Draft Environmental Impact Statement
Resource Programs

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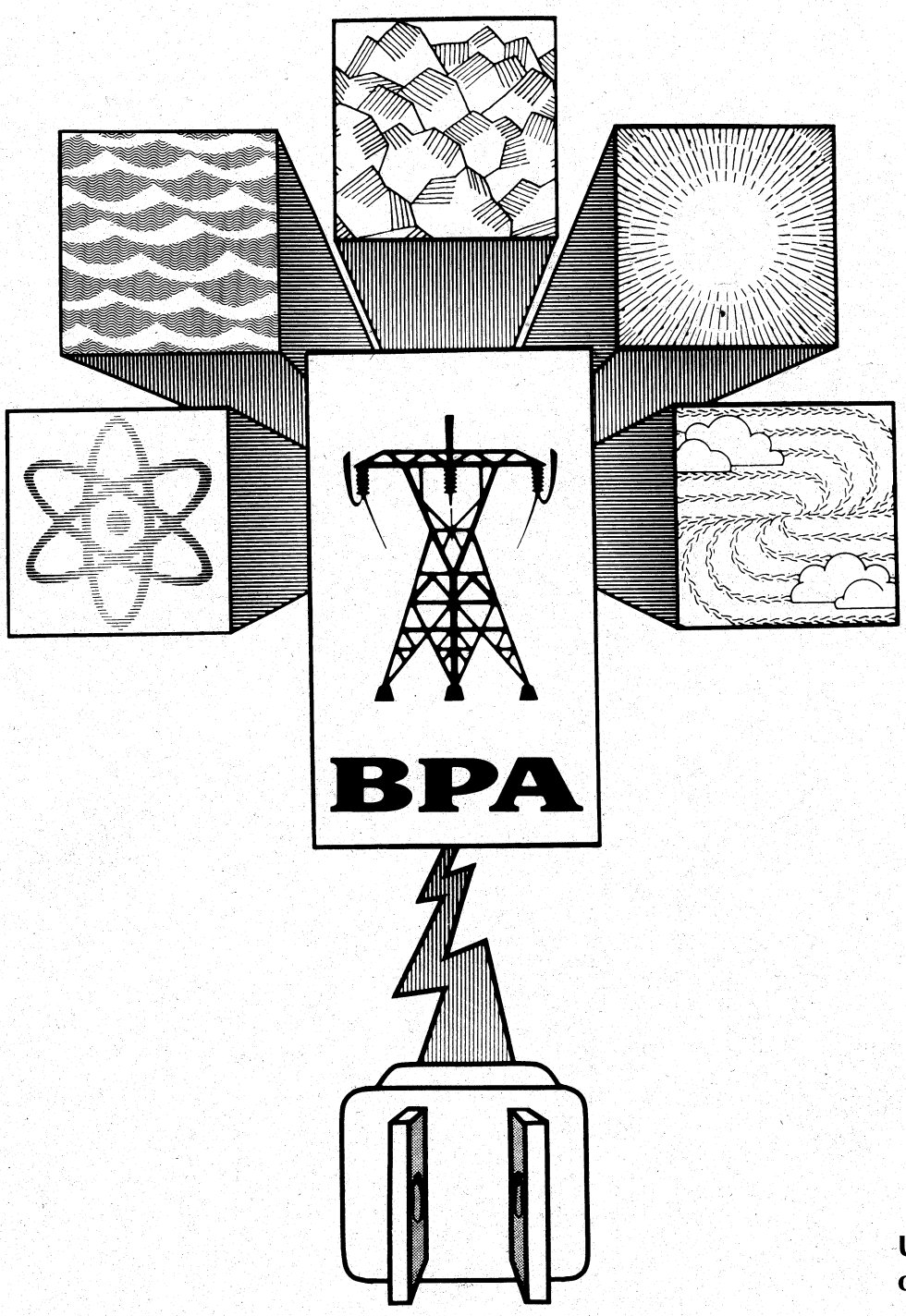
Volume 2: Appendices

March 1992



U.S. Department of Energy

Bonneville
POWER ADMINISTRATION

RESOURCE PROGRAMS
DRAFT ENVIRONMENTAL IMPACT STATEMENT

Bonneville Power Administration
January 1992

APPENDIX A

APPENDIX A

Supplemental Information on Existing Resources

Supplemental Information on the Affected Environment

Cultural Resources
Human Health

Wildlife/Threatened and Endangered Species, State Listings

Table A-1

Federal System Hydroelectric Projects
September 30, 1990

Project	Initial Year of Service	Number of Units	Generating Capacity (peak MW)	Firm Energy (aMW)
U.S. Bureau of Reclamation Hydroelectric Projects				
* Grand Coulee	1941	30	6,984	1,854
* Hungry Horse	1952	4	328	104
Palisades	1957	4	131	61
Anderson Ranch	1950	2	40	11
Minidoka	1909	7	16	9
Roza	1958	1	13	4
Chandler	1956	2	13	7
Black Canyon	1925	2	10	7
Boise River Diversion	1912	3	2	1
Total Bureau of Reclamation Projects		55	7,537	2,058
U.S. Army Corps of Engineers Hydroelectric Projects				
Chief Joseph	1955	27	2,614	1,125
John Day	1968	16	2,484	883
The Dalles	1957	22	2,074	700
Bonneville	1938	18	1,147	545
McNary	1953	14	1,127	615
Lower Granite	1975	6	930	188
Lower Monumental	1969	6	930	181
Little Goose	1970	6	930	188
Ice Harbor	1961	6	693	191
* Libby	1975	5	604	172
* Dworshak	1974	3	460	152
Lookout Point	1954	3	138	27
Detroit	1953	2	115	36
Green Peter	1967	2	92	22
Lost Creek	1975	2	56	23
* Albeni Falls	1955	3	49	29
Hills Creek	1962	2	35	15
Cougar	1964	2	29	14
Foster	1968	2	23	13
Big Cliff	1954	1	21	10
Dexter	1955	1	17	8
Total Corps of Engineers Projects		149	14,568	5,137
Total Bureau of Reclamation and Corps of Engineers Projects		204	22,105	7,195

