDERAL ENERGY S/D	1776	708	491	1912	1812	5350	8463	7508	3791	8923	6807	9060	5068	5117	4807
1977 FEDERAL ENERGY S/D	4175	3432	5252	2210	-596	25	129	1500	-296	834	2769	1698	1217	648	1449
1978 FEDERAL ENERGY S/D	-423	-1072	-899	298	253	1265	3742	3542	4269	7071	5111	5786	3908	3037	2545

FEDERAL SYSTEM ENERGY ANALYSIS

FEDERAL SYSTEM ENERGY SURPLUS/DEFICIT  
FOR THE 50 HISTORICAL WATER YEARS ON RECORD  
(FEDERAL TABLE 2 LINE 42)

1998 WHITE BOOK: 12/31/98

2008- 9 OPERATING YEAR

RUN DATE: 12/31/98

ENERGY IN AVERAGE MEGAWATTS	AUG		SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	APR	MAY	JUN	JUL	12 MO
	1-15	16-31								1-15	16-30				AVG
1929 FEDERAL ENERGY S/D	2975	-654	251	1319	-427	100	59	1215	455	892	1667	365	3540	1531	904
1930 FEDERAL ENERGY S/D	761	-900	222	409	15	876	-206	224	534	2615	5107	-215	1057	1752	705
1931 FEDERAL ENERGY S/D	986	187	-322	277	151	630	-254	-642	330	3443	616	2811	1356	2504	788
1932 FEDERAL ENERGY S/D	-112	-1016	-484	556	271	67	-875	1129	3929	8061	6275	5639	6311	2566	2143
1933 FEDERAL ENERGY S/D	1256	454	602	1292	231	685	5740	5211	1259	4563	2192	3865	9556	6137	3234
1934 FEDERAL ENERGY S/D	2633	3011	1750	2657	2343	6310	9327	8017	5260	9265	7306	6069	2413	-697	4546
1935 FEDERAL ENERGY S/D	-540	-1391	176	592	176	814	5351	4282	2730	5167	3007	3151	5155	3131	2390
1936 FEDERAL ENERGY S/D	1651	-1133	-64	503	-503	602	-13	1446	942	2215	7267	6044	3551	3092	1717
1937 FEDERAL ENERGY S/D	782	-863	262	562	-81	417	-324	96	272	1045	15	2795	2869	1052	701
1938 FEDERAL ENERGY S/D	-145	-615	105	239	497	988	4520	3484	4964	4557	4996	6539	5850	2477	2838
1939 FEDERAL ENERGY S/D	855	-1109	137	817	-540	254	-216	3576	3337	4679	4496	3286	743	3657	1626
1940 FEDERAL ENERGY S/D	1534	-782	292	1164	70	271	773	2345	5018	4905	4391	2946	925	1222	1671
1941 FEDERAL ENERGY S/D	-64	-1240	184	1304	-79	421	536	919	1532	1697	1979	1576	2997	993	964
1942 FEDERAL ENERGY S/D	-433	-745	100	1451	768	3654	4542	3517	710	3352	2707	3929	5369	3883	2530
1943 FEDERAL ENERGY S/D	3109	689	322	1057	-57	310	4527	6510	4288	9958	7467	6371	6938	3523	3700
1944 FEDERAL ENERGY S/D	2462	1235	671	1322	-471	192	49	1575	-53	1013	936	1104	1954	769	828
1945 FEDERAL ENERGY S/D	-283	-945	-434	552	192	946	-1508	190	562	1648	1689	3993	4296	2999	1070
1946 FEDERAL ENERGY S/D	1684	-183	432	459	149	1358	5516	3905	3624	5331	6540	7138	6249	3142	3222
1947 FEDERAL ENERGY S/D	2436	-517	877	1552	360	3146	7275	7826	2904	5049	4579	6067	6284	2485	3713
1948 FEDERAL ENERGY S/D	1463	-729	704	4244	2065	1517	6822	5734	3443	3450	5686	8652	12043	5619	4648
1949 FEDERAL ENERGY S/D	2903	3359	2263	1816	-45	-135	3137	3529	6596	6172	7137	6488	5594	858	3324
1950 FEDERAL ENERGY S/D	-420	-1806	-304	269	-640	918	5603	6654	5981	7294	5999	5643	10038	4652	3696
