DECEMBER 2003

2003 PACIFIC NORTHWEST LOADS AND RESOURCES STUDY

BONNEVILLE POWER ADMINISTRATION

Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

POWER BUSINESS LINE

July 15, 2004

In reply refer to: PGPL-5

Dear Interested Parties:

This document is Bonneville Power Administration's (BPA) latest projected Pacific Northwest Loads and Resources summary, commonly called the "White Book". The 2003 White Book is a snapshot of the Pacific Northwest (PNW) region and Federal system loads and resources as of March 31, 2004. This analysis incorporates BPA's estimates of PNW total retail loads, contract obligations, contract purchases, and resource capabilities. These estimates were provided by BPA and PNW Federal agencies, public agencies, cooperatives, U.S. Bureau of Reclamation (USBR), and investor-owned utilities (IOUs) through their annual Pacific Northwest Utilities Conference Committee (PNUCC) data submittals for 2003 as well as direct submittals to BPA. BPA compiled these projections to present the PNW region and Federal system load and resource capabilities for a 10-year study horizon, operating years (OY) 2005 through 2014.

BPA's White Book is used as input into BPA's long-range resource planning process to plan for adequate and reliable load service for both the Federal system and the region. BPA has included different resource scenarios for the Federal system and region. This 2003 White Book updates the 2002 Pacific Northwest Loads and Resources Study.

Federal Firm Sales and Load Obligations

Federal system sales and load obligations are comprised of BPA's power sales contract (PSC) obligations to PNW Federal agency, public agency, cooperative, USBR, IOU, and DSI customers and other BPA firm contractual obligations.

BPA Power Sales Contract Obligations: BPA signed either 5- or 10-year PSCs with its customers that began October 1, 2001. The following is a description of power deliveries to specific customer classes:

- BPA's Federal agency, public agency, cooperative, and USBR customers signed either 5- or 10-year PSCs. Some of the public agencies and cooperatives signed up for the 10-year Slice of the System Product (Slice). BPA's PSC and Slice obligations end September 30, 2011; however, this study assumes that BPA will meet these or similar obligations through OY 2014. For October 1, 2006, through September 30, 2011, BPA's PSC obligations include approximately 800 average megawatts (aMW) of service that are not currently signed. The public utility load obligations are estimated to range from approximately 6,750 aMW in OY 2005 to 7,650 aMW in OY 2014. In actual operation, BPA's obligations to serve these customers may be higher or lower than those shown in this study;
- The IOU's signed the 10-year Residential Purchase and Sales Agreement (RPSA) settling BPA's obligations under the Northwest Power Act to the IOUs. As a result of negotiations in 2001, IOU power deliveries under the RPSA settlement reflect reduced deliveries in exchange for financial considerations through September 30, 2006. This resulted in a net IOU RPSA

settlement power delivery of 258 aMW during this time period. For the period October 1, 2006, through September 30, 2011, this study assumed that BPA's IOU RPSA settlement contracts provide only financial benefits and no power is delivered. This assumption is consistent with the amendments made to the RPSA contracts by BPA and the IOUs on May 28, 2004; and

- BPA's DSI customers signed 5-year contracts beginning October 1, 2001, through September 30, 2006. Due to signed load reduction agreements, closures, and contract terminations, BPA's DSI load obligations have been reduced to 271 aMW since last year's study. After September 30, 2006, Federal service to the DSIs is not assumed because the DSIs do not have signed contracts in place for service. However, this assumption does not represent a decision by BPA on whether or what amount of post-September 30, 2006, firm DSI service will be offered.

Table 1, shows BPA's Federal agency, public agency, cooperative, USBR, IOU, and DSI load obligations under their 2001 PSCs.

Table 1

2003 White Book
BPA Power Sales Contract Load Obligations
Annual Energy in Average Megawatts

Operating Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
USBR	149	149	149	149	149	149	149	149	149	149
Federal Agency	119	119	120	120	121	121	122	119	118	118
Public Agency 1/	6,474	6,536	6,920	7,076	7,100	7,177	7,197	7,283	7,309	7,377
DSI 2/	267	271	45	0	0	0	0	0	0	0
IOU										
Power Deliveries 3/	382	382	64	0	0	0	0	0	0	0
Power Purchase Programs 4/	-124	-124	-21	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Net IOU Power Deliveries 5/	258	258	43	0	0	0	0	0	0	0

1/ This includes BPA's public agency and cooperative PSC obligations that include full service, partial service, block, slice block, and slice resource contracts. BPA's obligations are reduced for load reduction agreements.

2/ BPA's DSI customers signed 5-year contracts beginning October 1, 2001, extending through September 30, 2006, and reflect load reduction agreements and contract terminations as of March 31, 2004. After September 30, 2006, Federal service to the DSIs is not assumed because the DSIs do not have signed contracts in place for service. This assumption does not represent a decision by BPA whether or what amount of on post-September 30, 2006 firm DSI service will be offered.

3/ BPA's IOU RPSA settlement power deliveries were reduced through September 30, 2006. For October 1, 2006 through September 30, 2011, BPA's IOU RPSA settlement contracts assume only financial benefits and no power is delivered. This assumption is consistent with the amendments made to the RPSA contracts by BPA and the IOUs on May 28, 2004.

4/ In addition to the IOU RPSA settlement, some of the IOUs reduced BPA's obligations utilizing power purchase programs through September 30, 2006. Under these programs, BPA purchased power back from some of the IOUs through September 30, 2006. These contracts are shown as BPA purchases in Intraregional Transfers and reduce BPA's actual IOU power deliveries.

5/ BPA's net IOU power deliveries, under the RPSA settlement and BPA power purchase programs, are 258 aMW through September 30, 2006.

Federal System Resources

BPA is the designated marketer of the hydro resources of the Federal system, which includes 31 dams owned and operated by the USBR and the U.S. Army Corps of Engineers. BPA also markets the generation from: hydro projects owned by the City of Idaho Falls and Lewis County Public Utility District; thermal generation from the Columbia Generating Station nuclear plant, operated by Energy Northwest, Inc.; and the output from several renewable power plants, primarily cogeneration and wind turbines, under power purchase contracts with BPA. This analysis reflects a hydro regulation study that incorporates measures from the National Oceanographic and Atmospheric Administration Fisheries Biological Opinions dated December 2000, and the U.S. Fish and Wildlife Service's 2000 Biological Opinion for the Snake River and Columbia River projects.

Hydro Improvements: BPA has budgeted $1.2 billion over the next 10- to 12-years for maintaining and improving the reliability of the Federal hydro system. These improvements increase and preserve Federal hydro generation by:

- Replacing turbine runners to preserve and increase generation and to make the turbine operations more fish friendly;
- Providing increased reliability by decreasing forced and planned outages; and
- Implementing hydro system optimization and operational planning tools to increase generation efficiency as part of Federal operating decisions for the system.

Under critical water conditions, it is estimated that by OY 2005, the combination of these hydro improvements will annually preserve and create up to 69 aMW, of which 54 aMW are potential additional Federal hydro generation and the remaining 15 aMW are associated with preserving the existing level of hydro generation capability from degradation. In OY 2014, it is estimated that these improvements will annually preserve and create up to 285 aMW, of which 223 aMW are potential additional generation and the remaining 62 aMW, preserving hydro generation from degradation.

Under average water conditions, it is estimated that by OY 2005, the combination of these hydro improvements will annually preserve and create up to 208 aMW, of which 79 aMW are potential additional generation and the remaining 129 aMW, preserving hydro generation from degradation. In OY 2014, it is estimated that these improvements will annually preserve and create up to 839 aMW, of which 295 aMW are potential additional generation and the remaining 544 aMW, preserving hydro generation from degradation.

The total amount and timing of annual aMW realized over the next 10- to 12-years will be dependent on the timely completion of the scheduled installations, the success of the optimization changes, and hydrologic conditions. These estimated increases in generation are associated with the current level of fishery operations. If future fishery operations decrease the flexibility of the hydro system operations and/or increase the amount of spill, the annual megawatt contribution of the hydro improvements realized will most likely be lower. As changes occur in the hydro improvements programs, further analyses will be performed to quantitatively assess impacts to hydro generation and those impacts will be reflected in future studies.

Federal System Annual Energy Surplus/Deficit

Table 2 is a summary of the Federal system annual energy surplus/deficits presented in the 2003 White Book, page 57. This analysis used the Federal System Assumptions detailed on page 13 of the study, utilizing normal weather conditions and 1937-critical water conditions. The Federal system is expected to be energy surplus in OY 2005 through 2008 and have energy deficits of less than -100 aMW in OY 2009 through 2010. In OY 2011 through 2014, the Federal energy deficits increase to approximately -250 aMW due to growth in BPA's public customers' loads, and the expiration of inter-regional purchases and import contracts. BPA will most likely meet these deficits using a combination of methods described below in Federal Resource Adequacy.

Table 2

2003 White Book
Federal System Energy Surplus/Deficit
Under 1937-Critical Water Conditions
Annual Energy in Average Megawatts

Operating Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Obligations	8,911	8,839	8,460	8,413	8,373	8,523	8,532	8,437	8,439	8,494
Resources	9,320	9,307	8,527	8,433	8,315	8,454	8,347	8,310	8,187	8,316
Surplus/Deficit	409	468	67	20	-58	-69	-185	-127	-252	-178

Potential Variability of Federal System Annual Energy Surplus/Deficits

This analysis presents the Federal system annual energy surplus/deficit projections under different water condition levels over the study horizon. See Potential Variability of Federal Annual Energy Surplus/Deficit Projections, page 24 of the document.

Federal System Resource Adequacy

The Federal system energy and capacity load resource projections are considered conservative and assume hydro generation under 1937-critical water conditions, Federal non-hydro resources operating at expected generation levels, and Federal contract obligations and purchases delivered at maximum contract levels. This analysis includes Federal power purchases or new resources that were acquired as of March 31, 2004. Federal system deficits will be met by any combination of the following:

- Better than critical water conditions, which increases water flow and water storage thereby increasing the output of the Federal hydro system;
- Power purchases or the acquisition of generation from operating Independent Power Producer (IPP) projects;
- BPA's DSI obligations may be lower than their contracted amounts through September 30, 2006, due to contract termination, closures, and/or economic conditions; and
- Purchase of off-system storage and exchange agreements that allow for monthly seasonal shaping of Federal hydropower with other PNW entities or other west coast regions.

PNW Region Total Retail Load Forecast

For this study, total retail load forecasts for each PNW entity were estimated separately and then grouped into the following customer categories: Federal agency, public agency, cooperative, USBR, IOU, and DSI. The total retail load forecasts for the Federal agencies, USBR, cooperatives, and most public agencies were developed by BPA's East and West Hubs using linear trend methods, based on individual customers' historical annual energy consumption and their 2001 Power Sales Contracts' Exhibit C submittals. Similarly, the forecasts for the IOUs and some generating public agencies were developed from data submitted in their 2003 PNUCC submittals or load forecasts sent directly to BPA. DSI total retail load estimates were based on their current PSCs with BPA through September 30, 2006, and forecasts from BPA's Bulk Hub throughout the remainder of the study period. All total retail load forecasts were finalized on March 31, 2004.

2003 White Book and the Council Regional Total Retail Load Comparison: Table 3 shows the comparison of the non-DSI regional total retail loads for the 2003 White Book and the Northwest Power and Conservation Council (Council) for OY 2005 through 2014. The Council's load forecast, for this comparison, was based on their Revised Draft Forecast of Electricity Demand for the Fifth Power Plan (2003). To provide consistency between the load forecasts for comparison purposes, the DSI load components were removed from both forecasts. The comparison of the non-DSI load forecasts shows that the 2003 White Book projections are slightly lower in all years. The average difference over the 10-years of the study is –2.3 percent. The maximum difference is –2.9 percent (-577 aMW) in OY 2006, declining to –1.8 percent (389 aMW) by OY 2014. This difference is considered minor and is mainly due to variations in modeling methods and the vintage of data used in the two forecasts.

Table 3

Non-DSI PNW Regional Firm Load Comparison
2003 White Book and the Council Revised Draft Fifth Power Plan
Annual Energy in Average Megawatts

Operating Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
2003 White Book	19,374	19,661	19,964	20,240	20,572	20,882	21,190	21,486	21,863	22,175
Council Reg. Plan	19,928	20,238	20,497	20,759	21,033	21,331	21,632	21,941	22,245	22,565
Difference (aMW)	-554	-557	-533	-519	-461	-449	-442	-455	-382	-389
Difference (%)	-2.9%	-2.9%	-2.7%	-2.6%	-2.2%	-2.2%	-2.1%	-2.1%	-1.7%	-1.8%

PNW Region Annual Energy Surplus/Deficit

Table 4 is a summary of the PNW region annual energy surplus/deficits presented in the 2003 White Book, page 87. This study used the Regional Analysis Assumptions detailed on page 33 of the study, utilizing normal weather conditions and 1937-critical water conditions. The PNW regional resource stack assumes that generation from IPP projects are regional resources available to meet regional loads unless otherwise specified. Using this resource stack, the region is expected to experience firm energy surpluses through OY 2010.

The region is projected to be energy deficit starting in OY 2011 through 2014. The region will most likely meet these deficits using a combination of methods described in the Regional Resource Adequacy, page 48.

Table 4

2003 White Book
PNW Regional Energy Surplus/Deficit
Under 1937-Critical Water Conditions
Annual Energy in Average Megawatts

Operating Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Obligations	21,135	21,264	21,652	21,859	22,086	22,465	22,762	23,049	23,400	23,698
Resources	22,883	23,022	22,735	22,971	22,653	22,740	22,607	22,755	22,665	22,813
Surplus/Deficit	1,748	1,758	1,083	1,112	567	275	-155	-294	-735	-885

Potential Variability of Regional Annual Energy Surplus/Deficit Projections

To show the potential variability of the regional annual energy surplus/deficits, this analysis shows projections using two different resource scenarios. First, the regional energy surplus/deficits are presented using different levels of water conditions over the study horizon. Second, since only a portion of PNW IPP resources are specifically contracted for delivery to the PNW region, this study presents regional surplus/deficit scenarios based on different levels of PNW region IPP generation. See Potential Variability of Regional Annual Energy Surplus/Deficit Projections, page 43 of the document.

Additional copies of this document can be obtained from BPA's Public Information Center, 1-800-622-4520. The 2003 Pacific Northwest Loads and Resources Study Technical Appendix presents regional loads, grouped by major PNW utility categories and detailed contract and resource information. The Technical Appendix is available only in electronic form. Both the Technical Appendix and this document are available on BPA's external web site at: http://www.bpa.gov/power/whitebook2003.

Please send questions or additional comments to Tim Misley (503) 230-3942.

Sincerely,

/s/ Scott A. Coe

Scott A. Coe
Acting Vice President, Generation Supply

Enclosure

2003 PACIFIC NORTHWEST LOADS AND RESOURCES STUDY

THE WHITE BOOK

BONNEVILLE POWER ADMINISTRATION
December 2003

Cover Photo Montage:

(Top left clockwise)

Photographs provided by John Hyde P.E., Hydraulic Engineer, BPA, Regional Coordination & Operations Planning Group

Lower Granite Dam is located at the head of Lake Bryan in southeastern Washington. Lower Granite dam is owned and operated by the U.S. Corps of Engineers. Construction for this project began in July 1964, and was completed in 1984. The installed capacity of Lower Granite dam is 810 MW.

Grand Coulee Dam spans the Columbia River and is 90 miles west of Spokane, Washington. The U.S. Bureau of Reclamation began operating this storage project in 1933. Grand Coulee dam has an installed capacity of 6,465 MW.

Bonneville Second Power House is part of Bonneville Dam and is located on the Washington side of the Columbia River. The U.S. Army Corps of Engineers began operating this unit in 1982. The installed capacity of the Second Power House is 532 MW. Total capacity of Bonneville Dam is 1,093 MW.

Libby Dam is located on the Kootenai River in northwestern Montana. Its reservoir, Koocanusa, extends 42 miles into British Columbia, Canada. The Columbia River Treaty allowed the construction of Libby dam, which was completion in 1972. The installed capacity is 525 MW.

ACKNOWLEDGMENTS

Preparation of the annual Pacific Northwest loads and resources study is a complex, multidisciplinary effort. BPA wishes to acknowledge the team—BPA staff and others—whose diligence and dedication result in a reliable, high quality document.

Bonneville Power Administration

Generation Supply: Regional Coordination Group

Requirements Marketing: Western Power Business Area Group
Eastern Power Business Area Group

Bulk Marketing and Transmission Services: Account Services Group

Office of General Counsel

Pacific Northwest Utilities Conference Committee

Northwest Power & Conservation Council

Reports Powered by:

LARIS

Loads and Resources Information System

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Section 1: Introduction

Description of the White Book

The Pacific Northwest Loads and Resources Study (White Book), which is published annually by the Bonneville Power Administration (BPA), establishes one of the planning bases for supplying electricity to customers. The White Book contains projections of regional and Federal system load and resource capabilities, along with relevant definitions and explanations. The White Book also contains information obtained from formalized resource planning reports and data submittals including those from individual utilities, the Northwest Power and Conservation Council (Council), and the Pacific Northwest Utilities Conference Committee (PNUCC).

The White Book is not an operational planning guide, nor is it used for determining BPA revenues, although the database that generates the data for the White Book analysis contributes to the development of BPA's inventory and ratemaking processes. 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 that include 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.

In this loads and resources study, resource availability is compared to an expected level of total retail electricity consumption. The forecasted annual energy electricity retail load plus contract obligations are subtracted from the sum of the projected annual energy capability of existing resources and contract purchases to determine whether BPA and/or the region will be surplus or deficit. Surplus energy is available when resources are greater than loads. This energy could be marketed to increase revenues. Deficits occur when resources are less than loads. Energy deficits could be met by any combination of the following: better-than-critical water conditions, demand-side management and conservation programs, permanent loss of a load (i.e., due to economic conditions or closures), additional contract purchases, and/or new generating resources.

This study incorporates information on Pacific Northwest (PNW) regional retail loads, contract obligations, and contract resources. It also includes resource capability estimates provided by BPA, PNW Federal agencies, public agencies, cooperatives, U.S. Bureau of Reclamation (USBR), and investor-owned utility (IOU) customers furnished through annual PNUCC data submittals for 2003 and direct submittals to BPA.

The loads and resources analysis in this study simulates the operation of the power system under the Pacific Northwest Coordination Agreement (PNCA). The PNCA defines the planning and operation of seventeen U.S. Pacific Northwest utilities and other parties with generating facilities within the region's hydroelectric (hydro) system. The hydroregulation study used for the 2003 White Book incorporates measures from the National Oceanographic and Atmospheric Administration Fisheries (NOAA Fisheries) Biological Opinion dated December 2000, and the

U.S. Fish and Wildlife Service's 2000 Biological Opinion (2000 FCRPS BiOps) for the Snake River and Columbia River projects. These measures include:

- Increased flow augmentation for juvenile fish migrations in the Snake and Columbia rivers in the spring and summer;
- Mandatory spill requirements at the Lower Snake and Columbia dams to provide for non-turbine passage routes for juvenile fish migrants; and
- Additional flows for Kootenai River white sturgeon in the spring.

The hydroregulation criteria for this analysis includes: an updated Detailed Operation Plan for Treaty reservoirs for Operating Year (OY)[1] 2004, updated PNCA planning criteria for OY 2003, and revised juvenile fish bypass spill levels for 2000 FCRPS BiOps implementation.

The 2003 White Book is presented in two documents: 1) this summary document of Federal system and PNW region loads and resources, and 2) a technical appendix which presents regional loads, grouped by major PNW utility categories, and detailed contract and resource information. The technical appendix is available only in electronic form. Individual customer information regarding marketer contracts is not detailed due to confidentiality agreements. The 2003 White Book analysis updates the December 2002 White Book.

This analysis projects the yearly average energy consumption and resource availability for the study period, OY 2005 through 2014. The study shows the Federal system's and the region's expected monthly peak demand, monthly energy demand, monthly peak generating capability, and monthly energy generation for OY 2005, 2009, and 2014. The Federal system and regional monthly capacity surplus/deficit projections are summarized for the 10 operating years of the study period.

This document analyzes the PNW'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 PNW regional power system loads and resources that include the Federal system as well other PNW entities. The Federal system analysis is presented in Section 4, beginning on page 13. The analysis for the PNW region is presented in Section 5, page 33.

The Administrator's Record of Decision (ROD) for the 2003 White Book is contained in Section 9, page 113.

The glossary of terms and a list of acronyms are included in Section 10, page 119.

This document and the 2003 Pacific Northwest Loads and Resources Study Technical Appendix are available on BPA's external web site at http://www.bpa.gov/power/whitebook2003.

Additional hard copies of this summary document are available from BPA's Public Information Center, toll-free, 1-800-622-4520.

[1] Operating Year (OY) is the 12-month period August 1 through July 31. For example, OY 2004 is August 1, 2003, through July 31, 2004.

Section 2: Background

Pacific Northwest Planning Area

The PNW regional planning area is defined by the 1980 Pacific Northwest Electric Power Planning and Conservation Act (Northwest Power Act), and includes Oregon, Washington, Idaho, Montana west of the Continental Divide; and portions of Nevada, Utah, and Wyoming that lie within the U.S. Columbia River drainage basin. The PNW planning area also includes 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. *16 U.S.C. §839(14).*

White Book Study Assumptions

This traditional loads and resources analysis for the Federal system and PNW region has been produced using a specific set of assumptions concerning contracts and non-hydro and hydro resources. The Federal system assumptions are detailed in Section 4, Federal System Analysis, page 13. Regional assumptions are presented in Section 5, Regional Analysis, page 33.

Total Retail Load Forecast

For this study, the total retail loads were forecasted separately for each PNW entity. BPA's East and West Hubs estimated the retail load for the Federal agencies, cooperatives, USBR, and most public agencies using linear trend methods based on individual customers' historical annual energy consumption and their 2001 Power Sales Contracts' (PSC) Exhibit C submittals. The forecasts for the IOUs and some generating public agencies were developed from data submitted in their PNUCC submittals or total retail load forecasts sent directly to BPA. DSI total retail load estimates are based on their current PSCs with BPA through September 30, 2006, and forecasts from BPA's Bulk Hub throughout the remaining study period. All total retail load forecasts are as of March 31, 2004.

Pacific Northwest Hydro and Thermal Resources

Hydro Operations Under the PNCA: The 1997 PNCA agreement incorporates the NOAA Fisheries and U.S Fish and Wildlife Service's BiOps that changes the shape of energy production and increases flows in the spring and summer to aid in the downstream migration of juvenile salmon. This agreement will remain in place through September 15, 2024. Reservoirs are no longer drafted to meet firm loads in the fall and winter but are operated to retain as much water as flood control requirements will allow by mid-April. The additional water in storage going into the spring snowmelt period results in additional flow in the river during the spring and summer. The ability to shift and shape hydro energy production to meet firm loads is greatly reduced as a result.

To illustrate the monthly variability of the hydro system under the current PNCA, this document presents the Federal system and regional firm surpluses and deficits for OY 2005 through 2014 for 50-historical water conditions (1929 through 1978). The results are shown in Exhibits 8 through 17, pages 73 through 82, for the Federal system, and in Exhibits 25 through 34, pages 103 through 112, for the region.

Hydro Energy: This Study estimates the monthly energy capability of the Columbia River Basin's regulated and independent hydro projects based on their average monthly river discharge that reflects river constraints and storage limitations. The generation from these hydro projects is estimated for each OY, by water year, for 1929 through 1978 historical water conditions. Water year conditions span periods similar to OYs, in that the 12-month water year for 1937-water conditions spans August 1936 through July 1937. This study uses a very low water year, 1937-water conditions, to estimate the firm hydro energy capability for a period of adverse water conditions during which the hydro system produces low amounts of hydro generation. This is called the "critical period".

Hydro Capacity: This study estimates the monthly instantaneous capacity of Columbia River Basin regulated and independent hydro projects based on their full-gate-flow maximum generation at its mid-month reservoir elevation using 1929 through 1978 historical water conditions. The hydro generation reflects river constraints and storage limitations, within any water condition, that may limit the release of water to achieve maximum capacity. BPA assumes 1937-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 PNCA.

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 the 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 the PNW resource peak capability. The hydro generation is also adjusted for scheduled hydro maintenance, spinning reserves, and forced outages.

Hydro Projects' Multiple-Use Planning: Federal hydro projects in the PNW have many uses in addition to power generation. The projects may provide flood control, supply irrigation for farming, assist in river navigation, provide for reservoir recreation, and contribute to municipal water supplies. In addition, constraints are in place to protect and enhance resident and anadromous fish and wildlife populations. Non-power reservoir operating requirements may reduce or increase hydropower production. BPA's resource planning takes into account all presently known non-power operating requirements in assessing regional hydro system capability.

The Council, BPA, other Federal agencies, and other PNW entities will continue to evaluate ways to enhance fish and wildlife. Future proposals could include additional amendments to the Council's Columbia River Basin Fish and Wildlife Program, revision of the PNCA, 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, will most likely increase non-power requirements on the hydro system and change operating flexibility, the monthly shape of streamflows, and the availability of sustained Federal system capacity. Future studies will incorporate any known impacts.

Hydro Improvements: BPA has budgeted $1.2 billion over the next 10- to 12-years for maintaining and improving the reliability of the Federal hydro system. These improvements increase and preserve Federal hydro generation by:

- Replacing turbine runners to preserve and increase generation and to make the turbine operations more fish friendly;
- Providing increased reliability by decreasing forced and planned outages; and
- Implementing hydro system optimization and operational planning tools to increase generation efficiency as part of Federal operating decisions for the system.

Under critical water conditions, it is estimated that by OY 2005, the combination of these hydro improvements will annually preserve and create up to 69 average megawatts (aMW), of which 54 aMW are potential additional Federal hydro generation and the remaining 15 aMW are associated with preserving the existing level of hydro generation capability from degradation. In OY 2014, it is estimated that these improvements will annually preserve and create up to 285 aMW, of which 223 aMW are potential additional generation and the remaining 62 aMW, preserving hydro generation from degradation.

Under average water conditions, it is estimated that by OY 2005, the combination of these hydro improvements will annually preserve and create up to 208 aMW, of which 79 aMW are potential additional generation and the remaining 129 aMW, preserving hydro generation from degradation. In OY 2014, it is estimated that these improvements will annually preserve and create up to 839 aMW, of which 295 aMW are potential additional generation and the remaining 544 aMW, preserving hydro generation from degradation.

The total amount and timing of annual aMW realized over the next 10- to 12-years will be dependent on the timely completion of the scheduled installations, the success of the optimization changes, and hydrologic conditions. These estimated increases in generation are associated with the current level of fishery operations. If future fishery operations decrease the flexibility of the hydro system operations and/or increase the amount of spill, the annual megawatt contribution of the hydro improvements realized will most likely be lower.

Non-Hydro Resources: The expected output of regional non-hydro resources is based on the energy and capacity capability information submitted to BPA by the project owners. These projects include: nuclear, coal, gas-fired, oil-fired, and renewable resources such as wind, geothermal, solar, and biomass projects. Total plant output was reduced to account for scheduled maintenance, spinning reserves, and forced outage reserves. Merchant plants that have been built or that are in the process of construction have been added to the regional resource stack. Merchant plants are assumed dedicated to meet regional loads unless otherwise specified. The discussion of the Federal resources is in Section 4, page 18. Regional resources are discussed in Section 5, page 37.

Analysis of Federal System Firm Loads and Resources

BPA is the Federal power marketing agency in the PNW charged with marketing power and transmission to serve the firm electric load needs of its customers. BPA does not own generating resources. BPA's customer load 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 in this study. BPA owns and operates the primary transmission grid, which includes more than 14,800 circuit miles of transmission lines above 115 kilovolts (high voltage) and 600 circuit miles below 115 kilovolts in the PNW.

The Federal system load obligations are comprised of BPA's sales to PNW Federal agencies, public agencies and cooperatives, USBR, IOUs, DSIs, and other firm contractual obligations to deliver power. BPA has no retail customers.

BPA is the designated marketer of the hydro resources of the Federal system, which includes 31 dams owned and operated by the USBR and the U.S. Army Corps of Engineers (USACE). BPA also markets the generation from: hydro projects owned by the City of Idaho Falls and Lewis County Public Utility District (PUD); thermal generation from the Columbia Generating Station nuclear plant, operated by Energy Northwest, Inc. (ENW); and the output from several renewable power plants, primarily cogeneration and wind turbines, under power purchase contracts with BPA. The expected energy generation production from wind turbines is included in the analysis; however, since wind power production is intermittent and cannot be guaranteed to be available to meet peak hour loads, no capacity contribution is assumed. The Federal system analysis is shown in Section 4, beginning on page 13.

BPA Power Sales Contract Obligations

BPA signed either 5- or 10-year PSCs with its PNW customers that began October 1, 2001. The following is a description of some of the contractual uncertainties associated with specific customer classes.

- Federal agency, public agency, cooperative, and USBR customers signed either 5- or 10-year PSCs. Some of the public agencies, and cooperatives signed up for the 10-year Slice of the System Product (see Slice of the System Product, page 15). BPA's PSC and Slice obligations end September 30, 2011; however, this study assumes that BPA will meet these or similar obligations through OY 2014. For October 1, 2006, through September 30, 2011, BPA's PSC obligations include approximately 800 aMW of service that are not currently signed. In actual operation, BPA's obligations to serve these customers may be higher or lower than those shown in this analysis;
- The IOU's signed the 10-year Residential Purchase and Sales Agreement (RPSA) settling BPA's obligations under the Northwest Power Act to the IOUs. As a result of negotiations in 2001, the IOU RPSA firm power deliveries were reduced in exchange for financial considerations through September 30, 2006. This resulted in a net IOU RPSA settlement power delivery of 258 aMW during this time period. For the period October 1, 2006, through September 30, 2011, this study assumes that BPA's IOU RPSA settlement contracts provide only financial benefits and no power is delivered. This assumption is consistent with the amendments made to the RPSA contracts by BPA and the IOUs on May 28, 2004; and

- BPA's DSI customers signed 5-year contracts beginning October 1, 2001, through September 30, 2006. BPA's DSI load obligations reflect signed load reduction agreements, contract terminations, and closures through March 31, 2004. BPA's DSI load obligations are estimated to be up to 271 aMW through September 30, 2006. The actual DSI loads may be lower than those obligations included in this study due to new agreements or changes in economic conditions. After September 30, 2006, no DSI Federal service is assumed because the DSIs do not have signed contracts in place for service. However, this assumption does not represent a decision by BPA on whether or what amount of post-September 30, 2006, firm DSI service will be offered.

Decisions and agreements may be reached through the Regional Dialogue process between BPA and its customers and other regional stakeholders to decide the nature of BPA's electrical service products post-2006. Any decisions made from the Regional Dialogue discussions will be incorporated in future studies.

Analysis of Regional Firm Loads and Resources

The PNW regional analysis contains the Federal system loads and resources, plus non-Federal regional loads, contractual obligations, and generating resources in the PNW region. The region has several groups that represent load sectors: Federal agencies, public agencies, cooperatives, USBR, IOUs, and DSIs. The regional hydro resources are owned and operated by various Federal entities, public agencies, cooperatives, 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 5, beginning on page 33.

Canadian Treaty Downstream Benefits

The Columbia River Treaty between the United States and Canada enhanced the use of storage in the Columbia River Basin with the construction of three large storage projects in Canada (Mica, Duncan, and Keenleyside). These Canadian Treaty projects provide downstream power benefits by increasing the firm power generating capability of U.S. hydro projects. Under the terms of the Treaty, the downstream power benefits are shared equally between the two countries. The Determination of Downstream Power Benefits analysis is performed annually and establishes the amount of benefits for each sixth succeeding year. The non-Federal mid-Columbia projects are Wells, Rocky Reach, Rock Island, Wanapum, and Priest Rapids. BPA and the non-Federal mid-Columbia participants are obligated to return their share of the downstream power benefits owed to Canada. This is called the Canadian Entitlement Return to Canada. The non-Federal Canadian Entitlement obligations are delivered to BPA, who delivers both BPA's and the non-federal participant's obligations to Canada. The non-Federal entities' Canadian Entitlement obligation is included in each participating utility's loads and resources balance as a delivery to BPA. Table 1, page 8, shows BPA's delivery of the total Canadian Entitlement Return obligation to Canada, which is shown as an export.

Table 1

Federal System Exports of Canadian Entitlement to Canada
Energy and Capacity Obligations

Energy in Average Megawatts

Operating Year	2005	2006	2007	2008	2009	2010[1]	2011[1]	2012[1]	2013[1]	2014[1]
Federal System	537	535	488	483	465	534	524	513	501	490

January Capacity in Megawatts

Operating Year	2005	2006	2007	2008	2009	2010[1]	2011[1]	2012[1]	2013[1]	2014[1]
Federal System	1,176	1,218	1,244	1,241	1,245	1,273	1,240	1,240	1,240	1,240

Table 2, below, depicts the Non-Federal entities share of Canadian Entitlement Return obligations for the mid-Columbia hydro projects that are delivered to BPA.

Table 2

Non-Federal Canadian Entitlement Return Obligations Delivered to BPA
Energy and Capacity Obligations

Energy in Average Megawatts

Operating Year	2005	2006	2007	2008	2009	2010[1]	2011[1]	2012[1]	2013[1]	2014[1]
Investor-Owned Utilities	77	71	66	65	64	63	64	63	62	61
Public Agencies	56	60	60	58	58	62	66	65	65	64
Other Entities	9	9	8	8	8	8	9	9	8	8
Total Energy Obligation	142	139	134	131	130	133	139	137	135	133

January Capacity in Megawatts

Operating Year	2005	2006	2007	2008	2009	2010[1]	2011[1]	2012[1]	2013[1]	2014[1]
Investor-Owned Utilities	135	122	116	113	111	104	111	110	107	105
Public Agencies	98	109	103	101	99	105	113	113	112	110
Other Entities	16	16	15	14	14	14	15	15	15	15
Total Capacity Obligation	248	246	234	228	225	223	240	238	234	230

[1] Values are estimated for OY 2010 through 2014

Major Sources of Uncertainty

This study reflects several potential major changes in regional resources and power sales products that could affect regional and Federal loads and resources.

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. Some of these uncertainties include:

- Changes in loads or available resources resulting from deregulation of retail sales in the electric power industry;
- Federal system and regional water availability that affects hydro generation available to meet load obligations. See Potential Variability of Federal System Resources, page 21, and Potential Variability of Regional Resources, page 39;
- Volatility in short- and long-term electricity market prices;
- Deviation from forecasted loads due to changes in the PNW economy;
- Failure of existing or contracted generating resources to operate at anticipated times and output levels;
- The availability of new and existing regional resources that can be purchased to serve firm loads in the PNW region;
- Implementation of decisions and agreements that may be reached through the Regional Dialogue process for BPA's electrical service products post-2006;
- Additional changes to existing hydro system operation in response to programs developed to address the Endangered Species Act or other environmental considerations; and
- The success of BPA's future purchasing and marketing efforts, including contracts, demand-side management programs, and conservation measures, and the purchase of the output of new or existing resources.

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

Section 3: Changes in the 2003 Pacific Northwest Loads and Resources Study

This section describes the major data updates and changes in the assumptions for the 2003 White Book analysis compared to the 2002 White Book. Specific resource and contract changes are detailed in the 2003 Pacific Northwest Loads and Resources Study Technical Appendix. The 2003 Technical Appendix will be available on BPA's external web site at http://www.bpa.gov/power/whitebook2003. The 2003 Technical Appendix presents auxiliary tables (A-tables) that contain aggregate information summarized by customer type.

Federal Firm Sales and Obligations

The 2003 White Book analysis reflects the following Federal system contract and obligation changes compared to the 2002 study:

- BPA's Federal agency, public agency, cooperative, and USBR PSC obligations were updated using linear trend methods based on historical power consumption under their PSCs. Though these contract obligations actually expire September 30, 2011, this study assumes that BPA will meet these or similar obligation agreements through OY 2014;
- BPA's Federal public agency and cooperative Slice customer obligations were updated for this study using methods described in Slice of the System Product, page 15. Though these Slice obligations actually expire September 30, 2011, this study assumes that BPA will meet these or similar Slice obligation agreements through OY 2014;
- For the period October 1, 2006, through September 30, 2011, this study assumed that BPA's IOU RPSA settlement contracts provide only financial benefits and no power is delivered. This assumption is consistent with the amendments made to the RPSA contracts by BPA and the IOUs on May 28, 2004;
- BPA's DSI load obligations were updated to reflect signed load reduction agreements, contract terminations, and closures through March 31, 2004; and
- Updated Federal system contract sales.

Federal Resource Stack

The 2003 White Book analysis reflects the following Federal system resource stack changes compared to the 2002 study:

- Updated Federal system contract purchases; and
- Fourmile Hill Geothermal plant was postponed from October 1, 2004, to October 1, 2006. Future studies will reflect new information on this project as it becomes available.

PNW Total Retail Load

The 2003 White Book utilizes updated customer-by-customer regional retail load forecasts. The forecasts are based on a combination of their historical electrical load consumption, submittals provided for the 2001 PSCs, and/or their PNUCC data submittals. If available, the information and growth trends were verified with Federal Energy Regulatory Commission (FERC) filings. Below highlights the methods used to arrive at the load forecasts. The forecasts reflect applicable load reduction agreements and were aggregated together for each of the following customer classes.

- Federal agency, public agency, cooperative, and USBR retail load forecasts were developed by BPA using linear trend methods that incorporate historical retail load data and their 2001 PSCs' Exhibit C submittals;
- IOU retail load forecasts were developed by BPA using data provided in their PNUCC data submittals;
- DSI retail load estimates were updated by BPA and are based on their current PSCs with BPA; and
- Updated PNW regional contract sales.

PNW Regional Resource Stack Changes

In addition to the Federal system resource stack updates, the 2003 White Book analysis reflects the following regional resource changes compared to the 2002 study:

- Updated PNW regional contract purchases; and
- The removal of the Satsop #1 CCCT (599 aMW) plant that was included beginning OY 2005 and the Longview Mint CCCT (248 aMW) plant that was included beginning OY 2006. Future studies will reflect new information as it becomes available.

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Section 4: Federal System Analysis

Federal System Assumptions

The Federal system loads and resources analysis is based on Federal resources, Federal contracts, and Federal power sales contract obligations as of March 31, 2004. Federal study assumptions are as follows:

- Forecasted Federal load obligations reflect normal weather conditions;
- Generating resources include all operating requirements currently adopted by the hydro project owners and the firm planning assumptions for assured resource capability for the PNCA;
- BPA's Federal agency, public agency, cooperative, and USBR PSC obligations, that expire September 30, 2011, continue to be met by BPA with similar obligation agreements through OY 2014. For OY 2007 through 2011, public PSC obligations include approximately 800 aMW of service that currently are not signed;
- BPA's public agency and cooperative Slice obligations, that expire September 30, 2011, continue to be met by BPA with similar Slice obligation agreements through OY 2014;
- For the period October 1, 2006, through September 30, 2011, BPA's IOU RPSA settlement contracts reflect only financial benefits and no power is delivered. This assumption is consistent with the amendments made to the RPSA contracts by BPA and the IOUs on May 28, 2004;
- BPA's DSI PSC obligations reflect signed load reduction agreements, contract terminations, and closures. DSI purchases total up to an annual maximum of 271 aMW per year through September 30, 2006;
- All existing Federal contractual arrangements not included under BPA's power sales contracts expire by the terms of their agreements and are not renewed;
- Federal power sales and capacity/energy exchange agreements with the cities of Burbank, Glendale, and Pasadena are shown as capacity/energy exchanges until they expire April 15, 2008;
- Federal capacity sale contract with PacifiCorp expires August 31, 2011;
- Sustained capacity limits are 50-hours-per-week;
- Capacity surplus/deficit values do not reflect potential nighttime return problems on the Federal system; and
- Transmission losses are treated as a resource reduction.

Federal Firm Annual Energy Load Obligations

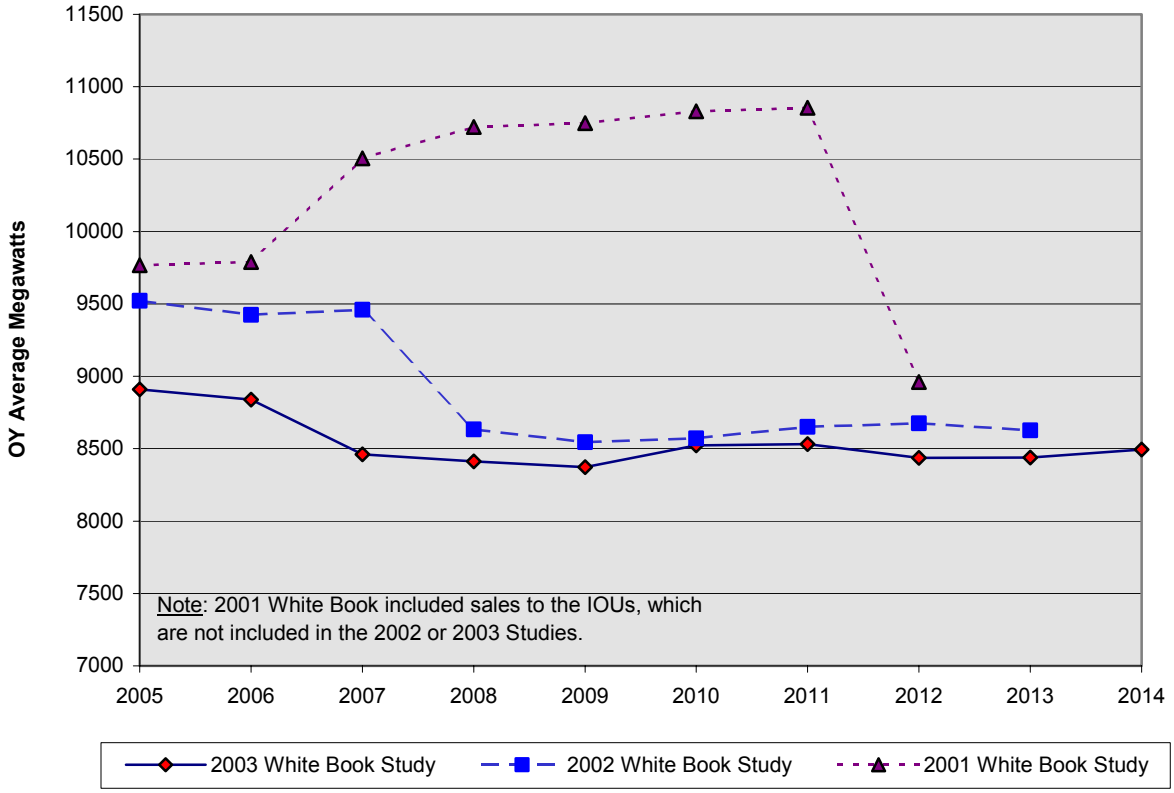
In this study, the Federal system firm annual energy load obligations incorporate the preceding Federal System Assumptions and include BPA's forecasted 2001 PSC obligations, including the Slice product discussed on page 15, for PNW Federal agencies, public agencies, cooperatives, USBR, IOUs, and DSIs. The forecast assumes that PNW Federal agencies, public agencies, cooperatives, and the USBR purchase power from BPA under their PSCs to meet energy loads not served by their own resources. The Federal obligations also include contracted Federal

deliveries within the PNW region and export contracts delivered outside the PNW. The methods and assumptions used to complete this year's Federal power sales contract obligations are based on the forecasts of individual entity's total retail load discussed in Total Retail Load Forecast, page 3.

Figure 1, below, illustrates the difference between the forecasted 2003 White Book Federal system annual energy load obligations for OY 2005 through 2014 from the previous 2002 and 2001 Studies. The expected lower Federal load obligations for OY 2005 through 2006 reflect changes in BPA's small public agency, cooperative, DSI, and export contracts. The Federal firm annual energy load obligations for OY 2005 through 2014 are presented in Exhibit 1, page 57.

Figure 1

Federal Firm Annual Energy Load Obligations
Under Normal Weather Conditions
For OY 2005 through 2014



Slice of the System Product: Slice of the System (Slice) is a public preference PSC product that provides firm and secondary energy to a customer based on their net requirements and was contracted for 10-years. It differs from traditional PSC products in that it has the following components: 1) Slice product power deliveries based on the level and shape of the Federal system Slice resources; and 2) Slice fixed block power deliveries.

The Slice product power deliveries are based on 22.63 percent of Federal system Slice resources that are comprised of specific Federal resources, net of certain Federal obligations. Customers signed 10-year contracts for Slice product for the period October 1, 2001, through September 30, 2011. The specific Federal resources include the generation from the Federal hydro projects, Columbia Generating Station, Georgia Pacific Corporation's Wauna Mill, Federal Non-Utility Generation; and power deliveries from the Non-Federal Canadian Entitlement Return (CER) for Canada contracts. The specific Federal contract obligations, which are subtracted from the Federal resources for this purpose, include deliveries for the CER to Canada (shown as an Export) and Federal pumping loads. This is not the Federal system resource stack. The amount of Slice product available for delivery is dependent on the Federal system operating decisions, hydro production, which varies by water conditions, and generation from non-hydro Federal resources.

The Slice fixed block product has a 100 percent load factor for each month. Slice customers had a choice of either 5- or 10-year Slice Block purchases. Customers that signed 10-year contracts for Slice Block product purchases have the option to increase their Slice Block product for the period October 1, 2006, through September 30, 2011, to cover load growth that may have occurred during the first 5-years of their Slice contract. Customers that signed contracts for 5-year Slice Block product purchases could later contract for another 5-year Slice Block product purchased but at the prevailing rate applicable to their product.