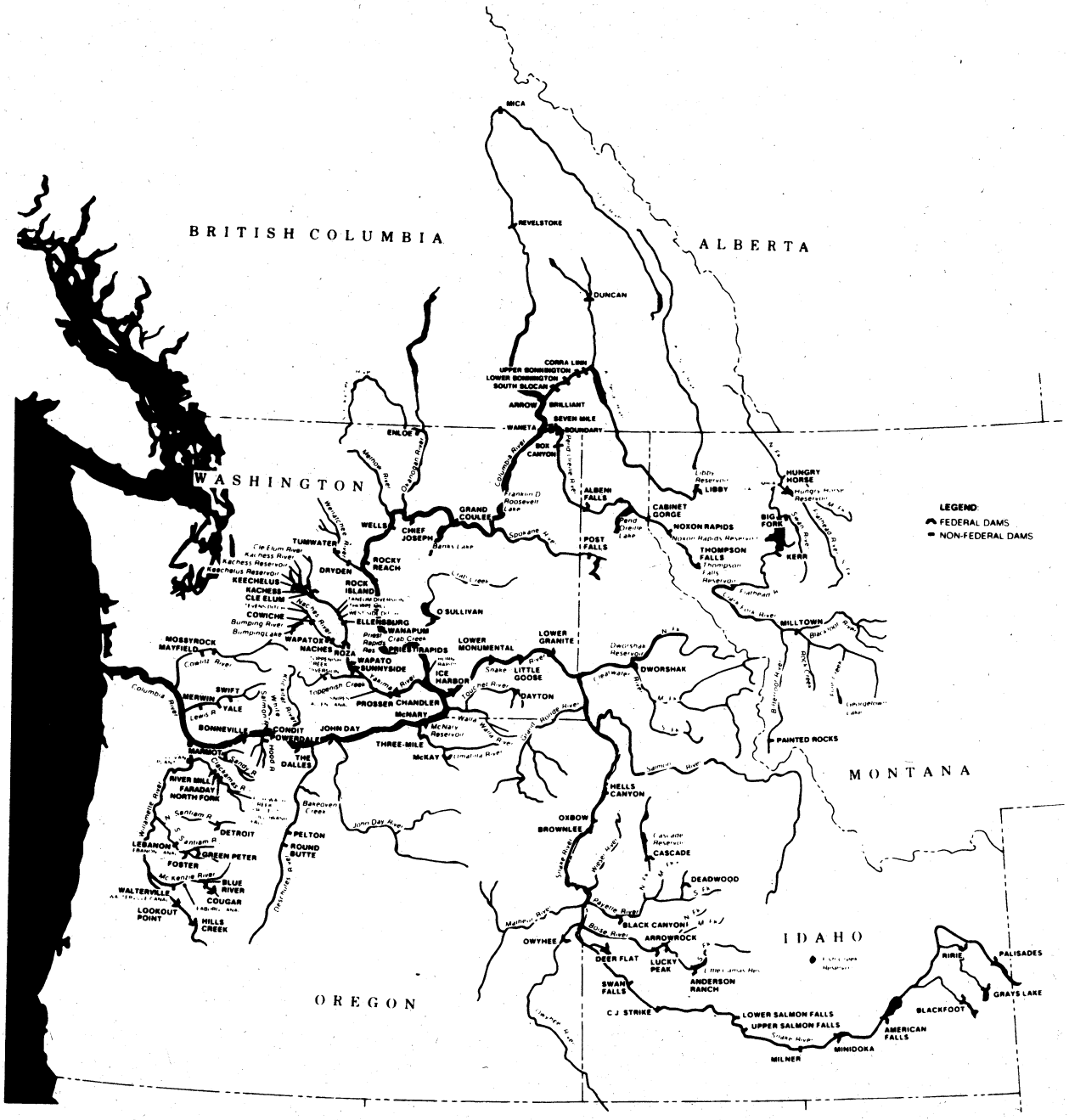
*Major U.S. storage reservoirs

Table A-2
Pacific Northwest Region
Large Thermal Resources

Resource	Fuel Type	Operating Level Average Annual MW
Boardman	Coal	397
Centralia	Coal	1,122
Colstrip 1 & 2	Coal	329
Colstrip 3	Coal	447
Colstrip 4	Coal	560
Jim Bridger	Coal	547
Trojan	Nuclear	766
WNP 2	Nuclear	716
Valmy	Coal	195
Total Large Thermal Resources		5,079

Figure A-1

Columbia River Basin Hydroelectric Projects



SECTION 2

Supplemental Information on the Affected Environment

Cultural Resources

Archaeology
Native Cultures
Euro-American History

Human Health

Indoor Air Quality
Nonattainment Areas

A.2 Cultural Resources

A.2.1 Archaeology

People have occupied the Pacific Northwest for over 11,000 years. Sharing a common ancestral culture of mobile, generalized hunters, regional ways of life have diverged as they adapted then readapted to local, changing environments. Peoples of the northwestern plains remained primarily hunters, depending on bison and other big game for the bulk of their food supply. Across the northern Rocky Mountains and into eastern Oregon and Washington, people depended more extensively on smaller game, wild root species, and fish. These regional differences in the food base profoundly affected other aspects of people's cultures, particularly their patterns of settlement, social interactions, and world views.

Throughout prehistory, the archaeological record of the northwestern plains consists of encampments, hunting facilities, and kill sites of various scales (Frison 1978). Kill areas occur in a wide range of settings. Earliest sites of this kind are found eroding from arroyo walls in valley bottoms or open plains. Later kills are typically at the foot of bluffs, from which bison were driven to their deaths, and may occur at many elevations and settings. Drive lines of trees and brush occur on high ridges well into the mountains and are often associated with kill sites containing remains of deer and mountain sheep. Campsites, constrained largely by the presence of a water source, may occur anywhere, but there is usually one or more near each major kill site.

In the northern Rocky Mountains, campsites of various sizes and debris concentrations occur in a wide variety of settings. However, kill sites, particularly of bison, become increasingly rare as one moves west. Sites of early and middle Holocene age (ca. 10,000 to 4,000 years B.C.) tend to be more common than later sites in heavily forested areas, probably because of the lower vegetation density and more accessible animal biomass that characterized that time. Later sites in forested areas tend to follow major stream channels or exposed ridges along major travel routes, such as the Lolo Trail.

The east flank of the Rocky Mountains and the Blue Mountains were important root producing areas. Camas attracted food gatherers to mountain meadows, where remains of campsites and processing ovens abound. Hunting camps of various ages occur. But increasingly, campsites are concentrated on rivers, positioned to take advantage of salmon runs. Remains of semi-subterranean winter houses may be found in protected areas on river bottoms.

Farther west, as the rivers coalesce into the area's major trunk streams, the Columbia and Snake Rivers, archaeological sites become nearly continuous. Sites of early Holocene age are rare, but may occur almost anywhere. Sites of middle Holocene age occur practically everywhere along the rivers where sediments of that age remain, but are rare in low hills in the arid central basin. Later habitations become more concentrated, culminating in often-immense village sites of 100 and more semi-subterranean house depressions. Campsites of the later period abound in upland settings in proximity to stony soils, where important root species grow.

The Cascade Mountains repeat many of the characteristics of the Rocky Mountains. From the Columbia River, east to the mountain crest, archaeological remains repeat the progression from lowland, to camas meadows, to forested highlands and the associated archaeological record of small village sites, camps, and root gathering and hunting encampments. In the high mountains, west of the crest, activity was heaviest during middle Holocene times, probably due to lower forest density. Sites of this age are common in mountain meadows and along the banks of now-forested stream channels. Later sites occur in mountain passes, along numerous travel corridors, and at key fishing sites along larger rivers.

West of the Cascade Range, in the Puget and Willamette troughs, there is evidence of dense human populations. Camas collecting sites, hunting camps, village sites, and habitation mounds are scattered throughout the low, undulating landscape. Little archaeological research has been conducted in the Chehalis and lower Cowlitz river valleys, however, so the archaeological record of the southern Puget Trough remains largely unknown.

Graves of the people who left this archaeological record are distributed variously across the landscape of the northwest. Although there is a tendency for graves to cluster near major village sites or root gathering areas, it was the custom of most peoples to bury the dead near where they expired. Graves, therefore, can occur almost anywhere.

A.2.2 Native Cultures

The descendants of people who created the rich archaeological record of the Pacific Northwest still reside in the region, many of them on reservations. The largest tribes among them are the Crow, Cheyenne, Sioux, Blackfeet, Flathead, Kootenai, Shoshone, Nez Perce, Coeur d'Alene, Spokane, Colville, Paiute, Umatilla, Yakima, and Chehalis.

Many members of these and other groups retain their traditional beliefs and value systems, a significant part of which is a reverence for the land and the remains of their ancestors. Many of these groups use native plants and animals in their religious ceremonies and as traditional medicines; prominent landforms often figure closely into their mythology and relationship to the spirit world.

A.2.3 Euro-American History

Contact between Europeans and native Americans began as early as the 16th century, when Spanish explorers sailed up the Pacific Coast. With the possible exception of diseases, these contacts had little effect on the local peoples. Beginning in the late 18th century, however, the changes were profound. Fur trading along the Washington and Oregon Coasts began then in earnest, drawing native populations into the worldwide economy, although actual contact between people remained confined to the coastline.

The first exploration of the interior northwest came in 1805 and 1806 with the Lewis and Clark expedition. This was followed by the establishment of fur trading posts in the Pacific drainages by the American Fur Company, Northwest Company, and Hudson's Bay Company. Trappers and independent traders entered from the Missouri River and interacted with native tribes.

By the middle 19th century, Catholic and Protestant missionaries had become established throughout the region, and were soon followed by settlers. Settlement began in the Willamette Valley and Puget Trough, but soon began to enter the fertile valleys on both sides of the Rocky Mountains. Lumbering was a key early industry on the west coast. Timber was shipped to world markets. Cattlemen began using the ranges of Montana, Wyoming, and the Columbia River Basin in the 1860s and 1870s, supplying miners who came to the mountainous areas in search of precious metals. Market centers began to develop into cities, such as Seattle, Washington and Portland, Oregon.