1951 FEDERAL ENERGY S/D	2212	2342	1451	2639	2431	4790	8339	8826	4707	8087	6747	7030	4767	4365	4920
1952 FEDERAL ENERGY S/D	3025	2119	2053	3530	1194	1639	6569	5347	2533	8239	7176	8449	6460	2545	4217
1953 FEDERAL ENERGY S/D	1592	-942	206	747	-338	358	988	7449	5225	2452	2619	4710	7801	3812	2818
1954 FEDERAL ENERGY S/D	3335	867	722	1702	266	600	4517	8331	4230	4653	4289	6234	8664	5307	3929
1955 FEDERAL ENERGY S/D	4319	3287	4481	2811	1411	650	3097	1432	566	6309	2524	2876	8228	6378	3346
1956 FEDERAL ENERGY S/D	2921	2319	1513	2233	1726	4388	8653	7511	5047	7368	8712	9413	10211	4052	5451
1957 FEDERAL ENERGY S/D	3447	1891	1072	2033	-4	1003	2694	6018	4276	7837	3842	9067	8124	1512	3692
1958 FEDERAL ENERGY S/D	1090	-972	329	1023	-201	72	3157	7436	2835	4224	5483	7776	7034	896	2939
1959 FEDERAL ENERGY S/D	1814	-578	315	1783	889	2374	8376	7642	3660	5490	3141	5446	8325	3941	3974
1960 FEDERAL ENERGY S/D	3063	644	3842	5341	2867	3361	6603	3108	4120	10392	5330	3778	5571	3627	4328
1961 FEDERAL ENERGY S/D	2036	-891	16	1328	456	-281	4816	7981	4800	5706	1645	6287	8999	1971	3385
1962 FEDERAL ENERGY S/D	2120	-353	132	1512	-430	108	5096	2131	1839	7270	6514	4225	4276	2884	2462
1963 FEDERAL ENERGY S/D	3389	376	289	2341	1239	2021	5822	4360	1812	4500	3230	3728	6061	2997	3035
1964 FEDERAL ENERGY S/D	2792	291	1044	1187	-268	-137	2818	5789	1391	5225	2218	4339	9450	5276	3013
1965 FEDERAL ENERGY S/D	2952	1894	2064	2701	1089	4245	9436	8477	4800	5726	7478	6826	7613	3039	4943
1966 FEDERAL ENERGY S/D	3015	1490	1141	2257	806	441	4583	5158	1812	7435	3125	3289	3293	3475	2816
1967 FEDERAL ENERGY S/D	2029	-558	363	1155	-254	583	6296	7915	3903	3366	200	4078	8679	5195	3369
1968 FEDERAL ENERGY S/D	3071	1674	1314	1887	530	467	5324	6907	4457	2337	1276	1784	5660	3230	2978
1969 FEDERAL ENERGY S/D	3369	1807	2446	3208	2071	1691	8372	6854	4913	8228	7463	8754	7394	2656	4899
1970 FEDERAL ENERGY S/D	1819	-836	319	1800	-161	-164	2733	6356	3266	3085	2610	3751	5845	2419	2459
1971 FEDERAL ENERGY S/D	2337	-651	93	1032	-170	1242	7294	9957	6026	6763	6267	9045	9268	4687	4653
1972 FEDERAL ENERGY S/D	3602	2997	1915	1705	410	627	7840	9245	9576	8881	3691	8738	9946	6203	5483
1973 FEDERAL ENERGY S/D	4089	3505	2224	2196	104	951	2640	2591	1756	1023	398	1521	2771	1389	1888
1974 FEDERAL ENERGY S/D	729	-1691	-533	824	680	3801	9961	9470	7015	8743	7974	8296	10988	6604	5415
1975 FEDERAL ENERGY S/D	3438	3675	2321	1108	-352	261	4603	5378	6645	3893	2984	5160	7891	6043	3838
1976 FEDERAL ENERGY S/D	1934	865	642	2043	1934	5470	8484	7510	3792	8926	5809	8066	5242	5292	4770
1977 FEDERAL ENERGY S/D	4334	3591	5407	2340	-475	144	148	1499	-299	834	1771	701	1390	820	1412
1978 FEDERAL ENERGY S/D	-266	-916	-748	428	373	1385	3761	3543	4268	7074	4113	4790	4082	3210	2508