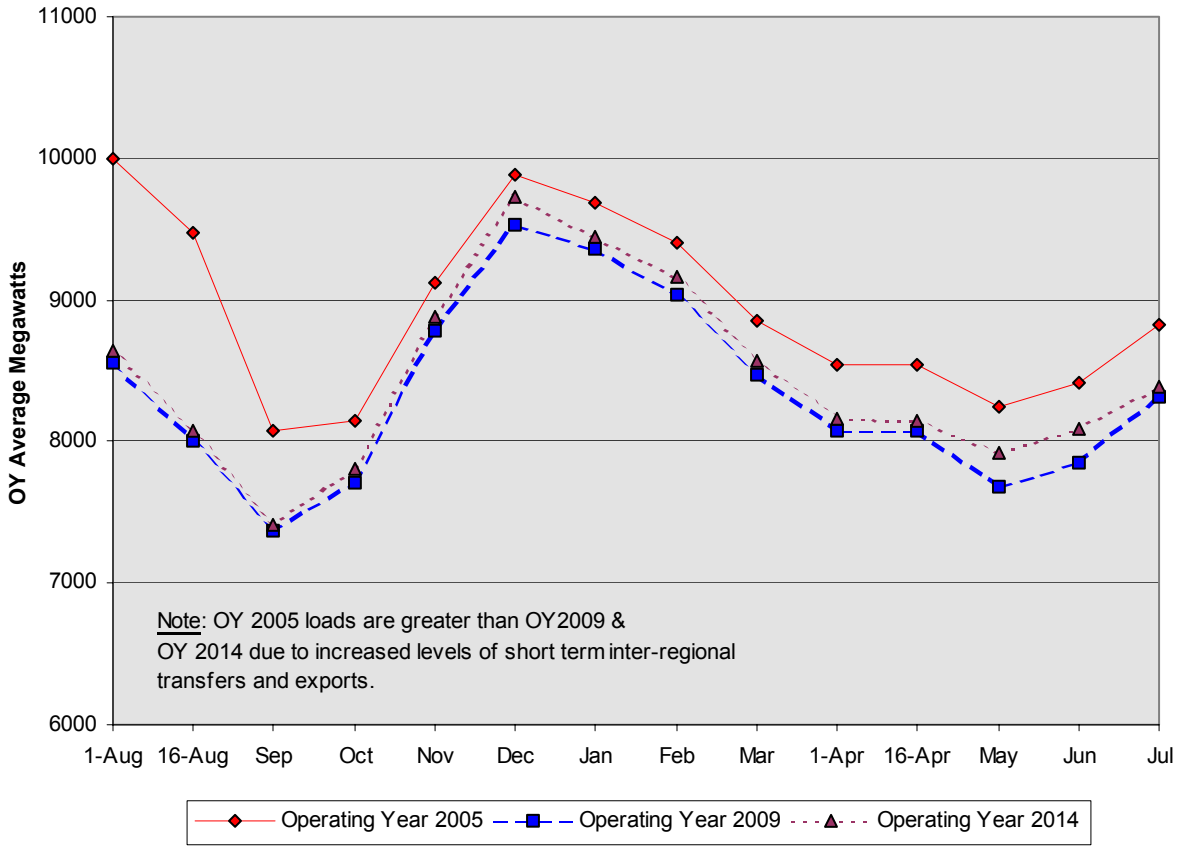
Federal Firm Monthly Energy Load Obligations

Figure 2, below, illustrates the Federal firm monthly energy load obligations for OY 2005, 2009, and 2014 and uses the Federal System Assumptions detailed on page 13.

The Federal firm monthly energy load obligations for OY 2005, 2009, and 2014, assuming 1937-water conditions, are shown in Exhibits 2 through 4, pages 61 through 63.

Figure 2

Federal Firm Monthly Energy Load Obligations
Under Normal Weather Conditions
For OY 2005, 2009, and 2014



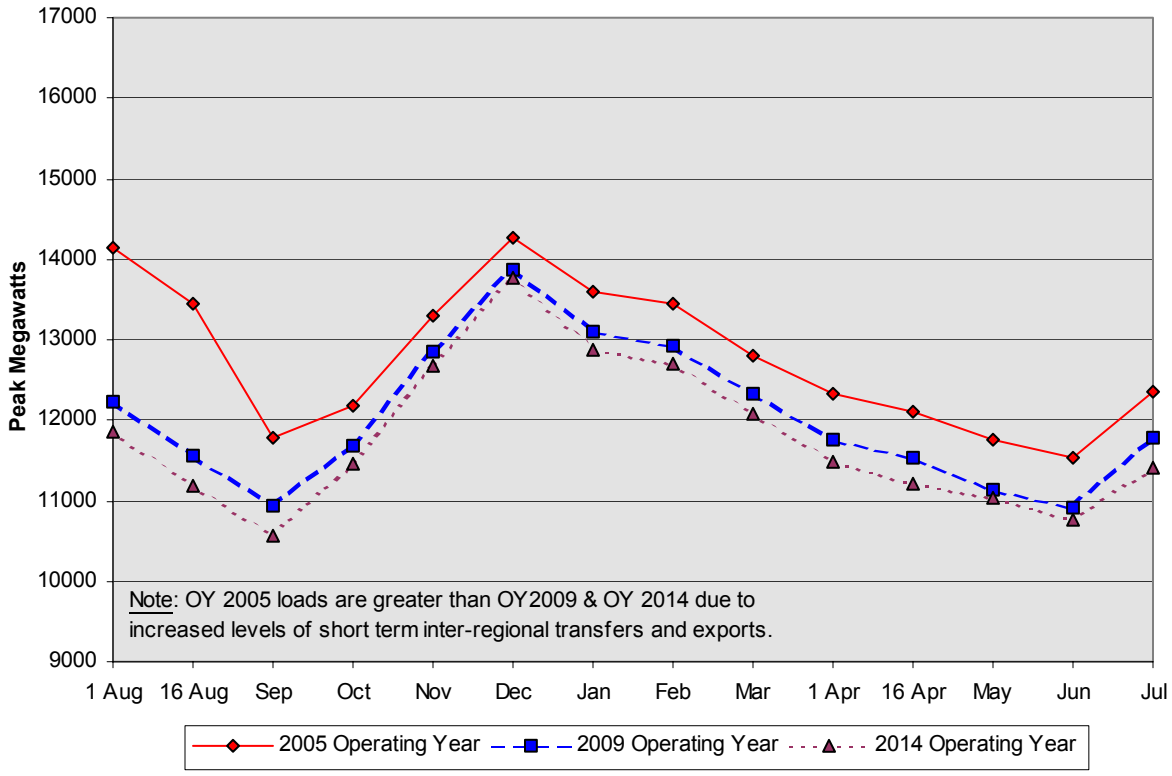
Federal Firm Monthly Peak Load Obligations

Figure 3, page 17, illustrates the Federal firm monthly peak load obligations for OY 2005, 2009, and 2014 and utilizes the Federal System Assumptions detailed on page 13. The figure shows the expected 1-hour monthly maximum demand under BPA's 2003 White Book Study load obligations. The forecast assumes that PNW Federal agencies, public agencies, cooperatives, and the USBR purchase capacity from BPA under their PSCs to meet peak loads not served by their own resources

with the exception of the Slice product customers. Federal load obligations include BPA's exports and inter-regional contracts. The peak load obligations assume normal weather conditions with a 50-percent probability that the actual peak load obligations could be exceeded. The peak load projections are reduced by a diversity component to address the fact that all electrical peak demands do not occur simultaneously throughout the region.

Figure 3

Federal Firm Monthly Peak Load Obligations
Under Normal Weather Conditions
For OY 2005, 2009, and 2014



Federal peak load obligations decline from OY 2014 due to lower level of load growth and the expiration of export and inter-regional contracts. The monthly Federal firm peak loads are presented in Exhibits 5 through 7, pages 67 through 69.

Federal Firm Resources

Table 3, below, summarizes the Federal system firm energy resources and contract purchases available to BPA to meet Federal load obligations for OY 2005. Federal system energy resources are comprised of approximately 73 percent from hydropower, 9 percent from one nuclear power plant, and 18 percent from BPA's contracts and small thermal and renewable resources.

Table 3

Federal Firm Resources for OY 2005
Based on 1937-Water Conditions
Capacity Based on January 2005

Project Type	Sustained Peak Capacity (Peak MW)	Generating Peaking Capacity (Percent of Total)	Energy (OY in aMW)	Energy (Percent of Total)
Hydro	13,483[1]	83.0%	6,985	72.8%
Nuclear	1,150	7.1%	861	9.0%
Contracts/Small Thermal Resources	1,608	9.9%	1,744	18.2%
Total Federal Resources	**16,241**	**100%**	**9,590**	**100%**

The Federal system hydro resources from which BPA markets power are detailed in Table 4, page 19. 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. Table 5, page 20, shows the non-Federally owned resources, return energy associated with BPA's existing capacity/energy exchanges, contractual resources, and other BPA hydro-related contracts.

Combined, these resources represent BPA's available firm resources. A detailed listing of Federal generating resources is in BPA's 2003 Pacific Northwest Loads and Resources Study Technical Appendix and is available on BPA's external web site at http://www.bpa.gov/power/whitebook2003.

[1] A Sustained Peaking Adjustment of -7,776 Peak MW reduces the hydro capacity.

Table 4

Federal System Hydro Projects
Capacity and Energy Based on OY 2005

Project	Initial Year of Service	Number of Units	Nameplate Rating (MW)	OY 2005	
				Instantaneous Generating Capacity[1] (Peak MW)	Firm Energy [2] (aMW)
U.S. Bureau of Reclamation Hydro Projects					
Grand Coulee	1941	27	6,465	5,934	1,938
Grand Coulee Pump Gen.	1973	6	314	300	0
Hungry Horse	1952	4	428	361	77
Palisades	1957	4	176	122	66
Anderson Ranch	1950	2	27	36	16
Green Springs	1960	1	17	18	7
Minidoka	1909	4	28	26	16
Roza	1958	1	11	4	8
Black Canyon	1925	2	10	9	8
Chandler	1956	2	12	9	9
Total USBR Projects		53	7,488	6,819	2,145
U.S. Army Corps of Engineers Hydro Projects					
Chief Joseph	1955	27	2,458	2,535	1,062
John Day	1968	16	2,160	2,484	797
The Dalles w/fish turbines	1957	24	1,808	2,074	595
Bonneville w/fish turbines	1938	20	1,093	1,059	362
McNary	1953	14	980	1,127	518
Lower Granite	1975	6	810	930	221
Lower Monumental	1969	6	810	922	224
Little Goose	1970	6	810	928	218
Ice Harbor	1961	6	603	693	138
Libby	1975	5	525	566	168
Dworshak	1974	3	400	444	126
Lookout Point	1954	3	120	67	35
Detroit	1953	2	100	96	41
Green Peter	1967	2	80	79	28
Lost Creek	1975	2	49	18	30
Albeni Falls	1955	3	43	23	25
Hills Creek	1962	2	30	30	18
Cougar	1964	2	25	25	16
Foster	1968	2	20	22	12
Big Cliff	1954	1	18	21	11
Dexter	1955	1	15	17	9
Total Corp of Engineer Projects		153	12,957	14,160	4,654
Total USBR and USACE Projects		**206**	**20,445**	**20,979**	**6,799**

[1] This is the maximum hydro generation under optimum conditions for January 2005 assuming 1937-water conditions. Does not reflect reduction to the peaking capacity of the hydro system due to the drafting of reservoirs and other project constraints.

[2] Firm energy is a 12-month annual average for OY 2005 assuming 1937-water conditions.

Table 5

Non-Federally Owned BPA Resources and Contracts
Capacity and Energy Based on OY 2005

Project	Type	Operator	Date in Service	OY 2005	
				Capacity[1] (Peak MW)	Firm Energy (aMW)
Existing Non-Federally Owned BPA Resources					
Columbia Generating Station	Nuclear	ENW	1984	1,150	861
Idaho Falls Bulb Projects	Hydro	City of Idaho Falls	1982	18	19
Cowlitz Falls	Hydro	Lewis County PUD	1994	13[2]	26
Big Creek Hydro Unit	Hydro	Mission Valley	1981	1	0
Clearwater	Hydro	State of Idaho DWR	2000	1	1
Dworshak Small Hydro	Hydro	State of Idaho DWR	2000	3	3
Glines Canyon	Hydro	US Parks Service	1927	16	15
Elwah Hydro	Hydro	US Parks Service	1910	13	9
Georgia Pacific Paper Wauna	Cogen.	Georgia Pacific	1996	32	29
Foote Creek 1	Wind	Foote Creek 1, LLC	1999	0	6
Foote Creek 2	Wind	Foote Creek 2, LLC	1999	0	1
Foote Creek 4	Wind	Foote Creek 4, LLC	2000	0	7
Stateline Wind Project	Wind	PPM, FLP	2001	0	30
Condon Wind Project	Wind	Condon Wind Project, LLC	2002	0	12
Klondike Phase 1	Wind	NW Wind Power	2001	0	8
Fourmile Hill Geothermal	Geo	Calpine	2006[3]	0	0
Ashland Solar Project	Solar	Ashland, Oregon	2000	0	0
Total Non-Federally Owned BPA Resources				1,247	1,027
Firm Contracts					
Canadian Entitlement for CSPE (non-Federal)				0	0
Canadian Entitlement for Canada (non-Federal)				248	142
Canadian Imports				1	1
Pacific Southwest Imports				20	59
Inland Southwest Imports				95	102
Eastern Imports				189	94
Pacific Northwest Purchase				1,238	1,367
Supplemental & Entitlement Replacement Energy				0	0
Total BPA Firm Contracted Resources				1,791	1,765
Total Non-Federally Owned BPA Resource Contracts				**3,038**	**2,792**

[1] This is the maximum generation under optimum conditions for January 2005 assuming 1937-water conditions.

[2] Operational capacity is 70 MW, but is restricted in January.

[3] Fourmile Hill is assumed to be operational October 1, 2006. It has a January peak of 50 MW and annual energy of 50 aMW. However, the actual date for the completion of this project is uncertain.

Potential Variability of Federal System Resources

To show the potential variability of Federal system resources, this study compares four different levels of Federal system generation based on 50-historical water conditions (1929 through 1978). This study uses 1937-water conditions to estimate the firm generation of the Federal system. Table 6, below, and Figure 4, page 22, show the annual Federal system generation under 1937-water conditions, and the averages of the bottom ten percent, middle 80 percent, and top ten percent of the historical 50-water year conditions.

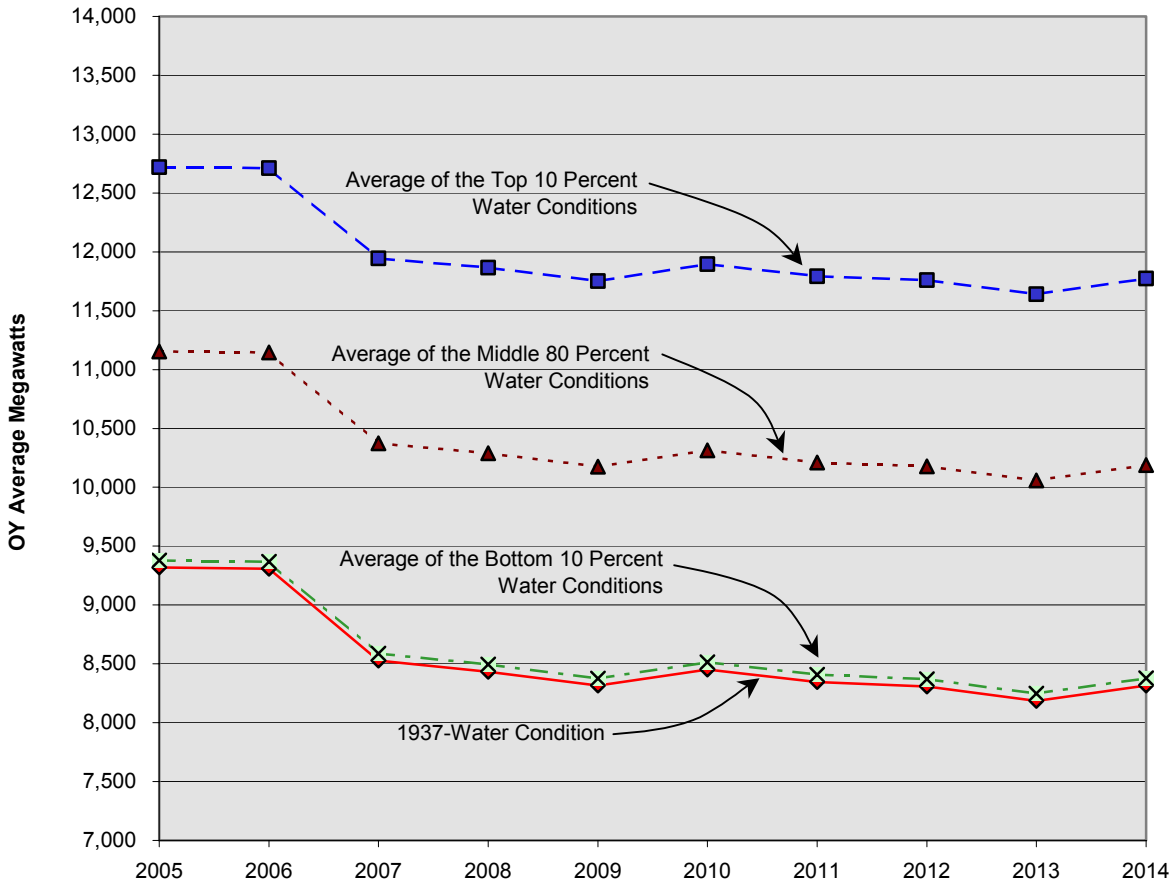
Table 6

Potential Variability of Federal Energy Resource Projections
Utilizing Different Levels of Water Conditions
Energy in Average Megawatts

Operating Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
1937-Water Conditions	9,320	9,307	8,527	8,433	8,315	8,454	8,347	8,310	8,187	8,317
Average Bottom 10% Water Conditions	9,380	9,368	8,588	8,494	8,377	8,515	8,409	8,372	8,249	8,378
Average Middle 80% Water Conditions	11,155	11,146	10,374	10,288	10,174	10,316	10,213	10,178	10,058	10,190
Average Top 10% Water Conditions	12,720	12,713	11,945	11,865	11,753	11,897	11,795	11,761	11,643	11,775

Figure 4

Potential Variability of Federal Annual Energy Resource Projections Utilizing Differing Water Conditions



Federal Firm Annual Energy Surplus/Deficit Projections

The Federal firm annual energy surplus/deficit projections under 1937-water conditions for OY 2005 through 2014 are presented in Table 7 and graphically in Figure 5, page 23. Figure 5 illustrates the change in the 2003 White Book from the 2002 and 2001 studies. Under the Federal System Assumptions detailed on page 13, the Federal system is expected to be energy surplus through OY 2008. For OY 2009 through 2014, the Federal system shows energy deficits of up to -252 aMW due to growth in BPA's public customers' loads and the expiration of inter-regional purchases and import contracts. BPA will most likely meet these deficits using a combination of methods described in the Federal Resource Adequacy Section, page 31. The components of the annual Federal energy loads and resources balance under 1937-water conditions for OY 2005 through 2014 are presented in Exhibit 1, page 57.

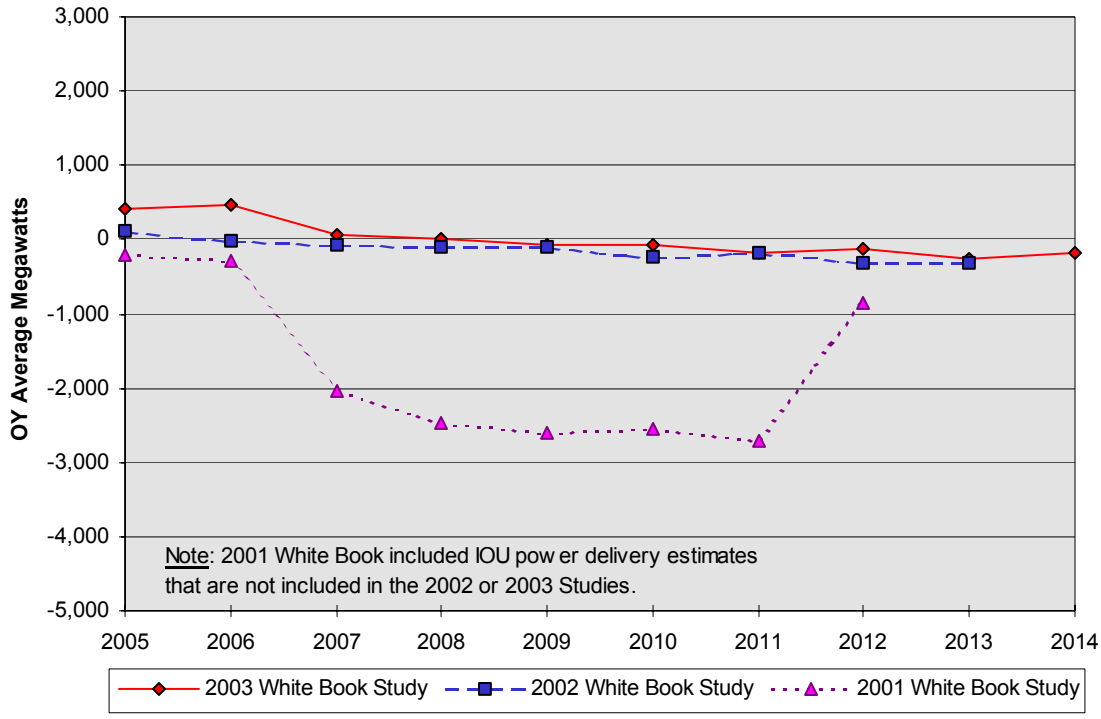
Table 7

Federal Firm Annual Energy Surplus/Deficit Projections
Assuming Existing Loads, Resources, Contracts,
and Normal Weather Conditions
Under 1937-Water Conditions
Energy in Average Megawatts

Operating Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Federal S/D	409	468	67	20	-58	-69	-185	-127	-252	-178

Figure 5

Federal Firm Annual Energy Surplus/Deficit Projections
Assuming Existing Loads, Resources, Contracts,
and Normal Weather Conditions
Under 1937-Water Conditions



Potential Variability of Federal Annual Energy Surplus/Deficit Projections

To show the potential variability of the Federal system annual energy surplus/deficits, this study presents four hydro resource scenarios. These scenarios incorporate various generation levels based on the historical 50-water conditions (1929 through 1978), under normal weather conditions. Each scenario uses the Federal System Assumptions presented on page 13. This study uses 1937-water conditions to estimate the firm annual energy surplus/deficits of the Federal system. Table 8, below, and Figure 6, page 25, show the annual Federal system energy surplus/deficits under 1937-water conditions, and the averages of the bottom ten percent, middle 80 percent, and top ten percent of the historical 50-water year conditions.

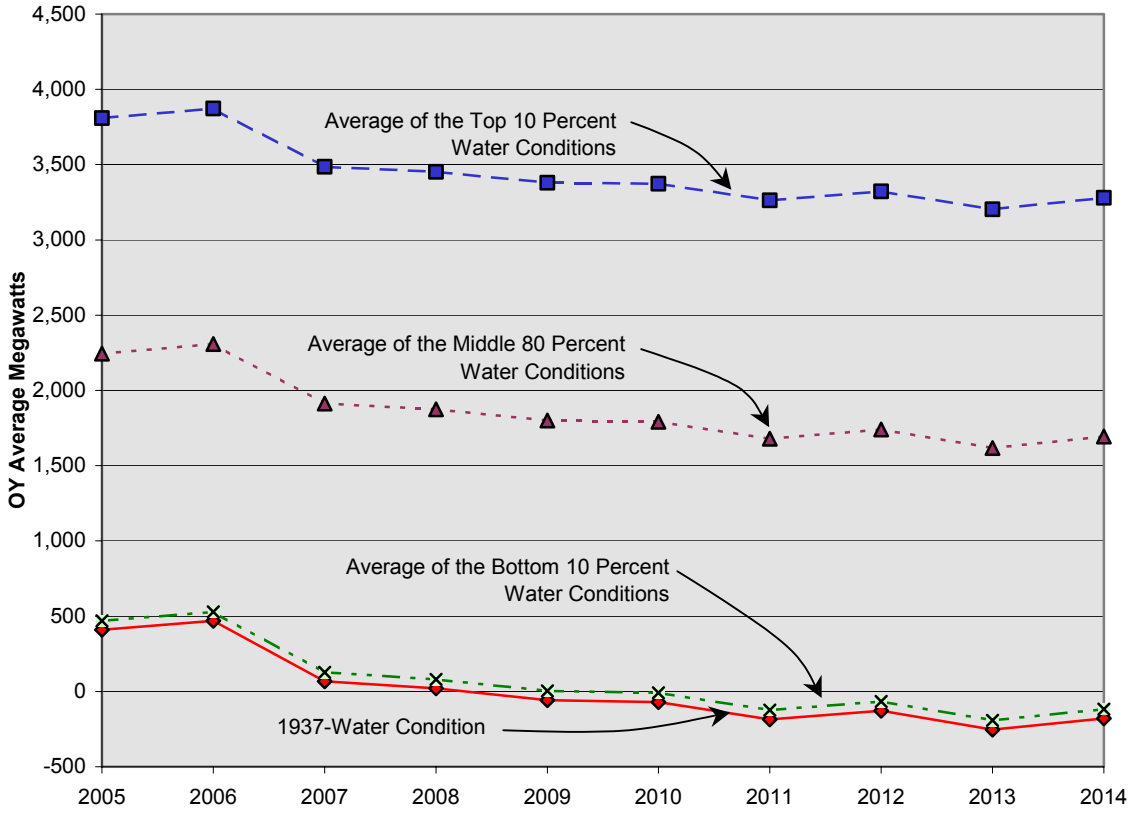
Table 8

Potential Variability of Federal Annual Energy Surplus/Deficit
Utilizing Differing Water Conditions

Operating Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
1937-Water Conditions	409	469	67	20	-58	-69	-185	-127	-252	-178
Average Bottom 10% Water Conditions	469	529	128	81	3	-8	-123	-65	-190	-116
Average Middle 80% Water Conditions	2,244	2,307	1,914	1,875	1,801	1,793	1,681	1,741	1,619	1,695
Average Top 10% Water Conditions	3,809	3,873	3,485	3,452	3,379	3,374	3,263	3,324	3,204	3,281

Figure 6

Potential Variability of Federal Annual Energy Surplus/Deficit Projections
Utilizing Differing Water Conditions
For OY 2005 through 2014



Federal Firm Monthly Energy Surplus/Deficit Projections

To depict the monthly variability of the loads and resources, under the Federal system assumptions detailed on page 13, the monthly Federal system energy components under 1937-water conditions for OY 2005, 2009, and 2014 are shown in Exhibits 2 through 4, pages 61 through 63. Figure 7, page 26, graphically illustrates the monthly Federal system firm energy loads and resources for OY 2005. This figure demonstrates the monthly timing of Federal system surpluses and deficits under the provisions of the PNCA.

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

In addition to the monthly variability of the Federal surplus/deficit under critical water conditions, the Federal surplus/deficit can vary greatly depending on water

conditions in the PNW. Exhibits 8 through 17, pages 73 through 82, illustrate the Federal firm energy surplus/deficit projections under the 50-water years of record.

Figure 7

OY 2005 Federal Firm Monthly Energy Loads and Resources
Assuming Normal Weather Conditions
Under 1937-Water Conditions

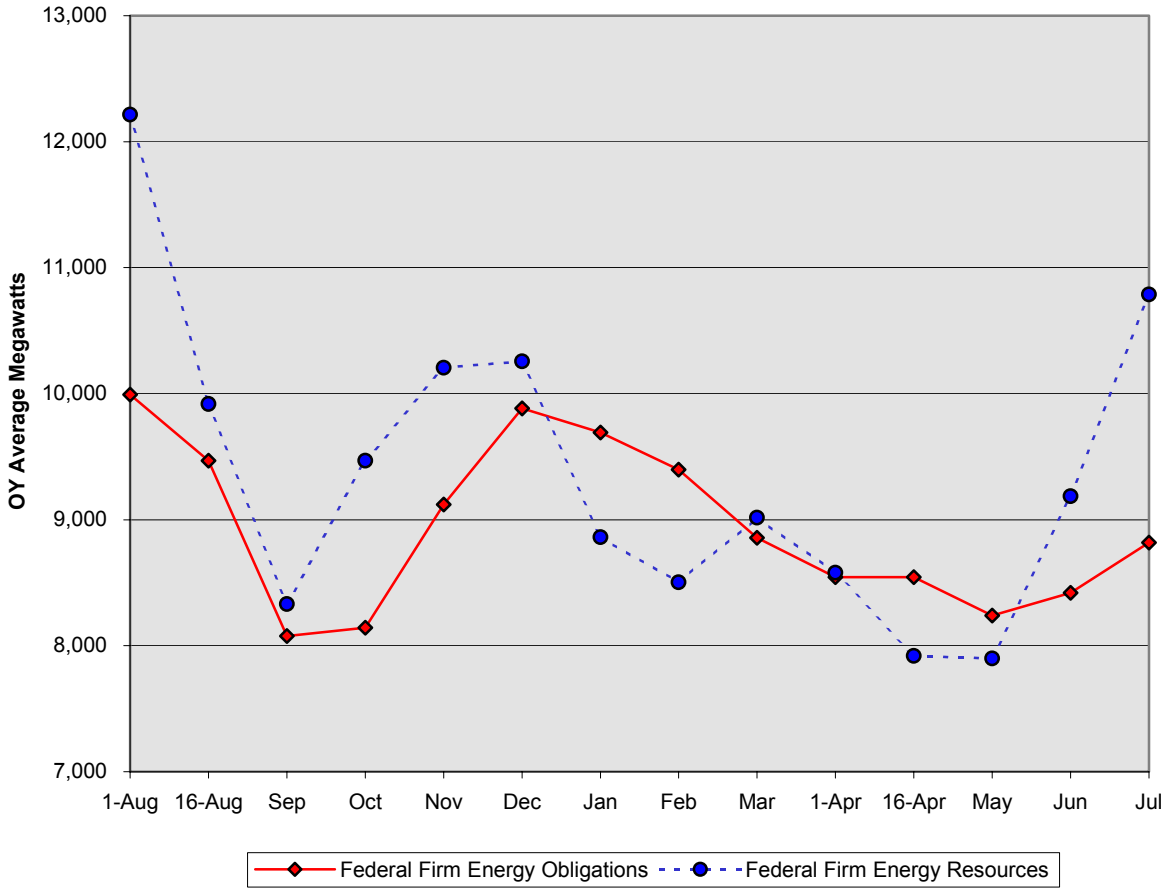
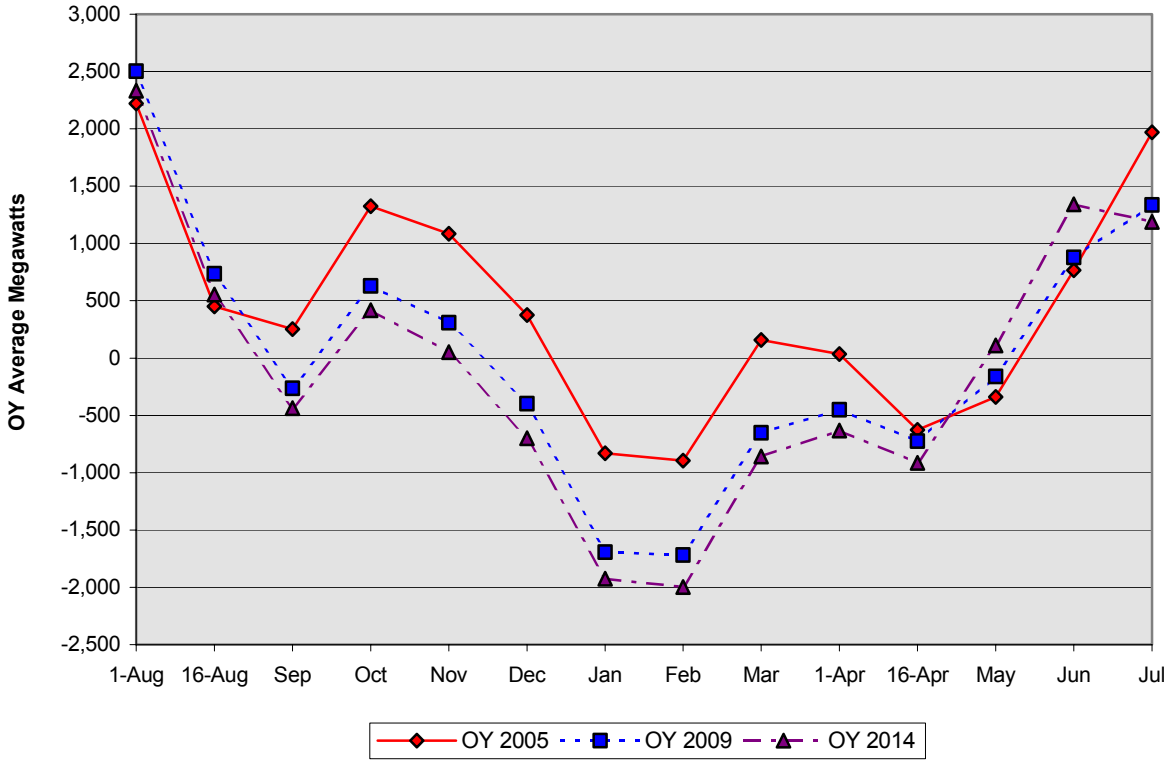


Figure 8, below, shows the monthly Federal firm energy surplus/deficit projections for OY 2005, 2009, and 2014 incorporating the Federal System Assumptions detailed on page 13.

Figure 8

Federal Firm Monthly Energy Surplus/Deficit Projections
Assuming Normal Weather Conditions
Under 1937-Water Conditions
For OY 2005, 2009, and 2014

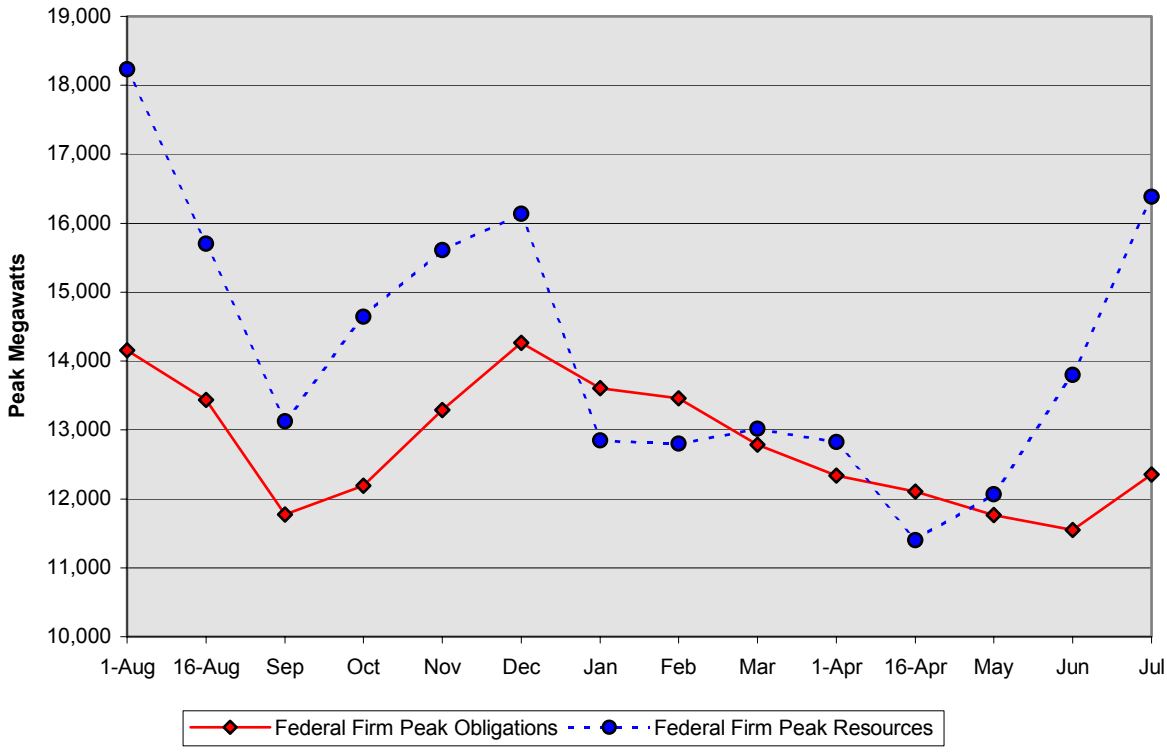


Federal Firm Monthly Capacity Surplus/Deficit Projections

Figure 9, below, shows the monthly Federal system peak loads and resources for OY 2005 under the Federal System Assumptions detailed on page 13. The projections assume 1937-water conditions, normal weather conditions, and a 50-percent probability that the actual peak loads will be exceeded. This figure illustrates the timing and magnitude of the Federal system capacity surpluses and deficits that could occur in any operating year.

Figure 9

OY 2005 Federal Monthly Capacity Loads and Resources
Assuming Normal Weather Conditions
Under 1937-Water Conditions
Peak in Megawatts



BPA's surplus firm capacity values take into account the following Federal system hydrologic 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.

This analysis, however, does not take into account potential nighttime return problems from capacity sales. Nighttime return problems can occur when replacement energy from capacity sales combined with minimum Federal hydro generation, thermal resources, and other Federal contract returns are greater than BPA's nighttime load. The following factors may contribute to nighttime return problems:

- Low nighttime Federal system load obligations;
- Minimum nighttime contract levels from contract purchases, peaking replacement, and exchange energy;
- The inability of Federal non-hydro resources—especially ENW's Columbia Generating Station—to cycle to fit differing day to night load requirements; and
- Additional nonpower hydro requirements that dictate minimum streamflows.

Any of these factors can potentially restrict the ability to accept nighttime return energy even though there is surplus generating capability during the daytime.

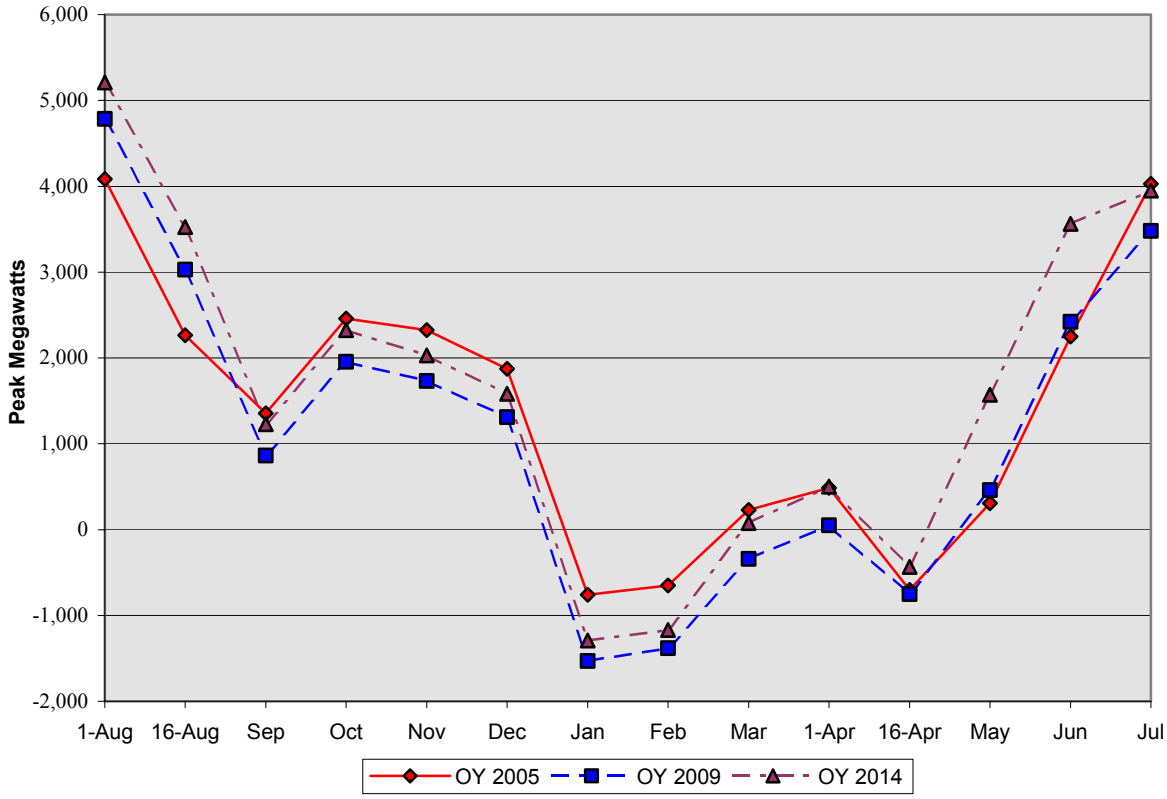
If BPA makes additional market purchases, the added capacity most likely will increase capacity available to the Federal system.

Figure 10, page 30, illustrates the Federal firm capacity surplus/deficit projections for OY 2005, 2009, and 2014.

Federal capacity surplus/deficit projections, assuming normal weather conditions and 1937-water conditions for OY 2005, 2009, and 2014, are shown in Exhibits 5 through 7, pages 67 through 69.

Figure 10

Federal Monthly Capacity Surplus/Deficit Projections
Assuming Normal Weather Conditions
Under 1937-Water Conditions
For OY 2005, 2009, and 2014



Federal Resource Adequacy

The Federal system energy and capacity load resource projections use the Federal System Assumptions presented on page 13 and are considered conservative. This analysis assumes Federal system hydro generation under 1937-critical water conditions, Federal non-hydro resources operating at expected generation levels, and Federal contract obligations and purchases delivered at maximum contract levels. In addition, this analysis includes Federal power purchases or new resources that were acquired prior to March 31, 2004. Federal system deficits will be met by any combination of the following:

- Better than critical water conditions, which increases water flow and water storage thereby increasing the output of the Federal hydro system;
- Power purchases or the acquisition of generation from operating IPP projects;
- PSC load obligation variability due to current and future economic conditions;
- BPA' s DSI PSC obligations have been reduced to 271 aMW annually through load reduction agreements, contract terminations, and closures. In actual operation, BPA's DSI obligations may be lower than their full contracted amounts through September 30, 2006, due to economic or other conditions; and
- Purchase of off-system storage and exchange agreements that allow for monthly seasonal shaping of Federal hydropower with other PNW entities or other west coast regions.

As the Federal system contracts for additional power purchases or generation from new or existing resources, those amounts will be incorporated into future studies.

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Section 5: Pacific Northwest Regional Analysis

Regional Analysis Assumptions

This regional loads and resources analysis is based on regional loads, resources and contracts that were finalized on March 31, 2004. Study assumptions for the regional Base Case analysis are as follows:

- Total retail load forecasts reflect normal weather conditions;
- Generating resources include all operating requirements currently adopted by the hydro project owners and the firm planning assumptions for assured resource capability for the PNCA;
- All existing regional import and export contracts expire by the terms of their agreements and are not renewed;
- Federal system power sales and capacity/energy exchange agreements with the cities of Burbank, Glendale, and Pasadena are shown as capacity/energy exchanges until they expire April 15, 2008;
- IPP plants are included in the regional resource stack and are assumed available to meet regional load unless otherwise specified;
- There is no substantial operational change in non-Federal hydro licensing for regional hydro resources;
- Sustained capacity limits are 50-hours-per-week;
- Capacity surplus/deficit values do not reflect potential nighttime return problems for regional entities; and
- Transmission losses are treated as a resource reduction.

Regional Firm Energy Load Projections

BPA's 2003 White Book regional firm annual energy load projections include two components:

- Total retail load consumption based on the individual entity's total retail load forecast discussed in Total Retail Load Forecast, page 3; plus
- All reported long-term and multi-year export contracts made by PNW entities including BPA.

Regional firm annual energy loads for OY 2005 through 2014 are shown in Figure 11, page 34. The regional firm annual energy loads are presented in Exhibit 18, page 87, and monthly firm energy loads for OY 2005, 2009, and 2014 are presented in Exhibits 19 through 21, pages 91 through 93.

Figure 11, below, illustrates the change of the annual regional firm energy load projections for OY 2005 through 2014 from the previous 2002 and 2001 studies. These differences reflect updates in the regional loads and export contracts for regional Federal agencies, public agencies, cooperatives, USBR, IOUs, and DSIs. Due to changing economic conditions, the base levels of the regional load projections have been declining for each of the three studies. This trend is mostly attributed to lower IOU and public load projections and declining DSI load estimates.

Figure 11

Regional Firm Annual Energy Load Projections
Including Exports
Under Normal Weather Conditions
For OY 2005 through 2014

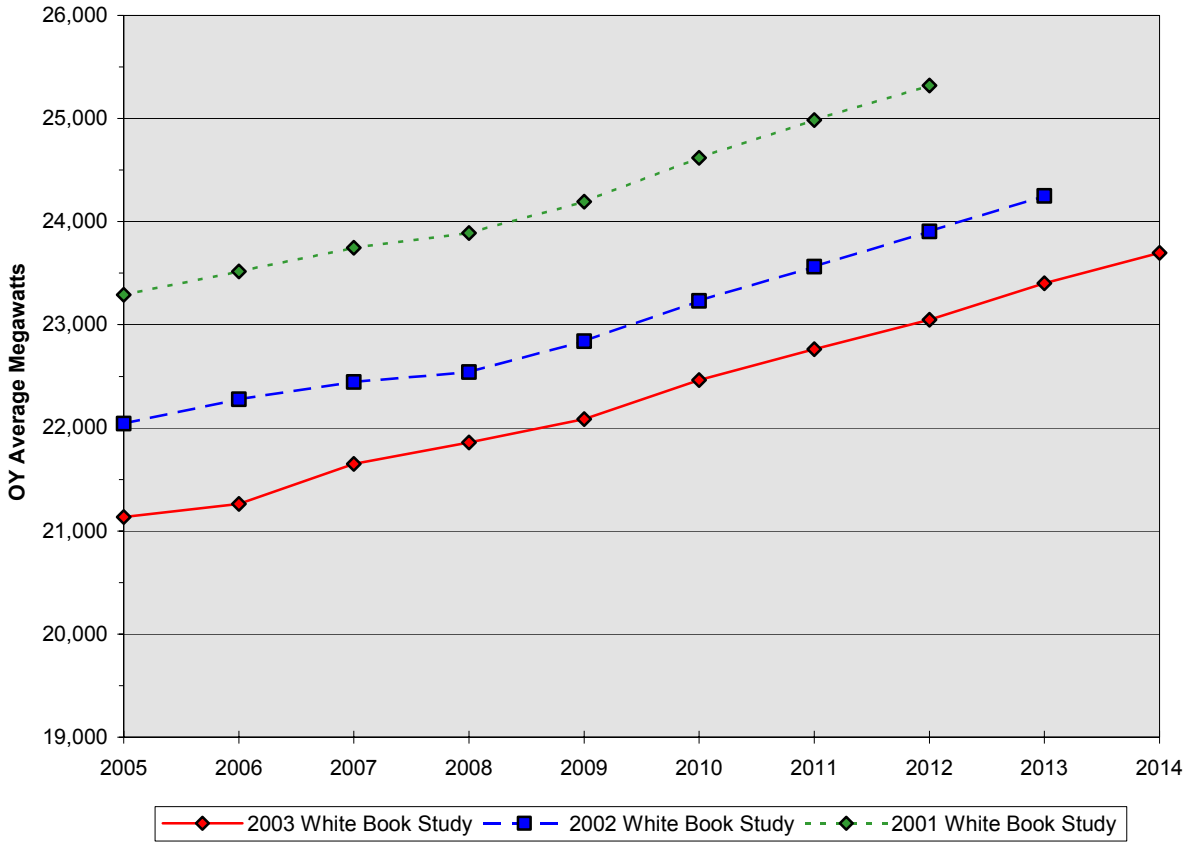


Figure 12, below, and Table 8, page 36, illustrates the breakdown of the regional annual load trends, by customer category, for OY 2005, 2009, and 2014 for the 2003, 2002, and 2001 studies.