Immigration brought conflict between cultures and people. Native-American populations dwindled as diseases took their toll and as ranching and farming destroyed the wild foods upon which these hunting and gathering people depended. To avoid potential armed conflict, and open land for settlement, the U.S. Government negotiated treaties with Indian tribes, relegating the latter to reservations. Violation of treaties by adventurous immigrants caused violence; clamorings from miners and settlers covetous of Indian lands led Congress to further restrict Indian ownership of land, causing anger among Indian people. The result was a series of skirmishes and wars between the U.S. Government and Indian tribes between the 1850s and 1880s, leading to the final subjugation of the tribes.

The Homestead acts and completion of transcontinental railroads brought farmers from the east, and most of the arable land was under cultivation by the 1920s. Drying climates in the late 1920s and early 1930s caused many to lose their land, and many abandoned farmsteads dot the countryside in drier portions of the region. Farms were bought up and consolidated into larger and larger holdings, a trend that continues today.

A.3 Human Health

Indoor Air Quality

Many of the alternative generating and conservation resource options examined in this EIS produce pollutants (see Chapter 2, Section 2.2.1, Air Quality). The concern is that these pollutants may adversely affect the health of exposed individuals. Exposure is the amount of time a person is subjected to a specific pollutant level. Pollutant exposure can lead to both near-term and delayed, long-term health effects. Both can be produced by the same pollutant.

As energy conservation activities have gained momentum over the last decade, so has concern regarding their impact on indoor air quality (IAQ). Both residential and commercial structure energy conservation activities have been considered as possible actions degrading IAQ. The concerns have centered around energy conservation measures (ECMs) that affect ventilation (building envelope tightening measures and changes to air ventilation systems, for example).

BPA prepared environmental impact statements in 1984 for its retrofit residential energy conservation programs (DOE/EIS-0095F), and in 1988 for its new homes programs (DOE/EIS-0127F). To determine the health effects from these various pollutant concentrations, quantitative relationships between formaldehyde (HCHO), benzo-(a)-pyrene (BaP), and radon levels and cancer risk are examined. These relationships are the best available for estimating health effects, although they are not universally accepted. Regional health effects for these pollutants are estimated by considering the fact that not all residences have all pollutant sources or need all tightening measures.

Near-Term Health Effects

Even brief exposure to high concentrations of certain pollutants--carbon monoxide, nitrogen oxide, and formaldehyde, for example--can cause eye, nose, and throat irritation and respiratory problems. People may experience headaches, dizziness, or nausea. They may have difficulty breathing or find they tire easily. Symptoms vary, depending on sensitivity to a particular pollutant and the level of exposure. Generally, the greater the level of exposure, the greater the effect. Often, these effects disappear when the source of the pollutant is removed.

Long-Term Health Effects

Delayed health effects from exposure to low pollutant levels over long time periods is also of concern. However, very little is now known about the effects of long-term exposure to low levels of pollutants found in homes. The picture is further complicated by the fact that people are exposed to many pollutants, so it is difficult to isolate and analyze the effect of any single pollutant.

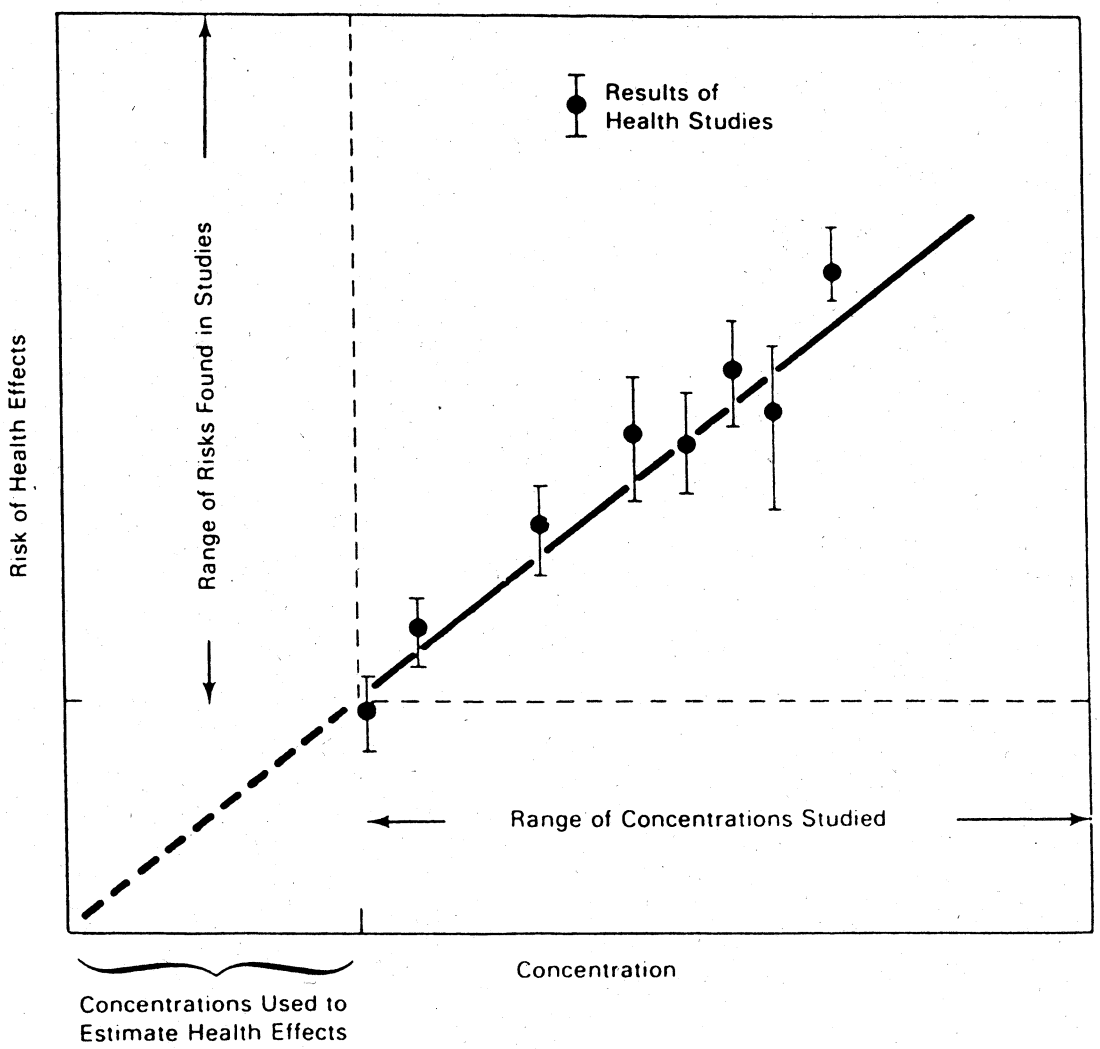
Most of what is known about long-term health effects of pollutants comes from studies of workers exposed to high levels of pollutants on the job. These workers developed a range of medical problems, including respiratory problems and cancer. But pollutant levels in the workplace were many times higher than those found in most homes.

For the RPEIS analysis, long-term health effects are defined as the estimated increase in lifetime cancer rates. Based on currently acceptable data, lifetime cancer rates were able to be calculated for only two of the indoor pollutants commonly found in homes: radon and formaldehyde. The risk factors used for these two pollutants are presented in Chapter 5.

A risk of developing cancer from long-term exposure to all levels of radon (lung) and formaldehyde (nasal) is assumed. There is no acceptable threshold for exposure to either pollutant. Although little is known about the actual health effects of long-term exposure to low levels of these pollutants, risks of health effects at high concentrations can be used to estimate risks at low concentrations. This procedure requires making an assumption about the extrapolation of data from higher exposure levels to lower levels. Although other extrapolation techniques have also been proposed for estimating cancer rates from exposure to carcinogens, we use a linear extrapolation technique (see Figure A-2) for estimating cancer rates from radon and formaldehyde.