## **Section 8: Regional System Exhibits**

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***Exhibit 19***

***Regional Annual Energy Analysis Under 1937 Water Conditions for 10 Operating  
Years***

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***Exhibits 20 – 22***

***Regional Monthly Energy Analysis Under Medium Loads for 1937 Water  
Conditions***

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***Exhibit 23***

***Regional Monthly 50-Hour Capacity Surpluses and Deficits Under Medium Loads  
for 1937 Water Conditions***

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***Exhibits 24 – 26***

***Regional Monthly Capacity Analysis Under Medium Loads for 1937 Water  
Conditions***

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## REGIONAL FOOTNOTES

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### For Exhibits 19 through 26

1. Firm loads for the region include the sum of the estimated firm loads of Federal agencies, public agencies, direct service industries (DSIs), investor-owned utilities (IOUs), and associated transmission losses. Peak loads represent non-coincidental capacity demands adjusted to account for Federal system diversity; they are based on the prediction of normal weather and have a 50-percent chance of being exceeded.
2. Total loads for the region include system firm loads plus Utah Power Company's interruptible load.
3. Regional exports include: BPA to Anaheim, capacity/energy exchange and capacity sale; BPA to Azusa, power exchange and capacity sale; BPA to Banning, power exchange and capacity sale; BPA to BART, power sale; BPA to Burbank, power sale and capacity/energy exchange; BPA to Colton, power exchange and capacity sale; BPA to Farmington, power sale; BPA to Federal agencies, power sale; BPA to Glendale, power sale and capacity/energy exchange; BPA to M-S-R, power sale; BPA to other entities, power sales; BPA to Palo Alto, capacity sale and seasonal energy; BPA to Pasadena, power sale, capacity/energy exchange and seasonal energy exchange; BPA to Riverside, capacity/energy exchange, capacity sale and diversity exchange; BPA to SCE, power sale, capacity/energy exchange, environmental storage, and option capacity; BPA to SCE Source, power sale; BPA to BC Hydro for Canadian Entitlement; and BPA's Northwest-Southwest Intertie losses; AVC to Modesto, power sale; AVC to West Kootenai, capacity sale; city of Idaho Falls to UPC for Gem State, IPC to Sierra Pacific, power sale and for Harney and Wells; IPC to UAMPS, power sale; IPC to the city of Washington, Utah, power sale; IPC to Truckee/Donner, power sale; PP&L to CDWR, power sale; PP&L to PP&L (Northern California), transfer to PP&L's Northern California load; PP&L to Redding, power sale; PP&L to SMUD, power sale; PP&L to SCE, power sale; PP&L to WAPA, power sale; PGE to Glendale, power sale and seasonal power exchange; PSE to PG&E, seasonal power exchange; SCL to NCPA, seasonal power exchange; Snohomish County PUD to SMUD, power sale; and TPU to WAPA, power sale.

Also included in exports are resources purchased by utilities outside the region. These include Longview Fibre to WAPA; 14.8 percent of the Boardman coal plant sold to San Diego Gas and Electric; and 10.2 percent of the Boardman coal plant sold to the city of Turlock, CA.

This analysis assumes that BPA's power sales and capacity/energy exchange agreements with the cities of Burbank, Glendale, Pasadena, Modesto, Santa Clara and Redding, and with SCE are in power sales mode throughout the study period.

4. Federal diversity is a percentage reduction applied to the Federal system non-coincidental peak utility allocation requirements. This is because all peaking electrical loads do not occur simultaneously throughout the region.
5. Regulated hydro includes those hydro dams where the firm energy generation of the dam is affected by the release of stored water from upstream reservoirs. Regulated hydro generation is determined by completing a hydro regulation study of the Pacific Northwest hydro system.
6. Independent hydro includes those hydro dams where no reservoirs exist upstream to release stored water and the firm energy is based on fixed historical flows. Hydro independents are not changed as a part of the hydro regulation study.