Figure 12

Regional Firm Annual Energy Load Projections
By Customer Category Including Exports
Under Normal Weather Conditions

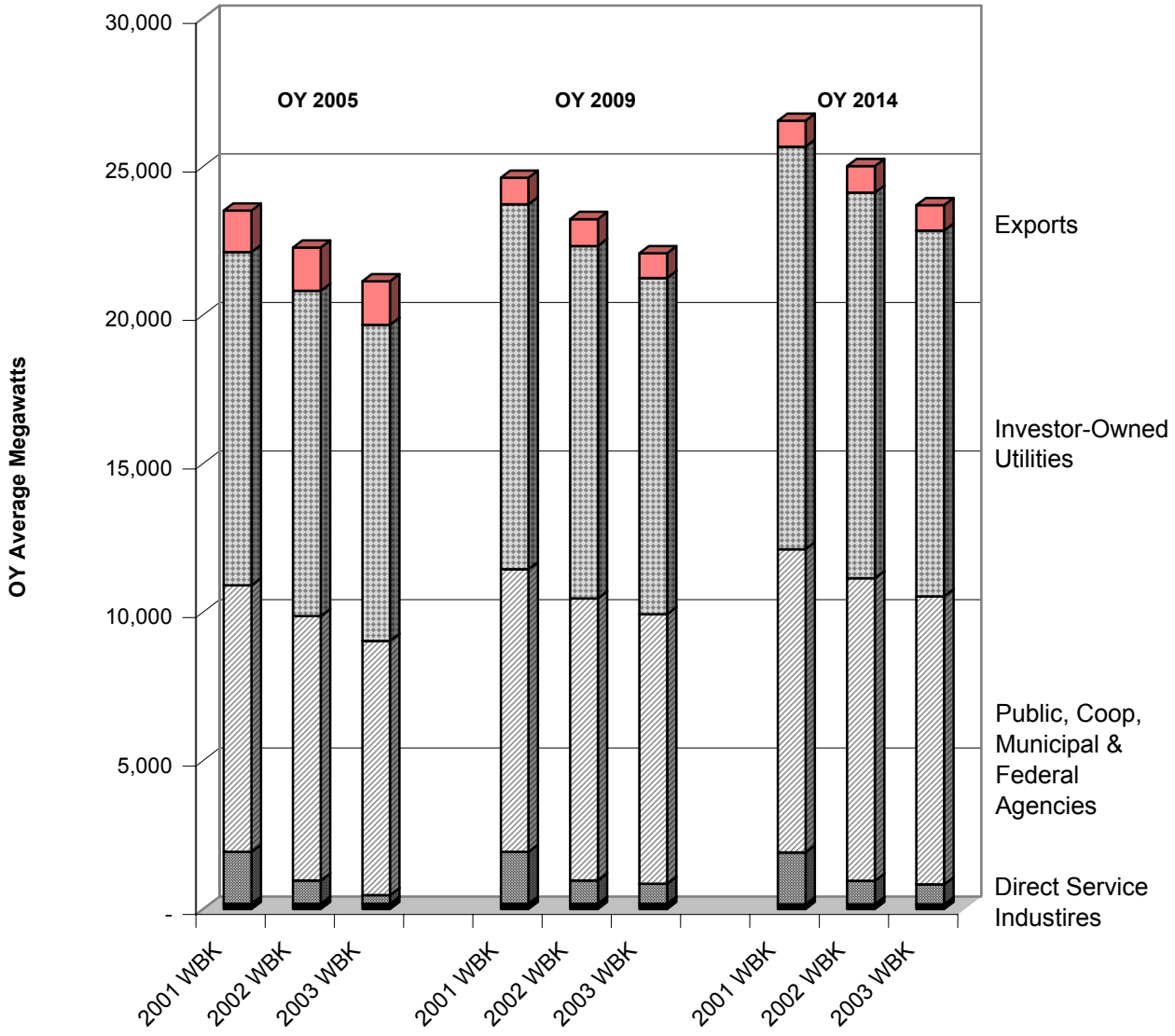


Table 8

Regional Firm Annual Energy Load Projections
Including Exports
Energy in Average Megawatts

Operating Year	2005			2009			2014		
	2001 White Book	2002 White Book	2003 White Book	2001 White Book	2002 White Book	2003 White Book	2001 White Book	2002 White Book	2003 White Book
Exports	1,393	1,464	1,468	894	904	840	875	887	848
IOUs	11,221	10,950	10,635	12,278	11,868	11,321	13,549	12,985	12,318
Public & Federal Entities	8,973	8,892	8,559	9,518	9,488	9,071	10,207	10,184	9,693
DSI Loads	1,750	792	292	1,750	792	674	1,750	792	674
Other Entities	180	179	181	180	180	180	165	164	165
Total Region	23,517	22,277	21,135	24,620	23,232	22,086	26,546	25,012	23,698

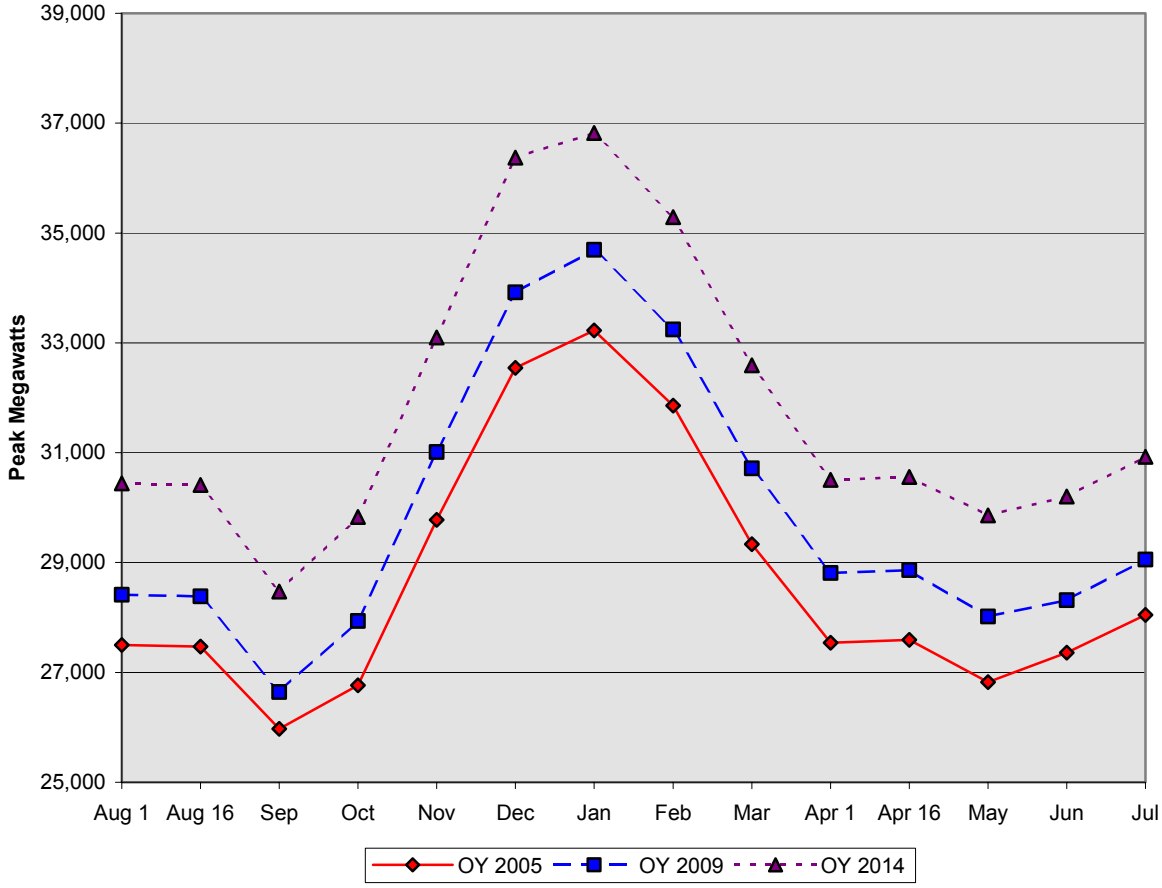
Regional Firm Monthly Peak Load Projections

Figure 13, page 37, illustrates the regional firm monthly peak loads for OY 2005, 2009, and 2014. BPA's 2003 White Book peak total retail loads are based on the individual entity's total retail load forecasts and estimates of their expected 1-hour monthly demand. The peak loads are estimated based on normal weather conditions using a 50-percent probability that the forecasted peak load will be exceeded. The projected regional peak loads include all intra-regional contracts made by PNW utilities, including those in the Federal system. The peak load projections are decreased by a diversity factor to account for the fact that all electrical peak demands do not occur simultaneously throughout the region.

The monthly regional firm peak loads are presented in Exhibits 22 through 24, pages 97 through 99.

Figure 13

Regional Firm Monthly Peak Load Projections
Under Normal Weather Conditions
For OY 2005, 2009, and 2014



Regional Firm Resources

Table 9, page 38, and Figure 14, page 39, summarize the regional resources for OY 2005. For the region, hydro resources represent a smaller share of the total regional resources than that of the Federal system. This is because regional IOU's own the majority of the PNW thermal resources. Regional thermal resources are comprised primarily of IOU-owned coal, gas, and oil-fired projects, and ENW's Columbia Generating Station nuclear plant.

Regional Resource Changes: The PacifiCorp (Wyoming) thermal import contract that estimated PacifiCorp's share of the Jim Bridger plant delivered to the PNW region was eliminated. In its place, PacifiCorp's shares of the Jim Bridger coal plant, units 1 through 4, are now modeled as resources dedicated to serve its PNW regional load. In addition, Pacificorp also established an inter-company transfer of power from Wyoming to meet its regional load through 2008.

Several small peaking projects were added to this study. These projects were included in their PNUCC data submittals and were also included in the resource stack of the Northwest Power and Conservation Council.

Two potential plants were removed from this study. These are the Satsop #1 CCCT plant (650 MW) and the Longview Mint CCCT plant (286 MW). Duke Power has mothballed the Satsop #1 plant and is currently looking for a buyer to complete construction and operate the plant. Longview Mint has been mothballed by Mirant and the future of the plant is in question at this time. There are no major power plants expected in this study. A review of potential regional resources will be made for the next study.

Table 9

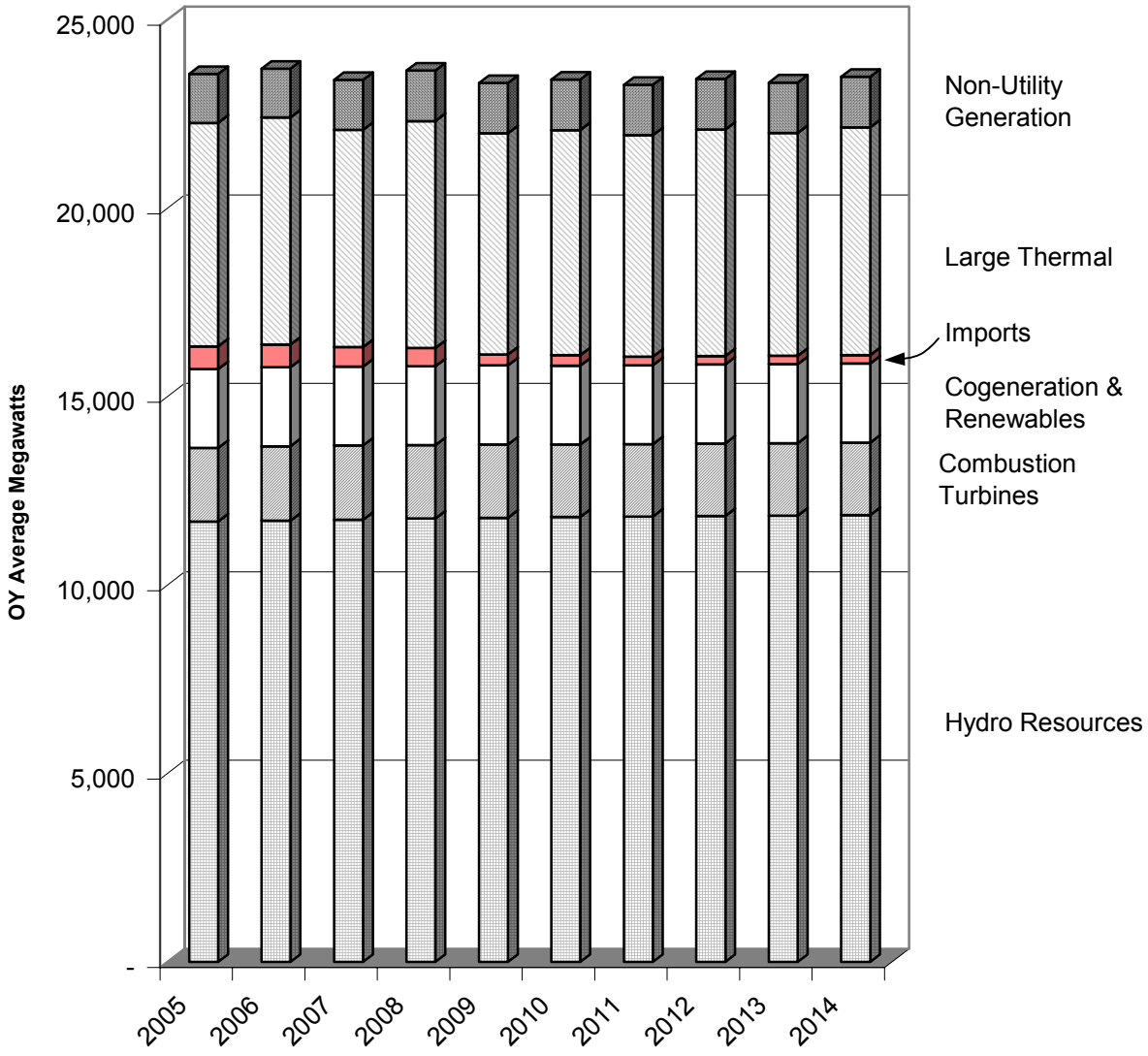
Regional Firm Resources for OY 2005
Based on 1937-Water Conditions

Project Type	Sustained Peak Capacity (January Peak MW)	Generating Peaking Capacity (Percent of Total)	Firm Energy (OY in aMW)	Firm Energy (Percent of Total)
Hydro	24,011[1]	61.4%	11,688	49.5%
Coal[2]	5,842	15.0%	5,069	21.5%
Nuclear	1,150	2.9%	861	3.7%
Imports[2]	1,168	3.0%	603	2.6%
Combustion Turbines	3,464	8.9%	1,946	8.3%
Cogeneration	2,239	5.7%	1,999	8.5%
Non-Utility Generation	1,079	2.8%	1,296	5.5%
Miscellaneous	122	0.3%	97	0.4%
Total Resources	39,075	100.0%	23,559	100.0%

[1] The hydroelectric capacity is reduced by a Sustained Peaking Adjustment of –7,776 MWs.
[2] PacifiCorp's shares of the Jim Bridger coal plant, units 1 through 4, are now shown as resources dedicated to the PNW region. In prior studies, power from these projects was shown as a thermal import.

Figure 14

PNW Regional Resource Stack
For OY 2005 through 2014



Potential Variability of Regional Resources

To show the potential variability of regional resources, this study compares different levels of regional hydro generation based on 50-historical water conditions (1929 through 1978). This study uses 1937-water conditions to estimate the firm generation of regional resources. Table 10 and Figure 15 on page 40, present a range of estimated regional resources assuming regional hydro generation using the averages of the bottom ten percent, middle 80 percent, and top ten percent of the historical 50-water year conditions.

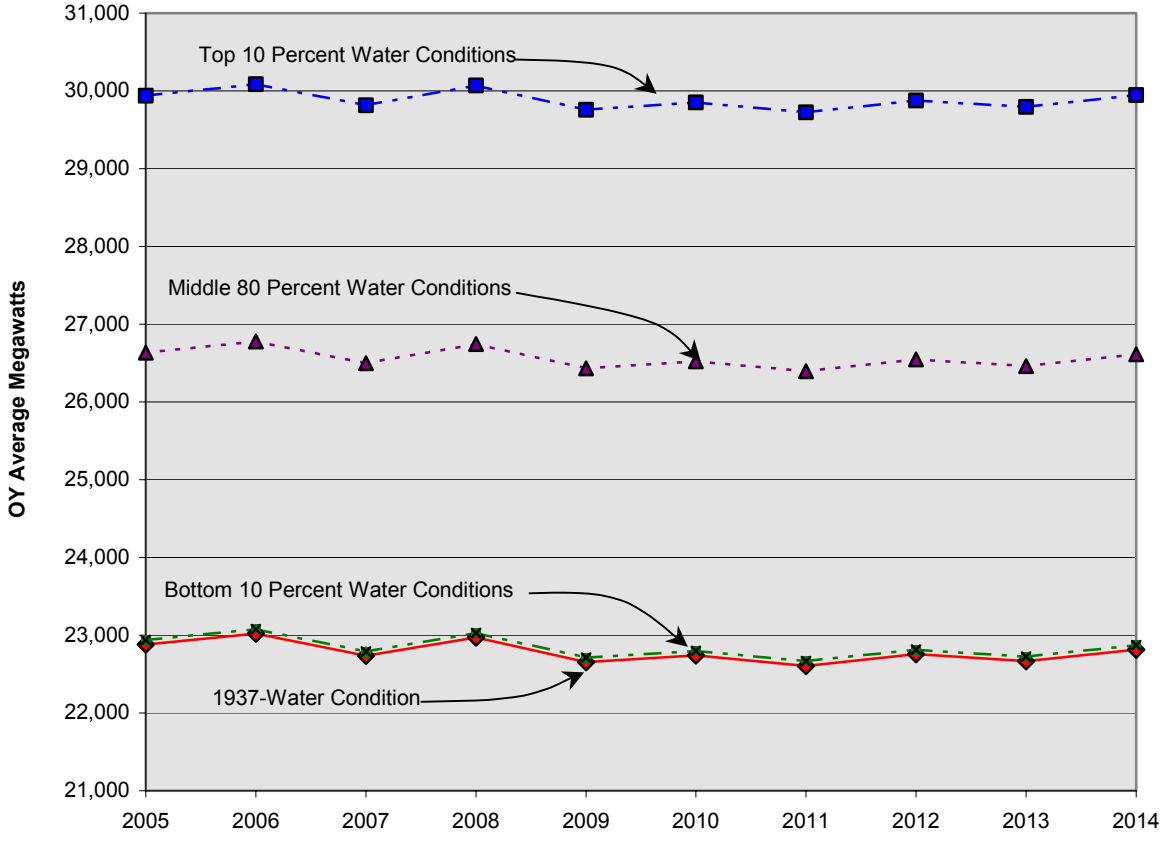
Table 10

Potential Variability of Regional Total Net Resource Projections
Utilizing Different Levels of Water Conditions
Energy in Average Megawatts

Operating Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
1937-Water Conditions	22,883	23,022	22,735	22,972	22,645	22,740	22,607	22,755	22,665	22,813
Average Bottom 10% Water Conditions	22,939	23,078	22,792	23,030	22,712	21,799	22,666	22,815	22,725	22,873
Average Middle 80% Water Conditions	26,632	26,776	26,498	26,746	26,433	26,525	26,396	26,547	26,461	26,611
Average Top 10% Water Conditions	29,939	30,085	29,814	30,069	29,759	29,853	29,726	29,878	29,794	29,946

Figure 15

Potential Variability of Regional Hydro Resource Projections
Utilizing Different Levels of Water Conditions



Regional Firm Energy Surplus/Deficit Projections

The regional firm annual energy surplus/deficit projections for OY 2005 through 2014, assuming 1937-water conditions, are presented below in Table 11 and graphically illustrated in Figure 16, page 42. These projections incorporate the Regional Analysis Assumptions presented on page 33. Under the current PNW regional resource stack, the region is expected to experience firm energy surpluses through OY 2010. The region will be deficit starting in OY 2011 through the end of the study period, OY 2014. In addition, Figure 16 illustrates how the 2003 White Book regional energy surplus/deficits compare to the 2002 and 2001 studies. The changes in the regional energy surplus/deficit levels are mainly due to a lower regional load forecast. The region will most likely meet these deficits using a variety of methods as described in Regional Resource Adequacy, page 48.

The regional energy surplus/deficits for OY 2005 through 2014 are presented in Exhibit 18, page 87. Monthly firm energy loads and resources balances for OY 2005, 2009, and 2014 are presented in Exhibits 19 through 21, pages 91 through 93. In addition to the monthly variability of the regional surplus/deficit, the region's surplus/deficit can vary greatly depending on water conditions in the PNW. Exhibits 25 through 34, pages 103 through 112, illustrate the regional firm energy surplus/deficit projections under the 50-water years of record.

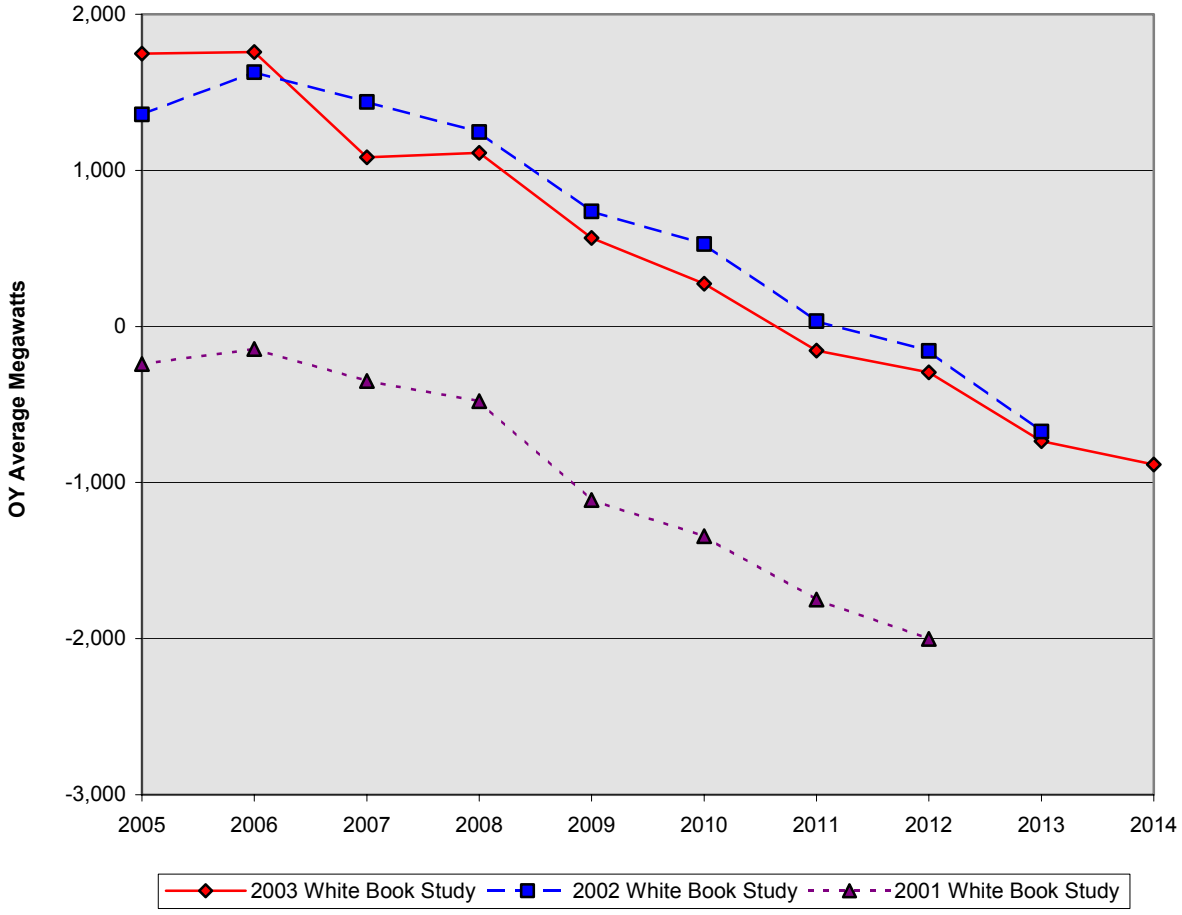
Table 11

Regional Firm Energy Surplus/Deficit Projections
Assuming Existing Loads, Resources, Contracts,
and Normal Weather Conditions
Under 1937-Water Conditions
Energy in Average Megawatts

Operating Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Regional Surplus/Deficit	1,748	1,758	1,083	1,112	567	275	-155	-294	-735	-885

Figure 16

Regional Firm Annual Energy Surplus/Deficit Projections
Assuming Existing Loads, Resources, Contracts,
and Normal Weather Conditions
Under 1937-Water Conditions
For OY 2005 through 2014



Potential Variability of Regional Annual Energy Surplus/Deficit Projections

Potential Variability Due to Water Conditions: To show the potential variability of regional surplus/deficits, this study compares the surplus/deficits under different levels of regional hydro generation based on 50-historical water conditions (1929 through 1978). These projections incorporate the Regional Analysis Assumptions presented on page 33. This study uses 1937-water conditions to estimate firm generation of the region. Table 12, below, and Figure 17, page 44, present a range of estimated regional surplus/deficits assuming regional hydro generation using the averages of the bottom ten percent, middle 80 percent, and top ten percent of the historical 50-water year conditions.

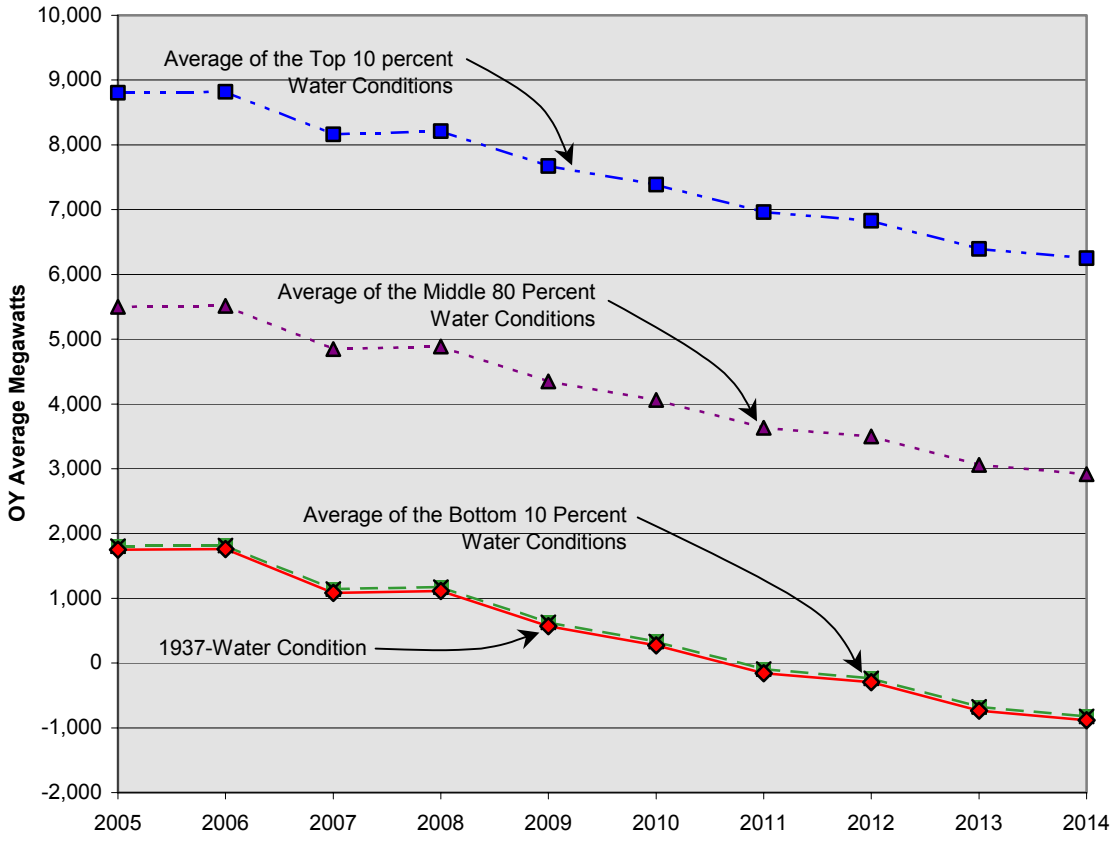
Table 12

Potential Variability of Regional Annual Energy Surplus/Deficit
Utilizing Differing Water Conditions
Energy in Average Megawatts

Operating Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
1937-Water Conditions	1,748	1,758	1,083	1,112	567	275	-155	-294	-735	-885
Bottom 10% Water Conditions	1,804	1,814	1,140	1,171	626	334	-95	-234	-675	-824
Middle 80% Water Conditions	5,497	5,512	4,846	4,887	4,347	4,059	3,634	3,497	3,060	2,913
Top 10% Water Conditions	8,804	8,821	8,163	8,210	7,672	7,388	6,964	6,829	6,394	6,248

Figure 17

Variability of Regional Annual Energy Surplus/Deficit
Utilizing Differing Water Conditions
For OY 2005 through 2014



Potential Variability Due to IPP Generation Levels Delivered to the Region: This study assumes approximately 3,400 aMW of IPP generation are contracted or sold to regional entities to serve PNW regional loads. While this assumption is reasonable from an electrical reliability standpoint, the resulting regional surpluses may understate the potential for price volatility, as the PNW region may have to compete with other western markets to secure these sources of supply. Table 13 and Figure 18, page 45, show potential variability of regional surplus/deficits due to the level of IPP generation assumed delivered to the region. This comparison assumes regional IPP resource levels of 25 percent, 50 percent, and 75 percent.

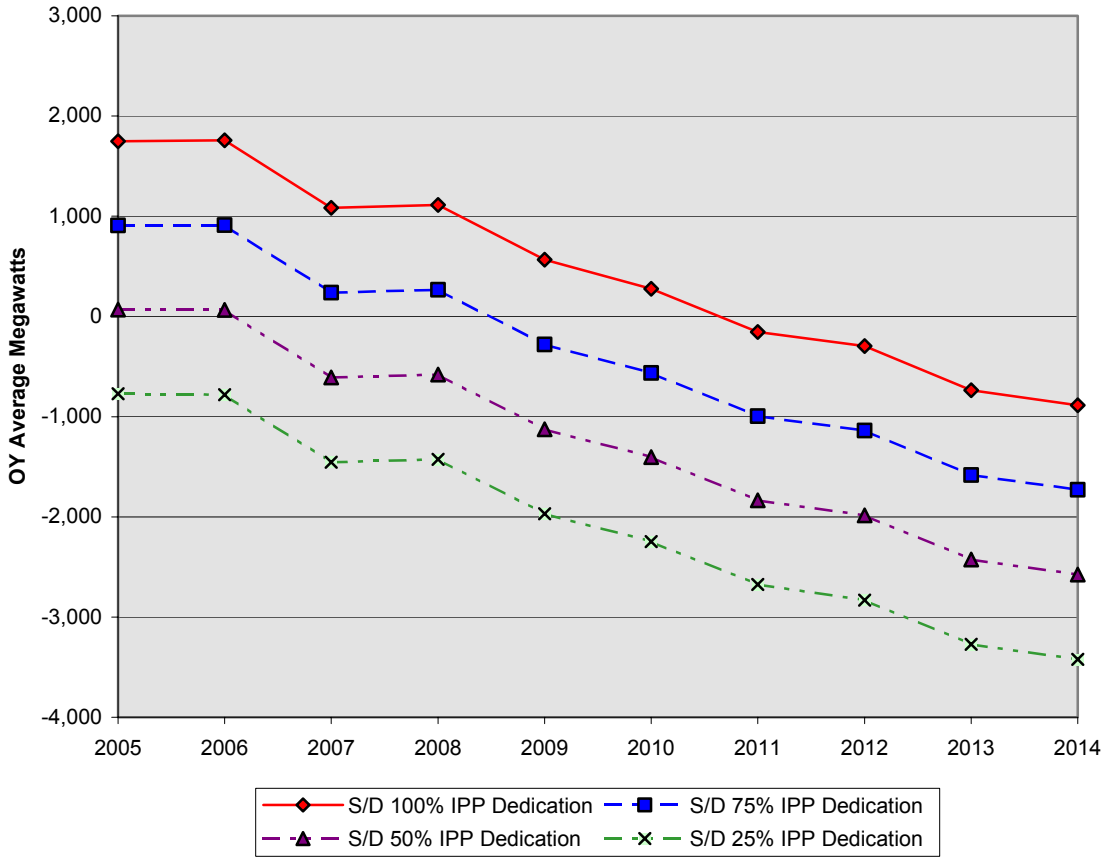
Table 13

Potential Variability of Regional Annual Firm Energy Surplus/Deficit
Utilizing Different Levels of IPP Generation Delivered to the Region
Energy in Average Megawatts

Operating Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Surplus/Deficit 100% IPP Delivered	1,748	1,758	1,083	1,112	567	275	-155	-294	-735	-885
Surplus/Deficit 75% IPP Delivered	908	912	237	266	-279	-565	-995	-1,140	-1,581	-1,731
Surplus/Deficit 50% IPP Delivered	68	66	-609	-580	-1,125	-1,405	-1,835	-1,986	-2,427	-2,577
Surplus/Deficit 25% IPP Delivered	-772	-780	-1,455	-1,425	-1,970	-2,245	-2,675	-2,832	-3,273	-3,423

Figure 18

Potential Variability of Regional Annual Energy Surplus/Deficit
Utilizing Different Levels of IPP Generation Delivered to the Region



Regional Firm Monthly Capacity Surplus/Deficit Projections

Figure 19, page 47, graphically illustrates the regional firm 50-hours-per-week capacity surplus/deficit projections for OY 2005, 2009, and 2014 and incorporates the regional assumptions on page 33. Regional surplus firm capacity values take into account the following hydrologic 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.

This study, however, does not take into account potential nighttime return problems from capacity sales. Nighttime return problems can occur when replacement energy from capacity sales combined with minimum hydro generation, thermal resources, and other contract returns are greater than the region's nighttime load. The following factors may contribute to nighttime return problems:

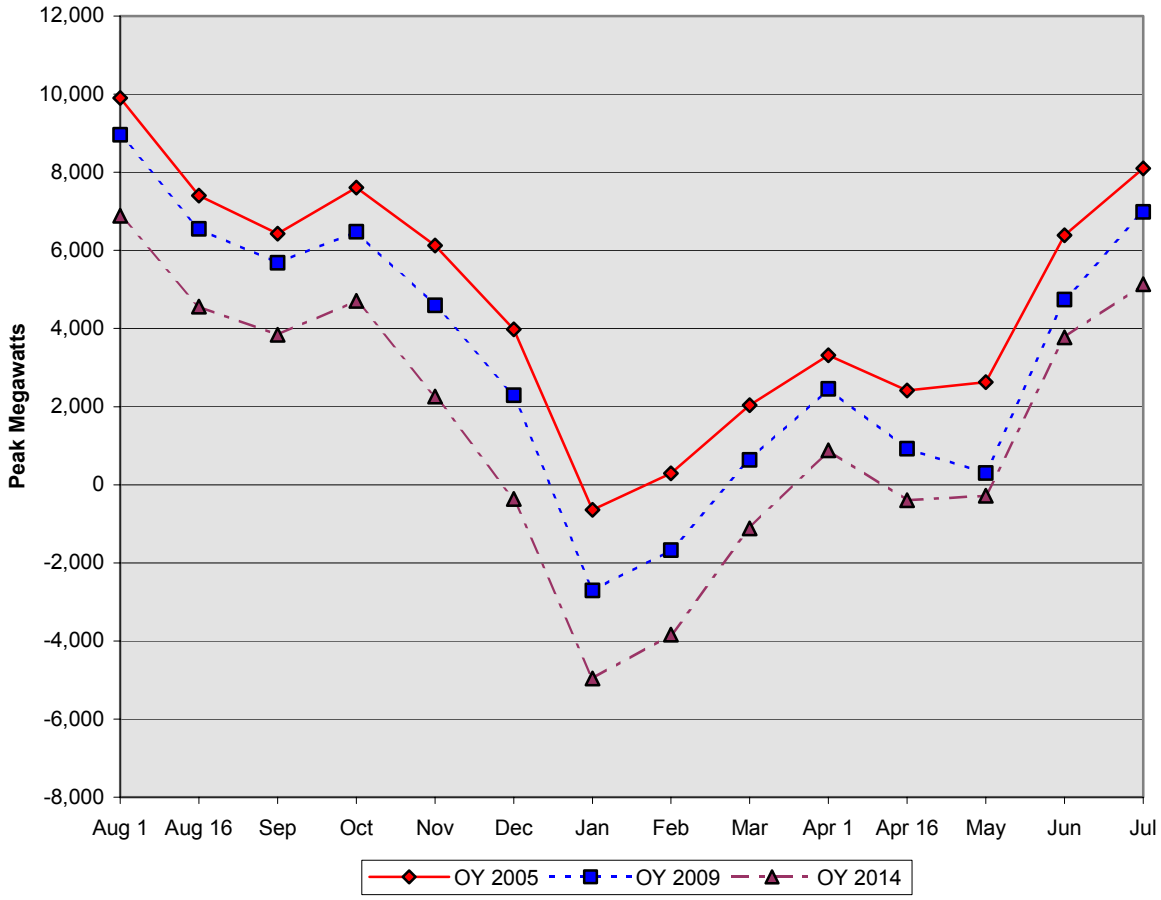
- Low nighttime regional loads;
- Minimum nighttime contract levels from contract purchases, peaking replacement, and exchange energy;
- The inability of regional non-hydro resources to cycle to fit differing day to night load requirements; and
- Additional nonpower hydro requirements that dictate minimum streamflows.

Any of these factors can potentially restrict the ability to accept nighttime return energy, even though there may be surplus generating capability during the daytime. Any added capacity due to regional entities making additional market purchases will most likely increase the capacity available to the region.

Regional capacity surplus/deficit projections, assuming normal weather conditions and 1937-water conditions for OY 2005, 2009, and 2014 are shown in Exhibits 22 through 24, pages 97 through 99.

Figure 19

Regional Firm Monthly Capacity Surplus/Deficit Projections
Assuming Normal Weather Conditions
Under 1937-Water Conditions
For OY 2005, 2009, and 2014



Regional Resource Adequacy

The regional energy and capacity load resource projections use the Regional Analysis Assumptions presented on page 33 and are considered conservative with the exception of the treatment of IPP resources. This analysis assumes regional hydro generation under 1937-critical water conditions, non-hydro resources operating at expected generation levels, and contract obligations and purchases delivered at maximum contract levels. IPP plants are assumed to be available to meet regional loads unless otherwise contracted, however, the resulting regional surpluses may understate the potential for price volatility as the PNW region may have to compete with other western markets to secure these sources of supply. Regional deficits will be met by any combination of the following:

- Better than critical water conditions, which increases water flow and water storage thereby increasing the output of the regional hydro system;
- Power purchases or the acquisition of generation from operating IPP projects;
- Total retail load variability due to current and future economic conditions;
- DSI long-term load levels are forecasted to reach 674 aMW throughout the study. Actual DSI load levels could be different, based on electricity prices, aluminum commodity prices, and closures; and
- Purchase of off-system storage and exchange agreements that allow for monthly seasonal shaping of regional hydropower with other west coast regions.

As the region contracts for power purchases or generation from new or existing resources, those amounts will be included in future analyses.

Section 6: Northwest Power and Conservation Council Comparison

Non-DSI Regional Load Comparison: 2003 White Book to Council

Table 14, page 50, and Figure 20, page 51, compare the non-DSI regional firm total retail loads between BPA's 2003 White Book and the Northwest Power and Conservation Council's Revised Draft Forecast of Electricity Demand for the Fifth Power Plan (2003). To provide consistency for this comparison, the DSI load components were removed from both forecasts.

2003 White Book Non-DSI Load Forecast: The 2003 White Book total retail load projections were initially estimated separately, by each individual entity and then grouped into the following categories: Federal agencies, public agencies, cooperatives, USBR, and IOUs. The total retail load forecasts were finalized on March 31, 2004.

The total retail load forecasts for the Federal agencies, public agencies, cooperatives, and USBR were developed using any combination of the following:

- Linear trending based on historical power consumption;
- Data obtained from the individual entity's 2001 power sales contracts' Exhibit C submittals; and
- Retail load forecasts sent directly to BPA through their PNUCC submittals.

The load forecasts for the IOUs were developed from both data submitted in their PNUCC submittals and load forecasts sent directly to BPA. Generally, the load estimates were lower when compared to last year's analysis due to depressed economic conditions that are now reflected in the forecast.

Council Non-DSI Load Forecast: The Council's Revised Draft Forecast of Electricity Demand for the Fifth Power Plan (2003) is based on the following:

- The Council's near-term regional load projections are based on actual loads through August 2001, reflecting the depressed levels of electricity demand at that time; and
- The Council's projections assume that the non-DSI loads will converge towards but not fully recover to the long-term load projections contained in their Fourth Regional Power Plan due to the following: 1) the rate of economic recovery has been slower than expected and 2) energy prices have increased again in OY 2003 after initially falling in OY 2002. This reduction is considered to be a permanent reduction in electricity demand.

Comparison of the Non-DSI Load Forecast: The comparison of the Council and 2003 White Book non-DSI load forecasts shows that the average difference over the 10-years of the study is -2.3 percent. The maximum difference is -2.9 percent (-577 aMW) in OY 2006, declining to –1.8% (389 aMW) by 2014. This difference is considered minor and is mainly due to variations in modeling methods and the vintage of data used in the two forecasts.

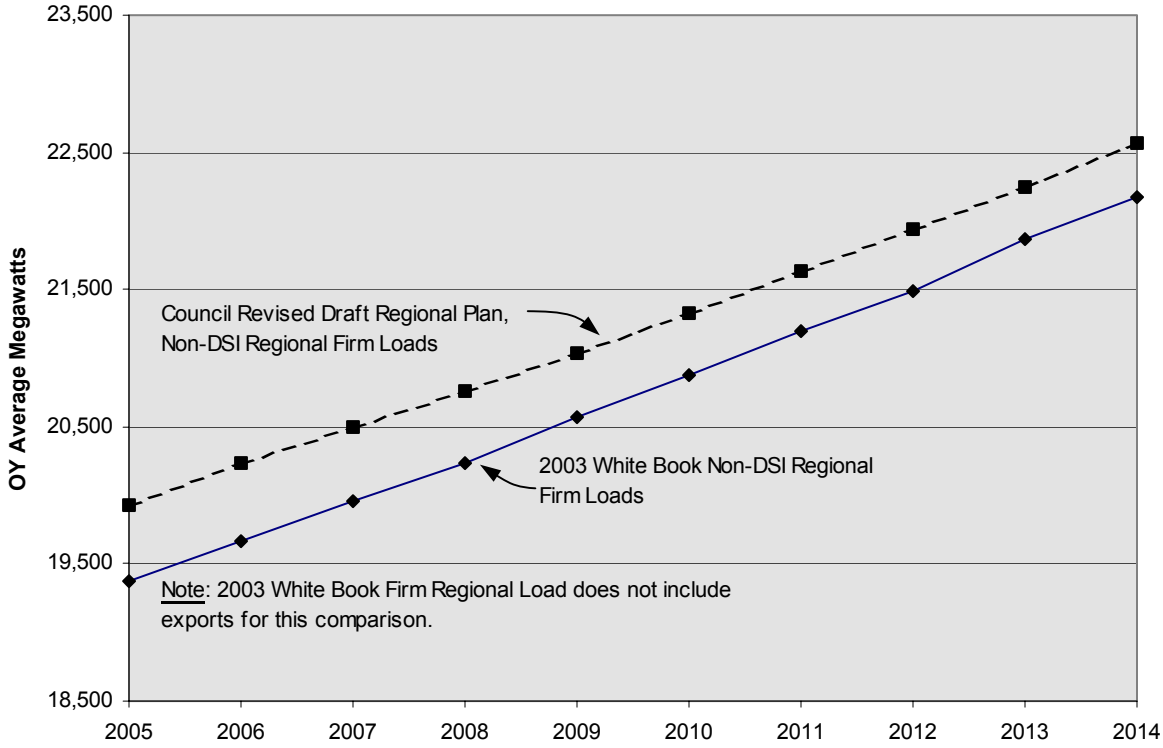
Table 14

Non-DSI PNW Regional Firm Load Comparison
BPA's 2003 White Book Load Projections
and the Council's Revised Draft Fifth Power Plan
Annual Energy in Average Megawatts

Operating Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
2003 White Book										
Regional Firm Loads	19,666	19,957	20,575	20,914	21,246	21,556	21,864	22,160	22,537	22,849
Regional DSI Loads	292	296	611	674	674	674	674	674	674	674
Non-DSI Regional Firm Loads	19,374	19,661	19,964	20,240	20,572	20,882	21,190	21,486	21,863	22,175
Council Revised Draft Fifth Plan										
Non-DSI Regional Firm Loads	19,928	20,238	20,497	20,759	21,033	21,331	21,632	21,941	22,245	22,565
Comparison: 2003 White Book – Council										
Difference	-554	-557	-533	-519	-461	-449	-442	-455	-382	-389
Percent Difference	-2.9%	-2.9%	-2.7%	-2.6%	-2.2%	-2.2%	-2.1%	-2.1%	-1.7%	-1.8%

Figure 20

Comparison of Non-DSI Regional Firm Loads
BPA 2003 White Book Load Projections
and the Council's Revised Draft Fifth Power Plan
Under Normal Weather Conditions



Comparison of Resource Stack Assumptions: 2003 White Book to Council

A comparison of the resource assumptions between the 2003 White Book and the Council's Revised Draft Power Price Forecast for the Fifth Power Plan are listed below.