While linear extrapolation is a commonly used method to estimate the risk of lifetime cancer, such factors as variations in indoor pollutant levels, total amounts of exposure, and human responses to pollutant exposure make health effects difficult to estimate. Because there are large amounts of experimental data for radon, scientists have been able to develop a commonly accepted risk factor, which is considered conservative but which is weighted toward a value representative of average conditions. Little experimental data exist for formaldehyde, so a conservative risk factor was used to estimate the incidence of nasal cancer from this pollutant.

Figure A-2
Example of Linear Extrapolation



Commercial Buildings. When a substantial portion of building occupants complain of symptoms associated with acute discomfort, there is no apparent cause, and the symptoms are relieved upon leaving the building, the building is said to suffer from sick building syndrome. When the symptoms result in a clinically defined illness, the building is said to evidence building related illness. It should be noted that some percentage of building occupants will experience some of the symptoms of sick building syndrome. Some of these complaints will be related to diseases contracted elsewhere or to stress, but the symptoms may be increased by indoor air contaminants.

Potential indoor air quality effects in commercial buildings may be caused by pollutants emitted inside buildings, inadequate ventilation rates, contamination from sources outside the building, or biological contamination. These factors interact with and may be exacerbated by temperature, humidity, and lighting. Most of the problems are caused by pollutants themselves or the interaction among them, but sick building syndrome may be increased by an inadequate building ventilation rate.

Some researchers have linked complaints of occupants with microbiological contamination from dampness or from chillers or humidifiers, but when studies have been performed, no direct relationship between the two has been found. The problems may stem from toxins released by microorganisms. There also is some evidence that biocides in low concentrations may cause symptoms.

Some studies have linked sick building syndrome and ventilation conditions. Others have found multiple factors that may cause it. A few studies have found either lighting or noise to be potential causes of sick building syndrome.

BPA proposes to use the energy conservation measures (ECMs) listed in Exhibits 1 through 3, Appendix C. Some of these ECMs potentially may either introduce pollutants into a building's indoor air, or may change the rate at which pollutants are either drawn into or removed from the indoor air.

Some ECMs used in commercial buildings may contain pollutants of concern to indoor air quality, e.g., caulking used to reduce infiltration rates contains many potentially harmful materials (see Human Health discussion). Or, the use of an ECM may increase the risk of indoor air quality problems, e.g., the reduction of ventilation during unoccupied periods may increase the concentration of pollutants in indoor air. Table A-7, taken from Baechler, et al., summarizes the impacts that different groups of ECMs may have on indoor air quality.

Ventilation. Building ventilation is the process of getting air into and out of a building. It is accommodated by three means: infiltration, natural ventilation, and mechanical ventilation. The overall process of infiltration generally is a combination of these three factors.

Infiltration is the flow of air through any unplanned openings in a building. Natural ventilation is the flow of air through windows, doors, skylights, ventilators, stacks, and other planned openings in the building. Natural ventilation is controlled by a building's occupants. Mechanical ventilation is the forced movement of air by fans into or out of a building. The building's windows are sealed. Occupants do not control the ventilation rate.

The amount of natural ventilation varies with temperature of the outside air, the pressure of the wind due to airflow around the building, and the amount of buoyancy in the air caused by differences in temperature between the air inside and outside the building. The airflow pressure varies with wind speed, and the buoyancy or stack effect varies with temperature differential, building height, and any vertical passages in a building. The degree of air exchange varies with the balance between these two forces. In warm conditions the temperature differential between indoor and outdoor temperatures is small, stack effect is minimal, wind effects dominate, and risk of stagnant air is greatest. In cold conditions, stack effects are greater, and infiltration is greater. There is smaller risk of stagnant air.

Mechanical systems generally provide a range of ventilation rates, and are designed to operate on a minimum of outside air. The two most common types of systems are the constant air volume system, and the variable air volume system. In the constant air volume system, temperature is controlled by regulating the temperature of the supply air. Dampers control the amount of intake and exhaust air and the amount of air recirculated.

For variable air volume systems, temperature is controlled by regulating the amount of air being supplied to a space. Dampers control the amount of air reaching a space.

The American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc. (ASHRAE) has established minimum mechanical ventilation rates to achieve acceptable indoor air quality assuming no unusual sources of pollutants are in a building. ASHRAE published its first standard in 1973, modified it in 1981, and modified it again in 1989. The 1973 standard specified a 5 cubic feet per minute (cfm) (2.5 liters per second [L/s]) per person minimum rate and a recommended rate of 20 to 25 cfm per person. The 1981 standard specified a minimum rate of 5 cfm for non-smoking areas and 20 to 35 cfm for smoking areas. The 1989 standard specifies a minimum of 15 cfm per person, combining the smoking and non-smoking recommendations into one.

Most research about health effects from indoor air quality have been performed in public buildings, which are similar to many commercial buildings in their construction and function. For this analysis, BPA is assuming that information from public buildings is applicable to commercial buildings in general.

Battelle Pacific Northwest Laboratories (PNL) prepared an assessment of health effects associated with indoor pollutants in commercial buildings PNL performed a comprehensive literature search on each of the pollutants. In addition, PNL used three active, professionally maintained, peer-reviewed, on-line data bases to investigate the health effects of various contaminants. That information formed the basis for this discussion, and is summarized in Appendix F.

Literally hundreds of potential indoor contaminants are emitted from a large variety of materials and substances used in the construction, maintenance, and use of commercial buildings. This analysis addresses only a small number of the compounds that potentially may be in commercial buildings. The compounds addressed are those that have been measured in the indoor air of public buildings, in test situations, and which have significant hazard ratings.

Health effects from exposure to these pollutants, individually or in mixtures, range from acute to chronic effects. These effects may be either reversible, such as rashes or irritation, or irreversible, such as toxic or carcinogenic effects. For a summary of the compounds, their description and chemical properties, and their hazard rating and carcinogen class, see Table A-6. The hazard rating scale and EPA carcinogenic weight-of-evidence classifications are shown on Table A-4 and Table A-5, respectively. For most of the compounds, their carcinogenic class is either unknown or a possible or probable human carcinogen. Most of the hazard ratings are either medium or high.

Some contaminants, like asbestos, formaldehyde, and radon, have been relatively well studied for some time. Many others have not. The study of mixtures of these contaminants is in its infancy. The issue of health effects from these contaminants is further complicated because biogenic compounds that may affect people also are present in buildings. Both the actual exposure to mixtures of chemical contaminants and the inclusion of biogenic factors confound the ability to identify health problems associated with specific compounds. For an in-depth discussion of the characteristics, risks, and health effects, refer to the health effects report, Appendix F.

It is difficult to predict or monitor most indoor pollutants, or to relate the application of one or more ECMs to the production of any particular amount of a specific compound. To help solve the problem, the ASHRAE has developed a national consensus standard for ventilation rates in commercial buildings. The stated purpose of the standard is to specify minimum ventilation rates and indoor air quality that will be acceptable to human occupants and are intended to avoid adverse health effects. It embraces two procedures for ventilation for acceptable indoor air quality. Its prescriptive ventilation rate procedure specifies the amount of outdoor air needed to dilute and remove contaminants for 91 different applications. Its air quality procedure requires that the concentration of contaminants be held below acceptable limits, but does not specify outdoor air flow rates. Minimum outdoor air flow rates for either case have been changed from 5 cubic feet per minute (cfm) (2.5 liters per second [L/s]) to 15 cfm (7.5 L/s), and distinctions between smoking and nonsmoking areas, allowed in 62-1981, the prior standard, have been discarded.

Mitigation: BPA requires that buildings receiving assistance from BPA programs follow program guidelines for incorporating ASHRAE Standard 62-89.