7. Sustained peaking adjustment is a percentage reduction applied to the Federal hydro system to meet a capacity load of 50 hours per week. This adjustment also includes reductions for Federal hydro maintenance, spinning reserves, forced outage reserves, and summer flow augmentation on the Lower Snake River and John Day hydro projects.
8. Small thermal and miscellaneous resources include: IPC: Energy Management Systems; MPC: regional Bird and Corette; PGE: Summit 1 and 2; PSE: Crystal Mountain and Shuffleton; SCL: Boundary; and TPU: Steam Plant 2.
9. Combustion turbines include: Clark: River Road (Cogentrix); IPC: Wood River; PGE: Bethel and Beaver; PSE: Whidbey Island, Whitehorn, Fredrickson, and Fredonia units 1 and 2; and WWP: Northeast units 1 and 2.
10. Renewables include: BPA: James River Wauna; Consumers: Coffin Butte; Emerald County PUD: Short Mountain; and WWP: Kettle Falls.
11. Cogeneration includes: EWEB: Weyerhaeuser's WEYCO Energy Center; Snohomish: County PUD Scott Paper; PGE: Coyote Springs; and PP&L: Hermiston. Longview Fibre output is sold outside the region to WAPA.
12. Regional imports include: Anaheim to BPA, exchange energy and peak replacement energy; Azusa to BPA, power exchange and peak replacement; Banning to BPA, power exchange and peak replacement; Basin Electric to BPA, power sale; BGP to BPA, supplemental energy; Burbank to BPA, exchange energy; Colton to BPA, power exchange and peak replacement; Glendale to BPA, exchange energy; other entities to BPA, power exchange; Pasadena to BPA, exchange energy, peak replacement energy, and seasonal replacement energy; PP&L (Wyoming Division) to BPA for Southern Idaho, power sale; Riverside to BPA, exchange energy, peak replacement energy, and seasonal exchange energy; Sierra Pacific to BPA for Harney and Wells; SCE to BPA, exchange energy, supplemental energy, environmental storage, option energy, and peak replacement; and PowerEx to BPA for ABC and Palo Alto, peak replacement energy; BC Hydro to PSE, power sale; BC Hydro to SCL, for Ross; Glendale to PGE, seasonal power exchange; NCPA to SCL, seasonal power exchange; PG&E to PSE, seasonal power exchange; PowerEx to Benton REA, power sale; PowerEx to Clearwater Power Company, power sale; PowerEx to EWEB, power sale; SCE to PP&L, power sale; and West Kootenai to AVC, peak replacement energy.

In addition, imports include the following intra-company transfers: PP&L (Wyoming) to PP&L, and Utah Power Company.

This analysis assumes that BPA's power sales and capacity/energy exchange agreements with the cities of Burbank, Glendale, Pasadena, Modesto, Santa Clara and Redding and with SCE are in power sale mode, so exchanges and supplemental energy with these utilities are zero through the study horizon.

13. Resource acquisitions are resources BPA has identified and contracted for future purchase. When new Federal resource acquisitions are contracted for and/or on-line, they will be included in the loads and resources balance.
14. Non-utility generation (NUG) resources include generation provided to utilities by independent power producers and resources included under the Public Utility Regulatory Policies Act (PURPA). This study included 180 Individual NUGs.
15. 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.

16. Large thermal reserve 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.
17. Federal spinning reserves equal the reserve generating capacity maintained to provide a regulating margin for the automatic generation and frequency control of power generation.
18. Hydro maintenance is the sum of individual Federal system, public agency, and IOU hydro project maintenance, based on the average of the 1983-84 through 1988-89 schedules submitted to the Northwest Power Pool.
19. Extreme weather adjustment is the sum of all utility load responses with Pacific Northwest cold weather and has a 5 percent chance of being exceeded in the months of November through February.