2003 White Book Resource Stack Assumptions: The 2003 White Book resource stack assumptions were estimated on a unit basis. Revisions to current thermal plant operations are based on submittals by utilities either to the PNUCC or data submitted directly to BPA for the purpose of this study. Resources listed in this study represent plants that have been placed into operation or are currently in the construction process. The capacity and energy values have been estimated through information provided by PNUCC or through conversations with the plant managers.

Council Resource Stack Assumptions: The Council's near-term regional resource stack assumptions for its wholesale power price forecast are based on projects under construction, similar to the process utilized by BPA. The treatment of new resources by the Council and BPA differ in the following manner: 1) BPA adds plants to the resources based on the operator's/developer's best estimate of completion; and 2) the Council estimates operation dates for new resources based on economic competitiveness as estimated by the AURORA™ Electric Market Model. Therefore, the Council may delay an announced operational date of a future plant based on the perceived need for the plant as determined by their model.

Comparison of the Resource Stack: The following compares the different assumptions used for BPA's 2003 White Book and the Council's estimation in constructing their new resource stack.

- BPA includes only Pennsylvania Power & Light Company's (PPL Montana) resources that are dedicated to serve Northwestern Energy's (formally Montana Power Company) eastern Montana loads. The Council includes most of PPL Montana's generation in their regional resource stack, regardless of whether they are dedicated to serve PNW regional loads. BPA will review the status of these resources in future studies.
- The Council includes the nameplate rating of the following self-generating units: BP Cherry Point, Georgia Pacific Bellingham, Sierra Pine Medite, and Wah Chang. In addition, the Council includes the reactivated Frontier Energy project. BPA does not include these plants and will review these plants for possible inclusion in future studies.
- In addition, BPA and the Council treat the wind projects differently. At this time, BPA only recognizes the average energy generation projections of wind projects and does not credit wind projects to be able to predictably meet peak loads. The Council models wind projects as predictable, shaped energy resources and credits wind with a capacity equivalent to the installed wind capacity times a capacity factor.

These resource stack differences are generally based on the timing and treatment of new regional resources. They are considered minor in long-range load resource planning.

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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Exhibit 1: OY 2005 through 2014 Annual Energy

Loads and Resources - Federal System
PNW Loads and Resources Study
2005 - 2014 Operating Years
1937 Water Year
2003 White Book

3/31/2004

Average Energy In Megawatts	*2005 Avg.*	*2006 Avg.*	*2007 Avg.*	*2008 Avg.*	*2009 Avg.*	*2010 Avg.*	*2011 Avg.*	*2012 Avg.*	*2013 Avg.*	*2014 Avg.*
Non-Utility Obligations										
Federal Agencies 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0
USBR 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0
DSI 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0
Federal Agencies 2002 PSC Sale	119	119	120	120	121	121	122	119	118	118
USBR 2002 PSC Sale	149	149	149	149	149	149	149	149	149	149
DSI 2002 PSC Sale	267	271	45	0	0	0	0	0	0	0
Total Firm Non-Utility Obligations	535	539	314	270	270	271	271	268	268	268
Transfers Out										
NGP 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0
GPU 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0
IOU 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0
NGP 2002 PSC Sale	2716	2755	2917	2974	3009	3044	3078	3103	3137	3169
GPU 2002 PSC Sale	2142	2126	2367	2431	2443	2454	2463	2494	2511	2518
NGP Slice Sale	607	621	614	627	618	630	621	632	623	634
GPU Slice Sale	1011	1034	1022	1044	1030	1049	1034	1053	1038	1056
IOU 2002 PSC Sale	382	382	64	0	0	0	0	0	0	0
Exports	1007	968	783	697	633	705	694	686	679	672
Intra-Regional Transfers (Out)	512	413	380	370	370	370	370	199	184	178
Supp & Entitlement Capacity (Out)	0	0	0	0	0	0	0	0	0	0
CSPE To West Group Utilities	0	0	0	0	0	0	0	0	0	0
Federal Diversity	0	0	0	0	0	0	0	0	0	0
Total Transfers Out	8376	8300	8146	8143	8103	8252	8261	8168	8172	8227
Total Firm Obligations	8911	8839	8460	8413	8373	8523	8532	8437	8439	8494
Hydro Resources										
Regulated Hydro	6446	6464	6492	6527	6545	6562	6577	6589	6603	6614
Independent Hydro	397	397	398	398	398	398	398	398	398	398
Sustained Peaking Adjustment	0	0	0	0	0	0	0	0	0	0
Non-Fed CER (CSPE)	0	0	0	0	0	0	0	0	0	0
Non-Fed CER (Canada)	142	139	134	131	130	133	139	137	135	133
Restoration	0	0	0	0	0	0	0	0	0	0
Total Hydro Resources	6985	7000	7024	7056	7072	7092	7114	7123	7136	7145
Other Resources										
Small Thermal & Misc.	0	0	0	0	0	0	0	0	0	0
Combustion Turbines	0	0	0	0	0	0	0	0	0	0
Renewables	29	29	29	29	29	29	29	29	29	29
Cogeneration	0	0	0	0	0	0	0	0	0	0
Imports	256	246	226	199	184	183	175	175	175	175
Intra-Regional Transfers (In)	1367	1210	510	276	276	276	276	105	90	90
Supp & Entitlement Capacity (In)	0	0	0	0	0	0	0	0	0	0
Large Thermal	861	1000	877	1000	877	1000	877	1000	877	1000
Non-Utility Generation	92	92	110	119	119	119	119	119	119	119
Resource Acquisition	0	0	0	0	0	0	0	0	0	0
Total Other Resources	2605	2577	1751	1622	1485	1607	1476	1428	1289	1413
Total Resources	9590	9578	8775	8678	8557	8699	8589	8551	8425	8558
Reserves & Maintenance										
Hydro Reserves	0	0	0	0	0	0	0	0	0	0
Small Thermal & Misc. Reserves	0	0	0	0	0	0	0	0	0	0
Contract Reserves	0	0	0	0	0	0	0	0	0	0
Large Thermal Reserves	0	0	0	0	0	0	0	0	0	0
Federal Hydro Maintenance	0	0	0	0	0	0	0	0	0	0
Spinning Reserves	0	0	0	0	0	0	0	0	0	0
Federal Transmission Losses	-270	-270	-247	-245	-241	-245	-242	-241	-238	-241
Total Reserves, Maintenance & Losses	-270	-270	-247	-245	-241	-245	-242	-241	-238	-241
Total Net Resources	9320	9307	8527	8433	8315	8454	8347	8310	8187	8317
Total Firm Surplus/Deficit	409	468	67	20	-58	-69	-185	-127	-252	-178

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Exhibits 2 - 4

Federal System Monthly Energy Analysis Under the 2003 White Book Load Forecast for 1937-Water Conditions

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Exhibit 2: OY 2005 Monthly Energy

Loads and Resources - Federal System
PNW Loads and Resources Study
2004 - 2005 Operating Year
1937 Water Year
2003 White Book

3/31/2004

Average Energy in Megawatts	*Aug1*	*Aug16*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr1*	*Apr16*	*May*	*Jun*	*Jul*	*Avg*
Non-Utility Obligations															
Federal Agencies 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USBR 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DSI 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Federal Agencies 2002 PSC Sale	120	120	108	106	122	136	137	131	123	110	110	108	108	115	119
USBR 2002 PSC Sale	309	275	166	129	0	0	0	1.0	23	252	315	268	298	332	149
DSI 2002 PSC Sale	277	276	274	271	269	266	263	262	262	265	265	265	265	265	267
Total Firm Non-Utility Obligations	706	671	548	506	391	402	400	394	408	627	690	641	671	712	535
Transfers Out															
NGP 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GPU 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IOU 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NGP 2002 PSC Sale	2618	2618	2399	2386	2678	3076	3175	3035	2765	2602	2597	2540	2600	2717	2716
GPU 2002 PSC Sale	1731	1731	1895	1925	2290	2581	2622	2601	2382	2147	2141	2030	1763	1733	2142
NGP Slice Sale	840	645	499	609	665	670	549	524	571	542	523	556	638	724	607
GPU Slice Sale	1399	1074	831	1014	1108	1117	915	873	951	903	870	927	1063	1206	1011
IOU 2002 PSC Sale	382	382	382	382	382	382	382	382	382	382	382	382	382	382	382
Exports	1070	1071	1062	974	961	995	991	987	950	974	974	992	1070	1064	1007
Intra-Regional Transfers (Out)	1248	1277	461	346	647	660	658	602	450	367	368	172	232	282	512
Supp & Entitlement Capacity (Out)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CSPE To West Group Utilities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Federal Diversity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Transfers Out	9288	8798	7528	7637	8731	9481	9293	9004	8451	7918	7855	7599	7750	8107	8376
Total Firm Obligations	9993	9468	8076	8143	9122	9883	9692	9398	8858	8546	8545	8240	8421	8819	8911
Hydro Resources															
Regulated Hydro	9248	6885	5135	6320	7020	7142	5731	5407	5916	5561	5238	6095	7314	7806	6446
Independent Hydro	437	435	370	386	305	237	176	196	275	434	515	711	746	451	397
Sustained Peaking Adjustment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-Fed CER (CSPE)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-Fed CER (Canada)	143	143	143	143	143	143	143	143	143	141	141	141	141	141	142
Restoration	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Hydro Resources	9828	7463	5647	6849	7468	7522	6050	5746	6333	6136	5894	6947	8201	8399	6985
Other Resources															
Small Thermal & Misc.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combustion Turbines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Renewables	27	27	27	28	29	31	32	31	31	30	30	27	27	27	29
Cogeneration	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Imports	183	183	216	270	338	395	369	325	295	276	238	101	123	204	256
Intra-Regional Transfers (In)	1448	1452	1623	1521	1567	1503	1562	1550	1529	1273	873	754	875	1396	1367
Supp & Entitlement Capacity (In)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Large Thermal	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	194	133	1000	861
Non-Utility Generation	83	81	58	76	101	104	107	98	91	113	113	107	94	75	92
Resource Acquisition	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Resources	2741	2743	2924	2895	3035	3034	3069	3004	2946	2692	2254	1183	1253	2702	2605
Total Resources	12569	10206	8572	9743	10502	10555	9119	8750	9279	8828	8149	8130	9454	11101	9590
Reserves & Maintenance															
Hydro Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Thermal & Misc. Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Contract Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Large Thermal Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Federal Hydro Maintenance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spinning Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Federal Transmission Losses	-354	-288	-242	-275	-296	-298	-257	-247	-262	-249	-230	-229	-267	-313	-270
Total Reserves, Maintenance & Losses	-354	-288	-242	-275	-296	-298	-257	-247	-262	-249	-230	-229	-267	-313	-270
Total Net Resources	12215	9918	8330	9469	10206	10257	8862	8503	9017	8579	7919	7900	9187	10788	9320
Total Firm Surplus/Deficit	2221	450	254	1326	1084	375	-830	-895	159	34	-626	-339	767	1969	409

Exhibit 3: OY 2009 Monthly Energy

Loads and Resources - Federal System
PNW Loads and Resources Study
2013 - 2014 Operating Year
1937 Water Year
2003 White Book

3/31/2004

Average Energy in Megawatts	*Aug1*	*Aug16*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr1*	*Apr16*	*May*	*Jun*	*Jul*	*Avg*
Non-Utility Obligations															
Federal Agencies 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USBR 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DSI 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Federal Agencies 2002 PSC Sale	114	114	105	107	126	137	139	134	122	110	110	107	108	112	118
USBR 2002 PSC Sale	309	275	166	129	0	0	0	1.0	23	252	315	268	298	332	149
DSI 2002 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Non-Utility Obligations	423	389	271	236	126	137	139	135	145	362	425	375	406	444	268
Transfers Out															
NGP 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GPU 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IOU 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NGP 2002 PSC Sale	3122	3122	2819	2788	3150	3555	3640	3527	3171	3002	2994	2971	3082	3202	3169
GPU 2002 PSC Sale	2098	2098	2238	2363	2767	3099	3102	3056	2813	2439	2432	2241	1960	2041	2518
NGP Slice Sale	866	667	517	626	685	690	565	539	586	559	536	618	726	744	634
GPU Slice Sale	1442	1110	860	1042	1141	1150	942	898	976	930	892	1030	1209	1238	1056
IOU 2002 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exports	677	677	668	640	655	676	673	668	658	678	678	687	693	690	672
Intra-Regional Transfers (Out)	13	13	42	108	363	418	391	347	217	188	190	0.1	18	34	178
Supp & Entitlement Capacity (Out)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CSPE To West Group Utilities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Federal Diversity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Transfers Out	8216	7686	7143	7567	8761	9588	9312	9034	8420	7796	7721	7547	7688	7948	8227
Total Firm Obligations	8640	8075	7414	7803	8887	9725	9451	9169	8565	8158	8146	7922	8094	8392	8494
Hydro Resources															
Regulated Hydro	9481	7071	5275	6492	7229	7353	5894	5559	6067	5722	5362	6199	7476	8013	6614
Independent Hydro	438	436	371	386	306	237	176	197	275	435	516	713	748	452	398
Sustained Peaking Adjustment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-Fed CER (CSPE)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-Fed CER (Canada)	134	134	134	134	134	134	134	134	134	132	132	132	132	132	133
Restoration	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Hydro Resources	10052	7641	5779	7012	7668	7723	6203	5889	6476	6289	6010	7044	8356	8598	7145
Other Resources															
Small Thermal & Misc.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combustion Turbines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Renewables	27	27	27	28	29	31	32	31	31	30	30	27	27	27	29
Cogeneration	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Imports	104	104	137	169	239	293	267	223	193	194	168	76	94	125	175
Intra-Regional Transfers (In)	0	0	135	135	135	112	112	112	112	112	112	0	112	0	90
Supp & Entitlement Capacity (In)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Large Thermal	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Non-Utility Generation	109	109	102	116	127	127	130	125	119	121	121	118	120	109	119
Resource Acquisition	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Resources	1240	1240	1402	1448	1530	1564	1541	1491	1455	1457	1432	1221	1354	1261	1413
Total Resources	11292	8880	7180	8460	9198	9287	7744	7380	7931	7746	7442	8265	9709	9859	8558
Reserves & Maintenance															
Hydro Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Thermal & Misc. Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Contract Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Large Thermal Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Federal Hydro Maintenance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spinning Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Federal Transmission Losses	-318	-250	-202	-239	-259	-262	-218	-208	-224	-218	-210	-233	-274	-278	-241
Total Reserves, Maintenance & Losses	-318	-250	-202	-239	-259	-262	-218	-208	-224	-218	-210	-233	-274	-278	-241
Total Net Resources	10973	8630	6978	8221	8939	9025	7526	7172	7707	7527	7232	8032	9436	9581	8317
Total Firm Surplus/Deficit	2334	555	-436	418	52	-700	-1925	-1997	-858	-631	-914	109	1341	1189	-178

Exhibit 4: OY 2014 Monthly Energy

Loads and Resources - Federal System
PNW Loads and Resources Study
2008 - 2009 Operating Year
1937 Water Year
2003 White Book

3/31/2004

Average Energy in Megawatts	*Aug1*	*Aug16*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr1*	*Apr16*	*May*	*Jun*	*Jul*	*Avg*
Non-Utility Obligations															
Federal Agencies 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USBR 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DSI 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Federal Agencies 2002 PSC Sale	122	122	110	108	124	139	139	134	125	112	112	110	110	117	121
USBR 2002 PSC Sale	309	275	166	129	0	0	0	1.0	23	252	315	268	298	332	149
DSI 2002 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Non-Utility Obligations	431	397	277	237	124	139	139	134	148	364	427	378	408	449	270
Transfers Out															
NGP 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GPU 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IOU 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NGP 2002 PSC Sale	2955	2955	2677	2634	2969	3343	3494	3348	3034	2878	2871	2832	2916	3034	3009
GPU 2002 PSC Sale	2049	2049	2188	2292	2675	2994	3011	2954	2734	2367	2360	2172	1894	1987	2443
NGP Slice Sale	858	660	512	620	679	684	560	534	581	553	531	556	657	736	618
GPU Slice Sale	1428	1099	853	1033	1130	1139	933	889	967	920	885	926	1095	1225	1030
IOU 2002 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exports	641	641	634	605	614	631	629	625	616	639	638	652	657	652	633
Intra-Regional Transfers (Out)	197	197	236	291	592	605	602	547	394	361	362	167	227	226	370
Supp & Entitlement Capacity (Out)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CSPE To West Group Utilities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Federal Diversity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Transfers Out	8127	7602	7100	7475	8659	9395	9229	8897	8325	7718	7648	7305	7447	7861	8103
Total Firm Obligations	8558	7999	7377	7712	8783	9534	9368	9031	8473	8083	8075	7682	7855	8310	8373
Hydro Resources															
Regulated Hydro	9383	6991	5217	6424	7151	7272	5829	5498	6001	5650	5309	6149	7409	7918	6545
Independent Hydro	438	436	371	386	306	237	176	197	275	434	516	712	748	452	398
Sustained Peaking Adjustment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-Fed CER (CSPE)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-Fed CER (Canada)	130	130	130	130	130	130	130	130	130	129	129	129	129	129	130
Restoration	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Hydro Resources	9951	7557	5718	6940	7586	7639	6135	5825	6406	6214	5955	6991	8286	8499	7072
Other Resources															
Small Thermal & Misc.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combustion Turbines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Renewables	27	27	27	28	29	31	32	31	31	30	30	27	27	27	29
Cogeneration	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Imports	111	111	144	182	249	304	277	234	203	204	173	83	101	132	184
Intra-Regional Transfers (In)	184	184	329	318	364	300	324	312	290	285	285	167	286	159	276
Supp & Entitlement Capacity (In)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Large Thermal	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	355	167	1000	877
Non-Utility Generation	109	109	102	116	127	127	130	125	119	121	121	118	120	109	119
Resource Acquisition	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Resources	1430	1431	1602	1643	1770	1762	1763	1701	1643	1641	1609	750	702	1427	1485
Total Resources	11381	8988	7320	8583	9356	9401	7898	7526	8048	7855	7564	7740	8988	9926	8557
Reserves & Maintenance															
Hydro Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Thermal & Misc. Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Contract Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Large Thermal Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Federal Hydro Maintenance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spinning Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Federal Transmission Losses	-321	-253	-206	-242	-264	-265	-223	-212	-227	-221	-213	-218	-253	-280	-241
Total Reserves, Maintenance & Losses	-321	-253	-206	-242	-264	-265	-223	-212	-227	-221	-213	-218	-253	-280	-241
Total Net Resources	11060	8735	7114	8341	9092	9136	7675	7314	7822	7633	7351	7522	8734	9646	8315
Total Firm Surplus/Deficit	2502	736	-263	629	310	-398	-1693	-1717	-652	-449	-724	-161	879	1336	-58

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Exhibits 5 – 7

Federal System Monthly Capacity Analysis Under the 2003 White Book Load Forecast for 1937-Water Conditions

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Exhibit 5: OY 2005 Monthly Capacity

Loads and Resources - Federal System
PNW Loads and Resources Study
2004 - 2005 Operating Year
1937 Water Year
2003 White Book

3/31/2004

Capacity in Megawatts	*Aug1*	*Aug16*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr1*	*Apr16*	*May*	*Jun*	*Jul*
Non-Utility Obligations														
Federal Agencies 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USBR 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DSI 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Federal Agencies 2002 PSC Sale	220	220	175	180	202	213	201	217	204	187	187	185	190	172
USBR 2002 PSC Sale	258	224	134	128	0	0	0	0	40	260	323	249	250	270
DSI 2002 PSC Sale	277	276	274	271	269	266	263	262	262	265	265	265	265	265
Total Firm Non-Utility Obligations	755	720	583	579	471	479	464	479	506	712	775	699	705	707
Transfers Out														
NGP 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GPU 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IOU 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NGP 2002 PSC Sale	3625	3625	3547	3695	3999	4429	4616	4398	4197	3945	3945	3931	3653	3721
GPU 2002 PSC Sale	2091	2091	2251	2354	2763	3144	3206	3187	2948	2610	2610	2393	2010	2006
NGP Slice Sale	1584	1328	1107	1249	1350	1325	1007	1046	1068	1050	941	1002	1138	1392
GPU Slice Sale	2638	2211	1844	2081	2248	2206	1677	1742	1779	1749	1568	1669	1895	2318
IOU 2002 PSC Sale	382	382	382	382	382	382	382	382	382	382	382	382	382	382
Exports	1964	1964	1955	1869	1814	1835	1832	1827	1817	1837	1837	1914	1920	1930
Intra-Regional Transfers (Out)	1919	1919	898	739	956	1010	984	940	830	753	753	581	634	698
Supp & Entitlement Capacity (Out)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CSPE To West Group Utilities	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Federal Diversity	-804	-799	-792	-762	-695	-544	-561	-545	-738	-699	-705	-810	-792	-801
Total Transfers Out	13398	12720	11192	11608	12816	13787	13143	12977	12283	11628	11331	11064	10840	11648
Total Firm Obligations	14153	13439	11775	12187	13287	14265	13607	13456	12789	12339	12105	11762	11545	12354
Hydro Resources														
Regulated Hydro	20409	20228	20436	20534	20459	20218	20367	20449	20111	19639	19335	19766	20362	20520
Independent Hydro	745	757	739	744	711	673	644	760	820	845	845	884	886	762
Sustained Peaking Adjustment	-225	-3255	-6247	-4686	-3662	-3702	-7776	-7488	-6936	-6299	-7367	-6057	-4916	-2753
Non-Fed CER (CSPE)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-Fed CER (Canada)	247	247	247	247	248	248	248	248	248	245	245	245	245	245
Restoration	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Hydro Resources	21177	17977	15175	16838	17755	17437	13483	13968	14243	14430	13058	14838	16577	18774
Other Resources														
Small Thermal & Misc.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combustion Turbines	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Renewables	27	27	27	28	29	31	32	31	31	30	30	27	27	27
Cogeneration	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Imports	139	139	168	224	277	331	305	261	233	216	216	76	94	160
Intra-Regional Transfers (In)	1288	1288	1361	1226	1226	1203	1238	1238	1238	988	588	588	588	1238
Supp & Entitlement Capacity (In)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Large Thermal	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150	0	0	1150
Non-Utility Generation	35	35	18	33	42	33	33	33	33	33	33	50	33	30
Resource Acquisition	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Resources	2639	2639	2725	2661	2724	2748	2758	2713	2685	2417	2017	741	743	2605
Total Resources	23816	20616	17900	19500	20479	20185	16241	16681	16928	16847	15075	15579	17319	21379
Reserves & Maintenance														
Hydro Reserves	-1058	-1049	-1059	-1064	-1058	-1045	-1051	-1060	-1047	-1024	-1009	-1033	-1062	-1064
Small Thermal & Misc. Reserves	-3.1	-3.1	-2.3	-3.1	-3.5	-3.2	-3.3	-3.2	-3.2	-3.2	-3.2	-3.8	-3	-2.9
Contract Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Large Thermal Reserves	-172	-172	-172	-172	-172	-172	-172	-172	-172	-172	-172	0	0	-172
Federal Hydro Maintenance	-3263	-2761	-2770	-2752	-2705	-1866	-1408	-1883	-1915	-2061	-1805	-1756	-1635	-2785
Spinning Reserves	-451	-384	-313	-356	-388	-401	-313	-313	-320	-314	-287	-298	-343	-404
Federal Transmission Losses	-632	-544	-455	-508	-541	-559	-445	-444	-451	-445	-395	-418	-478	-568
Total Reserves, Maintenance & Losses	-5580	-4913	-4771	-4855	-4869	-4047	-3393	-3877	-3908	-4020	-3672	-3509	-3522	-4996
Total Net Resources	18236	15703	13129	14645	15611	16138	12848	12805	13020	12827	11404	12070	13797	16384
Total Firm Surplus/Deficit	4083	2263	1354	2457	2323	1873	-759	-651	231	487	-702	307	2252	4029

Exhibit 6: OY 2009 Monthly Capacity

Loads and Resources - Federal System
PNW Loads and Resources Study
2008 - 2009 Operating Year
1937 Water Year
2003 White Book

3/31/2004

Capacity in Megawatts	*Aug1*	*Aug16*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr1*	*Apr16*	*May*	*Jun*	*Jul*
Non-Utility Obligations														
Federal Agencies 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USBR 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DSI 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Federal Agencies 2002 PSC Sale	217	217	178	183	203	215	205	217	206	189	189	187	190	175
USBR 2002 PSC Sale	258	224	134	128	0	0	0	0	40	260	323	249	250	270
DSI 2002 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Non-Utility Obligations	475	441	312	311	203	215	205	217	246	449	512	436	440	445
Transfers Out														
NGP 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GPU 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IOU 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NGP 2002 PSC Sale	3986	3986	3907	4028	4365	4798	4994	4775	4560	4309	4309	4263	3996	4058
GPU 2002 PSC Sale	2283	2283	2484	2631	3037	3421	3422	3363	3181	2733	2733	2501	2110	2224
NGP Slice Sale	1595	1346	1111	1268	1368	1348	1007	1046	1088	1050	941	1012	1148	1403
GPU Slice Sale	2657	2242	1850	2112	2278	2246	1677	1742	1812	1749	1568	1686	1912	2336
IOU 2002 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exports	1534	1534	1524	1485	1460	1484	1481	1475	1463	1482	1482	1530	1537	1549
Intra-Regional Transfers (Out)	588	588	617	683	900	954	928	884	774	747	747	575	628	642
Supp & Entitlement Capacity (Out)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CSPE To West Group Utilities	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Federal Diversity	-877	-872	-871	-836	-760	-590	-604	-585	-799	-749	-755	-864	-851	-875
Total Transfers Out	11766	11106	10621	11373	12647	13661	12907	12701	12079	11321	11024	10703	10480	11337
Total Firm Obligations	12241	11548	10933	11683	12850	13876	13111	12918	12324	11770	11536	11139	10920	11782
Hydro Resources														
Regulated Hydro	20409	20228	20436	20534	20459	20218	20367	20449	20111	19639	19335	19766	20362	20520
Independent Hydro	745	757	739	744	711	673	644	760	820	845	845	884	886	762
Sustained Peaking Adjustment	-132	-3071	-6247	-4448	-3438	-3405	-7776	-7488	-6690	-6299	-7367	-5935	-4793	-2621
Non-Fed CER (CSPE)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-Fed CER (Canada)	225	225	225	225	225	225	225	225	225	223	223	223	223	223
Restoration	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Hydro Resources	21248	18139	15153	17054	17956	17711	13460	13945	14466	14408	13036	14939	16678	18884
Other Resources														
Small Thermal & Misc.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combustion Turbines	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Renewables	27	27	27	28	29	31	32	31	31	30	30	27	27	27
Cogeneration	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Imports	89	89	118	154	207	261	235	191	163	166	166	76	94	110
Intra-Regional Transfers (In)	0	0	23	23	23	0	0	0	0	0	0	0	0	0
Supp & Entitlement Capacity (In)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Large Thermal	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150	0	0	1150
Non-Utility Generation	54	54	54	54	54	54	54	54	54	54	54	54	54	54
Resource Acquisition	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Resources	1320	1320	1372	1409	1463	1496	1471	1426	1398	1400	1400	157	175	1341
Total Resources	22567	19459	16525	18463	19419	19207	14931	15371	15864	15808	14436	15096	16853	20225
Reserves & Maintenance														
Hydro Reserves	-1058	-1049	-1059	-1064	-1058	-1045	-1051	-1060	-1047	-1024	-1009	-1033	-1062	-1064
Small Thermal & Misc. Reserves	-4	-4	-4	-4.1	-4.1	-4.2	-4.3	-4.2	-4.2	-4.2	-4.2	-4	-4	-4
Contract Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Large Thermal Reserves	-172	-172	-172	-172	-172	-172	-172	-172	-172	-172	-172	0	0	-172
Federal Hydro Maintenance	-3263	-2761	-2770	-2752	-2705	-1866	-1408	-1883	-1915	-2061	-1805	-1756	-1635	-2785
Spinning Reserves	-454	-389	-314	-362	-392	-408	-313	-313	-325	-314	-286	-300	-346	-406
Federal Transmission Losses	-590	-505	-409	-473	-505	-526	-401	-400	-415	-410	-374	-402	-462	-529
Total Reserves, Maintenance & Losses	-5541	-4880	-4727	-4826	-4838	-4022	-3349	-3833	-3879	-3986	-3651	-3495	-3510	-4961
Total Net Resources	17026	14578	11798	13637	14581	15185	11581	11538	11985	11822	10785	11601	13343	15264
Total Firm Surplus/Deficit	4785	3030	864	1954	1731	1309	-1530	-1379	-339	52	-751	461	2423	3482

Exhibit 7: OY 2014 Monthly Capacity

Loads and Resources - Federal System
PNW Loads and Resources Study
2013 - 2014 Operating Year
1937 Water Year
2003 White Book

3/31/2004

Capacity in Megawatts	*Aug1*	*Aug16*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr1*	*Apr16*	*May*	*Jun*	*Jul*
Non-Utility Obligations														
Federal Agencies 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USBR 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DSI 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Federal Agencies 2002 PSC Sale	195	195	161	170	201	204	203	222	203	175	175	181	175	159
USBR 2002 PSC Sale	258	224	134	128	0	0	0	0	40	260	323	249	250	270
DSI 2002 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Non-Utility Obligations	453	419	295	298	201	204	203	222	243	435	498	430	425	429
Transfers Out														
NGP 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GPU 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IOU 1981 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NGP 2002 PSC Sale	4175	4175	4111	4277	4639	5093	5200	5023	4757	4492	4492	4464	4201	4254
GPU 2002 PSC Sale	2326	2326	2552	2761	3171	3588	3568	3494	3311	2846	2846	2600	2199	2302
NGP Slice Sale	1598	1357	1111	1280	1378	1362	1007	1046	1104	1065	941	1098	1232	1411
GPU Slice Sale	2661	2259	1850	2132	2295	2269	1677	1742	1838	1774	1568	1829	2051	2350
IOU 2002 PSC Sale	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exports	1529	1529	1517	1480	1468	1498	1494	1486	1472	1488	1488	1525	1534	1548
Intra-Regional Transfers (Out)	13	13	42	108	325	379	353	309	199	172	172	0.1	18	34
Supp & Entitlement Capacity (Out)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CSPE To West Group Utilities	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Federal Diversity	-904	-900	-904	-880	-801	-622	-628	-612	-831	-777	-784	-899	-887	-908
Total Transfers Out	11398	10759	10278	11159	12474	13568	12671	12490	11850	11060	10724	10617	10348	10991
Total Firm Obligations	11851	11178	10573	11457	12675	13772	12874	12711	12093	11495	11222	11047	10773	11420
Hydro Resources														
Regulated Hydro	20409	20228	20436	20534	20459	20218	20367	20449	20111	19639	19335	19766	20362	20520
Independent Hydro	745	757	739	744	711	673	644	760	820	845	845	884	886	762
Sustained Peaking Adjustment	-100	-2940	-6247	-4299	-3312	-3230	-7776	-7488	-6495	-6117	-7367	-5827	-4711	-2513
Non-Fed CER (CSPE)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-Fed CER (Canada)	230	230	230	230	230	230	230	230	230	229	229	229	229	229
Restoration	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Hydro Resources	21285	18275	15158	17209	18088	17891	13465	13950	14666	14596	13042	15053	16766	18998
Other Resources														
Small Thermal & Misc.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combustion Turbines	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Renewables	27	27	27	28	29	31	32	31	31	30	30	27	27	27
Cogeneration	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Imports	89	89	118	154	207	261	235	191	163	166	166	76	94	110
Intra-Regional Transfers (In)	0	0	23	23	23	0	0	0	0	0	0	0	0	0
Supp & Entitlement Capacity (In)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Large Thermal	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150
Non-Utility Generation	54	54	54	54	54	54	54	54	54	54	54	54	54	54
Resource Acquisition	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Resources	1320	1320	1372	1409	1463	1496	1471	1426	1398	1400	1400	1307	1325	1341
Total Resources	22604	19595	16530	18618	19551	19387	14936	15376	16063	15996	14442	16360	18091	20339
Reserves & Maintenance														
Hydro Reserves	-1058	-1049	-1059	-1064	-1058	-1045	-1051	-1060	-1047	-1024	-1009	-1033	-1062	-1064
Small Thermal & Misc. Reserves	-4	-4	-4	-4.1	-4.1	-4.2	-4.3	-4.2	-4.2	-4.2	-4.2	-4	-4	-4
Contract Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Large Thermal Reserves	-172	-172	-172	-172	-172	-172	-172	-172	-172	-172	-172	-172	-172	-172
Federal Hydro Maintenance	-3263	-2761	-2770	-2752	-2705	-1866	-1408	-1883	-1915	-2061	-1805	-1756	-1635	-2785
Spinning Reserves	-454	-392	-314	-365	-396	-412	-313	-313	-330	-318	-286	-337	-382	-409
Federal Transmission Losses	-591	-510	-409	-478	-510	-532	-402	-400	-422	-416	-374	-437	-497	-533
Total Reserves, Maintenance & Losses	-5543	-4888	-4728	-4835	-4846	-4032	-3349	-3833	-3890	-3996	-3651	-3740	-3753	-4967
Total Net Resources	17061	14707	11803	13783	14705	15355	11586	11543	12173	11999	10791	12620	14338	15372
Total Firm Surplus/Deficit	5210	3529	1229	2325	2031	1583	-1288	-1168	80	504	-431	1573	3565	3952

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Exhibits 8 – 17

Federal System Energy Surpluses and Deficits under the 2003 White Book Load Forecast for 50-Historical Water Conditions

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Exhibit 8: OY 2005 Monthly 50-WY Energy

Federal Surplus/Deficit by Water Year
PNW Loads and Resources Study
2004 - 2005 Operating Year
2003 White Book

3/31/2004

Average Energy in Megawatts	*Aug1*	*Aug16*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr1*	*Apr16*	*May*	*Jun*	*Jul*	*Avg*
1929 Federal Surplus/Deficit	2657	642	330	1151	1012	415	977	-1098	167	-183	-901	-768	1378	2398	589
1930 Federal Surplus/Deficit	1321	418	216	1336	1160	388	-1086	-137	213	187	-475	-821	1265	2609	489
1931 Federal Surplus/Deficit	1777	674	342	1285	1128	429	-1039	-1078	-7.4	711	-1115	-319	762	1702	352
1932 Federal Surplus/Deficit	1644	209	363	1190	1017	355	-1006	-1230	1396	3587	4900	4596	4073	3527	1621
1933 Federal Surplus/Deficit	2939	2021	557	1336	771	1278	3431	2586	164	1034	1505	2948	6351	5862	2419
1934 Federal Surplus/Deficit	2470	2755	1137	2435	2504	5567	6560	4883	3411	6258	5164	4015	611	3150	3550
1935 Federal Surplus/Deficit	1054	-289	163	1090	736	829	2892	3237	-350	855	2201	2246	2957	3501	1601
1936 Federal Surplus/Deficit	2465	687	342	1277	1036	393	-353	-1064	394	70	1924	5738	2579	2479	1283
1937 Federal Surplus/Deficit	2221	450	254	1326	1084	375	-830	-895	159	34	-626	-339	767	1969	409
1938 Federal Surplus/Deficit	1825	61	241	1488	953	471	3700	581	2416	2951	2689	4781	3340	3094	2069
1939 Federal Surplus/Deficit	1582	290	645	1398	1040	377	1344	-788	735	902	1288	3475	1275	2592	1177
1940 Federal Surplus/Deficit	2395	569	259	1509	976	585	723	14	2637	1830	2000	2159	2018	1973	1354
1941 Federal Surplus/Deficit	1488	140	209	1299	860	978	1287	-1036	260	-343	-762	250	1596	1345	609
1942 Federal Surplus/Deficit	1267	286	588	1250	748	2568	3820	-417	-325	387	738	1890	4526	4043	1669
1943 Federal Surplus/Deficit	2907	1972	548	1299	874	811	3080	2312	3077	5928	4836	4716	4335	4173	2754
1944 Federal Surplus/Deficit	2709	1885	552	1405	1075	359	1349	-1021	-252	-126	-1076	-801	527	1187	506
1945 Federal Surplus/Deficit	1357	-218	325	1121	1039	357	-960	-604	35	-58	-786	2152	3591	2522	810
1946 Federal Surplus/Deficit	1535	1049	138	1426	1048	429	1793	1706	3157	3407	3927	5062	3706	3988	2284
1947 Federal Surplus/Deficit	3000	1669	770	1288	1024	3406	4052	3215	3423	1795	2803	4228	3388	3621	2754
1948 Federal Surplus/Deficit	3020	1099	603	3443	2008	2277	3947	794	2017	2035	3743	6208	7053	4399	3141
1949 Federal Surplus/Deficit	2604	3055	1482	1574	941	1046	1900	639	4241	2100	4639	5117	3232	1872	2354
1950 Federal Surplus/Deficit	1323	-177	-55	1317	861	145	2153	3629	4981	4482	3836	3979	6149	4536	2702
1951 Federal Surplus/Deficit	2230	2512	930	2297	2512	4350	5429	5376	3662	4336	4364	5108	2608	4445	3620
1952 Federal Surplus/Deficit	2702	2617	1221	2909	1192	2700	3720	2133	2436	4569	4561	6113	3538	2863	3004
1953 Federal Surplus/Deficit	2721	956	483	1278	1127	384	1165	3239	637	-70	1168	3666	5931	4615	2076
1954 Federal Surplus/Deficit	2844	1727	802	1551	1110	1743	2759	3476	2012	3758	2641	4444	5391	5316	2841
1955 Federal Surplus/Deficit	3820	2816	3374	2135	1622	1864	786	-704	-193	876	-3.5	1632	6706	6368	2279
1956 Federal Surplus/Deficit	2616	2986	694	2010	1910	4028	5969	2643	4382	4516	6023	6159	6704	4776	3946
1957 Federal Surplus/Deficit	2974	2228	746	1676	911	1912	2463	-63	1649	5112	2924	5703	6416	3062	2591
1958 Federal Surplus/Deficit	1882	517	394	1416	1038	524	1983	2193	2222	1110	3541	5079	4877	2634	2157
1959 Federal Surplus/Deficit	1912	788	490	1304	1529	2665	5452	3802	2257	3254	2061	3340	5357	5142	2946
1960 Federal Surplus/Deficit	2713	2049	3161	4077	2991	3525	3693	828	2075	6348	3863	2895	3725	3648	3175
1961 Federal Surplus/Deficit	3007	663	553	1453	1246	1011	2511	2862	2910	3294	2899	3593	6267	3197	2545
1962 Federal Surplus/Deficit	2082	1149	203	1372	1023	267	2396	-119	207	4709	4557	3050	2868	3871	1782
1963 Federal Surplus/Deficit	2528	1570	437	1874	1669	2637	2707	1431	1342	959	825	3890	3496	3590	2168
1964 Federal Surplus/Deficit	3236	1785	874	1198	1080	637	2262	637	160	2057	1708	2659	6391	5890	2182
1965 Federal Surplus/Deficit	2749	2459	1472	2259	1200	4269	6491	4995	3925	3047	4473	4892	4300	3168	3611
1966 Federal Surplus/Deficit	2815	2241	832	1805	1250	1841	3368	362	461	3727	1544	2973	2325	3954	2028
1967 Federal Surplus/Deficit	3042	1407	299	1269	1019	978	3775	4394	1391	2659	1050	1735	5937	5223	2508
1968 Federal Surplus/Deficit	2808	2129	932	1621	1142	1675	3273	2488	2200	-353	926	1884	4093	4886	2246
1969 Federal Surplus/Deficit	2969	2271	1865	2383	2047	2516	5311	3935	2692	5510	4599	5952	3951	3831	3513
1970 Federal Surplus/Deficit	2918	1003	478	1391	1142	803	2909	2426	664	99	1714	2917	4480	1990	1839
1971 Federal Surplus/Deficit	1735	670	216	1398	1246	679	4544	5965	3437	3781	4082	6315	6170	5107	3351
1972 Federal Surplus/Deficit	2927	3140	1099	1476	1159	1821	4345	5575	5994	5996	2550	6016	6606	5511	3909
1973 Federal Surplus/Deficit	3471	2834	1550	1641	1026	2053	3730	-746	98	-499	-853	114	1538	2322	1317
1974 Federal Surplus/Deficit	1623	-36	112	1030	732	2866	6978	5915	4742	5313	5517	5440	6733	6753	3959
1975 Federal Surplus/Deficit	2993	3110	1494	1162	1048	911	3148	1985	3454	2115	1979	3792	4926	5796	2735
1976 Federal Surplus/Deficit	1829	1111	873	2048	2323	5119	5336	3817	2852	5255	3637	5526	3009	5333	3513
1977 Federal Surplus/Deficit	4375	4035	3996	1792	1053	538	1373	-1115	-581	-627	-1369	-51	169	1155	961
1978 Federal Surplus/Deficit	1661	-224	83	855	839	733	2493	908	3307	2112	2459	3307	2675	3983	1849
-Ranked Averages-															
Top Ten Percent	2429	2212	862	1814	1503	3467	5842	4901	4541	4642	4585	5523	5390	4931	3809
Middle Eighty Percent	2448	1366	842	1634	1228	1490	2738	1565	1734	2424	2379	3602	4026	3761	2244
Bottom Ten Percent	2137	814	339	1300	1092	393	-126	-846	56	125	-839	-610	940	1973	469

Exhibit 9: OY 2006 Monthly 50-WY Energy

Federal Surplus/Deficit by Water Year
PNW Loads and Resources Study
2005 - 2006 Operating Year
2003 White Book

3/31/2004

Average Energy in Megawatts	*Aug1*	*Aug16*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr1*	*Apr16*	*May*	*Jun*	*Jul*	*Avg*
1929 Federal Surplus/Deficit	3660	1661	454	1137	981	397	556	-1497	-291	-566	-898	-114	2107	2113	648
1930 Federal Surplus/Deficit	2315	1438	341	1320	1132	372	-1512	-535	-243	-197	-478	-166	2002	2332	548
1931 Federal Surplus/Deficit	2775	1696	466	1267	1100	416	-1465	-1476	-464	329	-1113	340	1506	1430	414
1932 Federal Surplus/Deficit	2642	1230	489	1174	987	337	-1433	-1628	936	3212	4925	5266	4817	3248	1683
1933 Federal Surplus/Deficit	3941	3046	682	1323	740	1262	3023	2207	-289	665	1516	3621	7092	5597	2487
1934 Federal Surplus/Deficit	3473	3787	1267	2429	2473	5560	6159	4509	2966	5888	5182	4698	1349	2876	3621
1935 Federal Surplus/Deficit	2051	732	291	1074	704	812	2483	2860	-798	474	2210	2907	3693	3227	1666
1936 Federal Surplus/Deficit	3469	1710	469	1264	1008	380	-774	-1461	-64	-309	1921	6408	3326	2202	1346
1937 Federal Surplus/Deficit	3219	1470	377	1311	1057	361	-1254	-1291	-296	-347	-624	311	1497	1690	468
1938 Federal Surplus/Deficit	2823	1084	366	1474	926	454	3289	192	1962	2575	2697	5455	4074	2814	2133
1939 Federal Surplus/Deficit	2579	1306	771	1384	1009	358	930	-1184	276	519	1288	4138	2012	2313	1238
1940 Federal Surplus/Deficit	3396	1589	383	1497	949	569	301	-386	2184	1444	2014	2815	2754	1695	1415
1941 Federal Surplus/Deficit	2484	1161	333	1284	831	963	862	-1435	-197	-719	-748	910	2328	1059	669
1942 Federal Surplus/Deficit	2260	1305	710	1233	716	2547	3417	-815	-783	1.2	739	2549	5264	3769	1730
1943 Federal Surplus/Deficit	3912	2995	672	1285	842	790	2663	1911	2619	5549	4841	5391	5067	3889	2815
1944 Federal Surplus/Deficit	3708	2911	673	1390	1043	337	928	-1421	-709	-511	-1071	-142	1257	899	564
1945 Federal Surplus/Deficit	2350	800	449	1104	1008	340	-1388	-1006	-424	-443	-787	2807	4323	2243	868
1946 Federal Surplus/Deficit	2527	2069	261	1409	1017	408	1368	1311	2703	3033	3936	5740	4454	3710	2347
1947 Federal Surplus/Deficit	4004	2693	894	1272	991	3377	3647	2820	2973	1424	2817	4895	4135	3343	2818
1948 Federal Surplus/Deficit	4020	2118	727	3437	1974	2262	3533	394	1568	1661	3755	6879	7798	4130	3207
1949 Federal Surplus/Deficit	3605	4087	1608	1561	910	1026	1485	239	3787	1720	4653	5782	3974	1589	2416
1950 Federal Surplus/Deficit	2317	840	68	1301	830	127	1740	3237	4532	4101	3850	4652	6892	4256	2766
1951 Federal Surplus/Deficit	3228	3540	1054	2285	2476	4334	5025	4992	3209	3958	4380	5785	3344	4171	3686
1952 Federal Surplus/Deficit	3704	3645	1348	2901	1162	2679	3308	1740	1980	4185	4565	6783	4275	2581	3067
1953 Federal Surplus/Deficit	3722	1973	606	1262	1097	367	734	2849	185	-442	1176	4337	6667	4335	2138
1954 Federal Surplus/Deficit	3846	2751	927	1539	1081	1724	2345	3090	1562	3384	2645	5121	6145	5046	2908
1955 Federal Surplus/Deficit	4828	3846	3512	2126	1592	1851	365	-1102	-648	495	7.9	2296	7458	6105	2345
1956 Federal Surplus/Deficit	3618	4017	819	2000	1876	4009	5564	2253	3925	4145	6036	6831	7451	4502	4011
1957 Federal Surplus/Deficit	3976	3255	870	1663	879	1891	2048	-464	1193	4731	2937	6374	7163	2778	2654
1958 Federal Surplus/Deficit	2877	1534	517	1401	1008	503	1568	1795	1775	731	3548	5742	5626	2348	2219
1959 Federal Surplus/Deficit	2907	1808	613	1290	1495	2645	5044	3423	1803	2885	2077	4017	6104	4868	3012
1960 Federal Surplus/Deficit	3716	3076	3296	4069	2958	3514	3291	437	1619	5985	3888	3569	4466	3371	3244
1961 Federal Surplus/Deficit	4010	1681	679	1441	1216	993	2100	2475	2463	2927	2915	4275	7024	2922	2613
1962 Federal Surplus/Deficit	3081	2172	326	1359	991	248	1982	-513	-251	4329	4579	3723	3607	3593	1846
1963 Federal Surplus/Deficit	3531	2592	561	1859	1637	2619	2298	1035	884	581	837	4549	4230	3313	2230
1964 Federal Surplus/Deficit	4240	2807	1000	1184	1048	618	1849	246	-296	1670	1718	3324	7130	5624	2245
1965 Federal Surplus/Deficit	3751	3487	1598	2249	1172	4239	6082	4606	3471	2669	4481	5560	5027	2879	3673
1966 Federal Surplus/Deficit	3816	3264	955	1792	1220	1818	2956	-25	2.8	3356	1556	3640	3065	3682	2092
1967 Federal Surplus/Deficit	4048	2427	423	1256	988	960	3365	4013	943	2294	1064	2400	6681	4947	2574
1968 Federal Surplus/Deficit	3812	3157	1058	1607	1111	1654	2859	2098	1749	-736	939	2542	4836	4609	2309
1969 Federal Surplus/Deficit	3972	3298	1994	2371	2014	2499	4900	3551	2233	5137	4616	6627	4702	3552	3580
1970 Federal Surplus/Deficit	3917	2024	602	1379	1112	783	2484	2032	211	-274	1736	3579	5208	1705	1900
1971 Federal Surplus/Deficit	2731	1687	335	1381	1213	655	4124	5578	2980	3401	4096	6984	6907	4831	3412
1972 Federal Surplus/Deficit	3930	4171	1223	1462	1126	1798	3928	5189	5544	5631	2569	6686	7347	5246	3975
1973 Federal Surplus/Deficit	4477	3865	1676	1628	993	2031	3314	-1145	-360	-877	-841	770	2276	2042	1378
1974 Federal Surplus/Deficit	2621	983	236	1011	696	2840	6570	5533	4290	4937	5529	6107	7474	6486	4023
1975 Federal Surplus/Deficit	3996	4141	1621	1146	1016	889	2734	1596	2999	1742	1990	4459	5656	5520	2798
1976 Federal Surplus/Deficit	2827	2131	997	2034	2287	5100	4927	3432	2397	4878	3650	6194	3741	5063	3576
1977 Federal Surplus/Deficit	5386	5068	4136	1780	1022	518	953	-1514	-1037	-1008	-1360	614	906	876	1025
1978 Federal Surplus/Deficit	2658	797	208	838	807	705	2070	506	2856	1744	2476	3978	3407	3702	1909
-Ranked Averages-															
Top Ten Percent	3430	3240	986	1802	1469	3444	5434	4514	4088	4268	4599	6194	6129	4657	3874
Middle Eighty Percent	3448	2389	967	1620	1197	1471	2323	1172	1280	2048	2391	4270	4766	3484	2307
Bottom Ten Percent	3135	1835	462	1285	1063	377	-549	-1244	-401	-259	-837	46	1674	1693	528