Table A-4
Sax and Lewis' Chemical Hazard Rating Scale

Hazard Rating	LD_{50} (mg/kg)	LC_{50} (ppm)
Low(1)	4,000-40,000	4,000-40,000
Medium(2)	400-4,000	100-500
High(3)	< 400	< 100

Table A-5
EPA Carcinogenic Weight-of-Evidence Classifications

Category Group	Estimate of Cancer Risk	Type of Data Supporting Category
A	Known human carcinogen	Human
B1	Probable carcinogen	Human
B2	Probable carcinogen	Animal
C	Possible carcinogen	Animal
D	Carcinogenic potential	Unknown
E	Not carcinogenic	Human or animal

Table A-6
Summary of Quantitative Data on Contaminants

Family	Compound	Description	Vapor Pressure (degrees C)	Flash Point (degrees F)	Threshold Limit Value	Hazard Rating (a)	EPA Carcinogen Class (b)
Aliphatic and Oxygenated Aliphatic Hydrocarbons	n-Butylacetate ($C_6H_{12}O_2$)	Colorless liquid	15 mm Hg @ 25 deg	72 deg	150 ppm (TWA) 200 ppm (STEL)	--	--
	Decane ($C_{10}H_{22}$)	Liquid	1 mm Hg @ 16.5 deg	115 deg	--	3	--
	Dodecane ($C_{12}H_{26}$)	Oily paraffin; colorless liquid	--	--	--	3	--
	2-Ethoxyethylacetate ($C_6H_{12}O3$)	Colorless liquid with mild, pleasant, ester-like odor.	1.2 mm Hg @ 20 deg	117 deg	5 ppm (TWA)	2	--
	Octane (C_8H_{18})	Clear liquid	10 mm Hg @ 19.2 deg	56 deg	300 ppm (TWA) 375 ppm (STEL)	3	D
	a-Pinene ($C_{10}H_{16}$)	Liquid with odor of turpentine	10 mm Hg @ 37.3 deg	91 deg	--	3	--
	Undecane ($C_{11}H_{24}$)	Colorless liquid	--	149 deg	--	2	--
Halogenated Hydrocarbons	Carbontetrachloride (CCl_4)	Heavy, colorless liquid with an ethereal odor	100 mm Hg @ 23.0 deg	None	5 ppm (TWA)	3	B2
	Chloroform (CCl_4)	Heavy, colorless liquid with an ethereal odor	100 mm Hg @ 10.4 deg	None	10 ppm (TWA)	3	B2

Table A-6 (continued)

Family	Compound	Description	Vapor Pressure (degrees C)	Flash Point (degrees F)	Threshold Limit Value	Hazard Rating (a)	EPA Carcinogen Class (b)
	1,2-Dichlorobenzene ($C_6H_4Cl_2$)	Clear liquid	--	151 deg	50 ppm(TWA)	3	--
	Dichloromethane (CH_2Cl_2)	Colorless, volatile liquid	380 mm Hg @ 22 deg	--	50 ppm(TWA)	3	B2
	Tetracholoroethylene (C_2Cl_4)	Colorless liquid with chloroform-like odor	15.8 mm Hg @ 22 deg	None	50 ppm(TWA) 200 ppm (STEL)		Under review
	1,1,1-Trichloroethane	Colorless liquid	100 mm Hg @ 20 deg	None	350 ppm(TWA)		D
	($C_2H_3Cl_3$)				450 ppm(STEL)		
	1,1,1-Trichloro-ethylene (C_2HCl_3)	Mobile liquid with a characteristic odor of chloroform	100 mm Hg @ 32 deg	89.6 deg	50 ppm(TWA) 200 ppm(STEL)		B2
Aromatic Hydrocarbons	Benzene (C_6H_6)	Clear, colorless liquid	100 mm Hg @ 26.1 deg	12 deg	10 ppm(TWA)	3	A
	Ethylbonzena (C_8H_{10})	Colorless liquid with an aromatic odor	100 mm Hg @ 25.9 deg	59 deg	100 ppm(TWA) 125 ppm(STEL)	2	D
	Propylbenzene (C_9H_{12})	Clear liquid; insoluble in water, miscible in alcohol and ether	10 mm Hg @ 43.4 deg	86 deg	--	3	--
	Styrene (C_8H_8)	Colorless, retractive, oily liquid	--	88 deg	50 ppm(TWA) 100 ppm(STEL)	3	Under review

Table A-6 (continued)

	Toluene (C_7h_8)	Colorless liquid With a benzol like odor	36.7 mm Hg @ 30 deg	40 deg	100 ppm(TWA) 150 ppm(STEL)	3	D
	1,2,4-Trimethyl-benzene	Liquid	--	130 deg	25 ppm(TWA)	2	D
	Xylene (C_8H_{10})	Clear liquid	6.72 mm Hg @ 21 deg	100 deg	100 ppm(TWA) 150 ppm(TWA)	3	D

Table A-6 (continued)

Ketones	Methylethylketone	Colorless liquid with an acetone-like odor	71.2 mm Hg @ 20 deg	22 deg	200 ppm(TWA) 300 ppm(STEL)	3	D
Aldehydes	Formaldehyde (CH_2O)	Clear, water-white, very slightly acid gas or liquid with a pungent odor	10 mm Hg @ 88 deg	122 deg	1 ppm(TWA) 2 ppm(STEL)	3	B1
Family	Compound	Description	Vapor Pressure (degrees C)	Flash Point (degrees F)	Threshold Limit Value	Hazard Rating (a)	EPA Carcinogen Class (b)
	Radon/Radon Progeny (R_n)	Colorless, odorless, very dense inert gas	--	91 deg	--	3	Under review
Caulk Compounds	Carbitol ($C_6H_{14}O_3$)	Colorless liquid with mild pleasant odor	--	201 deg	--	2	--
	Ethylene Glycol ($C_2H_6O_2$)	Colorless, sweet-tasting, hygroscopic liquid	0.05 mm Hg @ 20 deg	232 deg	50 ppm(TWA)	3	--
	Octene	Colorless liquid	--	--	--	--	--

Table A-6 (continued)

Combustion Products	Benzo(A) Pyrene ($C_{20}H_{12}$)	Yellow crystals, insoluble in water, soluble in benzene, toluene, and xylene	--	--	--	3	B2
	Carbon Monoxide (CO)	Colorless, odorless gas	--	--	--	3	--
	Carbon Dioxide (CO_2)	Colorless, odorless gas	--	--	5,000 ppm(TWA) 30,000 ppm(STEL)	1	--
	Environmental Tobacco Smoke	--	--	--	--	D	Under review
Fibers	Asbestos	--	--	--	--	3	A
PCBs	PCBs	Range in consistency from heavy oily liquids to waxy solids	7.75E-5 mm Hg	200 deg	0.001 mg/m^3 for 10-hr day, 40 hr week (NIOSH)	3	B2
Family	Compound	Description	Vapor Pressure (degrees C)	Flash Point (degrees F)	Threshold Limit Value	Hazard Rating [a]	EPA Carcinogen Class [b]
					0.5 to 1.0 mg/m^3 for 8-hr day (OSHA)		
CFCs	Freon 113	--	--	--	--	1	--
	Freon 11	--	--	--	--	3	--
	Freon F-12	--	--	--	--	1	--

(a) Sax and Lewis Hazard Rating (see Table A-4)
(b) EPA Weight of Evidence Classification for Carcinogenicity (see Table A-5)

Table A-7
List of Candidate Energy Conservation Measures and Associated IAQ Impacts

Energy Conservation Measure	RSP Fibers	RSP Particles	Biogenic	Radon	Combustion Gases	VOCs
Building Envelope						
Install wall, ceiling, roof, floor, foundation and slab insulation	D+	nc	nc	nc	nc	D+
Reduce heat/cool loads from infiltration by caulking and weatherstripping	I+	I±	I±	I+	I±	D+ I+
Install storm windows/doors	I±	I±	I-	I+	I±	I+
Enclose loading docks with shelters and seals	I±	I±	I±	I+	I±	I+
Install vestibules to reduce infiltration/exfiltration	I±	I±	I±	I+	I±	I+
Seal vertical shafts to reduce in/exfiltration	I±	I±	I±	I+	I±	I+
Heating/Air Conditioning						
Install automatic condenser cleaning	u	u	D-	u	u	D+
Replace air-cooled condenser with cooling tower	nc	nc	D+	nc	nc	nc
Install spot cooling	nc	nc	D+	nc	nc	nc
Install earth cooling tubes	nc	nc	D+	nc	nc	nc