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***Exhibits 27 – 36***

***Regional Energy Surpluses and Deficits for 50 Historical Water Conditions***

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## **Section 9: Administrator's Record of Decision on the 1998 Pacific Northwest Loads and Resources Study**

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# Section 9: Administrator's Record of Decision on the 1998 Pacific Northwest Loads and Resources Study (The White Book)

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## 1. Introduction

The 1998 Pacific Northwest Loads and Resources Study (White Book) establishes the Bonneville Power Administration's (BPA) long range planning basis for supplying electric power to BPA customers. The White Book is not an operational planning guide, nor is it used for BPA ratesetting purposes under section 7(i) of the Northwest Power Act. The White Book includes Federal system loads and resources and regional loads and resources with detailed technical appendices. This White Book updates the 1997 Pacific Northwest Loads and Resources Study, published in July 1998. The 1998 White Book is being published as a projection of regional and Federal system load and resource capabilities to be used as input to BPA's resource planning process and as a benchmark for annual determinations under BPA's requirements power sales contracts.

In 1997, BPA began a public process to implement recommendations made in the Comprehensive Review of the Northwest Energy System Final Report. One aspect of that report recommends a contracting process, termed "subscription," through which BPA would offer new power sales contracts for the post-2001 period. BPA recognized some of its customers wanted contracts with some regional and extraregional customers. This White Book accounts for those additional contracts executed this past year as part of firm power sales for the post-2001 period.

## 2. Statutory Background

With the passage of the Northwest Power Act in December 1980, Congress directed BPA to assure the Pacific Northwest an adequate, efficient, economic and reliable power supply. *16 U.S.C. §839(2)*. In order to carry out this mandate, BPA was directed by Congress to offer new power sales contracts to its regional firm power customers and to plan and acquire firm resources sufficient to meet these firm power loads. *16 U.S.C. §839e(9)*.

Sections 5(b) and 5(d) of the Northwest Power Act obligate BPA to serve, in accordance with the terms of its contracts, the net firm power load requirements of utilities in the Pacific Northwest, including public bodies, cooperatives, and investor-owned utilities (IOUs), and authorize BPA to serve up to a defined amount of the firm power requirements of its existing direct-service industrial (DSI) customers. *16 U.S.C. §839c(b) and (d)*. Under section 5(b), BPA is to provide firm power from the Federal system to meet the firm regional loads of a customer in excess of the firm resources, if any, which the customer has dedicated to serve its own regional firm loads under the terms of its contract with BPA. *16 U.S.C. §839c(b)(1)(A) and (B)*. BPA is also to provide electric power for those loads which were served by a customer's dedicated resources if a customer's dedicated resource is no longer available to serve loads due to obsolescence, retirement or loss of the resource, or loss of contract rights. Because the Northwest Power Act requires that the Administrator meet all of the firm regional peak and energy loads of its utility customers in excess of the customers' firm resources dedicated to serve loads, BPA must have a high degree of certainty regarding its projected firm load obligations to efficiently and reliably plan the use of its own resources and anticipate any resource additions that may be needed to meet its obligations.

Section 6(a)(2) of the Northwest Power Act obligates BPA to acquire sufficient resources on a planning basis to meet its firm load obligations, including its section 5(b) contract obligations. BPA's obligations to provide firm electric power to its utility customers for their regional firm loads and its contract obligations to provide firm power to its DSI customers comprise the largest portion of BPA's firm obligations. *16 U.S.C. §839c(b); §839c(d)*. BPA's contracts with utility and DSI customers contain provisions that implement the above statutory directives.

### 3. The White Book and the 1981 Utility Power Sales Contract

#### A. The White Book

The White Book provides projections of regional and Federal system loads and resource capabilities that BPA uses to calculate the firm load obligations it must serve over the planning period and those Federal system resources that are or will be available to meet those loads. Technically, it is a loads and resources forecast document derived from regional economic planning models. It incorporates information on forecasted loads and resource capability obtained from (1) public agency and investor-owned utility (IOU) customers through their annual data submittals to the Pacific Northwest Utilities Conference; (2) the Pacific Northwest Coordination Agreement (PNCA) Operating Committee; and (3) analysis of the Federal hydroelectric power system. Verifiable changes to individual utility service obligations, as evidenced by the annual submission to BPA of a utility's Firm Resource Exhibit (FRE) under section 12 of the power sales contract with BPA, are also included. The White Book also serves as the referenced load-resource document under certain BPA contracts with extraregional purchasers.