Exhibit 10: OY 2007 Monthly 50-WY Energy

Federal Surplus/Deficit by Water Year
PNW Loads and Resources Study
2006 - 2007 Operating Year
2003 White Book

3/31/2004

Average Energy in Megawatts	*Aug1*	*Aug16*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr1*	*Apr16*	*May*	*Jun*	*Jul*	*Avg*
1929 Federal Surplus/Deficit	3401	1388	192	795	578	-2.1	88	-1961	-690	-727	-1054	-631	1424	1673	247
1930 Federal Surplus/Deficit	2045	1165	78	974	733	-25	-1987	-993	-640	-356	-635	-685	1320	1895	148
1931 Federal Surplus/Deficit	2508	1424	203	921	700	18	-1939	-1938	-862	171	-1272	-177	825	994	13
1932 Federal Surplus/Deficit	2376	960	226	829	586	-65	-1909	-2091	541	3064	4790	4764	4145	2815	1286
1933 Federal Surplus/Deficit	3676	2774	420	981	340	863	2566	1763	-683	514	1366	3112	6427	5174	2094
1934 Federal Surplus/Deficit	3209	3522	1011	2092	2072	5178	5715	4073	2584	5750	5050	4201	661	2440	3233
1935 Federal Surplus/Deficit	1785	462	31	729	303	411	2024	2418	-1190	319	2064	2396	3013	2796	1270
1936 Federal Surplus/Deficit	3207	1440	207	921	608	-18	-1243	-1924	-461	-470	1775	5908	2649	1766	949
1937 Federal Surplus/Deficit	2951	1197	114	967	657	-37	-1728	-1752	-693	-507	-781	-211	809	1252	67
1938 Federal Surplus/Deficit	2556	814	104	1130	527	56	2830	-259	1573	2424	2552	4955	3395	2381	1739
1939 Federal Surplus/Deficit	2309	1027	510	1042	607	-42	469	-1642	-119	364	1139	3632	1328	1876	840
1940 Federal Surplus/Deficit	3132	1318	121	1155	550	170	-168	-845	1798	1289	1876	2304	2071	1257	1018
1941 Federal Surplus/Deficit	2215	891	70	942	432	566	390	-1896	-595	-874	-896	397	1644	618	270
1942 Federal Surplus/Deficit	1989	1031	447	889	315	2148	2967	-1273	-1182	-156	590	2038	4591	3340	1334
1943 Federal Surplus/Deficit	3649	2723	410	943	440	389	2206	1459	2233	5407	4704	4892	4392	3458	2422
1944 Federal Surplus/Deficit	3439	2638	410	1048	640	-62	460	-1885	-1110	-673	-1224	-657	571	456	163
1945 Federal Surplus/Deficit	2079	526	186	759	606	-60	-1864	-1468	-823	-604	-947	2299	3647	1810	468
1946 Federal Surplus/Deficit	2254	1793	-2.1	1064	616	11	901	859	2319	2882	3795	5242	3780	3278	1953
1947 Federal Surplus/Deficit	3740	2422	634	930	590	2978	3198	2375	2588	1272	2672	4392	3463	2911	2426
1948 Federal Surplus/Deficit	3752	1841	465	3105	1573	1869	3079	-61	1181	1507	3612	6385	7137	3707	2816
1949 Federal Surplus/Deficit	3338	3819	1349	1221	509	626	1023	-220	3405	1569	4514	5280	3295	1150	2021
1950 Federal Surplus/Deficit	2045	563	-196	957	429	-271	1280	2788	4154	3955	3710	4149	6227	3828	2374
1951 Federal Surplus/Deficit	2957	3270	792	1948	2074	3946	4578	4558	2826	3811	4242	5287	2664	3743	3296
1952 Federal Surplus/Deficit	3437	3375	1089	2566	762	2284	2852	1294	1589	4038	4426	6289	3599	2149	2676
1953 Federal Surplus/Deficit	3455	1694	343	919	696	-31	261	2407	-205	-598	1025	3830	5998	3907	1743
1954 Federal Surplus/Deficit	3580	2477	666	1199	680	1325	1887	2648	1173	3234	2499	4621	5477	4621	2516
1955 Federal Surplus/Deficit	4567	3578	3263	1788	1192	1455	-103	-1563	-1047	341	-135	1780	6794	5685	1952
1956 Federal Surplus/Deficit	3353	3750	558	1661	1473	3619	5118	1810	3541	4001	5904	6336	6788	4075	3624
1957 Federal Surplus/Deficit	3710	2983	609	1323	478	1493	1588	-923	804	4584	2795	5881	6498	2342	2261
1958 Federal Surplus/Deficit	2606	1255	254	1059	607	102	1107	1344	1390	576	3404	5241	4959	1910	1824
1959 Federal Surplus/Deficit	2636	1533	351	949	1094	2249	4595	2985	1412	2737	1932	3514	5438	4438	2620
1960 Federal Surplus/Deficit	3452	2805	3046	3738	2559	3124	2842	-14	1230	5849	3749	3061	3790	2939	2853
1961 Federal Surplus/Deficit	3746	1405	419	1101	816	593	1640	2031	2078	2777	2766	3774	6359	2487	2220
1962 Federal Surplus/Deficit	2815	1901	63	1017	589	-152	1521	-967	-649	4180	4445	3216	2928	3162	1450
1963 Federal Surplus/Deficit	3266	2319	298	1520	1236	2224	1842	588	487	428	692	4041	3557	2882	1836
1964 Federal Surplus/Deficit	3975	2532	740	842	646	217	1388	-206	-694	1514	1568	2815	6465	5203	1851
1965 Federal Surplus/Deficit	3484	3215	1340	1913	773	3843	5638	4170	3086	2517	4343	5061	4353	2445	3283
1966 Federal Surplus/Deficit	3548	2988	696	1452	821	1418	2498	-474	-394	3213	1411	3134	2386	3252	1697
1967 Federal Surplus/Deficit	3787	2154	161	913	586	560	2909	3575	553	2145	913	1890	6016	4519	2182
1968 Federal Surplus/Deficit	3548	2887	798	1267	711	1255	2402	1654	1362	-895	792	2027	4166	4178	1915
1969 Federal Surplus/Deficit	3709	3027	1739	2035	1613	2105	4451	3114	1844	4994	4480	6132	4032	3119	3191
1970 Federal Surplus/Deficit	3650	1750	340	1038	711	382	2020	1587	-182	-431	1592	3070	4532	1268	1504
1971 Federal Surplus/Deficit	2460	1407	71	1038	810	256	3670	5144	2594	3251	3957	6490	6241	4405	3021
1972 Federal Surplus/Deficit	3665	3902	964	1121	726	1399	3472	4753	5169	5492	2427	6191	6682	4825	3587
1973 Federal Surplus/Deficit	4215	3597	1417	1287	592	1633	2857	-1606	-758	-1034	-990	252	1594	1604	981
1974 Federal Surplus/Deficit	2353	710	-28	665	294	2441	6128	5099	3911	4794	5396	5610	6810	6066	3635
1975 Federal Surplus/Deficit	3729	3872	1363	804	613	489	2276	1150	2611	1591	1842	3954	4983	5097	2405
1976 Federal Surplus/Deficit	2557	1853	738	1695	1886	4715	4480	2992	2013	4736	3510	5697	3062	4638	3187
1977 Federal Surplus/Deficit	5126	4801	3889	1441	619	119	486	-1977	-1437	-1170	-1513	98	219	434	626
1978 Federal Surplus/Deficit	2391	526	-55	492	404	302	1606	50	2471	1595	2331	3473	2725	3271	1513
-Ranked Averages-															
Top Ten Percent	3163	2970	726	1461	1068	3050	4987	4078	3707	4123	4462	5697	5459	4231	3485
Middle Eighty Percent	3182	2116	707	1279	796	1073	1863	722	889	1897	2246	3766	4092	3053	1913
Bottom Ten Percent	2869	1562	199	941	662	-22	-1021	-1706	-799	-419	-993	-472	990	1254	128

Exhibit 11: OY 2008 Monthly 50-WY Energy

Federal Surplus/Deficit by Water Year
PNW Loads and Resources Study
2007 - 2008 Operating Year
2003 White Book

3/31/2004

Average Energy in Megawatts	*Aug1*	*Aug16*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr1*	*Apr16*	*May*	*Jun*	*Jul*	*Avg*
1929 Federal Surplus/Deficit	2871	842	-269	373	149	-436	168	-1836	-618	-644	-978	-86	2147	1764	200
1930 Federal Surplus/Deficit	1502	620	-381	549	310	-456	-1915	-865	-566	-273	-564	-140	2052	1991	102
1931 Federal Surplus/Deficit	1971	882	-257	493	275	-410	-1866	-1811	-788	256	-1199	374	1565	1091	-31
1932 Federal Surplus/Deficit	1838	414	-232	404	161	-501	-1837	-1964	613	3164	4900	5335	4890	2918	1245
1933 Federal Surplus/Deficit	3145	2238	-38	560	-87	430	2666	1918	-603	617	1453	3679	7174	5294	2060
1934 Federal Surplus/Deficit	2680	2997	561	1680	1645	4763	5827	4238	2679	5863	5155	4786	1391	2537	3205
1935 Federal Surplus/Deficit	1245	-84	-422	303	-126	-24	2122	2576	-1105	409	2152	2952	3744	2901	1232
1936 Federal Surplus/Deficit	2679	898	-249	499	184	-446	-1163	-1797	-388	-382	1851	6480	3392	1864	908
1937 Federal Surplus/Deficit	2414	652	-347	544	234	-467	-1653	-1623	-617	-420	-706	328	1531	1345	20
1938 Federal Surplus/Deficit	2018	272	-355	706	104	-377	2926	-117	1654	2521	2640	5531	4126	2483	1701
1939 Federal Surplus/Deficit	1772	480	53	620	180	-477	561	-1511	-45	452	1216	4193	2058	1971	797
1940 Federal Surplus/Deficit	2600	773	-339	734	127	-262	-89	-718	1881	1372	1972	2856	2801	1350	975
1941 Federal Surplus/Deficit	1675	346	-389	520	7.0	135	465	-1770	-522	-780	-804	952	2371	707	224
1942 Federal Surplus/Deficit	1446	487	-15	462	-114	1711	3075	-1144	-1110	-73	667	2590	5329	3449	1292
1943 Federal Surplus/Deficit	3123	2186	-50	521	12	-50	2297	1588	2312	5508	4794	5469	5124	3557	2382
1944 Federal Surplus/Deficit	2908	2106	-54	626	211	-500	541	-1762	-1039	-592	-1144	-106	1294	542	116
1945 Federal Surplus/Deficit	1537	-22	-274	333	179	-494	-1795	-1345	-752	-521	-877	2849	4377	1912	421
1946 Federal Surplus/Deficit	1710	1250	-463	638	189	-425	978	993	2404	2982	3888	5823	4527	3383	1913
1947 Federal Surplus/Deficit	3214	1884	175	506	160	2532	3306	2514	2677	1373	2765	4960	4211	3016	2390
1948 Federal Surplus/Deficit	3220	1296	5.8	2696	1144	1441	3175	68	1268	1604	3706	6962	7889	3827	2782
1949 Federal Surplus/Deficit	2810	3295	892	801	80	188	1113	-94	3492	1661	4613	5845	4033	1242	1982
1950 Federal Surplus/Deficit	1503	13	-658	531	1	-704	1374	2928	4248	4050	3807	4723	6976	3937	2337
1951 Federal Surplus/Deficit	2424	2741	333	1530	1640	3519	4687	4715	2912	3910	4343	5867	3396	3854	3263
1952 Federal Surplus/Deficit	2908	2846	633	2153	336	1849	2949	1434	1667	4131	4515	6865	4333	2251	2639
1953 Federal Surplus/Deficit	2925	1148	-119	495	270	-463	330	2553	-123	-501	1109	4398	6737	4015	1703
1954 Federal Surplus/Deficit	3052	1942	208	779	255	889	1980	2798	1258	3334	2582	5200	6234	4737	2483
1955 Federal Surplus/Deficit	4046	3052	2824	1373	766	1028	-22	-1436	-972	430	-44	2336	7550	5808	1916
1956 Federal Surplus/Deficit	2824	3223	100	1245	1041	3188	5227	1955	3624	4109	6006	6913	7540	4189	3592
1957 Federal Surplus/Deficit	3182	2451	150	903	49	1056	1680	-798	883	4679	2889	6458	7251	2438	2223
1958 Federal Surplus/Deficit	2067	708	-206	635	180	-337	1197	1477	1481	667	3491	5806	5712	2003	1785
1959 Federal Surplus/Deficit	2096	989	-109	529	664	1815	4700	3144	1492	2842	2028	4090	6189	4547	2587
1960 Federal Surplus/Deficit	2924	2273	2603	3328	2130	2700	2952	125	1309	5967	3855	3630	4529	3043	2822
1961 Federal Surplus/Deficit	3219	859	-37	681	390	157	1736	2177	2168	2883	2858	4357	7119	2586	2187
1962 Federal Surplus/Deficit	2280	1360	-397	597	161	-588	1613	-832	-577	4274	4553	3785	3663	3269	1411
1963 Federal Surplus/Deficit	2738	1779	-162	1100	808	1792	1940	725	560	521	783	4596	4291	2987	1796
1964 Federal Surplus/Deficit	3448	1993	283	420	218	-219	1481	-66	-620	1596	1654	3376	7211	5324	1813
1965 Federal Surplus/Deficit	2957	2685	886	1498	349	3398	5744	4320	3171	2612	4436	5632	5082	2542	3247
1966 Federal Surplus/Deficit	3020	2454	237	1032	396	980	2594	-330	-321	3320	1502	3699	3123	3359	1660
1967 Federal Surplus/Deficit	3262	1609	-299	492	159	126	3008	3733	640	2254	1003	2450	6766	4632	2148
1968 Federal Surplus/Deficit	3021	2357	342	847	284	817	2495	1799	1448	-810	883	2577	4912	4284	1878
1969 Federal Surplus/Deficit	3184	2496	1288	1619	1184	1674	4553	3270	1922	5101	4582	6711	4784	3223	3159
1970 Federal Surplus/Deficit	3118	1208	-119	618	284	-55	2098	1727	-101	-336	1694	3628	5260	1362	1462
1971 Federal Surplus/Deficit	1922	860	-394	613	379	-184	3761	5298	2674	3344	4055	7065	6985	4514	2983
1972 Federal Surplus/Deficit	3139	3377	506	698	296	960	3563	4907	5265	5608	2527	6767	7429	4946	3555
1973 Federal Surplus/Deficit	3693	3072	961	867	163	1196	2949	-1479	-685	-943	-902	799	2328	1698	938
1974 Federal Surplus/Deficit	1815	163	-488	236	-138	1998	6235	5258	4002	4898	5498	6182	7558	6187	3601
1975 Federal Surplus/Deficit	3203	3348	908	380	184	50	2368	1294	2692	1690	1930	4521	5715	5209	2367
1976 Federal Surplus/Deficit	2024	1315	279	1275	1453	4286	4586	3145	2096	4839	3606	6270	3790	4753	3152
1977 Federal Surplus/Deficit	4611	4280	3453	1023	190	-317	569	-1852	-1364	-1086	-1429	656	949	522	585
1978 Federal Surplus/Deficit	1851	-19	-515	64	-26	-145	1686	176	2559	1702	2428	4043	3451	3374	1471
-Ranked Averages-															
Top Ten Percent	2632	2438	267	1042	638	2613	5091	4231	3795	4227	4562	6272	6201	4344	3452
Middle Eighty Percent	2650	1578	250	858	368	639	1955	861	970	1993	2338	4333	4832	3157	1875
Bottom Ten Percent	2333	1020	-261	517	236	-454	-945	-1579	-726	-335	-918	74	1718	1347	81

Exhibit 12: OY 2009 Monthly 50-WY Energy

Federal Surplus/Deficit by Water Year
PNW Loads and Resources Study
2008 - 2009 Operating Year
2003 White Book

3/31/2004

Average Energy in Megawatts	*Aug1*	*Aug16*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr1*	*Apr16*	*May*	*Jun*	*Jul*	*Avg*
1929 Federal Surplus/Deficit	2960	925	-185	460	223	-368	131	-1931	-653	-675	-997	-572	1497	1755	122
1930 Federal Surplus/Deficit	1588	703	-298	633	386	-387	-1957	-958	-600	-302	-583	-627	1402	1983	23
1931 Federal Surplus/Deficit	2059	967	-174	577	351	-340	-1907	-1906	-823	229	-1219	-111	917	1084	-110
1932 Federal Surplus/Deficit	1926	498	-149	489	236	-434	-1879	-2059	581	3139	4893	4858	4246	2911	1169
1933 Federal Surplus/Deficit	3234	2325	46	646	-11	499	2635	1834	-635	592	1440	3201	6531	5290	1986
1934 Federal Surplus/Deficit	2769	3087	648	1770	1721	4840	5798	4156	2653	5841	5148	4310	739	2529	3132
1935 Federal Surplus/Deficit	1333	0.6	-337	388	-51	44	2091	2494	-1136	382	2140	2470	3097	2895	1157
1936 Federal Surplus/Deficit	2768	984	-165	585	260	-377	-1201	-1892	-422	-411	1840	6003	2747	1856	832
1937 Federal Surplus/Deficit	2502	736	-263	629	310	-398	-1693	-1717	-652	-449	-724	-161	879	1336	-58
1938 Federal Surplus/Deficit	2106	358	-271	791	180	-308	2894	-205	1625	2496	2629	5055	3479	2477	1626
1939 Federal Surplus/Deficit	1859	563	138	706	254	-409	528	-1604	-78	425	1203	3713	1407	1963	720
1940 Federal Surplus/Deficit	2688	857	-256	821	204	-194	-127	-811	1853	1345	1964	2374	2151	1342	899
1941 Federal Surplus/Deficit	1762	431	-306	606	83	205	425	-1864	-556	-806	-817	468	1721	697	147
1942 Federal Surplus/Deficit	1533	572	69	548	-38	1779	3047	-1236	-1145	-100	654	2109	4685	3444	1216
1943 Federal Surplus/Deficit	3212	2273	35	607	86	18	2265	1500	2284	5485	4785	4993	4479	3550	2308
1944 Federal Surplus/Deficit	2996	2193	30	712	285	-432	504	-1857	-1075	-623	-1161	-591	642	531	38
1945 Federal Surplus/Deficit	1623	61	-191	417	254	-426	-1837	-1440	-787	-552	-897	2369	3731	1905	343
1946 Federal Surplus/Deficit	1796	1336	-380	722	264	-356	941	905	2376	2957	3879	5347	3884	3376	1839
1947 Federal Surplus/Deficit	3303	1971	260	592	235	2600	3278	2429	2650	1348	2756	4483	3567	3009	2316
1948 Federal Surplus/Deficit	3308	1381	90	2787	1219	1513	3145	-23	1240	1578	3696	6486	7245	3823	2709
1949 Federal Surplus/Deficit	2899	3384	978	889	155	256	1080	-187	3465	1636	4604	5367	3387	1234	1907
1950 Federal Surplus/Deficit	1589	96	-575	616	76	-635	1341	2841	4222	4026	3798	4247	6333	3932	2263
1951 Federal Surplus/Deficit	2512	2829	417	1619	1715	3594	4659	4634	2885	3885	4335	5391	2750	3849	3191
1952 Federal Surplus/Deficit	2997	2934	719	2243	412	1919	2919	1349	1636	4106	4505	6389	3688	2245	2566
1953 Federal Surplus/Deficit	3014	1233	-35	580	345	-394	290	2470	-152	-527	1096	3920	6094	4009	1628
1954 Federal Surplus/Deficit	3141	2029	293	867	331	958	1949	2714	1230	3309	2571	4724	5591	4733	2410
1955 Federal Surplus/Deficit	4137	3141	2914	1462	842	1098	-59	-1531	-1007	404	-53	1853	6907	5804	1842
1956 Federal Surplus/Deficit	2913	3312	185	1333	1116	3262	5198	1871	3596	4086	5999	6437	6897	4184	3519
1957 Federal Surplus/Deficit	3272	2539	235	991	124	1125	1647	-891	854	4654	2880	5982	6608	2430	2148
1958 Federal Surplus/Deficit	2155	792	-123	721	255	-270	1164	1388	1454	641	3481	5328	5070	1994	1710
1959 Federal Surplus/Deficit	2183	1074	-25	616	739	1885	4671	3062	1462	2818	2018	3614	5547	4542	2513
1960 Federal Surplus/Deficit	3013	2361	2693	3419	2206	2773	2923	36	1279	5946	3847	3152	3885	3036	2749
1961 Federal Surplus/Deficit	3309	942	48	768	466	225	1703	2093	2141	2859	2847	3881	6477	2579	2113
1962 Federal Surplus/Deficit	2368	1445	-314	683	235	-521	1581	-921	-612	4248	4546	3307	3017	3263	1335
1963 Federal Surplus/Deficit	2828	1866	-78	1188	884	1863	1910	639	526	495	771	4117	3646	2981	1721
1964 Federal Surplus/Deficit	3537	2080	368	506	292	-151	1448	-155	-655	1568	1642	2897	6568	5320	1738
1965 Federal Surplus/Deficit	3046	2773	972	1588	425	3468	5715	4238	3143	2586	4428	5156	4437	2534	3174
1966 Federal Surplus/Deficit	3110	2541	322	1120	472	1048	2563	-417	-355	3296	1492	3221	2476	3353	1585
1967 Federal Surplus/Deficit	3352	1694	-216	578	234	194	2978	3651	611	2230	991	1972	6123	4627	2074
1968 Federal Surplus/Deficit	3111	2445	427	934	360	885	2465	1715	1421	-839	871	2094	4269	4278	1803
1969 Federal Surplus/Deficit	3274	2584	1376	1708	1259	1745	4524	3188	1893	5078	4574	6234	4141	3217	3087
1970 Federal Surplus/Deficit	3206	1293	-35	706	359	12	2063	1642	-133	-363	1684	3148	4614	1354	1387
1971 Federal Surplus/Deficit	2010	943	-311	698	453	-116	3730	5216	2646	3319	4047	6589	6341	4508	2910
1972 Federal Surplus/Deficit	3229	3466	591	785	371	1028	3533	4825	5239	5587	2518	6291	6787	4942	3483
1973 Federal Surplus/Deficit	3783	3161	1047	954	237	1265	2918	-1573	-719	-971	-916	313	1679	1689	862
1974 Federal Surplus/Deficit	1903	246	-406	320	-63	2067	6206	5177	3975	4875	5491	5706	6915	6183	3528
1975 Federal Surplus/Deficit	3293	3437	994	466	258	117	2336	1209	2663	1665	1919	4044	5071	5205	2293
1976 Federal Surplus/Deficit	2112	1401	365	1363	1528	4362	4557	3062	2069	4816	3597	5794	3144	4748	3080
1977 Federal Surplus/Deficit	4702	4370	3544	1110	264	-249	532	-1947	-1400	-1117	-1445	171	297	511	507
1978 Federal Surplus/Deficit	1938	65	-431	148	49	-79	1651	85	2532	1678	2418	3566	2805	3368	1395
-Ranked Averages-															
Top Ten Percent	2721	2525	352	1129	713	2684	5062	4149	3768	4204	4554	5796	5557	4338	3379
Middle Eighty Percent	2739	1664	335	945	443	708	1922	773	939	1967	2327	3854	4187	3151	1801
Bottom Ten Percent	2421	1105	-178	602	311	-385	-984	-1674	-760	-364	-937	-412	1067	1338	3.1

Exhibit 13: OY 2010 Monthly 50-WY Energy

Federal Surplus/Deficit by Water Year
PNW Loads and Resources Study
2009 - 2010 Operating Year
2003 White Book

3/31/2004

Average Energy in Megawatts	*Aug1*	*Aug16*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr1*	*Apr16*	*May*	*Jun*	*Jul*	*Avg*
1929 Federal Surplus/Deficit	2866	826	-286	360	117	-480	11	-2048	-764	-774	-1097	-196	2047	1664	111
1930 Federal Surplus/Deficit	1491	604	-398	531	281	-498	-2082	-1072	-710	-399	-684	-252	1952	1893	13
1931 Federal Surplus/Deficit	1963	869	-275	475	246	-451	-2032	-2023	-934	133	-1321	265	1468	994	-120
1932 Federal Surplus/Deficit	1831	399	-249	387	131	-548	-2005	-2176	473	3045	4804	5243	4802	2822	1160
1933 Federal Surplus/Deficit	3140	2228	-53	547	-116	387	2522	1729	-743	499	1345	3584	7088	5204	1980
1934 Federal Surplus/Deficit	2675	2993	551	1673	1616	4738	5686	4053	2550	5751	5060	4696	1287	2439	3127
1935 Federal Surplus/Deficit	1237	-98	-436	286	-156	-69	1976	2389	-1243	287	2047	2851	3649	2807	1149
1936 Federal Surplus/Deficit	2674	887	-265	484	156	-487	-1323	-2008	-532	-508	1746	6388	3302	1766	823
1937 Federal Surplus/Deficit	2406	637	-364	528	205	-509	-1817	-1833	-762	-547	-824	213	1427	1246	-69
1938 Federal Surplus/Deficit	2011	260	-372	690	76	-419	2779	-315	1520	2402	2537	5441	4033	2388	1619
1939 Federal Surplus/Deficit	1764	464	38	607	148	-521	412	-1719	-187	330	1107	4096	1956	1873	711
1940 Federal Surplus/Deficit	2594	759	-356	721	100	-305	-249	-926	1749	1249	1874	2755	2701	1251	890
1941 Federal Surplus/Deficit	1666	332	-406	507	-21	95	302	-1980	-667	-901	-911	847	2272	606	137
1942 Federal Surplus/Deficit	1437	473	-32	447	-142	1667	2935	-1350	-1256	-196	559	2489	5240	3356	1207
1943 Federal Surplus/Deficit	3119	2176	-66	507	-20	-94	2151	1389	2179	5393	4695	5379	5034	3462	2301
1944 Federal Surplus/Deficit	2902	2097	-71	612	179	-544	383	-1975	-1187	-722	-1260	-213	1191	438	27
1945 Federal Surplus/Deficit	1526	-38	-291	315	148	-538	-1963	-1557	-899	-650	-999	2751	4285	1816	332
1946 Federal Surplus/Deficit	1699	1238	-481	621	159	-467	821	794	2273	2863	3788	5733	4439	3288	1831
1947 Federal Surplus/Deficit	3209	1874	161	492	130	2488	3165	2321	2546	1254	2664	4868	4123	2921	2310
1948 Federal Surplus/Deficit	3213	1283	-9.8	2691	1114	1404	3031	-136	1137	1483	3605	6872	7801	3737	2703
1949 Federal Surplus/Deficit	2805	3289	879	790	50	143	963	-302	3361	1541	4514	5751	3941	1143	1900
1950 Federal Surplus/Deficit	1492	-4.1	-676	515	-29	-746	1226	2733	4120	3933	3708	4632	6890	3845	2256
1951 Federal Surplus/Deficit	2417	2734	318	1522	1609	3488	4547	4530	2781	3792	4245	5777	3304	3762	3186
1952 Federal Surplus/Deficit	2903	2839	621	2147	308	1809	2805	1242	1530	4013	4414	6775	4243	2157	2560
1953 Federal Surplus/Deficit	2920	1134	-136	479	240	-505	167	2364	-258	-622	1001	4304	6650	3922	1620
1954 Federal Surplus/Deficit	3047	1933	194	768	226	846	1834	2609	1125	3216	2478	5110	6148	4647	2404
1955 Federal Surplus/Deficit	4045	3047	2820	1365	738	989	-180	-1647	-1119	309	-145	2233	7464	5718	1834
1956 Federal Surplus/Deficit	2819	3217	85	1236	1010	3155	5086	1765	3492	3995	5911	6823	7454	4097	3514
1957 Federal Surplus/Deficit	3178	2443	136	892	18	1015	1531	-1006	749	4560	2788	6368	7165	2341	2141
1958 Federal Surplus/Deficit	2059	692	-223	621	149	-383	1047	1278	1351	546	3389	5712	5627	1904	1702
1959 Federal Surplus/Deficit	2087	976	-126	516	634	1775	4559	2959	1355	2725	1927	4000	6104	4454	2507
1960 Federal Surplus/Deficit	2920	2265	2599	3323	2102	2666	2811	-74	1173	5856	3758	3536	4439	2948	2744
1961 Federal Surplus/Deficit	3215	843	-51	669	361	112	1588	1987	2037	2766	2753	4267	7034	2490	2107
1962 Federal Surplus/Deficit	2273	1348	-415	584	129	-634	1464	-1033	-723	4154	4457	3691	3571	3175	1327
1963 Federal Surplus/Deficit	2734	1769	-178	1090	779	1753	1797	531	415	400	678	4499	4201	2892	1714
1964 Federal Surplus/Deficit	3443	1983	269	406	186	-264	1332	-266	-765	1472	1548	3281	7125	5234	1730
1965 Federal Surplus/Deficit	2953	2678	874	1491	320	3357	5603	4134	3039	2492	4337	5542	4991	2445	3169
1966 Federal Surplus/Deficit	3016	2446	223	1021	368	936	2449	-527	-465	3204	1399	3605	3029	3265	1578
1967 Federal Surplus/Deficit	3259	1595	-316	478	128	82	2864	3547	506	2138	896	2355	6680	4540	2067
1968 Federal Surplus/Deficit	3017	2350	328	835	256	774	2350	1609	1317	-936	777	2473	4826	4190	1797
1969 Federal Surplus/Deficit	3181	2489	1280	1611	1154	1636	4412	3084	1788	4987	4485	6620	4697	3128	3082
1970 Federal Surplus/Deficit	3111	1194	-136	607	254	-101	1944	1535	-240	-459	1593	3531	5168	1264	1379
1971 Federal Surplus/Deficit	1914	843	-412	597	347	-228	3616	5113	2541	3225	3957	6975	6898	4421	2903
1972 Federal Surplus/Deficit	3136	3372	492	685	266	916	3418	4721	5138	5497	2428	6677	7344	4856	3477
1973 Federal Surplus/Deficit	3691	3067	948	855	132	1154	2804	-1689	-830	-1068	-1012	690	2229	1599	853
1974 Federal Surplus/Deficit	1808	146	-507	217	-170	1955	6094	5073	3873	4783	5402	6092	7472	6097	3522
1975 Federal Surplus/Deficit	3199	3343	896	365	151	4.7	2221	1101	2558	1571	1826	4428	5625	5119	2287
1976 Federal Surplus/Deficit	2017	1305	266	1265	1423	4258	4445	2958	1965	4724	3507	6180	3697	4662	3074
1977 Federal Surplus/Deficit	4610	4276	3451	1012	158	-361	412	-2064	-1513	-1216	-1543	548	845	418	497
1978 Federal Surplus/Deficit	1842	-34	-532	46	-57	-193	1532	-28	2429	1586	2327	3951	3357	3280	1387
-Ranked Averages-															
Top Ten Percent	2626	2429	252	1030	607	2574	4950	4044	3665	4112	4465	6182	6113	4252	3374
Middle Eighty Percent	2644	1567	236	846	338	597	1806	663	833	1873	2235	4238	4742	3062	1793
Bottom Ten Percent	2326	1007	-279	501	206	-496	-1108	-1790	-871	-462	-1037	-37	1617	1247	-7.8

Exhibit 14: OY 2011 Monthly 50-WY Energy

Federal Surplus/Deficit by Water Year
PNW Loads and Resources Study
2010 - 2011 Operating Year
2003 White Book

3/31/2004

Average Energy in Megawatts	*Aug1*	*Aug16*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr1*	*Apr16*	*May*	*Jun*	*Jul*	*Avg*
1929 Federal Surplus/Deficit	2857	812	-300	342	93	-510	-17	-2078	-788	-804	-1124	-690	1386	1643	-4.1
1930 Federal Surplus/Deficit	1479	590	-413	511	259	-528	-2113	-1099	-734	-428	-712	-747	1291	1874	-103
1931 Federal Surplus/Deficit	1953	856	-290	454	223	-481	-2063	-2052	-958	106	-1349	-228	807	975	-236
1932 Federal Surplus/Deficit	1820	385	-264	367	108	-580	-2036	-2205	451	3020	4788	4757	4146	2803	1046
1933 Federal Surplus/Deficit	3130	2217	-67	528	-138	357	2500	1710	-765	474	1324	3097	6433	5187	1868
1934 Federal Surplus/Deficit	2666	2983	540	1658	1594	4715	5666	4035	2533	5728	5043	4211	624	2420	3017
1935 Federal Surplus/Deficit	1226	-112	-449	266	-179	-101	1953	2371	-1264	261	2027	2361	2991	2789	1037
1936 Federal Surplus/Deficit	2665	875	-278	466	133	-517	-1351	-2037	-555	-536	1726	5902	2646	1747	710
1937 Federal Surplus/Deficit	2396	624	-378	509	183	-539	-1848	-1862	-785	-576	-850	-283	764	1226	-185
1938 Federal Surplus/Deficit	2000	248	-386	671	54	-449	2756	-338	1501	2377	2518	4956	3376	2370	1507
1939 Federal Surplus/Deficit	1753	451	25	588	125	-552	388	-1745	-209	303	1085	3609	1294	1853	598
1940 Federal Surplus/Deficit	2584	745	-370	702	78	-336	-277	-953	1731	1223	1856	2266	2040	1232	776
1941 Federal Surplus/Deficit	1656	319	-420	488	-43	65	272	-2008	-690	-927	-932	356	1611	585	23
1942 Federal Surplus/Deficit	1425	460	-46	428	-165	1637	2914	-1376	-1280	-223	537	2000	4583	3339	1094
1943 Federal Surplus/Deficit	3109	2165	-79	489	-43	-125	2129	1366	2161	5369	4677	4894	4377	3443	2189
1944 Federal Surplus/Deficit	2892	2086	-86	594	155	-575	355	-2004	-1212	-752	-1285	-706	529	417	-88
1945 Federal Surplus/Deficit	1515	-52	-306	295	125	-569	-1995	-1586	-924	-680	-1026	2262	3628	1797	217
1946 Federal Surplus/Deficit	1688	1227	-495	601	136	-497	794	770	2255	2838	3770	5247	3783	3269	1719
1947 Federal Surplus/Deficit	3200	1863	148	474	107	2457	3145	2301	2529	1229	2646	4381	3468	2903	2199
1948 Federal Surplus/Deficit	3204	1270	-23	2676	1091	1376	3010	-161	1119	1457	3587	6387	7146	3720	2592
1949 Federal Surplus/Deficit	2795	3280	867	773	27	112	939	-328	3344	1516	4497	5265	3284	1123	1787
1950 Federal Surplus/Deficit	1481	-19	-691	496	-52	-776	1203	2712	4104	3907	3690	4146	6235	3827	2144
1951 Federal Surplus/Deficit	2407	2724	305	1506	1586	3462	4526	4513	2764	3767	4228	5291	2646	3744	3076
1952 Federal Surplus/Deficit	2894	2828	609	2131	285	1780	2784	1222	1510	3988	4396	6290	3586	2138	2449
1953 Federal Surplus/Deficit	2910	1121	-150	460	217	-535	137	2345	-278	-648	980	3817	5994	3904	1508
1954 Federal Surplus/Deficit	3038	1922	181	751	203	816	1812	2590	1107	3190	2459	4624	5493	4630	2293
1955 Federal Surplus/Deficit	4036	3037	2812	1349	716	960	-208	-1676	-1143	283	-163	1743	6809	5702	1722
1956 Federal Surplus/Deficit	2809	3207	72	1220	987	3128	5066	1746	3474	3971	5894	6337	6799	4079	3404
1957 Federal Surplus/Deficit	3168	2433	123	875	-5.3	985	1507	-1032	730	4535	2770	5883	6510	2321	2029
1958 Federal Surplus/Deficit	2048	678	-238	603	126	-415	1023	1255	1334	519	3370	5226	4972	1884	1590
1959 Federal Surplus/Deficit	2076	963	-140	499	611	1746	4539	2941	1336	2701	1908	3514	5449	4436	2396
1960 Federal Surplus/Deficit	2910	2255	2590	3308	2080	2640	2791	-97	1153	5833	3740	3049	3783	2930	2633
1961 Federal Surplus/Deficit	3206	829	-64	652	338	80	1564	1968	2020	2741	2732	3781	6379	2471	1995
1962 Federal Surplus/Deficit	2263	1335	-429	566	105	-666	1440	-1057	-747	4128	4441	3205	2914	3156	1214
1963 Federal Surplus/Deficit	2725	1758	-193	1073	756	1725	1775	511	392	374	657	4011	3544	2874	1602
1964 Federal Surplus/Deficit	3434	1972	256	387	162	-296	1308	-290	-789	1445	1527	2793	6470	5218	1617
1965 Federal Surplus/Deficit	2944	2667	862	1476	298	3328	5582	4116	3021	2466	4320	5057	4334	2426	3058
1966 Federal Surplus/Deficit	3007	2435	211	1004	346	905	2427	-549	-489	3180	1379	3118	2371	3247	1466
1967 Federal Surplus/Deficit	3250	1582	-330	459	105	51	2843	3529	486	2113	875	1868	6025	4523	1956
1968 Federal Surplus/Deficit	3008	2340	315	818	233	743	2328	1590	1299	-965	756	1982	4171	4172	1685
1969 Federal Surplus/Deficit	3172	2479	1270	1596	1132	1607	4392	3066	1769	4963	4468	6135	4042	3110	2972
1970 Federal Surplus/Deficit	3101	1181	-150	589	230	-132	1918	1516	-261	-485	1574	3043	4511	1245	1266
1971 Federal Surplus/Deficit	1904	829	-427	578	323	-259	3594	5095	2523	3199	3939	6489	6243	4404	2792
1972 Federal Surplus/Deficit	3127	3362	479	667	243	885	3396	4703	5122	5474	2410	6191	6688	4840	3367
1973 Federal Surplus/Deficit	3682	3058	935	838	108	1124	2782	-1717	-854	-1096	-1035	197	1569	1579	739
1974 Federal Surplus/Deficit	1797	132	-522	197	-193	1924	6074	5056	3856	4759	5386	5607	6816	6080	3411
1975 Federal Surplus/Deficit	3190	3334	883	347	127	-27	2199	1081	2539	1546	1806	3942	4969	5102	2175
1976 Federal Surplus/Deficit	2007	1293	253	1249	1399	4234	4424	2940	1947	4700	3489	5695	3039	4645	2964
1977 Federal Surplus/Deficit	4602	4267	3443	995	134	-392	385	-2093	-1538	-1246	-1568	55	182	395	383
1978 Federal Surplus/Deficit	1831	-48	-547	26	-81	-225	1506	-53	2411	1561	2309	3465	2700	3262	1274
-Ranked Averages-															
Top Ten Percent	2617	2418	239	1013	584	2545	4929	4027	3647	4088	4447	5696	5457	4234	3263
Middle Eighty Percent	2635	1555	223	828	315	567	1782	640	812	1847	2216	3751	4085	3044	1681
Bottom Ten Percent	2315	994	-293	482	183	-527	-1137	-1819	-895	-491	-1064	-531	955	1227	-123

Exhibit 15: OY 2012 Monthly 50-WY Energy

Federal Surplus/Deficit by Water Year
PNW Loads and Resources Study
2011 - 2012 Operating Year
2003 White Book