Table A-7 (continued)

Energy Conservation Measure	RSP Fibers	RSP Particles	Biogenic	Radon	Combustion Gases	VOCs
Install roof spray systems	nc	nc	D+	nc	nc	nc
Install economizer (air-side)	u	u	u	u	u	I-
Install warm-up cycle controls/optimum start	u	u	u	u	u	I-
Install automatic setback/ setup thermostats	u	u	u	u	u	I+
Insulate ducts	D+	nc	I-	nc	nc	D+
Ventilation						
Install CO-controlled ventilation	u	u	u	u	I-	nc
Install CO-controlled covered parking ventilation	u	u	u	u	D-	nc
Automatically reduce ventilation during unoccupied periods	I±	I±	I±	I+	I±	I+
Reduce minimum outside air	u	u	u	u	u	I+
Recirculate exhaust air using activated carbon filters	D+	I-	nc	nc	I-	I-
Install vortex hoods for restaurants	nc	I-	nc	nc	I-	I-

Table A-7 (continued)

Energy Conservation Measure	RSP Fibers	RSP Particles	Biogenic	Radon	Combustion Gases	VOCs
Employ evaporative cooling of outdoor air	nc	nc	D+	nc	nc	nc
Employ desiccant dehumidification	u	u	u	u	u	nc
Reduce energy consumption for fans by reducing air flow rates and resistance to air flow	nc	nc	nc	nc	nc	nc
Install high efficiency fans with larger ductwork	u	u	u	u	u	I-
Instal dual speed fans	u	u	u	u	u	I-
Install attic ventilation	nc	nc	nc	nc	nc	I-
Install low leakage dampers	u	u	u	u	u	I-
Install ceiling fans	u	u	u	u	u	nc
Install outside air reset control	u	u	u	u	u	nc

KEY D = direct effect
I = indirect effect
+ = increase pollutant levels
- = decrease pollutant levels
± = either increase or decrease depending on whether indoor or outdoor source
nc = no change
u = unsure

Chlorinated Fluorocarbons

Greenhouse Effect

Recent scientific evidence suggests that chlorofluorocarbons may cause environmentally harmful long term effects. Chlorofluorocarbons are chemically stable compounds of the halocarbon family, derived from common hydrocarbons such as methane, ethane, and propane. Of all the halocarbons, which include the hydrogenated chlorofluorocarbons and the hydrogenated fluorocarbons, the chlorofluorocarbons are the most useful. They include most of the best refrigerants used today. They also are among the best foaming agents for low-density insulating materials, used in both buildings and appliances. About one-third of the worldwide production of 2 billion pounds is manufactured by the United States.

CFCs are persistent in the environment. Their life expectancy is about 100 years. Over time, individual CFC molecules are theorized to disperse into the atmosphere, where they break down under ultraviolet (UV) bombardment. When that happens, the halogen chlorine found in all CFCs causes ozone destruction by disrupting normal atmospheric chemistry. One estimate is that each free atom of chlorine helps destroy 100,000 atoms of ozone.

The ozone layer in the stratosphere normally forms a shield, protecting the earth. This shield blocks harmful UV rays emitted by the sun from reaching the earth. The release of CFCs in large amounts by man's activity may cause ozone depletion. Ozone depletion allows increased amounts of UV radiation to penetrate the earth's atmosphere. The increased UV radiation may cause increased incidence of skin cancer in humans. EPA has predicted that each 1 percent decrease in the ozone will result in a 1 to 2 percent increase in melanoma. Other effects that have been predicted include crop damage, increases in cataracts, increased smog, increased degradation of man-made materials, and a suspected cause in the decline of amphibian populations worldwide.

CFCs are also known as greenhouse gases, which, as they build up in the earth's atmosphere, are suspected of contributing to an increase in the temperature of the earth, also known as global warming or the greenhouse effect. CFCs and CO^2 are the most widely known of these compounds. They absorb long-wave radiation, which normally escapes from the earth's atmosphere, effectively warming the atmosphere and the earth.

Worldwide attention has focused on the effects of global warming, leading to international treaties to phase out the chemicals. Most notable of these agreements is the Montreal Protocol, which 56 nations signed. Signators commit to reduce the production of CFCs, halon gases, carbon tetrachloride, and methyl chloroform by 50 percent by 1998. The United Nations Environmental Program sponsored a meeting in London in June 1990 that resulted in an acceleration of the phaseout of more damaging CFCs and a more gradual phaseout of less damaging HCFCs (see below). National and local legislation also has flourished.

The Montreal Protocol calls for a phased reduction in CFC production between now and 1998. Two of the compounds being phased out are CFC-11 and CFC-12. These compounds are widely used as blowing agents in the production of plastic foam insulation and as a heat transfer compound in refrigerators and heat pumps.

Identifying possible substitute compounds for CFC refrigerants is just the beginning of the process. In order to be considered a viable substitute, the alternatives must be effective as a refrigerant, safe to use, and possible to manufacture economically in commercial quantities. In addition, they must be chemically stable at the temperatures and pressures to which they will be exposed, and be compatible with lubricants used in refrigerant compressors. Manufacturers may need to redesign equipment to accommodate the new product. Testing of new products will be expensive and time consuming. Some toxicity tests are run 5 to 7 years before the new products are on the market.

A great deal of research to find acceptable CFC substitutes is underway. Several alternatives in the developmental stages are outlined below.

Halocarbon compounds that are not fully halogenated contain hydrogen, have shorter atmospheric lifetimes, contain less chlorine, and have less potential to deplete the ozone layer. Halocarbons that contain hydrogen, fluorine and chlorine, as well as carbon, are called HCFCs. A new refrigerant that may prove useful as an alternative to CFC-11 is HCFC-123. One possible application could be in centrifugal compressors. This type of equipment is used in large commercial systems, including the air conditioning in high-rise office buildings.

Halocarbons that contain only hydrogen, fluorine, and carbon are called HFCs. Many HFCs are being investigated as possible refrigerants. A likely substitute for CFC-12 is HFC-134a. This could be a possible substitute refrigerant in automobile air conditioners as well as other uses.

Ammonia is widely used as a primary refrigerant in many large commercial and industrial refrigeration applications. In Japan, ammonia refrigerants are used in some energy efficient commercial buildings. Helium refrigerators, long used in military and space applications, are now being adapted for civilian use in trucks and homes. Rigid foam insulation in refrigerators may ultimately be replaced by vacuum insulation, similar to that used in thermos bottles. In automobiles, side vent windows, window glazings that slow solar absorption, and new solar ventilation systems can reduce interior heating and curb or eliminate the need for air conditioning, thus reducing CFC emissions.

There needs to be a renewed focus on containment and recycling of refrigerants containing CFCs. Service and maintenance practices need to be changed and better containment methods need to be established. Currently available control technologies and stricter standards governing equipment operation and maintenance could reduce CFC and halon emissions by approximately 90 percent. Some states are in the process of implementing recovery and recycling regulations to prevent additional CFC emissions. EPA also is investigating options to ensure that refrigerants are recycled.

Table A-8 Global CFC Use, by Category, 1985

Use	Share of Total (percent)
Aerosols	25
Solvents	19
Air Conditioning	12
Flexible Foam	7
Other	10
Total	100

SOURCE: Daniel F. Kohler et al., Projections of Consumption of Products Using Chlorofluorocarbons in Developing Countries (Santa Monica, Calif.: Rand Corporation, 1987).

Table A-9 Global CFC Use, by Region, 1986

Region	Share of Total (percent)
United States	29
Other Industrial Countries[1]	41
Soviet Union, Eastern Bloc	14
Other Developing Countries	14
China and India	2

[1]European Community accounts for more than half, followed by Japan, Canada, Australia, and others.

SOURCE: "THE OZONE TREATY: A Triumph for All," Update from State, May/June 1988.