#### B. The 1981 Utility Power Sales Contract

In 1981, BPA and its utility, Federal agency and DSI customers entered into 20-year power sales contracts. Section 5(b)(1) of the Northwest Power Act directed BPA to sell electric power for the firm load requirements under contracts with its public utility, electric cooperative, and IOU customers. *16 U.S.C. §839c(b)(1)*. BPA also entered into requirements power sales contracts with its DSI customers under section 5(d). *16 U.S.C. §839c(d)(1)*.

Certain provisions of the utility power sales contract address BPA's load obligation planning. Sections 10(a) and (d) require BPA and its customers to exchange long-term planning and load information with each other. Customers are to provide BPA with any planned changes in their firm power loads. Section 8 of the contract requires a customer to inform BPA of any new large single loads it plans to serve. Section 5(a) of the contract restates BPA's statutory obligation to plan and acquire enough resources to meet the firm power load obligations of its customers. BPA's contractual obligation to provide electric power to serve its customers' loads is not contingent upon any specific action taken by its customers to provide resources.

Section 12 of the utility contract addresses the statutory need for BPA and the customer to identify those firm resources, if any, which the customer will dedicate to serve its firm load for a rolling 7-year period. It also identifies the conditions for adding to, removing, or modifying dedicated firm resources and the terms for notice. These provisions enable both BPA and its customer to know the resources each will use to serve the customer's firm load and their respective service obligations, thus creating certainty for load and resource planning.

Under section 12 of the contract the customer must submit an FRE, which BPA reviews and either changes or accepts. The FRE declares the utility's resources dedicated to serve its regional firm load over the stated 7-year period. The customer must update the declaration and may make

deletions or additions in the amounts of firm energy resources the customer will use to serve its firm load in the intervening 6 years and in the seventh year only to the extent such changes are consistent with the terms and notice periods required under section 12.

### **C. Amendments to the 1981 Utility Power Sales Contract and the 1996 Contracts**

In 1996, BPA offered its public agency customers a series of amendments to their 1981 power sales contracts, or as an alternative, offered to negotiate new power sales contracts. As a result of customers executing either amendatory agreements or new contracts, BPA's firm load obligations were reduced. BPA's firm load obligations under the amendatory agreements, the new contracts, and the unamended 1981 utility power sales contracts expire September 30, 2001, or July 31, 2001, respectively. BPA's power sales contract obligations to its public agency customers are determined by each customer's load and its dedicated resources. These dedicated resources are categorized as either 5(b)(1)(A) or 5(b)(1)(B) resources. Section 5(b)(1)(A) requires a customer to dedicate any firm resources it used or had planned to use in the year prior to enactment of the Act on December 5, 1980. Section 5(b)(1)(B) resources include each customer's generation and contract resources dedicated to serve that customer's load, including pre- and post-1996 diversification (5)(b)(1)(B) resources.

BPA's 1998 White Book includes the change in Federal firm loads and obligations resulting from the amendatory agreements and new contracts and also shows projections of Federal firm regional load obligations and resources for the 10-year period ending July 31, 2009. The firm load obligations projected for the study period are based in part on current firm contract obligations and the following assumptions:

- BPA's power sales contracts with Pacific Northwest Federal and public agencies and IOUs, which expire between June 30 and September 30, 2001, are assumed to continue at their FY 2001 levels through the remainder of the study period.<sup>1</sup>
- Total public agency firm resources serving firm regional load will continue to be available in OY 2000-01 and through OY 2008-09.<sup>2</sup> The actual amount of load obligation BPA will have after expiration of the above agreements will be determined by new agreements reached through the subscription process.