3/31/2004

Average Energy in Megawatts	*Aug1*	*Aug16*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr1*	*Apr16*	*May*	*Jun*	*Jul*	*Avg*
1929 Federal Surplus/Deficit	2841	793	-313	277	-4.8	-631	-32	-1996	-812	-819	-1142	-253	1970	1607	54
1930 Federal Surplus/Deficit	1462	572	-427	445	162	-648	-2131	-1015	-757	-443	-730	-311	1874	1838	-45
1931 Federal Surplus/Deficit	1937	838	-304	389	126	-601	-2080	-1971	-982	93	-1368	209	1390	939	-178
1932 Federal Surplus/Deficit	1804	366	-278	302	11	-702	-2054	-2124	430	3007	4776	5199	4732	2768	1105
1933 Federal Surplus/Deficit	3114	2201	-79	464	-235	236	2490	1799	-787	461	1311	3539	7019	5152	1928
1934 Federal Surplus/Deficit	2650	2966	529	1596	1498	4600	5655	4124	2514	5715	5032	4653	1205	2384	3078
1935 Federal Surplus/Deficit	1210	-130	-461	201	-276	-222	1942	2461	-1285	248	2014	2801	3576	2753	1097
1936 Federal Surplus/Deficit	2649	858	-291	401	37	-638	-1366	-1955	-578	-550	1715	6343	3232	1712	769
1937 Federal Surplus/Deficit	2380	606	-392	443	86	-659	-1865	-1779	-808	-591	-867	152	1346	1190	-127
1938 Federal Surplus/Deficit	1984	231	-399	606	-42	-569	2745	-252	1481	2364	2507	5398	3962	2334	1567
1939 Federal Surplus/Deficit	1737	433	12	524	28	-673	376	-1662	-231	290	1071	4050	1876	1818	657
1940 Federal Surplus/Deficit	2568	727	-384	638	-19	-457	-292	-870	1712	1210	1845	2706	2622	1196	836
1941 Federal Surplus/Deficit	1640	301	-434	424	-139	-54	256	-1926	-714	-940	-946	794	2195	549	82
1942 Federal Surplus/Deficit	1409	442	-59	363	-261	1517	2904	-1292	-1304	-236	525	2440	5170	3303	1154
1943 Federal Surplus/Deficit	3093	2148	-92	424	-140	-246	2118	1454	2142	5356	4665	5336	4964	3407	2250
1944 Federal Surplus/Deficit	2876	2070	-99	529	57	-696	341	-1922	-1236	-767	-1301	-268	1111	380	-30
1945 Federal Surplus/Deficit	1499	-71	-320	230	27	-690	-2012	-1504	-948	-695	-1044	2704	4214	1761	276
1946 Federal Surplus/Deficit	1671	1210	-509	536	39	-617	780	857	2236	2825	3758	5689	4370	3234	1779
1947 Federal Surplus/Deficit	3184	1846	136	410	9.6	2338	3135	2390	2510	1216	2635	4823	4054	2867	2259
1948 Federal Surplus/Deficit	3187	1253	-36	2614	995	1258	2999	-76	1100	1444	3576	6828	7731	3685	2652
1949 Federal Surplus/Deficit	2779	3263	856	709	-70	-9.5	927	-244	3325	1503	4486	5707	3870	1088	1848
1950 Federal Surplus/Deficit	1464	-37	-704	431	-149	-895	1191	2799	4084	3895	3679	4588	6821	3792	2205
1951 Federal Surplus/Deficit	2391	2708	292	1443	1490	3347	4516	4602	2745	3754	4217	5733	3233	3709	3137
1952 Federal Surplus/Deficit	2878	2812	597	2069	189	1662	2773	1310	1489	3975	4385	6732	4172	2102	2510
1953 Federal Surplus/Deficit	2894	1104	-164	395	120	-656	122	2434	-298	-661	968	4259	6580	3868	1568
1954 Federal Surplus/Deficit	3022	1906	168	687	107	695	1801	2680	1087	3177	2448	5066	6079	4595	2354
1955 Federal Surplus/Deficit	4020	3021	2802	1286	620	840	-223	-1594	-1167	270	-174	2183	7396	5666	1781
1956 Federal Surplus/Deficit	2793	3191	59	1157	890	3012	5055	1835	3455	3958	5883	6779	7385	4044	3465
1957 Federal Surplus/Deficit	3152	2416	110	812	-102	865	1495	-949	711	4522	2759	6324	7096	2286	2089
1958 Federal Surplus/Deficit	2032	659	-251	539	29	-536	1011	1342	1314	506	3358	5667	5558	1848	1650
1959 Federal Surplus/Deficit	2060	946	-153	435	515	1628	4528	3030	1315	2688	1897	3956	6035	4400	2457
1960 Federal Surplus/Deficit	2894	2238	2580	3246	1983	2522	2781	-11	1133	5820	3729	3491	4369	2894	2694
1961 Federal Surplus/Deficit	3190	811	-77	588	241	-41	1552	2057	2001	2728	2720	4223	6965	2435	2056
1962 Federal Surplus/Deficit	2247	1318	-443	501	7.5	-788	1428	-972	-771	4115	4430	3647	3500	3121	1274
1963 Federal Surplus/Deficit	2709	1741	-206	1010	660	1606	1765	600	368	361	644	4453	4131	2838	1663
1964 Federal Surplus/Deficit	3418	1955	244	323	65	-417	1296	-205	-812	1432	1515	3235	7057	5182	1677
1965 Federal Surplus/Deficit	2927	2651	851	1414	202	3209	5572	4205	3002	2454	4308	5498	4921	2391	3119
1966 Federal Surplus/Deficit	2991	2418	199	941	250	784	2416	-463	-512	3167	1367	3560	2956	3211	1526
1967 Federal Surplus/Deficit	3234	1564	-344	395	7.5	-69	2833	3618	466	2100	861	2310	6611	4488	2016
1968 Federal Surplus/Deficit	2992	2323	302	754	137	623	2318	1679	1280	-979	742	2421	4757	4136	1746
1969 Federal Surplus/Deficit	3156	2462	1260	1533	1035	1488	4381	3155	1750	4950	4456	6577	4628	3074	3033
1970 Federal Surplus/Deficit	3085	1163	-163	525	133	-254	1906	1605	-282	-498	1562	3485	5097	1209	1326
1971 Federal Surplus/Deficit	1888	811	-441	513	225	-379	3584	5184	2504	3186	3928	6931	6829	4368	2852
1972 Federal Surplus/Deficit	3111	3345	467	603	146	764	3386	4792	5103	5461	2399	6633	7275	4804	3428
1973 Federal Surplus/Deficit	3666	3041	923	774	11	1004	2771	-1634	-877	-1111	-1050	634	2152	1543	798
1974 Federal Surplus/Deficit	1781	113	-536	131	-290	1804	6063	5145	3837	4747	5375	6048	7402	6045	3471
1975 Federal Surplus/Deficit	3174	3317	871	282	30	-148	2188	1169	2520	1533	1795	4384	5555	5067	2236
1976 Federal Surplus/Deficit	1991	1277	241	1186	1303	4119	4414	3029	1928	4687	3477	6137	3626	4609	3026
1977 Federal Surplus/Deficit	4585	4251	3433	931	36	-512	370	-2011	-1563	-1262	-1584	492	763	358	441
1978 Federal Surplus/Deficit	1815	-67	-560	-40	-178	-346	1493	32	2392	1548	2298	3906	3286	3226	1334
-Ranked Averages-															
Top Ten Percent	2601	2401	227	949	487	2427	4918	4116	3628	4075	4436	6138	6043	4198	3324
Middle Eighty Percent	2618	1537	210	764	218	447	1770	727	792	1834	2203	4192	4670	3008	1741
Bottom Ten Percent	2299	976	-307	417	85	-647	-1153	-1737	-919	-505	-1081	-94	1538	1191	-65

Exhibit 16: OY 2013 Monthly 50-WY Energy

Federal Surplus/Deficit by Water Year
PNW Loads and Resources Study
2012 - 2013 Operating Year
2003 White Book

3/31/2004

Average Energy in Megawatts	*Aug1*	*Aug16*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr1*	*Apr16*	*May*	*Jun*	*Jul*	*Avg*
1929 Federal Surplus/Deficit	2813	762	-337	273	-14	-642	-57	-2183	-835	-839	-1165	-743	1313	1591	-71
1930 Federal Surplus/Deficit	1433	541	-451	440	154	-659	-2161	-1200	-780	-461	-753	-801	1215	1822	-170
1931 Federal Surplus/Deficit	1909	808	-328	383	118	-611	-2109	-2158	-1005	76	-1392	-281	731	923	-303
1932 Federal Surplus/Deficit	1776	335	-302	296	2.5	-715	-2083	-2311	410	2992	4761	4716	4079	2752	981
1933 Federal Surplus/Deficit	3086	2172	-102	460	-242	226	2469	1620	-807	445	1293	3055	6367	5137	1807
1934 Federal Surplus/Deficit	2623	2939	508	1594	1490	4598	5636	3947	2498	5701	5017	4170	544	2368	2958
1935 Federal Surplus/Deficit	1182	-160	-484	195	-284	-233	1921	2283	-1305	232	1997	2315	2921	2738	974
1936 Federal Surplus/Deficit	2622	829	-314	396	29	-648	-1393	-2142	-600	-568	1699	5861	2578	1696	646
1937 Federal Surplus/Deficit	2352	575	-416	438	78	-670	-1894	-1966	-831	-609	-889	-339	687	1174	-252
1938 Federal Surplus/Deficit	1956	201	-423	601	-50	-578	2723	-434	1463	2348	2491	4915	3308	2318	1445
1939 Federal Surplus/Deficit	1709	403	-10	521	19	-683	353	-1848	-252	274	1053	3565	1216	1801	534
1940 Federal Surplus/Deficit	2541	697	-407	634	-26	-467	-319	-1055	1695	1194	1829	2221	1964	1180	712
1941 Federal Surplus/Deficit	1612	271	-457	420	-146	-64	229	-2112	-736	-956	-965	307	1538	532	-42
1942 Federal Surplus/Deficit	1381	412	-83	359	-268	1507	2884	-1476	-1327	-253	507	1955	4516	3287	1031
1943 Federal Surplus/Deficit	3066	2120	-115	420	-149	-256	2098	1273	2125	5341	4651	4853	4310	3392	2128
1944 Federal Surplus/Deficit	2849	2042	-123	526	48	-706	315	-2110	-1260	-787	-1323	-757	452	362	-155
1945 Federal Surplus/Deficit	1470	-102	-344	224	19	-701	-2042	-1690	-971	-714	-1068	2220	3560	1745	151
1946 Federal Surplus/Deficit	1643	1181	-532	530	31	-627	756	675	2219	2809	3743	5207	3716	3218	1657
1947 Federal Surplus/Deficit	3157	1818	113	407	1.5	2329	3115	2212	2493	1200	2619	4340	3401	2851	2138
1948 Federal Surplus/Deficit	3160	1223	-59	2613	987	1251	2979	-259	1083	1428	3560	6347	7079	3670	2531
1949 Federal Surplus/Deficit	2752	3235	834	707	-79	-20	904	-429	3309	1487	4470	5224	3216	1071	1726
1950 Federal Surplus/Deficit	1436	-68	-728	426	-157	-905	1169	2620	4068	3880	3664	4105	6169	3776	2083
1951 Federal Surplus/Deficit	2363	2680	270	1441	1483	3342	4496	4425	2728	3739	4202	5251	2578	3693	3017
1952 Federal Surplus/Deficit	2851	2784	575	2068	181	1654	2753	1132	1470	3960	4370	6250	3518	2087	2389
1953 Federal Surplus/Deficit	2867	1074	-187	390	111	-666	95	2257	-317	-677	950	3775	5927	3853	1446
1954 Federal Surplus/Deficit	2995	1878	145	684	99	685	1781	2502	1069	3162	2432	4584	5427	4580	2232
1955 Federal Surplus/Deficit	3993	2993	2783	1285	612	831	-249	-1780	-1191	254	-190	1697	6743	5651	1659
1956 Federal Surplus/Deficit	2766	3163	36	1155	882	3007	5036	1657	3439	3943	5868	6297	6733	4029	3345
1957 Federal Surplus/Deficit	3125	2388	88	809	-110	856	1472	-1134	693	4507	2743	5843	6444	2269	1968
1958 Federal Surplus/Deficit	2004	629	-274	535	20	-547	989	1161	1297	490	3343	5185	4905	1832	1528
1959 Federal Surplus/Deficit	2032	916	-176	432	507	1620	4509	2853	1297	2672	1881	3473	5382	4385	2336
1960 Federal Surplus/Deficit	2867	2210	2561	3245	1976	2517	2761	-193	1114	5806	3714	3008	3716	2878	2573
1961 Federal Surplus/Deficit	3163	781	-99	585	233	-52	1530	1879	1984	2712	2702	3740	6312	2419	1934
1962 Federal Surplus/Deficit	2219	1288	-467	498	-1.4	-799	1405	-1154	-794	4100	4415	3163	2846	3105	1151
1963 Federal Surplus/Deficit	2681	1713	-230	1008	652	1599	1745	421	346	345	627	3970	3477	2823	1541
1964 Federal Surplus/Deficit	3391	1927	221	319	56	-428	1273	-387	-835	1416	1498	2751	6404	5167	1555
1965 Federal Surplus/Deficit	2900	2623	829	1412	194	3202	5553	4028	2986	2438	4294	5016	4267	2375	2999
1966 Federal Surplus/Deficit	2964	2390	177	938	242	774	2395	-644	-534	3152	1350	3077	2301	3196	1404
1967 Federal Surplus/Deficit	3207	1533	-368	390	-1	-80	2812	3441	447	2085	843	1826	5959	4472	1894
1968 Federal Surplus/Deficit	2965	2295	280	752	130	613	2298	1501	1263	-998	724	1935	4104	4121	1624
1969 Federal Surplus/Deficit	3129	2434	1240	1532	1028	1480	4362	2978	1733	4935	4441	6095	3975	3058	2912
1970 Federal Surplus/Deficit	3058	1133	-187	522	124	-265	1882	1427	-302	-515	1546	3001	4443	1193	1204
1971 Federal Surplus/Deficit	1860	780	-465	509	216	-389	3564	5008	2487	3171	3913	6449	6176	4353	2731
1972 Federal Surplus/Deficit	3084	3317	445	600	138	754	3366	4615	5087	5446	2383	6151	6622	4789	3307
1973 Federal Surplus/Deficit	3639	3013	901	771	2.6	995	2751	-1820	-900	-1129	-1070	145	1495	1526	674
1974 Federal Surplus/Deficit	1753	81	-561	125	-299	1795	6044	4968	3821	4732	5360	5566	6750	6031	3350
1975 Federal Surplus/Deficit	3147	3289	849	278	21	-158	2167	990	2502	1517	1778	3900	4902	5052	2114
1976 Federal Surplus/Deficit	1964	1248	219	1184	1295	4117	4395	2851	1911	4673	3462	5654	2972	4594	2905
1977 Federal Surplus/Deficit	4559	4223	3414	928	27	-522	345	-2198	-1587	-1283	-1606	2.5	103	339	316
1978 Federal Surplus/Deficit	1786	-98	-584	-45	-186	-357	1469	-151	2375	1533	2282	3423	2632	3210	1211
-Ranked Averages-															
Top Ten Percent	2573	2373	204	947	480	2420	4899	3939	3612	4060	4421	5656	5390	4183	3204
Middle Eighty Percent	2591	1508	188	761	210	437	1748	545	772	1818	2187	3708	4016	2992	1619
Bottom Ten Percent	2271	946	-331	412	77	-657	-1181	-1923	-942	-524	-1105	-584	880	1174	-190

Exhibit 17: OY 2014 Monthly 50-WY Energy

Federal Surplus/Deficit by Water Year
PNW Loads and Resources Study
2013 - 2014 Operating Year
2003 White Book

3/31/2004

Average Energy in Megawatts	*Aug1*	*Aug16*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr1*	*Apr16*	*May*	*Jun*	*Jul*	*Avg*
1929 Federal Surplus/Deficit	2795	741	-358	254	-41	-672	-87	-2215	-861	-862	-1190	-293	1968	1605	3.5
1930 Federal Surplus/Deficit	1413	520	-472	419	128	-689	-2193	-1230	-806	-483	-779	-353	1870	1837	-96
1931 Federal Surplus/Deficit	1891	787	-350	362	92	-641	-2141	-2190	-1033	57	-1419	169	1386	938	-229
1932 Federal Surplus/Deficit	1758	313	-323	276	-24	-747	-2115	-2343	386	2972	4742	5170	4737	2767	1056
1933 Federal Surplus/Deficit	3068	2153	-123	441	-268	195	2444	1595	-833	426	1272	3510	7025	5152	1883
1934 Federal Surplus/Deficit	2604	2920	490	1577	1465	4573	5611	3923	2475	5681	4998	4625	1197	2383	3035
1935 Federal Surplus/Deficit	1164	-181	-504	175	-311	-264	1895	2258	-1330	212	1976	2767	3578	2753	1050
1936 Federal Surplus/Deficit	2603	810	-334	377	2.5	-678	-1423	-2174	-626	-589	1680	6315	3236	1710	722
1937 Federal Surplus/Deficit	2334	555	-436	418	52	-700	-1925	-1997	-858	-631	-914	109	1341	1189	-178
1938 Federal Surplus/Deficit	1938	181	-444	581	-76	-608	2697	-461	1440	2329	2472	5370	3966	2333	1522
1939 Federal Surplus/Deficit	1691	382	-30	502	-7.7	-714	326	-1878	-278	255	1032	4019	1870	1816	609
1940 Federal Surplus/Deficit	2522	677	-428	615	-52	-498	-349	-1085	1672	1174	1810	2673	2618	1194	788
1941 Federal Surplus/Deficit	1593	250	-478	401	-172	-93	198	-2143	-763	-976	-986	758	2194	546	32
1942 Federal Surplus/Deficit	1362	391	-104	339	-294	1477	2859	-1506	-1354	-272	487	2408	5174	3302	1107
1943 Federal Surplus/Deficit	3048	2101	-136	401	-176	-286	2073	1247	2102	5322	4631	5307	4968	3407	2205
1944 Federal Surplus/Deficit	2830	2023	-144	506	21	-737	286	-2142	-1288	-809	-1348	-307	1106	376	-81
1945 Federal Surplus/Deficit	1451	-123	-365	204	-8	-732	-2074	-1722	-999	-736	-1094	2674	4219	1760	225
1946 Federal Surplus/Deficit	1623	1161	-553	510	4.7	-657	727	647	2197	2790	3724	5661	4374	3233	1733
1947 Federal Surplus/Deficit	3138	1799	94	388	-25	2299	3090	2188	2471	1180	2600	4795	4059	2866	2215
1948 Federal Surplus/Deficit	3141	1203	-80	2596	962	1223	2954	-287	1060	1409	3541	6801	7736	3685	2608
1949 Federal Surplus/Deficit	2733	3216	815	688	-105	-52	877	-458	3286	1468	4451	5678	3874	1086	1802
1950 Federal Surplus/Deficit	1417	-89	-749	406	-184	-935	1143	2594	4046	3860	3645	4560	6827	3791	2160
1951 Federal Surplus/Deficit	2345	2661	250	1424	1457	3316	4471	4401	2706	3719	4183	5705	3237	3708	3094
1952 Federal Surplus/Deficit	2832	2765	556	2051	156	1625	2728	1107	1446	3940	4351	6704	4177	2102	2466
1953 Federal Surplus/Deficit	2848	1054	-208	371	85	-696	65	2232	-341	-697	930	4230	6586	3868	1522
1954 Federal Surplus/Deficit	2976	1858	125	666	73	655	1755	2478	1046	3142	2413	5038	6085	4595	2309
1955 Federal Surplus/Deficit	3975	2974	2766	1267	587	802	-278	-1812	-1218	234	-209	2149	7401	5666	1735
1956 Federal Surplus/Deficit	2747	3144	16	1137	856	2980	5011	1633	3416	3924	5849	6751	7391	4044	3422
1957 Federal Surplus/Deficit	3106	2369	68	791	-137	827	1446	-1163	670	4487	2724	6297	7102	2284	2044
1958 Federal Surplus/Deficit	1986	608	-295	515	-6.5	-578	962	1134	1275	470	3324	5639	5564	1847	1604
1959 Federal Surplus/Deficit	2014	896	-197	413	481	1591	4484	2829	1273	2653	1862	3927	6041	4400	2413
1960 Federal Surplus/Deficit	2848	2191	2544	3228	1951	2489	2736	-220	1091	5786	3695	3462	4374	2893	2651
1961 Federal Surplus/Deficit	3144	760	-120	566	207	-84	1503	1855	1961	2693	2682	4195	6971	2434	2011
1962 Federal Surplus/Deficit	2201	1268	-488	479	-28	-831	1378	-1182	-821	4080	4396	3617	3504	3120	1227
1963 Federal Surplus/Deficit	2663	1693	-251	990	626	1570	1719	396	319	326	606	4424	4135	2838	1618
1964 Federal Surplus/Deficit	3372	1908	201	300	29	-460	1246	-415	-862	1397	1478	3206	7063	5182	1631
1965 Federal Surplus/Deficit	2882	2604	810	1395	168	3173	5528	4004	2963	2418	4274	5470	4925	2390	3076
1966 Federal Surplus/Deficit	2945	2371	157	920	217	744	2369	-671	-561	3133	1330	3531	2958	3211	1480
1967 Federal Surplus/Deficit	3188	1513	-389	371	-28	-111	2787	3417	424	2065	821	2280	6617	4487	1971
1968 Federal Surplus/Deficit	2947	2276	260	733	104	582	2272	1477	1241	-1019	702	2386	4762	4135	1700
1969 Federal Surplus/Deficit	3110	2415	1222	1515	1002	1451	4337	2954	1710	4915	4422	6549	4633	3073	2990
1970 Federal Surplus/Deficit	3039	1113	-208	504	98	-296	1855	1403	-327	-535	1526	3455	5102	1208	1280
1971 Federal Surplus/Deficit	1842	759	-487	489	189	-420	3539	4983	2464	3151	3894	6903	6835	4368	2807
1972 Federal Surplus/Deficit	3065	3298	425	581	111	724	3341	4591	5065	5427	2364	6605	7280	4804	3384
1973 Federal Surplus/Deficit	3621	2994	882	752	-24	965	2726	-1851	-927	-1150	-1093	595	2150	1541	750
1974 Federal Surplus/Deficit	1735	59	-582	105	-325	1765	6019	4944	3799	4712	5341	6020	7408	6045	3427
1975 Federal Surplus/Deficit	3128	3270	830	258	-6.6	-189	2141	965	2480	1498	1759	4355	5560	5067	2191
1976 Federal Surplus/Deficit	1945	1229	199	1166	1269	4092	4370	2827	1889	4653	3443	6109	3630	4609	2983
1977 Federal Surplus/Deficit	4540	4204	3397	910	0.1	-553	316	-2230	-1616	-1306	-1630	452	756	351	391
1978 Federal Surplus/Deficit	1767	-119	-606	-66	-213	-387	1441	-179	2353	1513	2262	3878	3290	3225	1287
-Ranked Averages-															
Top Ten Percent	2555	2353	184	928	453	2392	4874	3914	3590	4040	4402	6110	6048	4198	3281
Middle Eighty Percent	2572	1488	168	742	184	407	1721	518	748	1798	2167	4162	4674	3007	1695
Bottom Ten Percent	2253	925	-352	392	50	-688	-1212	-1955	-969	-546	-1130	-135	1534	1189	-116

Section 8: Pacific Northwest Regional Exhibits

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Exhibit 18

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

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Exhibit 18: OY 2005 through 2014 Annual Energy

Loads and Resources - Pacific Northwest Region
PNW Loads and Resources Study
2005 - 2014 Operating Years
1937 Water Year
2003 White Book

3/31/2004

Average Energy in Megawatts	*2005 Avg.*	*2006 Avg.*	*2007 Avg.*	*2008 Avg.*	*2009 Avg.*	*2010 Avg.*	*2011 Avg.*	*2012 Avg.*	*2013 Avg.*	*2014 Avg.*
Firm Regional Loads										
Regional Firm Loads	19666	19957	20575	20914	21246	21556	21864	22160	22537	22849
Exports	1468	1307	1077	945	840	909	898	890	864	848
Federal Diversity	0	0	0	0	0	0	0	0	0	0
Total Firm Regional Loads	21135	21264	21652	21859	22086	22465	22762	23049	23400	23698
Non-Firm Regional Loads										
Regional Non-Firm Loads	0	0	0	0	0	0	0	0	0	0
Total Non-Firm Regional Loads	0	0	0	0	0	0	0	0	0	0
Total Loads	21135	21264	21652	21859	22086	22465	22762	23049	23400	23698
Hydro Resources										
Regulated Hydro	10605	10622	10650	10686	10703	10721	10736	10748	10762	10773
Independent Hydro	1084	1084	1085	1085	1085	1085	1085	1085	1085	1085
Sustained Peaking Adjustment	0	0	0	0	0	0	0	0	0	0
Total Hydro Resources	11688	11706	11735	11770	11788	11805	11821	11832	11846	11858
Other Resources										
Small Thermal & Misc.	17	17	17	17	17	17	17	17	17	17
Combustion Turbines	1946	1976	1967	1937	1941	1921	1914	1923	1918	1922
Renewables	80	80	80	80	80	80	80	80	80	80
Cogeneration	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999
Imports	603	597	514	484	288	280	226	226	223	223
Large Thermal	5930	6034	5766	6026	5873	5973	5878	6009	5910	6047
Non-Utility Generation	1296	1292	1329	1337	1337	1338	1340	1340	1341	1341
Resource Acquisition	0	0	0	0	0	0	0	0	0	0
Total Other Resources	11870	11996	11672	11880	11535	11607	11454	11596	11488	11629
Total Resources	23559	23702	23407	23650	23323	23412	23275	23428	23335	23487
Reserves & Maintenance										
Hydro Reserves	0	0	0	0	0	0	0	0	0	0
Small Thermal & Misc. Reserves	0	0	0	0	0	0	0	0	0	0
Contract Reserves	0	0	0	0	0	0	0	0	0	0
Large Thermal Reserves	0	0	0	0	0	0	0	0	0	0
Regional Hydro Maintenance	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12
Spinning Reserves	0	0	0	0	0	0	0	0	0	0
Regional Transmission Losses	-664	-668	-660	-667	-657	-660	-656	-660	-658	-662
Total Reserves, Maintenance & Losses	-676	-680	-672	-679	-669	-672	-668	-672	-670	-674
Total Net Resources	22883	23022	22735	22972	22654	22740	22607	22755	22665	22813
Surplus/Deficits										
Firm Surplus/Deficit	1748	1758	1083	1112	567	275	-155	-294	-735	-885
Total Surplus/Deficit	1748	1758	1083	1112	567	275	-155	-294	-735	-885

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Exhibits 19 – 21

Regional Monthly Energy Analysis Under the 2003 BPA White Book Load Forecast for 1937-Water Conditions

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Exhibit 19: OY 2005 Monthly Energy

Loads and Resources - Pacific Northwest Region
PNW Loads and Resources Study
2004 - 2005 Operating Year
1937 Water Year
2003 White Book

3/31/2004

Average Energy In Megawatts	*Aug1*	*Aug16*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr1*	*Apr16*	*May*	*Jun*	*Jul*	*Avg*
Firm Regional Loads															
Regional Firm Loads	18969	18934	17728	18102	19903	21973	22416	21525	19939	18780	18827	18302	18819	19534	19666
Exports	1753	1754	1750	1453	1424	1461	1354	1349	1312	1336	1336	1306	1524	1598	1468
Federal Diversity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Regional Loads	20722	20688	19478	19555	21327	23434	23770	22874	21251	20116	20164	19608	20342	21132	21135
Non-Firm Regional Loads															
Regional Non-Firm Loads	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Non-Firm Regional Loads	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Loads	20722	20688	19478	19555	21327	23434	23770	22874	21251	20116	20164	19608	20342	21132	21135
Hydro Resources															
Regulated Hydro	13476	10457	8449	10398	11587	11753	9953	8614	9793	9578	9358	9811	12989	12472	10605
Independent Hydro	1048	1075	1010	982	902	969	783	797	944	1212	1266	1553	1603	1160	1084
Sustained Peaking Adjustment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Hydro Resources	14524	11532	9459	11380	12489	12722	10736	9411	10738	10790	10624	11364	14592	13633	11688
Other Resources															
Small Thermal & Misc.	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
Combustion Turbines	2206	2206	2269	2191	2137	2119	2252	2002	1841	1594	1541	1266	1372	2131	1946
Renewables	79	79	79	81	84	86	87	85	84	82	82	57	79	79	80
Cogeneration	2126	2126	2130	2132	2139	2136	2144	2141	1518	2133	2133	1137	2128	2119	1999
Imports	424	424	357	441	789	1004	951	806	656	585	548	329	417	499	603
Large Thermal	6268	6268	6268	6268	6268	6268	6268	6268	6137	5055	5124	4615	5174	6268	5930
Non-Utility Generation	1392	1390	1265	1213	1232	1212	1204	1206	1223	1402	1402	1192	1550	1459	1296
Resource Acquisition	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Resources	12511	12510	12385	12342	12665	12841	12923	12525	11475	10869	10848	8613	10737	12571	11870
Total Resources	27036	24042	21844	23722	25154	25563	23659	21936	22213	21659	21472	19977	25329	26204	23559
Reserves & Maintenance															
Hydro Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Thermal & Misc. Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Contract Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Large Thermal Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regional Hydro Maintenance	-30	-25	-8.6	-9	-3.8	0	0	0	-5.2	-7.4	-7.6	-20	-14	-49	-12
Spinning Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regional Transmission Losses	-762	-677	-616	-669	-709	-721	-667	-619	-626	-611	-605	-563	-714	-738	-664
Total Reserves, Maintenance & Losses	-792	-702	-624	-678	-713	-721	-667	-619	-631	-618	-613	-583	-728	-787	-676
Total Net Resources	26244	23340	21219	23045	24441	24842	22992	21317	21581	21041	20859	19395	24601	25417	22883
Surplus/Deficits															
Firm Surplus/Deficit	5522	2652	1741	3489	3115	1408	-778	-1557	331	925	696	-213	4258	4285	1748
Total Surplus/Deficit	5522	2652	1741	3489	3115	1408	-778	-1557	331	925	696	-213	4258	4285	1748

Exhibit 20: OY 2009 Monthly Energy

Loads and Resources - Pacific Northwest Region
PNW Loads and Resources Study
2008 - 2009 Operating Year
1937 Water Year
2003 White Book

3/31/2004

Average Energy in Megawatts	*Aug1*	*Aug16*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr1*	*Apr16*	*May*	*Jun*	*Jul*	*Avg*
Firm Regional Loads															
Regional Firm Loads	20558	20524	19215	19602	21484	23688	24092	23169	21556	20381	20427	19755	20318	21135	21246
Exports	874	874	878	824	810	827	825	820	812	834	834	799	891	887	840
Federal Diversity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Regional Loads	21432	21398	20092	20426	22293	24515	24917	23989	22368	21215	21261	20554	21209	22021	22086
Non-Firm Regional Loads															
Regional Non-Firm Loads	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Non-Firm Regional Loads	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Loads	21432	21398	20092	20426	22293	24515	24917	23989	22368	21215	21261	20554	21209	22021	22086
Hydro Resources															
Regulated Hydro	13611	10564	8532	10501	11718	11883	10051	8705	9878	9667	9429	9865	13085	12583	10703
Independent Hydro	1049	1076	1011	983	903	969	783	798	945	1213	1267	1555	1605	1161	1085
Sustained Peaking Adjustment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Hydro Resources	14660	11640	9542	11485	12621	12853	10834	9503	10823	10880	10697	11420	14690	13745	11788
Other Resources															
Small Thermal & Misc.	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
Combustion Turbines	2309	2313	2375	2252	2044	2105	2091	1875	1875	1490	1490	1417	1316	2147	1941
Renewables	79	79	79	81	84	86	87	85	84	82	82	57	79	79	80
Cogeneration	2126	2126	2130	2132	2139	2136	2144	2141	1518	2133	2133	1137	2128	2119	1999
Imports	173	173	157	200	401	472	458	424	377	322	291	109	184	200	288
Large Thermal	6274	6274	6274	6274	6274	6274	6274	6274	6211	5785	5392	3458	5021	6274	5873
Non-Utility Generation	1417	1419	1309	1253	1259	1236	1227	1232	1250	1409	1409	1383	1575	1492	1337
Resource Acquisition	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Resources	12395	12401	12341	12209	12218	12326	12299	12049	11331	11238	10814	7579	10320	12328	11535
Total Resources	27055	24040	21884	23694	24839	25179	23133	21552	22155	22118	21511	18999	25010	26073	23323
Reserves & Maintenance															
Hydro Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Thermal & Misc. Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Contract Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Large Thermal Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regional Hydro Maintenance	-30	-25	-8.6	-9	-3.8	0	0	0	-5.2	-7.4	-7.6	-20	-14	-49	-12
Spinning Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regional Transmission Losses	-762	-677	-617	-668	-700	-710	-652	-608	-625	-624	-606	-535	-705	-734	-657
Total Reserves, Maintenance & Losses	-792	-702	-625	-677	-704	-710	-652	-608	-630	-631	-614	-555	-719	-783	-669
Total Net Resources	26263	23338	21258	23017	24135	24469	22480	20944	21525	21487	20897	18443	24291	25290	22654
Surplus/Deficits															
Firm Surplus/Deficit	4831	1941	1166	2591	1842	-46	-2436	-3045	-843	273	-364	-2111	3082	3268	567
Total Surplus/Deficit	4831	1941	1166	2591	1842	-46	-2436	-3045	-843	273	-364	-2111	3082	3268	567

Exhibit 21: OY 2014 Monthly Energy

Loads and Resources - Pacific Northwest Region
PNW Loads and Resources Study
2013 - 2014 Operating Year
1937 Water Year
2003 White Book

3/31/2004

Average Energy in Megawatts	*Aug1*	*Aug16*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr1*	*Apr16*	*May*	*Jun*	*Jul*	*Avg*
Firm Regional Loads															
Regional Firm Loads	22223	22189	20729	21143	23102	25521	25850	24877	23126	21861	21906	21252	21882	22620	22849
Exports	871	871	873	829	831	851	849	843	833	854	853	814	868	865	848
Federal Diversity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Regional Loads	23094	23060	21602	21973	23932	26373	26699	25720	23959	22714	22760	22066	22750	23485	23698
Non-Firm Regional Loads															
Regional Non-Firm Loads	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Non-Firm Regional Loads	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Loads	23094	23060	21602	21973	23932	26373	26699	25720	23959	22714	22760	22066	22750	23485	23698
Hydro Resources															
Regulated Hydro	13709	10643	8589	10570	11796	11964	10116	8765	9945	9739	9482	9915	13151	12679	10773
Independent Hydro	1049	1076	1011	983	903	970	783	798	945	1213	1268	1555	1605	1161	1085
Sustained Peaking Adjustment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Hydro Resources	14758	11720	9600	11553	12699	12933	10899	9563	10890	10952	10750	11471	14756	13841	11858
Other Resources															
Small Thermal & Misc.	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
Combustion Turbines	2211	2211	2317	2176	2118	2122	2129	1900	1900	1496	1539	1348	1228	2091	1922
Renewables	79	79	79	81	84	86	87	85	84	82	82	57	79	79	80
Cogeneration	2126	2126	2130	2132	2139	2136	2144	2141	1518	2133	2133	1137	2128	2119	1999
Imports	122	122	150	188	297	369	355	320	282	227	202	102	130	149	223
Large Thermal	6274	6274	6274	6274	6274	6274	6274	6274	6211	5733	5681	4600	5854	6274	6047
Non-Utility Generation	1419	1419	1309	1254	1267	1243	1235	1241	1258	1417	1416	1383	1576	1493	1341
Resource Acquisition	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Resources	12248	12248	12277	12122	12196	12247	12242	11979	11270	11106	11071	8644	11014	12222	11629
Total Resources	27006	23968	21877	23675	24895	25180	23141	21542	22160	22058	21821	20115	25770	26063	23487
Reserves & Maintenance															
Hydro Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Thermal & Misc. Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Contract Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Large Thermal Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regional Hydro Maintenance	-30	-25	-8.6	-9	-3.8	0	0	0	-5.2	-7.4	-7.6	-20	-14	-49	-12
Spinning Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regional Transmission Losses	-761	-675	-617	-667	-702	-710	-653	-607	-625	-622	-615	-567	-726	-734	-662
Total Reserves, Maintenance & Losses	-791	-700	-625	-676	-706	-710	-653	-607	-630	-629	-623	-587	-741	-783	-674
Total Net Resources	26215	23268	21252	22999	24190	24470	22488	20934	21530	21429	21198	19528	25030	25280	22813
Surplus/Deficits															
Firm Surplus/Deficit	3121	208	-350	1026	257	-1903	-4211	-4786	-2429	-1286	-1562	-2538	2280	1795	-885
Total Surplus/Deficit	3121	208	-350	1026	257	-1903	-4211	-4786	-2429	-1286	-1562	-2538	2280	1795	-885

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Exhibits 22 – 24

Regional Monthly Capacity Analysis Under the 2003 BPA White Book Load Forecast for 1937-Water Conditions

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Exhibit 22: OY 2005 Monthly Capacity

Loads and Resources - Pacific Northwest Region
PNW Loads and Resources Study
2004 - 2005 Operating Year
1937 Water Year
2003 White Book

3/31/2004

Capacity in Megawatts	*Aug1*	*Aug16*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr1*	*Apr16*	*May*	*Jun*	*Jul*
Firm Regional Loads														
Regional Firm Loads	25277	25242	23748	24966	27997	30592	31440	30062	27741	25887	25948	25205	25324	26009
Exports	3025	3025	3017	2560	2476	2497	2346	2340	2330	2351	2351	2428	2828	2838
Federal Diversity	-804	-799	-792	-762	-695	-544	-561	-545	-738	-699	-705	-810	-792	-801
Total Firm Regional Loads	27499	27468	25972	26765	29777	32545	33225	31857	29333	27539	27593	26823	27359	28047
Non-Firm Regional Loads														
Regional Non-Firm Loads	156	156	129	96	159	108	176	126	173	134	134	119	160	147
Total Non-Firm Regional Loads	156	156	129	96	159	108	176	126	173	134	134	119	160	147
Total Loads	27655	27624	26101	26861	29937	32653	33401	31982	29506	27673	27727	26942	27519	28193
Hydro Resources														
Regulated Hydro	31082	30866	31173	31068	30984	30641	30074	30219	30173	29832	29592	29643	31105	31179
Independent Hydro	1864	1846	1834	1819	1779	1766	1714	1827	1919	1968	1992	2071	2069	1924
Sustained Peaking Adjustment	-225	-3255	-6247	-4686	-3662	-3702	-7776	-7488	-6936	-6299	-7367	-6057	-4916	-2753
Total Hydro Resources	32721	29458	26760	28201	29101	28704	24011	24557	25156	25501	24218	25657	28257	30351
Other Resources														
Small Thermal & Misc.	30	30	30	30	33	33	33	33	30	30	30	30	30	30
Combustion Turbines	3380	3380	3387	3447	3457	3464	3464	3186	3182	2806	2806	2426	2542	3430
Renewables	84	84	84	85	86	88	89	88	88	87	87	84	84	84
Cogeneration	2221	2221	2225	2227	2234	2218	2239	2236	1603	2228	2228	1425	2223	2201
Imports	516	516	438	519	993	1168	1168	1147	772	661	661	420	528	610
Large Thermal	6992	6992	6992	6992	6992	6992	6992	6992	6858	5638	5766	5132	5688	6992
Non-Utility Generation	1356	1356	1258	1170	1125	1100	1079	1108	1146	1298	1298	948	1448	1403
Resource Acquisition	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Resources	14578	14578	14413	14469	14919	15063	15063	14790	13679	12748	12875	10465	12543	14750
Total Resources	47299	44036	41173	42670	44020	43767	39074	39347	38835	38249	37092	36121	40800	45100
Reserves & Maintenance														
Hydro Reserves	-1647	-1636	-1650	-1644	-1638	-1620	-1589	-1602	-1605	-1590	-1579	-1586	-1659	-1655
Small Thermal & Misc. Reserves	-354	-354	-349	-348	-347	-345	-345	-333	-302	-322	-322	-246	-316	-357
Contract Reserves	-31	-31	-19	-22	-24	-36	-35	-34	-28	-28	-28	-30	-31	-34
Large Thermal Reserves	-1049	-1049	-1049	-1049	-1049	-1049	-1049	-1049	-1029	-846	-865	-770	-853	-1049
Regional Hydro Maintenance	-4595	-4032	-3787	-3208	-2935	-2037	-1561	-2286	-2626	-2751	-2483	-2360	-2202	-3720
Spinning Reserves	-923	-856	-792	-830	-878	-890	-786	-781	-784	-787	-765	-661	-824	-887
Regional Transmission Losses	-1296	-1209	-1123	-1192	-1244	-1266	-1129	-1114	-1087	-1069	-1040	-1021	-1170	-1253
Total Reserves, Maintenance & Losses	-9894	-9165	-8769	-8294	-8115	-7244	-6495	-7199	-7461	-7394	-7083	-6673	-7055	-8955
Total Net Resources	37405	34871	32403	34377	35905	36523	32579	32149	31374	30855	30009	29449	33745	36146
Surplus/Deficits														
Firm Surplus/Deficit	9906	7403	6431	7612	6127	3979	-646	292	2041	3317	2416	2625	6385	8099
Total Surplus/Deficit	9750	7247	6302	7516	5968	3870	-822	166	1867	3182	2282	2507	6226	7952

Exhibit 23: OY 2009 Monthly Capacity *(Revised 12/01/2004)*

Loads and Resources - Pacific Northwest Region
PNW Loads and Resources Study
2008 - 2009 Operating Year
1937 Water Year
[22] 2003 White Book

3/31/2004

Capacity in Megawatts	*Aug1*	*Aug16*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr1*	*Apr16*	*May*	*Jun*	*Jul*
Firm Regional Loads														
Regional Firm Loads	27356	27322	25593	26948	30013	32726	33518	32055	29749	27776	27837	27051	27238	27991
Exports	1933	1933	1923	1824	1760	1785	1782	1775	1763	1782	1782	1831	1928	1939
Federal Diversity	-877	-872	-871	-836	-760	-590	-604	-585	-799	-749	-755	-864	-851	-875
Total Firm Regional Loads	28412	28383	26644	27935	31013	33920	34696	33245	30714	28809	28863	28018	28315	29056
Non-Firm Regional Loads														
Regional Non-Firm Loads	164	164	127	96	158	109	178	125	175	97	97	119	159	140
Total Non-Firm Regional Loads	164	164	127	96	158	109	178	125	175	97	97	119	159	140
Total Loads	28577	28547	26772	28031	31171	34029	34874	33370	30889	28906	28961	28136	28474	29196
Hydro Resources														
Regulated Hydro	31082	30866	31173	31068	30984	30641	30074	30219	30173	29832	29592	29643	31105	31179
Independent Hydro	1864	1846	1834	1820	1779	1766	1714	1827	1919	1968	1992	2071	2069	1924
Sustained Peaking Adjustment	-132	-3071	-6247	-4448	-3438	-3405	-7776	-7488	-6690	-6299	-7367	-5935	-4793	-2621
Total Hydro Resources	32814	29641	26760	28439	29325	29001	24011	24558	25402	25501	24218	25779	28381	30482
Other Resources														
Small Thermal & Misc.	30	30	30	30	33	33	33	33	30	30	30	30	30	30
Combustion Turbines	3457	3464	3464	3461	3457	3451	3451	3169	3162	2785	2785	2660	2552	3457
Renewables	84	84	84	85	86	88	89	88	88	87	87	84	84	84
Cogeneration	2221	2221	2225	2227	2234	2218	2239	2236	1603	2228	2228	1425	2223	2201
Imports	311	311	261	297	456	554	558	547	515	418	418	219	317	332
Large Thermal	6992	6992	6992	6992	6992	6992	6992	6992	6858	6436	5778	3287	4948	6992
Non-Utility Generation	1369	1369	1286	1184	1130	1114	1093	1122	1160	1312	1312	1196	1462	1420
Resource Acquisition	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Resources	14463	14470	14341	14275	14388	14449	14454	14187	13416	13295	12638	8901	11616	14516
Total Resources	47277	44111	41101	42714	43712	43450	38465	38744	38818	38797	36856	34680	39996	44998
Reserves & Maintenance														
Hydro Reserves	-1647	-1636	-1650	-1644	-1638	-1620	-1589	-1602	-1605	-1590	-1579	-1586	-1659	-1655
Small Thermal & Misc. Reserves	-358	-358	-354	-349	-347	-345	-345	-332	-302	-322	-322	-270	-318	-360
Contract Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Large Thermal Reserves	-1049	-1049	-1049	-1049	-1049	-1049	-1049	-1049	-1029	-965	-867	-493	-742	-1049
Regional Hydro Maintenance	-4595	-4032	-3787	-3208	-2935	-2037	-1561	-2286	-2626	-2751	-2483	-2360	-2202	-3720
Spinning Reserves	-925	-860	-793	-835	-883	-897	-785	-780	-790	-790	-761	-644	-842	-890
Regional Transmission Losses	-1297	-1212	-1121	-1194	-1235	-1256	-1110	-1095	-1088	-1085	-1033	-982	-1147	-1250
Total Reserves, Maintenance & Losses	-9871	-9147	-8754	-8280	-8086	-7205	-6440	-7145	-7439	-7503	-7045	-6335	-6909	-8923
Total Net Resources	37406	34964	32346	34434	35626	36245	32025	31600	31379	31294	29811	28346	33087	36075
Surplus/Deficits														
Firm Surplus/Deficit	8994	6582	5702	6499	4613	2325	-2670	-1646	666	2485	948	328	4772	7019
Total Surplus/Deficit	8829	6417	5575	6403	4455	2217	-2849	-1771	490	2388	851	209	4613	6879

Exhibit 24: OY 2014 Monthly Capacity *(Revised 12/01/2004)*

Loads and Resources - Pacific Northwest Region
PNW Loads and Resources Study
2013 - 2014 Operating Year
1937 Water Year
[22] 2003 White Book

3/31/2004

Capacity in Megawatts	*Aug1*	*Aug16*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr1*	*Apr16*	*May*	*Jun*	*Jul*
Firm Regional Loads														
Regional Firm Loads	29474	29440	27521	28919	32151	35218	35676	34134	31672	29513	29574	28950	29275	30007
Exports	1870	1870	1857	1790	1748	1778	1774	1767	1752	1768	1768	1806	1814	1828
Federal Diversity	-904	-900	-904	-880	-801	-622	-628	-612	-831	-777	-784	-899	-887	-908
Total Firm Regional Loads	30439	30410	28474	29828	33098	36374	36822	35289	32593	30504	30559	29857	30202	30927
Non-Firm Regional Loads														
Regional Non-Firm Loads	135	135	127	94	158	107	179	138	178	145	145	114	167	25
Total Non-Firm Regional Loads	135	135	127	94	158	107	179	138	178	145	145	114	167	25
Total Loads	30575	30545	28601	29923	33257	36481	37001	35428	32770	30649	30703	29971	30369	30952
Hydro Resources														
Regulated Hydro	31082	30866	31173	31068	30984	30641	30074	30219	30173	29832	29592	29643	31105	31179
Independent Hydro	1864	1846	1834	1820	1780	1766	1714	1827	1919	1968	1993	2071	2069	1924
Sustained Peaking Adjustment	-100	-2940	-6247	-4299	-3312	-3230	-7776	-7488	-6495	-6117	-7367	-5827	-4711	-2513
Total Hydro Resources	32846	29773	26760	28589	29452	29176	24011	24558	25596	25683	24218	25887	28463	30591
Other Resources														
Small Thermal & Misc.	30	30	30	30	33	33	33	33	30	30	30	30	30	30
Combustion Turbines	3451	3451	3444	3437	3183	3183	3437	3172	3182	2819	2819	2442	2562	3451
Renewables	84	84	84	85	86	88	89	88	88	87	87	84	84	84
Cogeneration	2221	2221	2225	2227	2234	2218	2239	2236	1603	2228	2228	1425	2223	2201
Imports	231	231	261	297	328	426	430	419	417	320	320	219	237	252
Large Thermal	6992	6992	6992	6992	6992	6992	6992	6992	6864	6436	6302	4960	6098	6992
Non-Utility Generation	1370	1370	1287	1185	1139	1123	1102	1132	1169	1321	1321	1198	1463	1421
Resource Acquisition	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Other Resources	14378	14378	14322	14252	13995	14062	14321	14071	13354	13240	13107	10358	12697	14431
Total Resources	47224	44151	41082	42841	43447	43238	38333	38629	38950	38924	37325	36245	41159	45021
Reserves & Maintenance														
Hydro Reserves	-1647	-1636	-1650	-1644	-1638	-1620	-1589	-1602	-1605	-1590	-1579	-1586	-1659	-1655
Small Thermal & Misc. Reserves	-358	-358	-354	-348	-334	-332	-345	-333	-304	-324	-324	-259	-318	-359
Contract Reserves	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Large Thermal Reserves	-1049	-1049	-1049	-1049	-1049	-1049	-1049	-1049	-1030	-965	-945	-744	-915	-1049
Regional Hydro Maintenance	-4595	-4032	-3787	-3208	-2935	-2037	-1561	-2286	-2626	-2751	-2483	-2360	-2202	-3720
Spinning Reserves	-926	-864	-793	-839	-886	-901	-785	-781	-795	-794	-761	-665	-879	-892
Regional Transmission Losses	-1295	-1213	-1121	-1198	-1226	-1249	-1106	-1091	-1092	-1089	-1046	-1026	-1179	-1251
Total Reserves, Maintenance & Losses	-9869	-9151	-8753	-8287	-8068	-7189	-6435	-7142	-7451	-7514	-7139	-6639	-7151	-8926
Total Net Resources	37355	35000	32329	34554	35379	36049	31897	31487	31499	31410	30186	29606	34009	36095
Surplus/Deficits														
Firm Surplus/Deficit	6915	4590	3855	4726	2281	-326	-4925	-3802	-1093	906	-372	-251	3807	5167
Total Surplus/Deficit	6780	4455	3728	4631	2122	-433	-5104	-3940	-1271	761	-517	-365	3639	5142