Table A-10 Use and Emissions Profiles of Commonly Used Chemicals, 1985

Chemical	Emissions (thousand tons)	Atmospheric Lifetime[1] (years)	Applications	Annual Growth Rate (percent)	Share of Contribution to Depletion[2] (percent)
CFC-11	238	76	Foams, Aerosols, Refrigeration	5	26
CFC-12	412	139	Air Conditioning, Refrigeration, Aerosols, Foams	5	45
HCFC-22	72	22	Refrigeration, Foams	11	0
CFC-113	138	92	Solvents	10	12
Halon 1211	3	12	Fire Extinguishers	23	1
Halon 1301	3	101	Fire Extinguishers	n.a.	4
Methyl Chloroform	474	8	Solvents	7	5
Carbon Tetrachloride	66	67	Solvents	1	8

[1] Time it takes for 63 percent of the chemical to be washed out of the atmosphere.
[2] Column does not total 100 due to rounding.
SOURCES: James K. Hammitt et al., "Future Emission Scenarios for Chemicals that May Deplete Stratospheric Ozone,: Nature, December 24, 1987; U.S. Environmental Protection Agency, Regulatory Impact Analysis: Protection of Stratospheric Ozone, Volume II, Part I (Washington, DC, 1987); Douglas Cogan. Stones in a Glass House: CFCs and Ozone depletion (Washington, DC, Investor Responsibility Research Center, 1988).

Proposed Legislation

Comprehensive indoor air quality legislation is now before the U.S. Senate (S. 455) and the House of Representatives (H.R. 1066).

In addition, S. 792, the Indoor Radon Abatement Reauthorization Act of 1991, directs the Environmental Protection Agency to undertake the following provisions:

Priority radon areas: By January 1992, EPA must designate as priority radon areas those areas where there is a reasonable likelihood that the average radon level will exceed the national average level by more than a de minimis amount.

Citizen's guide: The citizen's guide will list priority radon areas, state the average national ambient outdoor radon level, and establish a target action point that is as close to the national ambient outdoor level as it is possible for a single family home to achieve using available and affordable mitigation practices.

Model construction standards: EPA must publish final radon control standards for homes by 1992 and for multiunit residences and schools by 1994. In order to be approved for Federal mortgage assistance, such as FHA, VA, or Farmer's Home Administration loans, residential dwellings in radon priority areas must meet the new construction standards.

Technical assistance: The technical assistance program will be expanded to include assistance for activities such as assessing and mitigating radon in public water supplies and providing radon information to renters.

Proficiency testing: EPA must impose charges on those who apply for proficiency ratings.

Grant assistance: Eligible activities for grant assistance from EPA will be expanded to include (among others) activities related to radon in water and outreach to licensed child care facilities in priority radon areas.

Radon in schools: One year after enactment, EPA must publish guidelines on testing and remediating radon in schools. All school buildings in a priority radon area will be required to test for radon, and test results will be made available to the public.

Regional Radon Training Centers: Regional training centers will be authorized to train building code officials, contractors, and others on the model construction standards.

Federal buildings: EPA must submit a plan to Congress describing activities to assess and mitigate radon in Federal buildings. Federal agencies responsible for Federal buildings must assure that all schools and residences are tested by January 1996 and that all other Federal buildings are tested by January 1998.

Radon information: Within 6 months of enactment, EPA must publish a radon information document to be given by mortgage lenders to all those who apply for mortgage loans.

Mandatory Radon Proficiency Program: All persons offering radon measurement devices or measurement or mitigation services will have to complete EPA's radon proficiency program.

Medical community outreach: EPA and the Department of Health and Human Resources (HHS) must develop and implement an outreach program to provide radon information to the medical community.

Federal housing: Any new Federal building or any school constructed with Federal financial assistance in a radon priority area must comply with the model construction standards. HUD, in cooperation with EPA, must disseminate radon information in priority areas to those in public housing, assisted Indian housing, and housing funded by HUD housing assistance. Additionally, any single or multifamily home owned by the Federal government in a radon priority area must be tested for radon before a sales contract to sell the home is signed. The results of such testing must be made available to potential buyers.

National radon education efforts: EPA is authorized to establish a national educational campaign to increase public awareness about radon health risks.

Radon in work places: EPA must conduct a study to determine the extent of radon contamination in the nation's work places. Selected high-risk work places will be chosen for diagnostic and remedial efforts to reduce exposure.

Enforcement: EPA may assess civil penalties up to $25,000 for violation of the act.

Radon bills have also been introduced in the House. H.R. 1795 is intended to ensure that amounts paid for home improvements to mitigate radon gas qualify for the tax deduction. H.R. 1693, the National Radon in Schools Testing Act of 1991, amends the Toxic Substances Control Act and requires local education agencies to submit radon test results to the governor, who must submit a report to the EPA. Provisions similar to S. 792 have also been introduced.

Regulatory/Agency Actions

Consumer Product Safety Commission

In May 1991, the Consumer Product Safety Commission (CPSC) submitted a report to Congress outlining the agency's strategies and plans for identifying and remedying indoor air quality hazards associated with consumer products. The report, required by the Consumer Product Safety Act, addresses CPSC's activities and accomplishments on issues of: carbon monoxide emissions from fuel-fired heating and cooling equipment; nitrogen dioxide emissions from kerosene heaters, unvented gas space heaters, and gas stoves; benzene from paint removers; trichlorethylene, a widely used solvent in consumer products; glycol ethers in household cleaning products; volatile organic compounds from paints, cleansers, and various consumer products; methylene chloride in paint strippers; biological pollutants in household humidifiers; formaldehyde released from particle board, durable press fabrics, and glues; asbestos from insulation; and lead from lead-containing paint. Current CPSC goals include reducing carbon monoxide deaths from non-fire-related causes by at least 50 percent over the next 5 years; reducing childhood respiratory illnesses associated with exposure to nitrogen dioxide, biological pollutants, and particulates; and stimulating industry development of air cleaning systems that eliminate known pollutants from indoor air.

Table A-11
Federal Nonattainment Areas
in Study Area

	SO_2	NO_1	NO_2	CO	PM_{10}	O_3	TSP
IDAHO							
Boise & portion of Ada County				x	x		
City of Pinehurst					x		
City of Pocatello					x		
Bonner County (Sandpoint)					x		
Kootenai County (Coeur d'Alene)					x		
OREGON							
Medford-Ashland					x		
Grants Pass					x		
Eugene-Springfield					x		
Klamath Falls					x		
LaGrande					x		
Oakridge					x		
Portland/Vancouver				x		x	
Salem				x		x	
Jackson County				x			
Josephine County				x			
Lane County				x			
WASHINGTON							
A portion of Seattle					x		
A portion of Spokane County					x		
A portion of Tacoma					x		
A portion of Yakima County					x		
City of Kent					x		
Cities of Olympia, Tumwater, and Lacey					x		
Wallula					x		
Benton County (Kennewick)					x		
Clark County				x		x	
Seattle-Tacoma CMSA				x			
Yakima County				x			

Table A-11 (continued)
Federal Nonattainment Areas
in Study Area

	SO_2	NO_1	NO_2	CO	PM_{10}	O_3	TSP
ARIZONA							
Ajo	x						x
Douglas	x						x
Hayden	x						x
Joseph City							x
Miami	x						x
Paul Spur							x
Phoenix							x
Tucson				x			x
San Manuel	x						
Morenci	x						x
Rest of State							x
Maricopa				x		x	

Table A-11 (continued)
Federal Nonattainment Areas
in Study Area

	SO_2	NO_1	NO_2	CO	PM_{10}	O_3	TSP	Ozone
CALIFORNIA								
North Central Coast Air Basin								x
South Central Coast Air Basin							x	x
San Diego Air Basin				x	x		x	x
South Coast Air Basin			x	x	x		x	x
San Joaquin Valley				x	x		x	x
Sacramento Valley Air Basin				x	x			x
Southeast Dessert Air Basin							x	x
San Francisco Bay Area Air Basin				x			x	x
Mountain Counties Air Basin							x	x
Lake Tahoe Air Basin				x				
COLORADO								
Fort Collins & Greeley							x	
Denver Urbanized Area							x	
Boulder Urbanized Area							x	
Colorado Springs 3-C							x	
Grand Junction Urbanized							x	
NEVADA								
Las Vegas Valley				x			x	
Carson Desert							x	
Winnemucca Segment							x	
Lower Reese Valley							x	
Gabbs Valley							x	
Fernley Area							x	
Truckee Meadows				x			x	
Mason Valley							x	
Steptoe Valley Central	x							
Clovers Area							x	
Lake Tahoe Basin				x				