BPA believes these assumptions are based on the best known terms and conditions for its regional obligations at this time and it is reasonable to use them. BPA recognizes that its firm requirements obligation to its public agency customers under new contracts could range from 912 average megawatts to as much as 6,331 average megawatts in OY 2009 if no public agency diversification occurs after OY 2001. BPA may also serve firm nonrequirements obligations through sales of surplus power or excess Federal power in the region under new contracts. BPA's total regional firm power obligations may be a combination of both sales of requirements and sales of excess Federal power in the next contracts. Table R-1, page 122, shows BPA's potential public agency firm obligations using a comparative range of possible requirements service. BPA's obligation to public agencies and cooperatives based on BPA's current 1981 power sales contracts and 1996 amendments is 3,842 average megawatts for OY 2002 through 2009. Actual contract obligations under new power sales contracts for OY 2002 through 2009 may be higher.

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<sup>1</sup> Requirements service provisions are well understood and, for purposes of this study, BPA continues to use them with the recognition that replacement contracts may modify or alter some of those provisions. It is too speculative to attempt to define in this study what may result from the renegotiation of the power sales contracts with customers. To the extent new terms or provisions for requirements service become known, a later study may make adjustments to the assumptions used here.

<sup>2</sup> This obligation is proposed to be changed in the subscription contracts, but the form of load growth obligation is not presently known. To the extent that different terms for load growth become known, they will be accounted for in a later study.

**Table R-1**

**Range of Potential Federal System Public Obligations for OY 2001-02 Through OY 2008-09 (Energy in Average Megawatts)**

Operating Year	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
<b>1. Federal Minimum Public Obligations<sup>3</sup> (Already Signed Post-2001 Public Contracts)</b>	912	1,034	1,042	1,049	986	354	253	255
<b>2. 1998 White Book Estimated Federal Public Obligations (Public Obligation Remains at OY 2001 Levels)</b>	3,842	3,842	3,842	3,842	3,842	3,842	3,842	3,842
<b>3. Public Federal Maximum Obligation (Maximum Public Obligation Including Public Load Growth)</b>	5,428	5,444	5,555	5,573	5,486	6,141	6,286	6,331

**Excess Federal Power**

This White Book is not a recalculation of or change in BPA’s earlier published calculations of the amount of excess Federal power that may be sold by BPA. However, this White Book does provide a calculation of an amount of firm power in excess of BPA’s firm obligations over a 10-year planning period that is expected to be available as surplus firm power under section 5(f) of the Northwest Power Act. This power may be sold as either excess Federal power under Public Law (P.L.)104-46, consistent with BPA’s calculations of excess Federal power, or as surplus power under P.L. 88-552 and section 9(c) of P.L. 96-501 (Northwest Power Act). To the extent that BPA has annual amounts of planned firm power that are surplus to its firm contract obligations, BPA may market all or a portion of that surplus power as excess Federal power. The duration of these sales will be as stated in BPA’s Excess Federal Power Policy. For purposes of this White Book, a sale of excess Federal power with delivery occurring for a year or more is considered a firm obligation on BPA and is included as a firm obligation in Federal loads.

**CONCLUSIONS:**

For the foregoing reasons the methodology and the assumptions in the 1998 White Book are approved.

Issued in Portland, Oregon on \_\_\_\_\_.

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Judith A. Johansen  
Administrator and Chief Executive Officer

<sup>3</sup> Federal minimum public obligations include sales to regional public agencies and cooperatives and extraregional sales to public agencies in eastern Montana.

## **Section 10: Glossary and Acronyms**

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# Glossary

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**Average Megawatts** – A unit of electrical consumption or production over a year. It is equivalent to the energy produced by the continuous use of 1 megawatt of capacity served over a period of 1 year. (One average megawatt is equivalent to 8.76 gigawatt hours, 8,760 megawatt hours, or 8,760,000 kilowatt hours.)

**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.

**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 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 as a result of increases in the efficiency of energy use, production, or distribution.

**Critical Period** – That portion of the historical streamflow record during which the recorded streamflows, combined with all available reservoir storage, produced the least amount of energy.

**Dedicated Resources** – Generating resources owned by a utility and used to serve its firm loads. These resources are declared for a rolling 7-year period in Exhibit I of the utilities' power sales contracts with BPA.