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Exhibits 25 – 34

Regional Energy Surpluses and Deficits for 50-Historical Water Conditions

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Exhibit 25: OY 2005 Monthly 50-WY Energy

Federal Surplus/Deficit by Water Year
PNW Loads and Resources Study
2004 - 2005 Operating Year
2003 White Book

3/31/2004

Average Energy in Megawatts	*Aug1*	*Aug16*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr1*	*Apr16*	*May*	*Jun*	*Jul*	*Avg*
1929 Federal Surplus/Deficit	2657	642	330	1151	1012	415	977	-1098	167	-183	-901	-768	1378	2398	589
1930 Federal Surplus/Deficit	1321	418	216	1336	1160	388	-1086	-137	213	187	-475	-821	1265	2609	489
1931 Federal Surplus/Deficit	1777	674	342	1285	1128	429	-1039	-1078	-7.4	711	-1115	-319	762	1702	352
1932 Federal Surplus/Deficit	1644	209	363	1190	1017	355	-1006	-1230	1396	3587	4900	4596	4073	3527	1621
1933 Federal Surplus/Deficit	2939	2021	557	1336	771	1278	3431	2586	164	1034	1505	2948	6351	5862	2419
1934 Federal Surplus/Deficit	2470	2755	1137	2435	2504	5567	6560	4883	3411	6258	5164	4015	611	3150	3550
1935 Federal Surplus/Deficit	1054	-289	163	1090	736	829	2892	3237	-350	855	2201	2246	2957	3501	1601
1936 Federal Surplus/Deficit	2465	687	342	1277	1036	393	-353	-1064	394	70	1924	5738	2579	2479	1283
1937 Federal Surplus/Deficit	2221	450	254	1326	1084	375	-830	-895	159	34	-626	-339	767	1969	409
1938 Federal Surplus/Deficit	1825	61	241	1488	953	471	3700	581	2416	2951	2689	4781	3340	3094	2069
1939 Federal Surplus/Deficit	1582	290	645	1398	1040	377	1344	-788	735	902	1288	3475	1275	2592	1177
1940 Federal Surplus/Deficit	2395	569	259	1509	976	585	723	14	2637	1830	2000	2159	2018	1973	1354
1941 Federal Surplus/Deficit	1488	140	209	1299	860	978	1287	-1036	260	-343	-762	250	1596	1345	609
1942 Federal Surplus/Deficit	1267	286	588	1250	748	2568	3820	-417	-325	387	738	1890	4526	4043	1669
1943 Federal Surplus/Deficit	2907	1972	548	1299	874	811	3080	2312	3077	5928	4836	4716	4335	4173	2754
1944 Federal Surplus/Deficit	2709	1885	552	1405	1075	359	1349	-1021	-252	-126	-1076	-801	527	1187	506
1945 Federal Surplus/Deficit	1357	-218	325	1121	1039	357	-960	-604	35	-58	-786	2152	3591	2522	810
1946 Federal Surplus/Deficit	1535	1049	138	1426	1048	429	1793	1706	3157	3407	3927	5062	3706	3988	2284
1947 Federal Surplus/Deficit	3000	1669	770	1288	1024	3406	4052	3215	3423	1795	2803	4228	3388	3621	2754
1948 Federal Surplus/Deficit	3020	1099	603	3443	2008	2277	3947	794	2017	2035	3743	6208	7053	4399	3141
1949 Federal Surplus/Deficit	2604	3055	1482	1574	941	1046	1900	639	4241	2100	4639	5117	3232	1872	2354
1950 Federal Surplus/Deficit	1323	-177	-55	1317	861	145	2153	3629	4981	4482	3836	3979	6149	4536	2702
1951 Federal Surplus/Deficit	2230	2512	930	2297	2512	4350	5429	5376	3662	4336	4364	5108	2608	4445	3620
1952 Federal Surplus/Deficit	2702	2617	1221	2909	1192	2700	3720	2133	2436	4569	4561	6113	3538	2863	3004
1953 Federal Surplus/Deficit	2721	956	483	1278	1127	384	1165	3239	637	-70	1168	3666	5931	4615	2076
1954 Federal Surplus/Deficit	2844	1727	802	1551	1110	1743	2759	3476	2012	3758	2641	4444	5391	5316	2841
1955 Federal Surplus/Deficit	3820	2816	3374	2135	1622	1864	786	-704	-193	876	-3.5	1632	6706	6368	2279
1956 Federal Surplus/Deficit	2616	2986	694	2010	1910	4028	5969	2643	4382	4516	6023	6159	6704	4776	3946
1957 Federal Surplus/Deficit	2974	2228	746	1676	911	1912	2463	-63	1649	5112	2924	5703	6416	3062	2591
1958 Federal Surplus/Deficit	1882	517	394	1416	1038	524	1983	2193	2222	1110	3541	5079	4877	2634	2157
1959 Federal Surplus/Deficit	1912	788	490	1304	1529	2665	5452	3802	2257	3254	2061	3340	5357	5142	2946
1960 Federal Surplus/Deficit	2713	2049	3161	4077	2991	3525	3693	828	2075	6348	3863	2895	3725	3648	3175
1961 Federal Surplus/Deficit	3007	663	553	1453	1246	1011	2511	2862	2910	3294	2899	3593	6267	3197	2545
1962 Federal Surplus/Deficit	2082	1149	203	1372	1023	267	2396	-119	207	4709	4557	3050	2868	3871	1782
1963 Federal Surplus/Deficit	2528	1570	437	1874	1669	2637	2707	1431	1342	959	825	3890	3496	3590	2168
1964 Federal Surplus/Deficit	3236	1785	874	1198	1080	637	2262	637	160	2057	1708	2659	6391	5890	2182
1965 Federal Surplus/Deficit	2749	2459	1472	2259	1200	4269	6491	4995	3925	3047	4473	4892	4300	3168	3611
1966 Federal Surplus/Deficit	2815	2241	832	1805	1250	1841	3368	362	461	3727	1544	2973	2325	3954	2028
1967 Federal Surplus/Deficit	3042	1407	299	1269	1019	978	3775	4394	1391	2659	1050	1735	5937	5223	2508
1968 Federal Surplus/Deficit	2808	2129	932	1621	1142	1675	3273	2488	2200	-353	926	1884	4093	4886	2246
1969 Federal Surplus/Deficit	2969	2271	1865	2383	2047	2516	5311	3935	2692	5510	4599	5952	3951	3831	3513
1970 Federal Surplus/Deficit	2918	1003	478	1391	1142	803	2909	2426	664	99	1714	2917	4480	1990	1839
1971 Federal Surplus/Deficit	1735	670	216	1398	1246	679	4544	5965	3437	3781	4082	6315	6170	5107	3351
1972 Federal Surplus/Deficit	2927	3140	1099	1476	1159	1821	4345	5575	5994	5996	2550	6016	6606	5511	3909
1973 Federal Surplus/Deficit	3471	2834	1550	1641	1026	2053	3730	-746	98	-499	-853	114	1538	2322	1317
1974 Federal Surplus/Deficit	1623	-36	112	1030	732	2866	6978	5915	4742	5313	5517	5440	6733	6753	3959
1975 Federal Surplus/Deficit	2993	3110	1494	1162	1048	911	3148	1985	3454	2115	1979	3792	4926	5796	2735
1976 Federal Surplus/Deficit	1829	1111	873	2048	2323	5119	5336	3817	2852	5255	3637	5526	3009	5333	3513
1977 Federal Surplus/Deficit	4375	4035	3996	1792	1053	538	1373	-1115	-581	-627	-1369	-51	169	1155	961
1978 Federal Surplus/Deficit	1661	-224	83	855	839	733	2493	908	3307	2112	2459	3307	2675	3983	1849
-Ranked Averages-															
Top Ten Percent	2429	2212	862	1814	1503	3467	5842	4901	4541	4642	4585	5523	5390	4931	3809
Middle Eighty Percent	2448	1366	842	1634	1228	1490	2738	1565	1734	2424	2379	3602	4026	3761	2244
Bottom Ten Percent	2137	814	339	1300	1092	393	-126	-846	56	125	-839	-610	940	1973	469

Exhibit 26: OY 2006 Monthly 50-WY Energy

Federal Surplus/Deficit by Water Year
PNW Loads and Resources Study
2005 - 2006 Operating Year
2003 White Book

3/31/2004

Average Energy in Megawatts	*Aug1*	*Aug16*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr1*	*Apr16*	*May*	*Jun*	*Jul*	*Avg*
1929 Federal Surplus/Deficit	3660	1661	454	1137	981	397	556	-1497	-291	-566	-898	-114	2107	2113	648
1930 Federal Surplus/Deficit	2315	1438	341	1320	1132	372	-1512	-535	-243	-197	-478	-166	2002	2332	548
1931 Federal Surplus/Deficit	2775	1696	466	1267	1100	416	-1465	-1476	-464	329	-1113	340	1506	1430	414
1932 Federal Surplus/Deficit	2642	1230	489	1174	987	337	-1433	-1628	936	3212	4925	5266	4817	3248	1683
1933 Federal Surplus/Deficit	3941	3046	682	1323	740	1262	3023	2207	-289	665	1516	3621	7092	5597	2487
1934 Federal Surplus/Deficit	3473	3787	1267	2429	2473	5560	6159	4509	2966	5888	5182	4698	1349	2876	3621
1935 Federal Surplus/Deficit	2051	732	291	1074	704	812	2483	2860	-798	474	2210	2907	3693	3227	1666
1936 Federal Surplus/Deficit	3469	1710	469	1264	1008	380	-774	-1461	-64	-309	1921	6408	3326	2202	1346
1937 Federal Surplus/Deficit	3219	1470	377	1311	1057	361	-1254	-1291	-296	-347	-624	311	1497	1690	468
1938 Federal Surplus/Deficit	2823	1084	366	1474	926	454	3289	192	1962	2575	2697	5455	4074	2814	2133
1939 Federal Surplus/Deficit	2579	1306	771	1384	1009	358	930	-1184	276	519	1288	4138	2012	2313	1238
1940 Federal Surplus/Deficit	3396	1589	383	1497	949	569	301	-386	2184	1444	2014	2815	2754	1695	1415
1941 Federal Surplus/Deficit	2484	1161	333	1284	831	963	862	-1435	-197	-719	-748	910	2328	1059	669
1942 Federal Surplus/Deficit	2260	1305	710	1233	716	2547	3417	-815	-783	1.2	739	2549	5264	3769	1730
1943 Federal Surplus/Deficit	3912	2995	672	1285	842	790	2663	1911	2619	5549	4841	5391	5067	3889	2815
1944 Federal Surplus/Deficit	3708	2911	673	1390	1043	337	928	-1421	-709	-511	-1071	-142	1257	899	564
1945 Federal Surplus/Deficit	2350	800	449	1104	1008	340	-1388	-1006	-424	-443	-787	2807	4323	2243	868
1946 Federal Surplus/Deficit	2527	2069	261	1409	1017	408	1368	1311	2703	3033	3936	5740	4454	3710	2347
1947 Federal Surplus/Deficit	4004	2693	894	1272	991	3377	3647	2820	2973	1424	2817	4895	4135	3343	2818
1948 Federal Surplus/Deficit	4020	2118	727	3437	1974	2262	3533	394	1568	1661	3755	6879	7798	4130	3207
1949 Federal Surplus/Deficit	3605	4087	1608	1561	910	1026	1485	239	3787	1720	4653	5782	3974	1589	2416
1950 Federal Surplus/Deficit	2317	840	68	1301	830	127	1740	3237	4532	4101	3850	4652	6892	4256	2766
1951 Federal Surplus/Deficit	3228	3540	1054	2285	2476	4334	5025	4992	3209	3958	4380	5785	3344	4171	3686
1952 Federal Surplus/Deficit	3704	3645	1348	2901	1162	2679	3308	1740	1980	4185	4565	6783	4275	2581	3067
1953 Federal Surplus/Deficit	3722	1973	606	1262	1097	367	734	2849	185	-442	1176	4337	6667	4335	2138
1954 Federal Surplus/Deficit	3846	2751	927	1539	1081	1724	2345	3090	1562	3384	2645	5121	6145	5046	2908
1955 Federal Surplus/Deficit	4828	3846	3512	2126	1592	1851	365	-1102	-648	495	7.9	2296	7458	6105	2345
1956 Federal Surplus/Deficit	3618	4017	819	2000	1876	4009	5564	2253	3925	4145	6036	6831	7451	4502	4011
1957 Federal Surplus/Deficit	3976	3255	870	1663	879	1891	2048	-464	1193	4731	2937	6374	7163	2778	2654
1958 Federal Surplus/Deficit	2877	1534	517	1401	1008	503	1568	1795	1775	731	3548	5742	5626	2348	2219
1959 Federal Surplus/Deficit	2907	1808	613	1290	1495	2645	5044	3423	1803	2885	2077	4017	6104	4868	3012
1960 Federal Surplus/Deficit	3716	3076	3296	4069	2958	3514	3291	437	1619	5985	3888	3569	4466	3371	3244
1961 Federal Surplus/Deficit	4010	1681	679	1441	1216	993	2100	2475	2463	2927	2915	4275	7024	2922	2613
1962 Federal Surplus/Deficit	3081	2172	326	1359	991	248	1982	-513	-251	4329	4579	3723	3607	3593	1846
1963 Federal Surplus/Deficit	3531	2592	561	1859	1637	2619	2298	1035	884	581	837	4549	4230	3313	2230
1964 Federal Surplus/Deficit	4240	2807	1000	1184	1048	618	1849	246	-296	1670	1718	3324	7130	5624	2245
1965 Federal Surplus/Deficit	3751	3487	1598	2249	1172	4239	6082	4606	3471	2669	4481	5560	5027	2879	3673
1966 Federal Surplus/Deficit	3816	3264	955	1792	1220	1818	2956	-25	2.8	3356	1556	3640	3065	3682	2092
1967 Federal Surplus/Deficit	4048	2427	423	1256	988	960	3365	4013	943	2294	1064	2400	6681	4947	2574
1968 Federal Surplus/Deficit	3812	3157	1058	1607	1111	1654	2859	2098	1749	-736	939	2542	4836	4609	2309
1969 Federal Surplus/Deficit	3972	3298	1994	2371	2014	2499	4900	3551	2233	5137	4616	6627	4702	3552	3580
1970 Federal Surplus/Deficit	3917	2024	602	1379	1112	783	2484	2032	211	-274	1736	3579	5208	1705	1900
1971 Federal Surplus/Deficit	2731	1687	335	1381	1213	655	4124	5578	2980	3401	4096	6984	6907	4831	3412
1972 Federal Surplus/Deficit	3930	4171	1223	1462	1126	1798	3928	5189	5544	5631	2569	6686	7347	5246	3975
1973 Federal Surplus/Deficit	4477	3865	1676	1628	993	2031	3314	-1145	-360	-877	-841	770	2276	2042	1378
1974 Federal Surplus/Deficit	2621	983	236	1011	696	2840	6570	5533	4290	4937	5529	6107	7474	6486	4023
1975 Federal Surplus/Deficit	3996	4141	1621	1146	1016	889	2734	1596	2999	1742	1990	4459	5656	5520	2798
1976 Federal Surplus/Deficit	2827	2131	997	2034	2287	5100	4927	3432	2397	4878	3650	6194	3741	5063	3576
1977 Federal Surplus/Deficit	5386	5068	4136	1780	1022	518	953	-1514	-1037	-1008	-1360	614	906	876	1025
1978 Federal Surplus/Deficit	2658	797	208	838	807	705	2070	506	2856	1744	2476	3978	3407	3702	1909
-Ranked Averages-															
Top Ten Percent	3430	3240	986	1802	1469	3444	5434	4514	4088	4268	4599	6194	6129	4657	3874
Middle Eighty Percent	3448	2389	967	1620	1197	1471	2323	1172	1280	2048	2391	4270	4766	3484	2307
Bottom Ten Percent	3135	1835	462	1285	1063	377	-549	-1244	-401	-259	-837	46	1674	1693	528

Exhibit 27: OY 2007 Monthly 50-WY Energy

Federal Surplus/Deficit by Water Year
PNW Loads and Resources Study
2006 - 2007 Operating Year
2003 White Book

3/31/2004

Average Energy in Megawatts	*Aug1*	*Aug16*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr1*	*Apr16*	*May*	*Jun*	*Jul*	*Avg*
1929 Federal Surplus/Deficit	3401	1388	192	795	578	-2.1	88	-1961	-690	-727	-1054	-631	1424	1673	247
1930 Federal Surplus/Deficit	2045	1165	78	974	733	-25	-1987	-993	-640	-356	-635	-685	1320	1895	148
1931 Federal Surplus/Deficit	2508	1424	203	921	700	18	-1939	-1938	-862	171	-1272	-177	825	994	13
1932 Federal Surplus/Deficit	2376	960	226	829	586	-65	-1909	-2091	541	3064	4790	4764	4145	2815	1286
1933 Federal Surplus/Deficit	3676	2774	420	981	340	863	2566	1763	-683	514	1366	3112	6427	5174	2094
1934 Federal Surplus/Deficit	3209	3522	1011	2092	2072	5178	5715	4073	2584	5750	5050	4201	661	2440	3233
1935 Federal Surplus/Deficit	1785	462	31	729	303	411	2024	2418	-1190	319	2064	2396	3013	2796	1270
1936 Federal Surplus/Deficit	3207	1440	207	921	608	-18	-1243	-1924	-461	-470	1775	5908	2649	1766	949
1937 Federal Surplus/Deficit	2951	1197	114	967	657	-37	-1728	-1752	-693	-507	-781	-211	809	1252	67
1938 Federal Surplus/Deficit	2556	814	104	1130	527	56	2830	-259	1573	2424	2552	4955	3395	2381	1739
1939 Federal Surplus/Deficit	2309	1027	510	1042	607	-42	469	-1642	-119	364	1139	3632	1328	1876	840
1940 Federal Surplus/Deficit	3132	1318	121	1155	550	170	-168	-845	1798	1289	1876	2304	2071	1257	1018
1941 Federal Surplus/Deficit	2215	891	70	942	432	566	390	-1896	-595	-874	-896	397	1644	618	270
1942 Federal Surplus/Deficit	1989	1031	447	889	315	2148	2967	-1273	-1182	-156	590	2038	4591	3340	1334
1943 Federal Surplus/Deficit	3649	2723	410	943	440	389	2206	1459	2233	5407	4704	4892	4392	3458	2422
1944 Federal Surplus/Deficit	3439	2638	410	1048	640	-62	460	-1885	-1110	-673	-1224	-657	571	456	163
1945 Federal Surplus/Deficit	2079	526	186	759	606	-60	-1864	-1468	-823	-604	-947	2299	3647	1810	468
1946 Federal Surplus/Deficit	2254	1793	-2.1	1064	616	11	901	859	2319	2882	3795	5242	3780	3278	1953
1947 Federal Surplus/Deficit	3740	2422	634	930	590	2978	3198	2375	2588	1272	2672	4392	3463	2911	2426
1948 Federal Surplus/Deficit	3752	1841	465	3105	1573	1869	3079	-61	1181	1507	3612	6385	7137	3707	2816
1949 Federal Surplus/Deficit	3338	3819	1349	1221	509	626	1023	-220	3405	1569	4514	5280	3295	1150	2021
1950 Federal Surplus/Deficit	2045	563	-196	957	429	-271	1280	2788	4154	3955	3710	4149	6227	3828	2374
1951 Federal Surplus/Deficit	2957	3270	792	1948	2074	3946	4578	4558	2826	3811	4242	5287	2664	3743	3296
1952 Federal Surplus/Deficit	3437	3375	1089	2566	762	2284	2852	1294	1589	4038	4426	6289	3599	2149	2676
1953 Federal Surplus/Deficit	3455	1694	343	919	696	-31	261	2407	-205	-598	1025	3830	5998	3907	1743
1954 Federal Surplus/Deficit	3580	2477	666	1199	680	1325	1887	2648	1173	3234	2499	4621	5477	4621	2516
1955 Federal Surplus/Deficit	4567	3578	3263	1788	1192	1455	-103	-1563	-1047	341	-135	1780	6794	5685	1952
1956 Federal Surplus/Deficit	3353	3750	558	1661	1473	3619	5118	1810	3541	4001	5904	6336	6788	4075	3624
1957 Federal Surplus/Deficit	3710	2983	609	1323	478	1493	1588	-923	804	4584	2795	5881	6498	2342	2261
1958 Federal Surplus/Deficit	2606	1255	254	1059	607	102	1107	1344	1390	576	3404	5241	4959	1910	1824
1959 Federal Surplus/Deficit	2636	1533	351	949	1094	2249	4595	2985	1412	2737	1932	3514	5438	4438	2620
1960 Federal Surplus/Deficit	3452	2805	3046	3738	2559	3124	2842	-14	1230	5849	3749	3061	3790	2939	2853
1961 Federal Surplus/Deficit	3746	1405	419	1101	816	593	1640	2031	2078	2777	2766	3774	6359	2487	2220
1962 Federal Surplus/Deficit	2815	1901	63	1017	589	-152	1521	-967	-649	4180	4445	3216	2928	3162	1450
1963 Federal Surplus/Deficit	3266	2319	298	1520	1236	2224	1842	588	487	428	692	4041	3557	2882	1836
1964 Federal Surplus/Deficit	3975	2532	740	842	646	217	1388	-206	-694	1514	1568	2815	6465	5203	1851
1965 Federal Surplus/Deficit	3484	3215	1340	1913	773	3843	5638	4170	3086	2517	4343	5061	4353	2445	3283
1966 Federal Surplus/Deficit	3548	2988	696	1452	821	1418	2498	-474	-394	3213	1411	3134	2386	3252	1697
1967 Federal Surplus/Deficit	3787	2154	161	913	586	560	2909	3575	553	2145	913	1890	6016	4519	2182
1968 Federal Surplus/Deficit	3548	2887	798	1267	711	1255	2402	1654	1362	-895	792	2027	4166	4178	1915
1969 Federal Surplus/Deficit	3709	3027	1739	2035	1613	2105	4451	3114	1844	4994	4480	6132	4032	3119	3191
1970 Federal Surplus/Deficit	3650	1750	340	1038	711	382	2020	1587	-182	-431	1592	3070	4532	1268	1504
1971 Federal Surplus/Deficit	2460	1407	71	1038	810	256	3670	5144	2594	3251	3957	6490	6241	4405	3021
1972 Federal Surplus/Deficit	3665	3902	964	1121	726	1399	3472	4753	5169	5492	2427	6191	6682	4825	3587
1973 Federal Surplus/Deficit	4215	3597	1417	1287	592	1633	2857	-1606	-758	-1034	-990	252	1594	1604	981
1974 Federal Surplus/Deficit	2353	710	-28	665	294	2441	6128	5099	3911	4794	5396	5610	6810	6066	3635
1975 Federal Surplus/Deficit	3729	3872	1363	804	613	489	2276	1150	2611	1591	1842	3954	4983	5097	2405
1976 Federal Surplus/Deficit	2557	1853	738	1695	1886	4715	4480	2992	2013	4736	3510	5697	3062	4638	3187
1977 Federal Surplus/Deficit	5126	4801	3889	1441	619	119	486	-1977	-1437	-1170	-1513	98	219	434	626
1978 Federal Surplus/Deficit	2391	526	-55	492	404	302	1606	50	2471	1595	2331	3473	2725	3271	1513
-Ranked Averages-															
Top Ten Percent	3163	2970	726	1461	1068	3050	4987	4078	3707	4123	4462	5697	5459	4231	3485
Middle Eighty Percent	3182	2116	707	1279	796	1073	1863	722	889	1897	2246	3766	4092	3053	1913
Bottom Ten Percent	2869	1562	199	941	662	-22	-1021	-1706	-799	-419	-993	-472	990	1254	128

Exhibit 28: OY 2008 Monthly 50-WY Energy

Federal Surplus/Deficit by Water Year
PNW Loads and Resources Study
2007 - 2008 Operating Year
2003 White Book

3/31/2004

Average Energy in Megawatts	*Aug1*	*Aug16*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr1*	*Apr16*	*May*	*Jun*	*Jul*	*Avg*
1929 Federal Surplus/Deficit	2871	842	-269	373	149	-436	168	-1836	-618	-644	-978	-86	2147	1764	200
1930 Federal Surplus/Deficit	1502	620	-381	549	310	-456	-1915	-865	-566	-273	-564	-140	2052	1991	102
1931 Federal Surplus/Deficit	1971	882	-257	493	275	-410	-1866	-1811	-788	256	-1199	374	1565	1091	-31
1932 Federal Surplus/Deficit	1838	414	-232	404	161	-501	-1837	-1964	613	3164	4900	5335	4890	2918	1245
1933 Federal Surplus/Deficit	3145	2238	-38	560	-87	430	2666	1918	-603	617	1453	3679	7174	5294	2060
1934 Federal Surplus/Deficit	2680	2997	561	1680	1645	4763	5827	4238	2679	5863	5155	4786	1391	2537	3205
1935 Federal Surplus/Deficit	1245	-84	-422	303	-126	-24	2122	2576	-1105	409	2152	2952	3744	2901	1232
1936 Federal Surplus/Deficit	2679	898	-249	499	184	-446	-1163	-1797	-388	-382	1851	6480	3392	1864	908
1937 Federal Surplus/Deficit	2414	652	-347	544	234	-467	-1653	-1623	-617	-420	-706	328	1531	1345	20
1938 Federal Surplus/Deficit	2018	272	-355	706	104	-377	2926	-117	1654	2521	2640	5531	4126	2483	1701
1939 Federal Surplus/Deficit	1772	480	53	620	180	-477	561	-1511	-45	452	1216	4193	2058	1971	797
1940 Federal Surplus/Deficit	2600	773	-339	734	127	-262	-89	-718	1881	1372	1972	2856	2801	1350	975
1941 Federal Surplus/Deficit	1675	346	-389	520	7.0	135	465	-1770	-522	-780	-804	952	2371	707	224
1942 Federal Surplus/Deficit	1446	487	-15	462	-114	1711	3075	-1144	-1110	-73	667	2590	5329	3449	1292
1943 Federal Surplus/Deficit	3123	2186	-50	521	12	-50	2297	1588	2312	5508	4794	5469	5124	3557	2382
1944 Federal Surplus/Deficit	2908	2106	-54	626	211	-500	541	-1762	-1039	-592	-1144	-106	1294	542	116
1945 Federal Surplus/Deficit	1537	-22	-274	333	179	-494	-1795	-1345	-752	-521	-877	2849	4377	1912	421
1946 Federal Surplus/Deficit	1710	1250	-463	638	189	-425	978	993	2404	2982	3888	5823	4527	3383	1913
1947 Federal Surplus/Deficit	3214	1884	175	506	160	2532	3306	2514	2677	1373	2765	4960	4211	3016	2390
1948 Federal Surplus/Deficit	3220	1296	5.8	2696	1144	1441	3175	68	1268	1604	3706	6962	7889	3827	2782
1949 Federal Surplus/Deficit	2810	3295	892	801	80	188	1113	-94	3492	1661	4613	5845	4033	1242	1982
1950 Federal Surplus/Deficit	1503	13	-658	531	1	-704	1374	2928	4248	4050	3807	4723	6976	3937	2337
1951 Federal Surplus/Deficit	2424	2741	333	1530	1640	3519	4687	4715	2912	3910	4343	5867	3396	3854	3263
1952 Federal Surplus/Deficit	2908	2846	633	2153	336	1849	2949	1434	1667	4131	4515	6865	4333	2251	2639
1953 Federal Surplus/Deficit	2925	1148	-119	495	270	-463	330	2553	-123	-501	1109	4398	6737	4015	1703
1954 Federal Surplus/Deficit	3052	1942	208	779	255	889	1980	2798	1258	3334	2582	5200	6234	4737	2483
1955 Federal Surplus/Deficit	4046	3052	2824	1373	766	1028	-22	-1436	-972	430	-44	2336	7550	5808	1916
1956 Federal Surplus/Deficit	2824	3223	100	1245	1041	3188	5227	1955	3624	4109	6006	6913	7540	4189	3592
1957 Federal Surplus/Deficit	3182	2451	150	903	49	1056	1680	-798	883	4679	2889	6458	7251	2438	2223
1958 Federal Surplus/Deficit	2067	708	-206	635	180	-337	1197	1477	1481	667	3491	5806	5712	2003	1785
1959 Federal Surplus/Deficit	2096	989	-109	529	664	1815	4700	3144	1492	2842	2028	4090	6189	4547	2587
1960 Federal Surplus/Deficit	2924	2273	2603	3328	2130	2700	2952	125	1309	5967	3855	3630	4529	3043	2822
1961 Federal Surplus/Deficit	3219	859	-37	681	390	157	1736	2177	2168	2883	2858	4357	7119	2586	2187
1962 Federal Surplus/Deficit	2280	1360	-397	597	161	-588	1613	-832	-577	4274	4553	3785	3663	3269	1411
1963 Federal Surplus/Deficit	2738	1779	-162	1100	808	1792	1940	725	560	521	783	4596	4291	2987	1796
1964 Federal Surplus/Deficit	3448	1993	283	420	218	-219	1481	-66	-620	1596	1654	3376	7211	5324	1813
1965 Federal Surplus/Deficit	2957	2685	886	1498	349	3398	5744	4320	3171	2612	4436	5632	5082	2542	3247
1966 Federal Surplus/Deficit	3020	2454	237	1032	396	980	2594	-330	-321	3320	1502	3699	3123	3359	1660
1967 Federal Surplus/Deficit	3262	1609	-299	492	159	126	3008	3733	640	2254	1003	2450	6766	4632	2148
1968 Federal Surplus/Deficit	3021	2357	342	847	284	817	2495	1799	1448	-810	883	2577	4912	4284	1878
1969 Federal Surplus/Deficit	3184	2496	1288	1619	1184	1674	4553	3270	1922	5101	4582	6711	4784	3223	3159
1970 Federal Surplus/Deficit	3118	1208	-119	618	284	-55	2098	1727	-101	-336	1694	3628	5260	1362	1462
1971 Federal Surplus/Deficit	1922	860	-394	613	379	-184	3761	5298	2674	3344	4055	7065	6985	4514	2983
1972 Federal Surplus/Deficit	3139	3377	506	698	296	960	3563	4907	5265	5608	2527	6767	7429	4946	3555
1973 Federal Surplus/Deficit	3693	3072	961	867	163	1196	2949	-1479	-685	-943	-902	799	2328	1698	938
1974 Federal Surplus/Deficit	1815	163	-488	236	-138	1998	6235	5258	4002	4898	5498	6182	7558	6187	3601
1975 Federal Surplus/Deficit	3203	3348	908	380	184	50	2368	1294	2692	1690	1930	4521	5715	5209	2367
1976 Federal Surplus/Deficit	2024	1315	279	1275	1453	4286	4586	3145	2096	4839	3606	6270	3790	4753	3152
1977 Federal Surplus/Deficit	4611	4280	3453	1023	190	-317	569	-1852	-1364	-1086	-1429	656	949	522	585
1978 Federal Surplus/Deficit	1851	-19	-515	64	-26	-145	1686	176	2559	1702	2428	4043	3451	3374	1471
-Ranked Averages-															
Top Ten Percent	2632	2438	267	1042	638	2613	5091	4231	3795	4227	4562	6272	6201	4344	3452
Middle Eighty Percent	2650	1578	250	858	368	639	1955	861	970	1993	2338	4333	4832	3157	1875
Bottom Ten Percent	2333	1020	-261	517	236	-454	-945	-1579	-726	-335	-918	74	1718	1347	81

Exhibit 29: OY 2009 Monthly 50-WY Energy

Federal Surplus/Deficit by Water Year
PNW Loads and Resources Study
2008 - 2009 Operating Year
2003 White Book

3/31/2004

Average Energy in Megawatts	*Aug1*	*Aug16*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr1*	*Apr16*	*May*	*Jun*	*Jul*	*Avg*
1929 Federal Surplus/Deficit	2960	925	-185	460	223	-368	131	-1931	-653	-675	-997	-572	1497	1755	122
1930 Federal Surplus/Deficit	1588	703	-298	633	386	-387	-1957	-958	-600	-302	-583	-627	1402	1983	23
1931 Federal Surplus/Deficit	2059	967	-174	577	351	-340	-1907	-1906	-823	229	-1219	-111	917	1084	-110
1932 Federal Surplus/Deficit	1926	498	-149	489	236	-434	-1879	-2059	581	3139	4893	4858	4246	2911	1169
1933 Federal Surplus/Deficit	3234	2325	46	646	-11	499	2635	1834	-635	592	1440	3201	6531	5290	1986
1934 Federal Surplus/Deficit	2769	3087	648	1770	1721	4840	5798	4156	2653	5841	5148	4310	739	2529	3132
1935 Federal Surplus/Deficit	1333	0.6	-337	388	-51	44	2091	2494	-1136	382	2140	2470	3097	2895	1157
1936 Federal Surplus/Deficit	2768	984	-165	585	260	-377	-1201	-1892	-422	-411	1840	6003	2747	1856	832
1937 Federal Surplus/Deficit	2502	736	-263	629	310	-398	-1693	-1717	-652	-449	-724	-161	879	1336	-58
1938 Federal Surplus/Deficit	2106	358	-271	791	180	-308	2894	-205	1625	2496	2629	5055	3479	2477	1626
1939 Federal Surplus/Deficit	1859	563	138	706	254	-409	528	-1604	-78	425	1203	3713	1407	1963	720
1940 Federal Surplus/Deficit	2688	857	-256	821	204	-194	-127	-811	1853	1345	1964	2374	2151	1342	899
1941 Federal Surplus/Deficit	1762	431	-306	606	83	205	425	-1864	-556	-806	-817	468	1721	697	147
1942 Federal Surplus/Deficit	1533	572	69	548	-38	1779	3047	-1236	-1145	-100	654	2109	4685	3444	1216
1943 Federal Surplus/Deficit	3212	2273	35	607	86	18	2265	1500	2284	5485	4785	4993	4479	3550	2308
1944 Federal Surplus/Deficit	2996	2193	30	712	285	-432	504	-1857	-1075	-623	-1161	-591	642	531	38
1945 Federal Surplus/Deficit	1623	61	-191	417	254	-426	-1837	-1440	-787	-552	-897	2369	3731	1905	343
1946 Federal Surplus/Deficit	1796	1336	-380	722	264	-356	941	905	2376	2957	3879	5347	3884	3376	1839
1947 Federal Surplus/Deficit	3303	1971	260	592	235	2600	3278	2429	2650	1348	2756	4483	3567	3009	2316
1948 Federal Surplus/Deficit	3308	1381	90	2787	1219	1513	3145	-23	1240	1578	3696	6486	7245	3823	2709
1949 Federal Surplus/Deficit	2899	3384	978	889	155	256	1080	-187	3465	1636	4604	5367	3387	1234	1907
1950 Federal Surplus/Deficit	1589	96	-575	616	76	-635	1341	2841	4222	4026	3798	4247	6333	3932	2263
1951 Federal Surplus/Deficit	2512	2829	417	1619	1715	3594	4659	4634	2885	3885	4335	5391	2750	3849	3191
1952 Federal Surplus/Deficit	2997	2934	719	2243	412	1919	2919	1349	1636	4106	4505	6389	3688	2245	2566
1953 Federal Surplus/Deficit	3014	1233	-35	580	345	-394	290	2470	-152	-527	1096	3920	6094	4009	1628
1954 Federal Surplus/Deficit	3141	2029	293	867	331	958	1949	2714	1230	3309	2571	4724	5591	4733	2410
1955 Federal Surplus/Deficit	4137	3141	2914	1462	842	1098	-59	-1531	-1007	404	-53	1853	6907	5804	1842
1956 Federal Surplus/Deficit	2913	3312	185	1333	1116	3262	5198	1871	3596	4086	5999	6437	6897	4184	3519
1957 Federal Surplus/Deficit	3272	2539	235	991	124	1125	1647	-891	854	4654	2880	5982	6608	2430	2148
1958 Federal Surplus/Deficit	2155	792	-123	721	255	-270	1164	1388	1454	641	3481	5328	5070	1994	1710
1959 Federal Surplus/Deficit	2183	1074	-25	616	739	1885	4671	3062	1462	2818	2018	3614	5547	4542	2513
1960 Federal Surplus/Deficit	3013	2361	2693	3419	2206	2773	2923	36	1279	5946	3847	3152	3885	3036	2749
1961 Federal Surplus/Deficit	3309	942	48	768	466	225	1703	2093	2141	2859	2847	3881	6477	2579	2113
1962 Federal Surplus/Deficit	2368	1445	-314	683	235	-521	1581	-921	-612	4248	4546	3307	3017	3263	1335
1963 Federal Surplus/Deficit	2828	1866	-78	1188	884	1863	1910	639	526	495	771	4117	3646	2981	1721
1964 Federal Surplus/Deficit	3537	2080	368	506	292	-151	1448	-155	-655	1568	1642	2897	6568	5320	1738
1965 Federal Surplus/Deficit	3046	2773	972	1588	425	3468	5715	4238	3143	2586	4428	5156	4437	2534	3174
1966 Federal Surplus/Deficit	3110	2541	322	1120	472	1048	2563	-417	-355	3296	1492	3221	2476	3353	1585
1967 Federal Surplus/Deficit	3352	1694	-216	578	234	194	2978	3651	611	2230	991	1972	6123	4627	2074
1968 Federal Surplus/Deficit	3111	2445	427	934	360	885	2465	1715	1421	-839	871	2094	4269	4278	1803
1969 Federal Surplus/Deficit	3274	2584	1376	1708	1259	1745	4524	3188	1893	5078	4574	6234	4141	3217	3087
1970 Federal Surplus/Deficit	3206	1293	-35	706	359	12	2063	1642	-133	-363	1684	3148	4614	1354	1387
1971 Federal Surplus/Deficit	2010	943	-311	698	453	-116	3730	5216	2646	3319	4047	6589	6341	4508	2910
1972 Federal Surplus/Deficit	3229	3466	591	785	371	1028	3533	4825	5239	5587	2518	6291	6787	4942	3483
1973 Federal Surplus/Deficit	3783	3161	1047	954	237	1265	2918	-1573	-719	-971	-916	313	1679	1689	862
1974 Federal Surplus/Deficit	1903	246	-406	320	-63	2067	6206	5177	3975	4875	5491	5706	6915	6183	3528
1975 Federal Surplus/Deficit	3293	3437	994	466	258	117	2336	1209	2663	1665	1919	4044	5071	5205	2293
1976 Federal Surplus/Deficit	2112	1401	365	1363	1528	4362	4557	3062	2069	4816	3597	5794	3144	4748	3080
1977 Federal Surplus/Deficit	4702	4370	3544	1110	264	-249	532	-1947	-1400	-1117	-1445	171	297	511	507
1978 Federal Surplus/Deficit	1938	65	-431	148	49	-79	1651	85	2532	1678	2418	3566	2805	3368	1395
-Ranked Averages-															
Top Ten Percent	2721	2525	352	1129	713	2684	5062	4149	3768	4204	4554	5796	5557	4338	3379
Middle Eighty Percent	2739	1664	335	945	443	708	1922	773	939	1967	2327	3854	4187	3151	1801
Bottom Ten Percent	2421	1105	-178	602	311	-385	-984	-1674	-760	-364	-937	-412	1067	1338	3.1

Exhibit 30: OY 2010 Monthly 50-WY Energy

Federal Surplus/Deficit by Water Year
PNW Loads and Resources Study
2009 - 2010 Operating Year
2003 White Book

3/31/2004

Average Energy in Megawatts	*Aug1*	*Aug16*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr1*	*Apr16*	*May*	*Jun*	*Jul*	*Avg*
1929 Federal Surplus/Deficit	2866	826	-286	360	117	-480	11	-2048	-764	-774	-1097	-196	2047	1664	111
1930 Federal Surplus/Deficit	1491	604	-398	531	281	-498	-2082	-1072	-710	-399	-684	-252	1952	1893	13
1931 Federal Surplus/Deficit	1963	869	-275	475	246	-451	-2032	-2023	-934	133	-1321	265	1468	994	-120
1932 Federal Surplus/Deficit	1831	399	-249	387	131	-548	-2005	-2176	473	3045	4804	5243	4802	2822	1160
1933 Federal Surplus/Deficit	3140	2228	-53	547	-116	387	2522	1729	-743	499	1345	3584	7088	5204	1980
1934 Federal Surplus/Deficit	2675	2993	551	1673	1616	4738	5686	4053	2550	5751	5060	4696	1287	2439	3127
1935 Federal Surplus/Deficit	1237	-98	-436	286	-156	-69	1976	2389	-1243	287	2047	2851	3649	2807	1149
1936 Federal Surplus/Deficit	2674	887	-265	484	156	-487	-1323	-2008	-532	-508	1746	6388	3302	1766	823
1937 Federal Surplus/Deficit	2406	637	-364	528	205	-509	-1817	-1833	-762	-547	-824	213	1427	1246	-69
1938 Federal Surplus/Deficit	2011	260	-372	690	76	-419	2779	-315	1520	2402	2537	5441	4033	2388	1619
1939 Federal Surplus/Deficit	1764	464	38	607	148	-521	412	-1719	-187	330	1107	4096	1956	1873	711
1940 Federal Surplus/Deficit	2594	759	-356	721	100	-305	-249	-926	1749	1249	1874	2755	2701	1251	890
1941 Federal Surplus/Deficit	1666	332	-406	507	-21	95	302	-1980	-667	-901	-911	847	2272	606	137
1942 Federal Surplus/Deficit	1437	473	-32	447	-142	1667	2935	-1350	-1256	-196	559	2489	5240	3356	1207
1943 Federal Surplus/Deficit	3119	2176	-66	507	-20	-94	2151	1389	2179	5393	4695	5379	5034	3462	2301
1944 Federal Surplus/Deficit	2902	2097	-71	612	179	-544	383	-1975	-1187	-722	-1260	-213	1191	438	27
1945 Federal Surplus/Deficit	1526	-38	-291	315	148	-538	-1963	-1557	-899	-650	-999	2751	4285	1816	332
1946 Federal Surplus/Deficit	1699	1238	-481	621	159	-467	821	794	2273	2863	3788	5733	4439	3288	1831
1947 Federal Surplus/Deficit	3209	1874	161	492	130	2488	3165	2321	2546	1254	2664	4868	4123	2921	2310
1948 Federal Surplus/Deficit	3213	1283	-9.8	2691	1114	1404	3031	-136	1137	1483	3605	6872	7801	3737	2703
1949 Federal Surplus/Deficit	2805	3289	879	790	50	143	963	-302	3361	1541	4514	5751	3941	1143	1900
1950 Federal Surplus/Deficit	1492	-4.1	-676	515	-29	-746	1226	2733	4120	3933	3708	4632	6890	3845	2256
1951 Federal Surplus/Deficit	2417	2734	318	1522	1609	3488	4547	4530	2781	3792	4245	5777	3304	3762	3186
1952 Federal Surplus/Deficit	2903	2839	621	2147	308	1809	2805	1242	1530	4013	4414	6775	4243	2157	2560
1953 Federal Surplus/Deficit	2920	1134	-136	479	240	-505	167	2364	-258	-622	1001	4304	6650	3922	1620
1954 Federal Surplus/Deficit	3047	1933	194	768	226	846	1834	2609	1125	3216	2478	5110	6148	4647	2404
1955 Federal Surplus/Deficit	4045	3047	2820	1365	738	989	-180	-1647	-1119	309	-145	2233	7464	5718	1834
1956 Federal Surplus/Deficit	2819	3217	85	1236	1010	3155	5086	1765	3492	3995	5911	6823	7454	4097	3514
1957 Federal Surplus/Deficit	3178	2443	136	892	18	1015	1531	-1006	749	4560	2788	6368	7165	2341	2141
1958 Federal Surplus/Deficit	2059	692	-223	621	149	-383	1047	1278	1351	546	3389	5712	5627	1904	1702
1959 Federal Surplus/Deficit	2087	976	-126	516	634	1775	4559	2959	1355	2725	1927	4000	6104	4454	2507
1960 Federal Surplus/Deficit	2920	2265	2599	3323	2102	2666	2811	-74	1173	5856	3758	3536	4439	2948	2744
1961 Federal Surplus/Deficit	3215	843	-51	669	361	112	1588	1987	2037	2766	2753	4267	7034	2490	2107
1962 Federal Surplus/Deficit	2273	1348	-415	584	129	-634	1464	-1033	-723	4154	4457	3691	3571	3175	1327
1963 Federal Surplus/Deficit	2734	1769	-178	1090	779	1753	1797	531	415	400	678	4499	4201	2892	1714
1964 Federal Surplus/Deficit	3443	1983	269	406	186	-264	1332	-266	-765	1472	1548	3281	7125	5234	1730
1965 Federal Surplus/Deficit	2953	2678	874	1491	320	3357	5603	4134	3039	2492	4337	5542	4991	2445	3169
1966 Federal Surplus/Deficit	3016	2446	223	1021	368	936	2449	-527	-465	3204	1399	3605	3029	3265	1578
1967 Federal Surplus/Deficit	3259	1595	-316	478	128	82	2864	3547	506	2138	896	2355	6680	4540	2067
1968 Federal Surplus/Deficit	3017	2350	328	835	256	774	2350	1609	1317	-936	777	2473	4826	4190	1797
1969 Federal Surplus/Deficit	3181	2489	1280	1611	1154	1636	4412	3084	1788	4987	4485	6620	4697	3128	3082
1970 Federal Surplus/Deficit	3111	1194	-136	607	254	-101	1944	1535	-240	-459	1593	3531	5168	1264	1379
1971 Federal Surplus/Deficit	1914	843	-412	597	347	-228	3616	5113	2541	3225	3957	6975	6898	4421	2903
1972 Federal Surplus/Deficit	3136	3372	492	685	266	916	3418	4721	5138	5497	2428	6677	7344	4856	3477
1973 Federal Surplus/Deficit	3691	3067	948	855	132	1154	2804	-1689	-830	-1068	-1012	690	2229	1599	853
1974 Federal Surplus/Deficit	1808	146	-507	217	-170	1955	6094	5073	3873	4783	5402	6092	7472	6097	3522
1975 Federal Surplus/Deficit	3199	3343	896	365	151	4.7	2221	1101	2558	1571	1826	4428	5625	5119	2287
1976 Federal Surplus/Deficit	2017	1305	266	1265	1423	4258	4445	2958	1965	4724	3507	6180	3697	4662	3074
1977 Federal Surplus/Deficit	4610	4276	3451	1012	158	-361	412	-2064	-1513	-1216	-1543	548	845	418	497
1978 Federal Surplus/Deficit	1842	-34	-532	46	-57	-193	1532	-28	2429	1586	2327	3951	3357	3280	1387
-Ranked Averages-															
Top Ten Percent	2626	2429	252	1030	607	2574	4950	4044	3665	4112	4465	6182	6113	4252	3374
Middle Eighty Percent	2644	1567	236	846	338	597	1806	663	833	1873	2235	4238	4742	3062	1793
Bottom Ten Percent	2326	1007	-279	501	206	-496	-1108	-1790	-871	-462	-1037	-37	1617	1247	-7.8

Exhibit 31: OY 2011 Monthly 50-WY Energy

Federal Surplus/Deficit by Water Year
PNW Loads and Resources Study
2010 - 2011 Operating Year
2003 White Book

3/31/2004

Average Energy in Megawatts	*Aug1*	*Aug16*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr1*	*Apr16*	*May*	*Jun*	*Jul*	*Avg*
1929 Federal Surplus/Deficit	2857	812	-300	342	93	-510	-17	-2078	-788	-804	-1124	-690	1386	1643	-4.1
1930 Federal Surplus/Deficit	1479	590	-413	511	259	-528	-2113	-1099	-734	-428	-712	-747	1291	1874	-103
1931 Federal Surplus/Deficit	1953	856	-290	454	223	-481	-2063	-2052	-958	106	-1349	-228	807	975	-236
1932 Federal Surplus/Deficit	1820	385	-264	367	108	-580	-2036	-2205	451	3020	4788	4757	4146	2803	1046
1933 Federal Surplus/Deficit	3130	2217	-67	528	-138	357	2500	1710	-765	474	1324	3097	6433	5187	1868
1934 Federal Surplus/Deficit	2666	2983	540	1658	1594	4715	5666	4035	2533	5728	5043	4211	624	2420	3017
1935 Federal Surplus/Deficit	1226	-112	-449	266	-179	-101	1953	2371	-1264	261	2027	2361	2991	2789	1037
1936 Federal Surplus/Deficit	2665	875	-278	466	133	-517	-1351	-2037	-555	-536	1726	5902	2646	1747	710
1937 Federal Surplus/Deficit	2396	624	-378	509	183	-539	-1848	-1862	-785	-576	-850	-283	764	1226	-185
1938 Federal Surplus/Deficit	2000	248	-386	671	54	-449	2756	-338	1501	2377	2518	4956	3376	2370	1507
1939 Federal Surplus/Deficit	1753	451	25	588	125	-552	388	-1745	-209	303	1085	3609	1294	1853	598
1940 Federal Surplus/Deficit	2584	745	-370	702	78	-336	-277	-953	1731	1223	1856	2266	2040	1232	776
1941 Federal Surplus/Deficit	1656	319	-420	488	-43	65	272	-2008	-690	-927	-932	356	1611	585	23
1942 Federal Surplus/Deficit	1425	460	-46	428	-165	1637	2914	-1376	-1280	-223	537	2000	4583	3339	1094
1943 Federal Surplus/Deficit	3109	2165	-79	489	-43	-125	2129	1366	2161	5369	4677	4894	4377	3443	2189
1944 Federal Surplus/Deficit	2892	2086	-86	594	155	-575	355	-2004	-1212	-752	-1285	-706	529	417	-88
1945 Federal Surplus/Deficit	1515	-52	-306	295	125	-569	-1995	-1586	-924	-680	-1026	2262	3628	1797	217
1946 Federal Surplus/Deficit	1688	1227	-495	601	136	-497	794	770	2255	2838	3770	5247	3783	3269	1719
1947 Federal Surplus/Deficit	3200	1863	148	474	107	2457	3145	2301	2529	1229	2646	4381	3468	2903	2199
1948 Federal Surplus/Deficit	3204	1270	-23	2676	1091	1376	3010	-161	1119	1457	3587	6387	7146	3720	2592
1949 Federal Surplus/Deficit	2795	3280	867	773	27	112	939	-328	3344	1516	4497	5265	3284	1123	1787
1950 Federal Surplus/Deficit	1481	-19	-691	496	-52	-776	1203	2712	4104	3907	3690	4146	6235	3827	2144
1951 Federal Surplus/Deficit	2407	2724	305	1506	1586	3462	4526	4513	2764	3767	4228	5291	2646	3744	3076
1952 Federal Surplus/Deficit	2894	2828	609	2131	285	1780	2784	1222	1510	3988	4396	6290	3586	2138	2449
1953 Federal Surplus/Deficit	2910	1121	-150	460	217	-535	137	2345	-278	-648	980	3817	5994	3904	1508
1954 Federal Surplus/Deficit	3038	1922	181	751	203	816	1812	2590	1107	3190	2459	4624	5493	4630	2293
1955 Federal Surplus/Deficit	4036	3037	2812	1349	716	960	-208	-1676	-1143	283	-163	1743	6809	5702	1722
1956 Federal Surplus/Deficit	2809	3207	72	1220	987	3128	5066	1746	3474	3971	5894	6337	6799	4079	3404
1957 Federal Surplus/Deficit	3168	2433	123	875	-5.3	985	1507	-1032	730	4535	2770	5883	6510	2321	2029
1958 Federal Surplus/Deficit	2048	678	-238	603	126	-415	1023	1255	1334	519	3370	5226	4972	1884	1590
1959 Federal Surplus/Deficit	2076	963	-140	499	611	1746	4539	2941	1336	2701	1908	3514	5449	4436	2396
1960 Federal Surplus/Deficit	2910	2255	2590	3308	2080	2640	2791	-97	1153	5833	3740	3049	3783	2930	2633
1961 Federal Surplus/Deficit	3206	829	-64	652	338	80	1564	1968	2020	2741	2732	3781	6379	2471	1995
1962 Federal Surplus/Deficit	2263	1335	-429	566	105	-666	1440	-1057	-747	4128	4441	3205	2914	3156	1214
1963 Federal Surplus/Deficit	2725	1758	-193	1073	756	1725	1775	511	392	374	657	4011	3544	2874	1602
1964 Federal Surplus/Deficit	3434	1972	256	387	162	-296	1308	-290	-789	1445	1527	2793	6470	5218	1617
1965 Federal Surplus/Deficit	2944	2667	862	1476	298	3328	5582	4116	3021	2466	4320	5057	4334	2426	3058
1966 Federal Surplus/Deficit	3007	2435	211	1004	346	905	2427	-549	-489	3180	1379	3118	2371	3247	1466
1967 Federal Surplus/Deficit	3250	1582	-330	459	105	51	2843	3529	486	2113	875	1868	6025	4523	1956
1968 Federal Surplus/Deficit	3008	2340	315	818	233	743	2328	1590	1299	-965	756	1982	4171	4172	1685
1969 Federal Surplus/Deficit	3172	2479	1270	1596	1132	1607	4392	3066	1769	4963	4468	6135	4042	3110	2972
1970 Federal Surplus/Deficit	3101	1181	-150	589	230	-132	1918	1516	-261	-485	1574	3043	4511	1245	1266
1971 Federal Surplus/Deficit	1904	829	-427	578	323	-259	3594	5095	2523	3199	3939	6489	6243	4404	2792
1972 Federal Surplus/Deficit	3127	3362	479	667	243	885	3396	4703	5122	5474	2410	6191	6688	4840	3367
1973 Federal Surplus/Deficit	3682	3058	935	838	108	1124	2782	-1717	-854	-1096	-1035	197	1569	1579	739
1974 Federal Surplus/Deficit	1797	132	-522	197	-193	1924	6074	5056	3856	4759	5386	5607	6816	6080	3411
1975 Federal Surplus/Deficit	3190	3334	883	347	127	-27	2199	1081	2539	1546	1806	3942	4969	5102	2175
1976 Federal Surplus/Deficit	2007	1293	253	1249	1399	4234	4424	2940	1947	4700	3489	5695	3039	4645	2964
1977 Federal Surplus/Deficit	4602	4267	3443	995	134	-392	385	-2093	-1538	-1246	-1568	55	182	395	383
1978 Federal Surplus/Deficit	1831	-48	-547	26	-81	-225	1506	-53	2411	1561	2309	3465	2700	3262	1274
-Ranked Averages-															
Top Ten Percent	2617	2418	239	1013	584	2545	4929	4027	3647	4088	4447	5696	5457	4234	3263
Middle Eighty Percent	2635	1555	223	828	315	567	1782	640	812	1847	2216	3751	4085	3044	1681
Bottom Ten Percent	2315	994	-293	482	183	-527	-1137	-1819	-895	-491	-1064	-531	955	1227	-123

Exhibit 32: OY 2012 Monthly 50-WY Energy

Federal Surplus/Deficit by Water Year
PNW Loads and Resources Study
2011 - 2012 Operating Year
2003 White Book

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Average Energy in Megawatts	*Aug1*	*Aug16*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr1*	*Apr16*	*May*	*Jun*	*Jul*	*Avg*
1929 Federal Surplus/Deficit	2841	793	-313	277	-4.8	-631	-32	-1996	-812	-819	-1142	-253	1970	1607	54
1930 Federal Surplus/Deficit	1462	572	-427	445	162	-648	-2131	-1015	-757	-443	-730	-311	1874	1838	-45
1931 Federal Surplus/Deficit	1937	838	-304	389	126	-601	-2080	-1971	-982	93	-1368	209	1390	939	-178
1932 Federal Surplus/Deficit	1804	366	-278	302	11	-702	-2054	-2124	430	3007	4776	5199	4732	2768	1105
1933 Federal Surplus/Deficit	3114	2201	-79	464	-235	236	2490	1799	-787	461	1311	3539	7019	5152	1928
1934 Federal Surplus/Deficit	2650	2966	529	1596	1498	4600	5655	4124	2514	5715	5032	4653	1205	2384	3078
1935 Federal Surplus/Deficit	1210	-130	-461	201	-276	-222	1942	2461	-1285	248	2014	2801	3576	2753	1097
1936 Federal Surplus/Deficit	2649	858	-291	401	37	-638	-1366	-1955	-578	-550	1715	6343	3232	1712	769
1937 Federal Surplus/Deficit	2380	606	-392	443	86	-659	-1865	-1779	-808	-591	-867	152	1346	1190	-127
1938 Federal Surplus/Deficit	1984	231	-399	606	-42	-569	2745	-252	1481	2364	2507	5398	3962	2334	1567
1939 Federal Surplus/Deficit	1737	433	12	524	28	-673	376	-1662	-231	290	1071	4050	1876	1818	657
1940 Federal Surplus/Deficit	2568	727	-384	638	-19	-457	-292	-870	1712	1210	1845	2706	2622	1196	836
1941 Federal Surplus/Deficit	1640	301	-434	424	-139	-54	256	-1926	-714	-940	-946	794	2195	549	82
1942 Federal Surplus/Deficit	1409	442	-59	363	-261	1517	2904	-1292	-1304	-236	525	2440	5170	3303	1154
1943 Federal Surplus/Deficit	3093	2148	-92	424	-140	-246	2118	1454	2142	5356	4665	5336	4964	3407	2250
1944 Federal Surplus/Deficit	2876	2070	-99	529	57	-696	341	-1922	-1236	-767	-1301	-268	1111	380	-30
1945 Federal Surplus/Deficit	1499	-71	-320	230	27	-690	-2012	-1504	-948	-695	-1044	2704	4214	1761	276
1946 Federal Surplus/Deficit	1671	1210	-509	536	39	-617	780	857	2236	2825	3758	5689	4370	3234	1779
1947 Federal Surplus/Deficit	3184	1846	136	410	9.6	2338	3135	2390	2510	1216	2635	4823	4054	2867	2259
1948 Federal Surplus/Deficit	3187	1253	-36	2614	995	1258	2999	-76	1100	1444	3576	6828	7731	3685	2652
1949 Federal Surplus/Deficit	2779	3263	856	709	-70	-9.5	927	-244	3325	1503	4486	5707	3870	1088	1848
1950 Federal Surplus/Deficit	1464	-37	-704	431	-149	-895	1191	2799	4084	3895	3679	4588	6821	3792	2205
1951 Federal Surplus/Deficit	2391	2708	292	1443	1490	3347	4516	4602	2745	3754	4217	5733	3233	3709	3137
1952 Federal Surplus/Deficit	2878	2812	597	2069	189	1662	2773	1310	1489	3975	4385	6732	4172	2102	2510
1953 Federal Surplus/Deficit	2894	1104	-164	395	120	-656	122	2434	-298	-661	968	4259	6580	3868	1568
1954 Federal Surplus/Deficit	3022	1906	168	687	107	695	1801	2680	1087	3177	2448	5066	6079	4595	2354
1955 Federal Surplus/Deficit	4020	3021	2802	1286	620	840	-223	-1594	-1167	270	-174	2183	7396	5666	1781
1956 Federal Surplus/Deficit	2793	3191	59	1157	890	3012	5055	1835	3455	3958	5883	6779	7385	4044	3465
1957 Federal Surplus/Deficit	3152	2416	110	812	-102	865	1495	-949	711	4522	2759	6324	7096	2286	2089
1958 Federal Surplus/Deficit	2032	659	-251	539	29	-536	1011	1342	1314	506	3358	5667	5558	1848	1650
1959 Federal Surplus/Deficit	2060	946	-153	435	515	1628	4528	3030	1315	2688	1897	3956	6035	4400	2457
1960 Federal Surplus/Deficit	2894	2238	2580	3246	1983	2522	2781	-11	1133	5820	3729	3491	4369	2894	2694
1961 Federal Surplus/Deficit	3190	811	-77	588	241	-41	1552	2057	2001	2728	2720	4223	6965	2435	2056
1962 Federal Surplus/Deficit	2247	1318	-443	501	7.5	-788	1428	-972	-771	4115	4430	3647	3500	3121	1274
1963 Federal Surplus/Deficit	2709	1741	-206	1010	660	1606	1765	600	368	361	644	4453	4131	2838	1663
1964 Federal Surplus/Deficit	3418	1955	244	323	65	-417	1296	-205	-812	1432	1515	3235	7057	5182	1677
1965 Federal Surplus/Deficit	2927	2651	851	1414	202	3209	5572	4205	3002	2454	4308	5498	4921	2391	3119
1966 Federal Surplus/Deficit	2991	2418	199	941	250	784	2416	-463	-512	3167	1367	3560	2956	3211	1526
1967 Federal Surplus/Deficit	3234	1564	-344	395	7.5	-69	2833	3618	466	2100	861	2310	6611	4488	2016
1968 Federal Surplus/Deficit	2992	2323	302	754	137	623	2318	1679	1280	-979	742	2421	4757	4136	1746
1969 Federal Surplus/Deficit	3156	2462	1260	1533	1035	1488	4381	3155	1750	4950	4456	6577	4628	3074	3033
1970 Federal Surplus/Deficit	3085	1163	-163	525	133	-254	1906	1605	-282	-498	1562	3485	5097	1209	1326
1971 Federal Surplus/Deficit	1888	811	-441	513	225	-379	3584	5184	2504	3186	3928	6931	6829	4368	2852
1972 Federal Surplus/Deficit	3111	3345	467	603	146	764	3386	4792	5103	5461	2399	6633	7275	4804	3428
1973 Federal Surplus/Deficit	3666	3041	923	774	11	1004	2771	-1634	-877	-1111	-1050	634	2152	1543	798
1974 Federal Surplus/Deficit	1781	113	-536	131	-290	1804	6063	5145	3837	4747	5375	6048	7402	6045	3471
1975 Federal Surplus/Deficit	3174	3317	871	282	30	-148	2188	1169	2520	1533	1795	4384	5555	5067	2236
1976 Federal Surplus/Deficit	1991	1277	241	1186	1303	4119	4414	3029	1928	4687	3477	6137	3626	4609	3026
1977 Federal Surplus/Deficit	4585	4251	3433	931	36	-512	370	-2011	-1563	-1262	-1584	492	763	358	441
1978 Federal Surplus/Deficit	1815	-67	-560	-40	-178	-346	1493	32	2392	1548	2298	3906	3286	3226	1334
-Ranked Averages-															
Top Ten Percent	2601	2401	227	949	487	2427	4918	4116	3628	4075	4436	6138	6043	4198	3324
Middle Eighty Percent	2618	1537	210	764	218	447	1770	727	792	1834	2203	4192	4670	3008	1741
Bottom Ten Percent	2299	976	-307	417	85	-647	-1153	-1737	-919	-505	-1081	-94	1538	1191	-65

Exhibit 33: OY 2013 Monthly 50-WY Energy

Federal Surplus/Deficit by Water Year
PNW Loads and Resources Study
2012 - 2013 Operating Year
2003 White Book

3/31/2004

Average Energy in Megawatts	*Aug1*	*Aug16*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr1*	*Apr16*	*May*	*Jun*	*Jul*	*Avg*
1929 Federal Surplus/Deficit	2813	762	-337	273	-14	-642	-57	-2183	-835	-839	-1165	-743	1313	1591	-71
1930 Federal Surplus/Deficit	1433	541	-451	440	154	-659	-2161	-1200	-780	-461	-753	-801	1215	1822	-170
1931 Federal Surplus/Deficit	1909	808	-328	383	118	-611	-2109	-2158	-1005	76	-1392	-281	731	923	-303
1932 Federal Surplus/Deficit	1776	335	-302	296	2.5	-715	-2083	-2311	410	2992	4761	4716	4079	2752	981
1933 Federal Surplus/Deficit	3086	2172	-102	460	-242	226	2469	1620	-807	445	1293	3055	6367	5137	1807
1934 Federal Surplus/Deficit	2623	2939	508	1594	1490	4598	5636	3947	2498	5701	5017	4170	544	2368	2958
1935 Federal Surplus/Deficit	1182	-160	-484	195	-284	-233	1921	2283	-1305	232	1997	2315	2921	2738	974
1936 Federal Surplus/Deficit	2622	829	-314	396	29	-648	-1393	-2142	-600	-568	1699	5861	2578	1696	646
1937 Federal Surplus/Deficit	2352	575	-416	438	78	-670	-1894	-1966	-831	-609	-889	-339	687	1174	-252
1938 Federal Surplus/Deficit	1956	201	-423	601	-50	-578	2723	-434	1463	2348	2491	4915	3308	2318	1445
1939 Federal Surplus/Deficit	1709	403	-10	521	19	-683	353	-1848	-252	274	1053	3565	1216	1801	534
1940 Federal Surplus/Deficit	2541	697	-407	634	-26	-467	-319	-1055	1695	1194	1829	2221	1964	1180	712
1941 Federal Surplus/Deficit	1612	271	-457	420	-146	-64	229	-2112	-736	-956	-965	307	1538	532	-42
1942 Federal Surplus/Deficit	1381	412	-83	359	-268	1507	2884	-1476	-1327	-253	507	1955	4516	3287	1031
1943 Federal Surplus/Deficit	3066	2120	-115	420	-149	-256	2098	1273	2125	5341	4651	4853	4310	3392	2128
1944 Federal Surplus/Deficit	2849	2042	-123	526	48	-706	315	-2110	-1260	-787	-1323	-757	452	362	-155
1945 Federal Surplus/Deficit	1470	-102	-344	224	19	-701	-2042	-1690	-971	-714	-1068	2220	3560	1745	151
1946 Federal Surplus/Deficit	1643	1181	-532	530	31	-627	756	675	2219	2809	3743	5207	3716	3218	1657
1947 Federal Surplus/Deficit	3157	1818	113	407	1.5	2329	3115	2212	2493	1200	2619	4340	3401	2851	2138
1948 Federal Surplus/Deficit	3160	1223	-59	2613	987	1251	2979	-259	1083	1428	3560	6347	7079	3670	2531
1949 Federal Surplus/Deficit	2752	3235	834	707	-79	-20	904	-429	3309	1487	4470	5224	3216	1071	1726
1950 Federal Surplus/Deficit	1436	-68	-728	426	-157	-905	1169	2620	4068	3880	3664	4105	6169	3776	2083
1951 Federal Surplus/Deficit	2363	2680	270	1441	1483	3342	4496	4425	2728	3739	4202	5251	2578	3693	3017
1952 Federal Surplus/Deficit	2851	2784	575	2068	181	1654	2753	1132	1470	3960	4370	6250	3518	2087	2389
1953 Federal Surplus/Deficit	2867	1074	-187	390	111	-666	95	2257	-317	-677	950	3775	5927	3853	1446
1954 Federal Surplus/Deficit	2995	1878	145	684	99	685	1781	2502	1069	3162	2432	4584	5427	4580	2232
1955 Federal Surplus/Deficit	3993	2993	2783	1285	612	831	-249	-1780	-1191	254	-190	1697	6743	5651	1659
1956 Federal Surplus/Deficit	2766	3163	36	1155	882	3007	5036	1657	3439	3943	5868	6297	6733	4029	3345
1957 Federal Surplus/Deficit	3125	2388	88	809	-110	856	1472	-1134	693	4507	2743	5843	6444	2269	1968
1958 Federal Surplus/Deficit	2004	629	-274	535	20	-547	989	1161	1297	490	3343	5185	4905	1832	1528
1959 Federal Surplus/Deficit	2032	916	-176	432	507	1620	4509	2853	1297	2672	1881	3473	5382	4385	2336
1960 Federal Surplus/Deficit	2867	2210	2561	3245	1976	2517	2761	-193	1114	5806	3714	3008	3716	2878	2573
1961 Federal Surplus/Deficit	3163	781	-99	585	233	-52	1530	1879	1984	2712	2702	3740	6312	2419	1934
1962 Federal Surplus/Deficit	2219	1288	-467	498	-1.4	-799	1405	-1154	-794	4100	4415	3163	2846	3105	1151
1963 Federal Surplus/Deficit	2681	1713	-230	1008	652	1599	1745	421	346	345	627	3970	3477	2823	1541
1964 Federal Surplus/Deficit	3391	1927	221	319	56	-428	1273	-387	-835	1416	1498	2751	6404	5167	1555
1965 Federal Surplus/Deficit	2900	2623	829	1412	194	3202	5553	4028	2986	2438	4294	5016	4267	2375	2999
1966 Federal Surplus/Deficit	2964	2390	177	938	242	774	2395	-644	-534	3152	1350	3077	2301	3196	1404
1967 Federal Surplus/Deficit	3207	1533	-368	390	-1	-80	2812	3441	447	2085	843	1826	5959	4472	1894
1968 Federal Surplus/Deficit	2965	2295	280	752	130	613	2298	1501	1263	-998	724	1935	4104	4121	1624
1969 Federal Surplus/Deficit	3129	2434	1240	1532	1028	1480	4362	2978	1733	4935	4441	6095	3975	3058	2912
1970 Federal Surplus/Deficit	3058	1133	-187	522	124	-265	1882	1427	-302	-515	1546	3001	4443	1193	1204
1971 Federal Surplus/Deficit	1860	780	-465	509	216	-389	3564	5008	2487	3171	3913	6449	6176	4353	2731
1972 Federal Surplus/Deficit	3084	3317	445	600	138	754	3366	4615	5087	5446	2383	6151	6622	4789	3307
1973 Federal Surplus/Deficit	3639	3013	901	771	2.6	995	2751	-1820	-900	-1129	-1070	145	1495	1526	674
1974 Federal Surplus/Deficit	1753	81	-561	125	-299	1795	6044	4968	3821	4732	5360	5566	6750	6031	3350
1975 Federal Surplus/Deficit	3147	3289	849	278	21	-158	2167	990	2502	1517	1778	3900	4902	5052	2114
1976 Federal Surplus/Deficit	1964	1248	219	1184	1295	4117	4395	2851	1911	4673	3462	5654	2972	4594	2905
1977 Federal Surplus/Deficit	4559	4223	3414	928	27	-522	345	-2198	-1587	-1283	-1606	2.5	103	339	316
1978 Federal Surplus/Deficit	1786	-98	-584	-45	-186	-357	1469	-151	2375	1533	2282	3423	2632	3210	1211
-Ranked Averages-															
Top Ten Percent	2573	2373	204	947	480	2420	4899	3939	3612	4060	4421	5656	5390	4183	3204
Middle Eighty Percent	2591	1508	188	761	210	437	1748	545	772	1818	2187	3708	4016	2992	1619
Bottom Ten Percent	2271	946	-331	412	77	-657	-1181	-1923	-942	-524	-1105	-584	880	1174	-190

Exhibit 34: OY 2014 Monthly 50-WY Energy

Federal Surplus/Deficit by Water Year
PNW Loads and Resources Study
2013 - 2014 Operating Year
2003 White Book

3/31/2004

Average Energy in Megawatts	*Aug1*	*Aug16*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr1*	*Apr16*	*May*	*Jun*	*Jul*	*Avg*
1929 Federal Surplus/Deficit	2795	741	-358	254	-41	-672	-87	-2215	-861	-862	-1190	-293	1968	1605	3.5
1930 Federal Surplus/Deficit	1413	520	-472	419	128	-689	-2193	-1230	-806	-483	-779	-353	1870	1837	-96
1931 Federal Surplus/Deficit	1891	787	-350	362	92	-641	-2141	-2190	-1033	57	-1419	169	1386	938	-229
1932 Federal Surplus/Deficit	1758	313	-323	276	-24	-747	-2115	-2343	386	2972	4742	5170	4737	2767	1056
1933 Federal Surplus/Deficit	3068	2153	-123	441	-268	195	2444	1595	-833	426	1272	3510	7025	5152	1883
1934 Federal Surplus/Deficit	2604	2920	490	1577	1465	4573	5611	3923	2475	5681	4998	4625	1197	2383	3035
1935 Federal Surplus/Deficit	1164	-181	-504	175	-311	-264	1895	2258	-1330	212	1976	2767	3578	2753	1050
1936 Federal Surplus/Deficit	2603	810	-334	377	2.5	-678	-1423	-2174	-626	-589	1680	6315	3236	1710	722
1937 Federal Surplus/Deficit	2334	555	-436	418	52	-700	-1925	-1997	-858	-631	-914	109	1341	1189	-178
1938 Federal Surplus/Deficit	1938	181	-444	581	-76	-608	2697	-461	1440	2329	2472	5370	3966	2333	1522
1939 Federal Surplus/Deficit	1691	382	-30	502	-7.7	-714	326	-1878	-278	255	1032	4019	1870	1816	609
1940 Federal Surplus/Deficit	2522	677	-428	615	-52	-498	-349	-1085	1672	1174	1810	2673	2618	1194	788
1941 Federal Surplus/Deficit	1593	250	-478	401	-172	-93	198	-2143	-763	-976	-986	758	2194	546	32
1942 Federal Surplus/Deficit	1362	391	-104	339	-294	1477	2859	-1506	-1354	-272	487	2408	5174	3302	1107
1943 Federal Surplus/Deficit	3048	2101	-136	401	-176	-286	2073	1247	2102	5322	4631	5307	4968	3407	2205
1944 Federal Surplus/Deficit	2830	2023	-144	506	21	-737	286	-2142	-1288	-809	-1348	-307	1106	376	-81
1945 Federal Surplus/Deficit	1451	-123	-365	204	-8	-732	-2074	-1722	-999	-736	-1094	2674	4219	1760	225
1946 Federal Surplus/Deficit	1623	1161	-553	510	4.7	-657	727	647	2197	2790	3724	5661	4374	3233	1733
1947 Federal Surplus/Deficit	3138	1799	94	388	-25	2299	3090	2188	2471	1180	2600	4795	4059	2866	2215
1948 Federal Surplus/Deficit	3141	1203	-80	2596	962	1223	2954	-287	1060	1409	3541	6801	7736	3685	2608
1949 Federal Surplus/Deficit	2733	3216	815	688	-105	-52	877	-458	3286	1468	4451	5678	3874	1086	1802
1950 Federal Surplus/Deficit	1417	-89	-749	406	-184	-935	1143	2594	4046	3860	3645	4560	6827	3791	2160
1951 Federal Surplus/Deficit	2345	2661	250	1424	1457	3316	4471	4401	2706	3719	4183	5705	3237	3708	3094
1952 Federal Surplus/Deficit	2832	2765	556	2051	156	1625	2728	1107	1446	3940	4351	6704	4177	2102	2466
1953 Federal Surplus/Deficit	2848	1054	-208	371	85	-696	65	2232	-341	-697	930	4230	6586	3868	1522
1954 Federal Surplus/Deficit	2976	1858	125	666	73	655	1755	2478	1046	3142	2413	5038	6085	4595	2309
1955 Federal Surplus/Deficit	3975	2974	2766	1267	587	802	-278	-1812	-1218	234	-209	2149	7401	5666	1735
1956 Federal Surplus/Deficit	2747	3144	16	1137	856	2980	5011	1633	3416	3924	5849	6751	7391	4044	3422
1957 Federal Surplus/Deficit	3106	2369	68	791	-137	827	1446	-1163	670	4487	2724	6297	7102	2284	2044
1958 Federal Surplus/Deficit	1986	608	-295	515	-6.5	-578	962	1134	1275	470	3324	5639	5564	1847	1604
1959 Federal Surplus/Deficit	2014	896	-197	413	481	1591	4484	2829	1273	2653	1862	3927	6041	4400	2413
1960 Federal Surplus/Deficit	2848	2191	2544	3228	1951	2489	2736	-220	1091	5786	3695	3462	4374	2893	2651
1961 Federal Surplus/Deficit	3144	760	-120	566	207	-84	1503	1855	1961	2693	2682	4195	6971	2434	2011
1962 Federal Surplus/Deficit	2201	1268	-488	479	-28	-831	1378	-1182	-821	4080	4396	3617	3504	3120	1227
1963 Federal Surplus/Deficit	2663	1693	-251	990	626	1570	1719	396	319	326	606	4424	4135	2838	1618
1964 Federal Surplus/Deficit	3372	1908	201	300	29	-460	1246	-415	-862	1397	1478	3206	7063	5182	1631
1965 Federal Surplus/Deficit	2882	2604	810	1395	168	3173	5528	4004	2963	2418	4274	5470	4925	2390	3076
1966 Federal Surplus/Deficit	2945	2371	157	920	217	744	2369	-671	-561	3133	1330	3531	2958	3211	1480
1967 Federal Surplus/Deficit	3188	1513	-389	371	-28	-111	2787	3417	424	2065	821	2280	6617	4487	1971
1968 Federal Surplus/Deficit	2947	2276	260	733	104	582	2272	1477	1241	-1019	702	2386	4762	4135	1700
1969 Federal Surplus/Deficit	3110	2415	1222	1515	1002	1451	4337	2954	1710	4915	4422	6549	4633	3073	2990
1970 Federal Surplus/Deficit	3039	1113	-208	504	98	-296	1855	1403	-327	-535	1526	3455	5102	1208	1280
1971 Federal Surplus/Deficit	1842	759	-487	489	189	-420	3539	4983	2464	3151	3894	6903	6835	4368	2807
1972 Federal Surplus/Deficit	3065	3298	425	581	111	724	3341	4591	5065	5427	2364	6605	7280	4804	3384
1973 Federal Surplus/Deficit	3621	2994	882	752	-24	965	2726	-1851	-927	-1150	-1093	595	2150	1541	750
1974 Federal Surplus/Deficit	1735	59	-582	105	-325	1765	6019	4944	3799	4712	5341	6020	7408	6045	3427
1975 Federal Surplus/Deficit	3128	3270	830	258	-6.6	-189	2141	965	2480	1498	1759	4355	5560	5067	2191
1976 Federal Surplus/Deficit	1945	1229	199	1166	1269	4092	4370	2827	1889	4653	3443	6109	3630	4609	2983
1977 Federal Surplus/Deficit	4540	4204	3397	910	0.1	-553	316	-2230	-1616	-1306	-1630	452	756	351	391
1978 Federal Surplus/Deficit	1767	-119	-606	-66	-213	-387	1441	-179	2353	1513	2262	3878	3290	3225	1287
-Ranked Averages-															
Top Ten Percent	2555	2353	184	928	453	2392	4874	3914	3590	4040	4402	6110	6048	4198	3281
Middle Eighty Percent	2572	1488	168	742	184	407	1721	518	748	1798	2167	4162	4674	3007	1695
Bottom Ten Percent	2253	925	-352	392	50	-688	-1212	-1955	-969	-546	-1130	-135	1534	1189	-116

Section 9: Administrator's Record of Decision on the 2003 Pacific Northwest Loads and Resources Study

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Section 9: Administrator's Record of Decision on the 2003 Pacific Northwest Loads and Resources Study (The White Book)

I. Introduction

The 2003 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 rate setting purposes under section 7(i) of the Northwest Power Act. The White Book includes projected Federal system and regional loads and resources with detailed technical appendices. The White Book compiles loads, contracts, and resource capability estimates for Pacific Northwest (PNW) public agency, public utility cooperative, U.S. Bureau of Reclamation (USBR), investor-owned utility (IOU), and direct service industrial (DSI) customers obtained from (1) forecasts prepared by BPA; (2) direct submittals to BPA; (3) annual data submittals to the Pacific Northwest Utilities Conference Committee; and (4) data submittals to the Pacific Northwest Coordination Agreement (PNCA) Operating Committee. Hydro estimates are produced using BPA's hydro regulator to forecast PNW hydroelectric energy production by project. BPA uses the White Book to project potential regional and Federal system load and resource estimates over the planning period.

The White Book's long range planning basis for supplying electric power remains important as a valuable planning document for both BPA and the PNW region. BPA will continue to update it and make it publicly available. This 2003 White Book updates the 2002 Pacific Northwest Loads and Resources Study and represents a projection of regional and Federal system load and resource capabilities to be used as input to BPA's resource planning process.

II. 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 (PSCs) to its regional firm power customers and to plan and acquire firm resources sufficient to meet these firm power loads. *16 U.S.C. §839c(g).* These initial contracts had provisions that, under certain conditions, allowed purchasers to add or remove their non-Federal firm resources. Notably, the load and resources as determined in the White Book was referenced within such provisions.

Section 5(b)(1) of the Northwest Power Act obligates BPA to serve, in accordance with the terms of contracts, the net firm power load requirements of utilities in the PNW including Federal agencies, public agencies, public utility cooperatives, and IOUs. Section 5(d) authorizes BPA to serve up to a defined amount of the firm power load requirements of its existing DSI customers. *16 U.S.C. §839c(b)(1) and (d*). Under section 5(b)(1), BPA is to offer to sell firm power from the Federal system to meet the firm regional loads of a customer in excess of its firm resources, if any, which the

customer must dedicate to use or has dedicated to use for service of its own regional firm loads. *16 U.S.C. §839c(b)(1)(A) and (B)*. BPA is also to provide electric power for those firm loads that were served by a customer's dedicated resource if the Administrator determines that a customer's dedicated resource is no longer available to serve its loads due to obsolescence, retirement, loss of the resource, or loss of contractual rights.

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)(1) and 5(d) 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 power contract obligations. *16 U.S.C. §839c(b)(1) and (d)*.

III. BPA's Utility Power Sales Contract Obligations

In October 2000, BPA executed 5- or 10-year PSCs with Federal agency, public agency, public utility cooperative, USBR, IOU, and DSI customers. Power service under these contracts began October 1, 2001. The following sets forth BPA's 2001 PSC firm power load obligations projected for the 2003 White Book study period:

- BPA's Federal agency, public agency, cooperative, and USBR customers signed either 5- or 10-year PSCs. Some of the public agencies, and cooperatives signed up for the 10-year Slice of the System Product. BPA's PSC and Slice obligations end September 30, 2011; however, this study assumes that BPA will meet these or similar obligation agreements through OY 2014. For October 1, 2006, through September 30, 2011, BPA's PSC obligations include approximately 800 aMW of service that are not currently signed. These public utility load obligations are estimated to range from 6,750 aMW in OY 2005 to 7,650 aMW in OY 2014. In actual operation, BPA's obligations to serve these customers may be higher or lower than those shown in this analysis;

- The IOU's signed the 10-year Residential Purchase and Sales Agreement (RPSA) settling BPA's obligations under Section 5(c) of the Northwest Power Act to the IOUs. 16 U.S.C. §839c(c)(1). As a result of negotiations in 2001, IOU RPSA settlement firm power deliveries were reduced in exchange for financial considerations through September 30, 2006. This resulted in a net IOU RPSA settlement power delivery of 258 aMW during this time period. For the period October 1, 2006, through September 30, 2011, this study assumes that BPA's IOU RPSA settlement contracts provide only financial benefits and no firm power is delivered. This assumption is consistent with the amendments made to the RPSA contracts by BPA and the IOUs on May 28, 2004; and

- BPA's DSI customers signed 5-year contracts beginning October 1, 2001, through September 30, 2006. BPA's DSI load obligations reflect signed load reduction agreements, contract terminations, and closures through March 31, 2004. BPA's DSI load obligations are estimated to be up to 271 aMW through September 30, 2006. The actual DSI loads may be lower than those obligations included in this study due to new agreements or changes in economic conditions. After September 30, 2006, no DSI Federal service is assumed because the DSIs do not have signed contracts in place for BPA service. However, this assumption does not represent a decision by BPA on whether or what amount of post-September 30, 2006, firm DSI service will be offered.

III. 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 under Public Law (P.L.) 104-46, *§508(a) and (b).* However, this White Book does provide a calculation of surplus firm power under section 5(f) of the Northwest Power Act. Surplus firm power is the amount of firm power in excess of BPA's firm obligations under subsections 5(b), (c), and (d) of the Northwest Power Act. *16 U.S.C. §839c(b); (c); and (d)*. This surplus power, if any, may be sold as either excess Federal power under P.L. 104-46, consistent with BPA's calculations of excess Federal power, or as surplus power under P.L. 88-552, section 5(f) and 9(c) of the Northwest Power Act. *16 U.S.C. §837(a); 16 U.S.C. §839c(f) and 16 U.S.C. §839f(c)*. 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 of BPA and is included as a firm obligation in Federal loads.

IV. Federal System Resource Stack

The 2003 White Book reflects expected changes to Federal system resource stack. Federal system contract purchases were updated and the planned addition of the Fourmile Hill Geothermal plant was postponed for two years, until October 1, 2006. Federal resources also include planned improvements for maintaining and improving the reliability of the Federal hydro system. These improvements increase and preserve Federal hydro generation by:

- Replacing turbine runners to preserve and increase generation and to make the turbine operations more fish friendly;
- Providing increased reliability by decreasing forced and planned outages; and
- Implementing hydro system optimization and operational planning tools to increase generation efficiency as part of Federal operating decisions for the system.

Changes to the Federal resource stack through acquisitions, contract purchases, additional efficiency improvements, maintenance schedules, and/or the removal of resources will be reflected in future studies.

CONCLUSIONS:

For the foregoing reasons the methodology and the assumptions in the 2003 White Book are adopted and approved.

Issued in Portland, Oregon on **July 30, 2004**.

/s/ Stephen J. Wright

Stephen J. Wright
Administrator and Chief Executive Officer

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Section 10: Glossary and Acronyms

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Glossary

Average Megawatts (aMW) – 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 8,760 megawatt hours or 8.76 gigawatt hours.

Bonneville Power Administration (BPA) – BPA is a Federal power marketing agency (PMA), responsible for acquiring and delivering power to meet contractual obligations and electrical needs of its customers.

Canadian Entitlement Return (CER) for Canada – The public agencies' obligation to return the Canadian Entitlement allocation to Canada under the Columbia River Treaty that began April 1, 1998.

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, or that a power transmission line can carry.

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 sequential production of more than one form of energy, such as heat and electricity. Large industrial plants often are sources of electricity co-generated as a byproduct of a heating process.

Conservation – Any reduction in electrical power as a result of increases in the efficiency of energy end 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 in each utility's power sales contract 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.

Export – Electricity generated in the Pacific Northwest that is sold to another region, such as California.

Federal Columbia River Power System (FCRPS) – The FCRPS consists of 31 Federal hydroelectric projects constructed and operated by the U.S. Army Corps of Engineers (USACE), U.S. Bureau of Reclamation (USBR).

Federal Columbia River Transmission System (FCRTS) - All of the Federally-owned high voltage transmission facilities (lines, towers, substations, etc.) located in the BPA service territory.

Federal System – The Federal system is a combination of BPA's customer loads and contractual obligations, transmission facilities, and resources from which BPA acquires the power it sells. The resources include plants operated by the U.S. Army Corps of Engineers (USACE), U.S. Bureau of Reclamation (USBR), and hydroelectric projects owned by the city of Idaho Falls, Lewis County PUC, and Energy Northwest (ENW).

BPA markets the thermal generation from the Columbia Generating Station, operated by ENW.

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 that is considered assured to meet all contractual peak load requirements over a defined period for a customer or customer group.

Firm Energy – Electric power that is considered assured to the customer to meet all contractual energy load requirements over a defined period for a customer or customer group.

Fiscal Year – In this study, fiscal year (FY) is the 12-month period October 1 to September 30. For example, FY 2005 is October 1, 2004, through September 30, 2005.

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.

Independent Hydro – The output from hydropower plants that are not part of the regulated system. These plants are generally run-of-river. Examples are Cowlitz Falls or other small hydro plants whose output is used to serve load in the utility service territory in which it is located.

Import – Electricity that comes to the Pacific Northwest from another region. Examples would be purchases within the region from Canada, California, or western Montana.

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

Intra-regional Transfer – Sales of power between two parties within the Pacific Northwest region. Sales from an IOU to a public utility within the region are intraregional transfers, such as firm power sales from BPA to PNW entities.

Investor-Owned Utility (IOU) – A privately-owned utility organized under State law as a corporation to provide electric power service and earn a profit for its stockholders.

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.

Non-firm 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.

Non-firm Energy Load – Load served by additional hydro energy available in "better-than-critical period" water conditions.

Non-utility Generation – generation that is owned by a third party that is not a utility, such as an industrial customer or an independent power producer.

Operating Year – For this study, operating year (OY) is the 12-month period August 1 through July 31. For example, OY 2005 is August 1, 2004, through July 31, 2005.

Peak Load – The maximum demand for power during a specified period of time. There are usually two peaks to load each day (morning and evening, driven by residential patterns), six peaks to the week (Monday through Saturday, during "working hours"), and one or two months-long peaks to the year depending upon heating and/or cooling needs. The pattern of peak loads is called its "shape."

Power Sales Contract Obligation – Capacity and energy the Federal system is required to provide to Federal agencies, public agencies, cooperatives, USBR, IOUs, and DSIs under their 1981 or 2001 power sales contracts with BPA.

Publicly-Owned Utility - One of several types of not-for-profit utilities created by a group of voters, and can be a municipal utility, a public utility district, a cooperative, a mutual company, or a rural electric association.

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.

Regional Total Retail Load - The sum of all total retail load consumed in the PNW region as defined in the 1980 Pacific Northwest Electric Power Planning and Conservation Act.

Regulated Hydro – Hydropower plants that are part of the Columbia River hydro system that is operated jointly by BPA, the USACE, and the Bureau. Most of these are part of the mainstem system on the Columbia and Snake Rivers.

Renewable Resources – Resources that use solar, wind, hydro, geothermal, biomass, or a similar source of energy that is converted into electricity.

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

Slice of the System Product - A public-preference 10-year power sales contract product based on the customer's net requirements that provides firm and secondary energy using a fixed percentage of the output generated by the Federal system Slice resources.

Spinning Reserves – Reserve generating capacity maintained for immediate response to meet load variations. This provides a regulating margin for controlling the automatic generation and frequency of power in the region and 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.

Thermal Resources – Resources that burn coal, natural gas, or oil, or use nuclear fission to create heat which is then converted into electricity.

2003 White Book Document Acronyms

aMW	Average megawatt
BiOp	Biological Opinion
BPA	Bonneville Power Administration
CER	Canadian Entitlement Return
Council	Northwest Power and Conservation Council
DSI	Direct service industry
ENW	Energy Northwest, Inc. (formerly Washington Public Power Supply System)
EPM	Enron Power Marketing, Inc.
FCRPS	Federal Columbia River Power System
FCRTS	Federal Columbia River Transmission System
FERC	Federal Energy Regulatory Commission
FRE	Firm Resource Exhibit
FPS	Federal Power System
FY	Fiscal Year
IOU	Investor-owned utility
IPP	Independent Power Producer
MW	Megawatt
MSR	MSR Public Power Agency, whose members include the Modesto Irrigation District and the cities of Santa Clara and Redding, California
NOAA	National Oceanographic and Atmospheric Administration
NUG	Non-utility generating resources
OY	Operating Year
PGE	Portland General Electric
PNCA	Pacific Northwest Coordination Agreement
PNUCC	Pacific Northwest Utilities Conference Committee
PNW	Pacific Northwest
PP&L	PacifiCorp Power and Light Company
PPL Montana	Pennsylvania Power and Light (Montana)
PSC	Power Sales Contract
PUD	Public Utility District
RPSA	Residential Purchase and Sales Agreement
ROD	Record of Decision
USACE	U.S. Army Corps of Engineers
USBR	U.S. Bureau of Reclamation

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