**Direct Service Industries (DSI)** – A group of industrial customers that purchase electric power directly from BPA. Most DSIs are aluminum and other primary metal smelting plants.

**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 the Washington Public Power Supply System (WPPSS). BPA markets the thermal generation from WNP-2, operated by WPPSS.

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

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

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

**Fiscal Year** – In this study, fiscal year (FY) is the 12-month period October 1 to September 30. For example, FY 2000 is October 1, 1999, through September 30, 2000.

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

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

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

**Historical Streamflow Record** – The unregulated streamflow database of the 50 years from August 1928 to July 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.

**Load Diversity** – An adjustment applied to peak loads to reflect the fact that all peaking electrical demands do not occur simultaneously across the region.

**Megawatt (MW)**– A unit of electrical power equal to 1 million watts or 1,000 kilowatts.

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

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

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

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

**Operating Year** – For this study, operating year (OY) is the 12-month period August 1 through July 31. For example, OY 1999-2000 is August 1, 1999, through July 31, 2000.

**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 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.

# Acronyms

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<b>AMW</b>	Average megawatt
<b>AVC</b>	Avista Corporation (a division of Washington Water Power Company)
<b>BGP</b>	
<b>BPA</b>	Bonneville Power Administration
<b>CDWR</b>	California Department of Water Resources
<b>COE</b>	United States Army Corps of Engineers
<b>CRFA</b>	Columbia River Flow Augmentation
<b>CSPE</b>	Columbia Storage Power Exchange
<b>DOE</b>	United States Department of Energy
<b>DSI</b>	Direct service industry
<b>EIS</b>	Environmental Impact Statement
<b>ENW</b>	Energy Northwest (formerly WPPSS)
<b>EPAct</b>	Environmental Policy Act of 1992
<b>EWEB</b>	Eugene Water and Electric Board
<b>FCRPS</b>	Federal Columbia River Power System
<b>FERC</b>	Federal Energy Regulatory Commission
<b>FRE</b>	Firm Resource Exhibit
<b>FY</b>	Fiscal Year
<b>ICP</b>	Intercompany Pool (PGE)
<b>IOU</b>	Investor-owned utility
<b>IPC</b>	Idaho Power Company
<b>IPP</b>	Independent power producer
<b>LADWP</b>	Los Angeles Department of Water and Power
<b>MPC</b>	Montana Power Company
<b>M-S-R</b>	M-S-R Public Power Agency, whose members include the Modesto Irrigation District and the cities of Santa Clara and Redding, California.
<b>MW</b>	Megawatt
<b>NCPA</b>	Northern California Power Agency
<b>NMFS</b>	National Marine Fisheries Service
<b>NUG</b>	Non-utility generating resources
<b>NWE</b>	Northwest Energy (formerly Washington Public Power Supply System (WPPSS))
<b>OY</b>	Operating Year
<b>PGE</b>	Portland General Electric
<b>PG&amp;E</b>	Pacific Gas and Electric Company
<b>PNGC</b>	Pacific Northwest Generating Company
<b>PNUCC</b>	Pacific Northwest Utilities Conference Committee
<b>PP&amp;L</b>	Pacific Power and Light Company
<b>PSE</b>	Puget Sound Energy
<b>PUD</b>	Public Utility District
<b>PURPA</b>	Public Utility Regulatory Policies Act
<b>RCP</b>	Resource Contingency Plan
<b>SCE</b>	Southern California Edison Company
<b>SCL</b>	Seattle City Light Company
<b>SDG&amp;E</b>	San Diego Gas and Electric Company
<b>SMUD</b>	Sacramento Municipal Utility District
<b>SOR</b>	System Operating Review
<b>SOS</b>	System Operating Strategy

## **Acronyms, continued:**

**TPU**

Tacoma Public Utilities

**UAMPS**

**UPC**

Utah Power Company

**USBR**

United States Bureau of Reclamation

**WAPA**

Western Area Power Administration

**WNP**

Washington Nuclear Power

**WPPSS**

Washington Public Power Supply System

**WWP**

Washington Water Power