Table A-11 (continued)
Federal Nonattainment Areas
in Study Area

	SO_2	NO_1	NO_2	CO	PM_{10}	O_3	TSP	Ozone
UTAH								
Ogden (new)				x				
Provo				x				
Salt Lake City (temp suspd)				x	x			x
Utah County					x			
Salt Lake County	x							
Tooele County (elevated)	x							
MONTANA								
Billings				x				
Great Falls (temp suspd)				x				
Missoula				x	x			
Butte					x			
Columbia Falls					x			
Kalispell					x			
Libby					x			
Thompson Falls (new)					x			
Lame Deer (TIP)					x			
Polson (TIP)					x			
Ronan (TIP)					x			
East Helena (new) [lead]								
Lewis & Clark County	x							
Yellowstone County	x							
WYOMING								
Sheridan					x			

SECTION 3

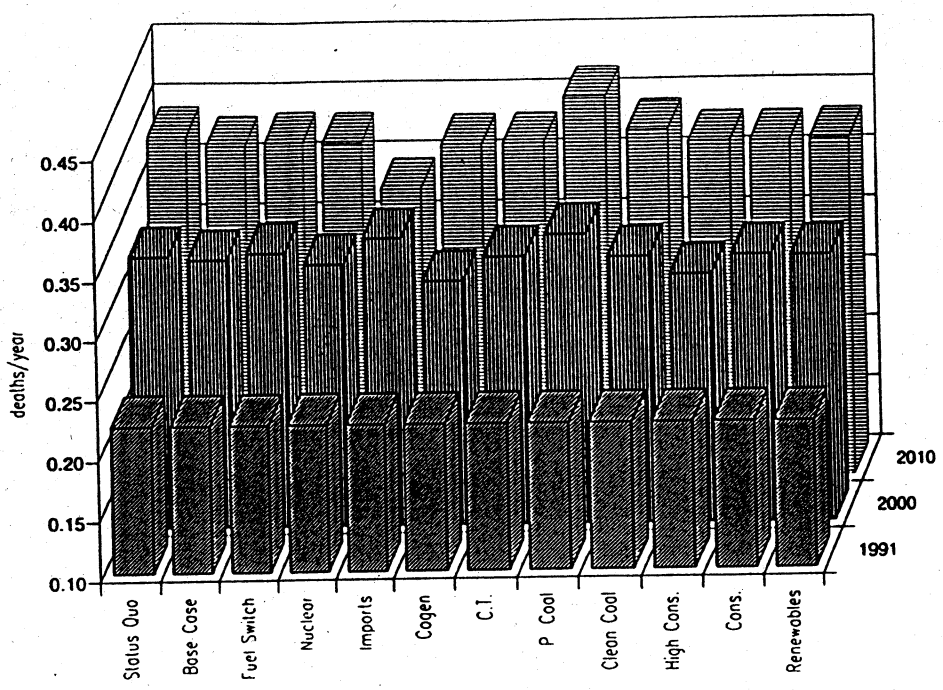
Wildlife/Threatened and Endangered Species, State Listings

A.4 Wildlife

Estimates of wildlife deaths resulting from exposure to SOx and TSP are shown in Figures A-3 through A-10. Appendix F, Section 7 details the estimates of wildlife effects for BPA's Resource Programs.

Figure A-3

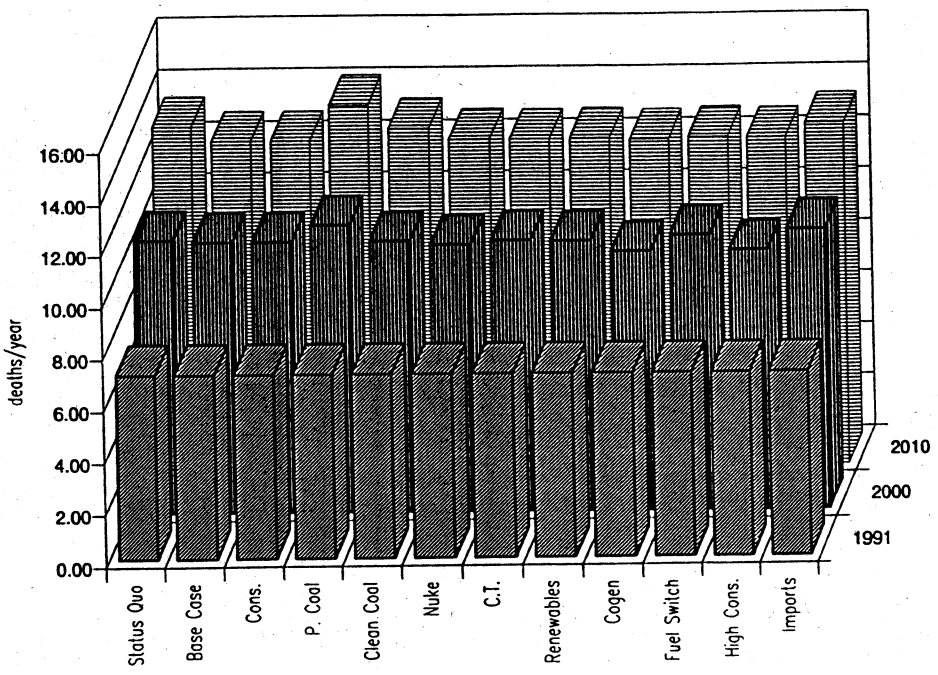
Regional Elk Mortality due to SOx Emissions



Alternatives

Figure A-4

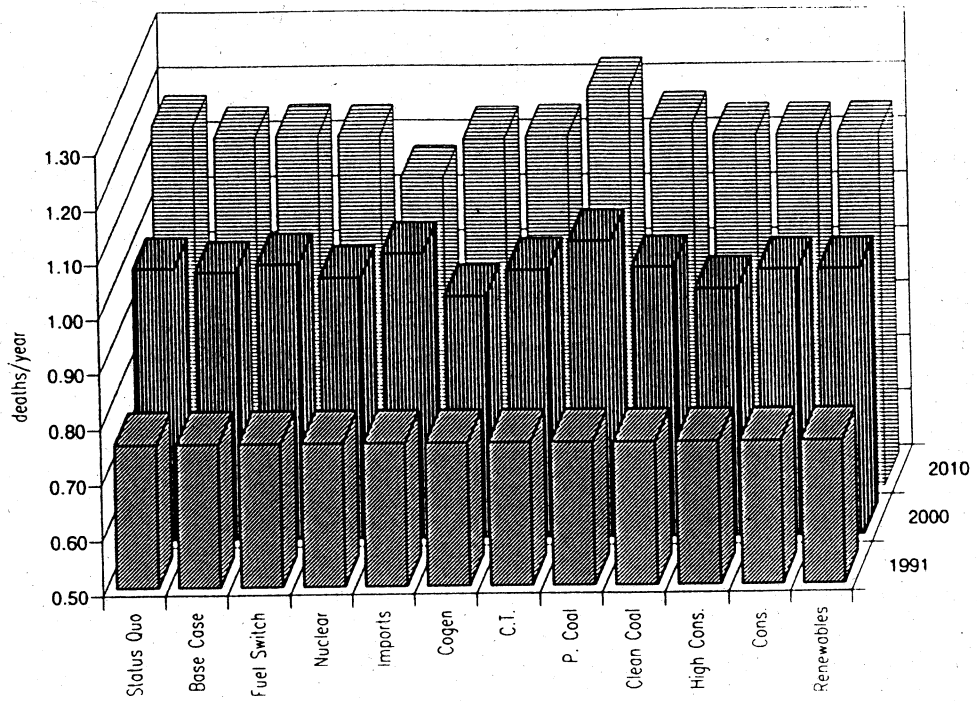
Regional Ground Squirrel Mortality due to SOx Emissions



Alternatives

Figure A-5

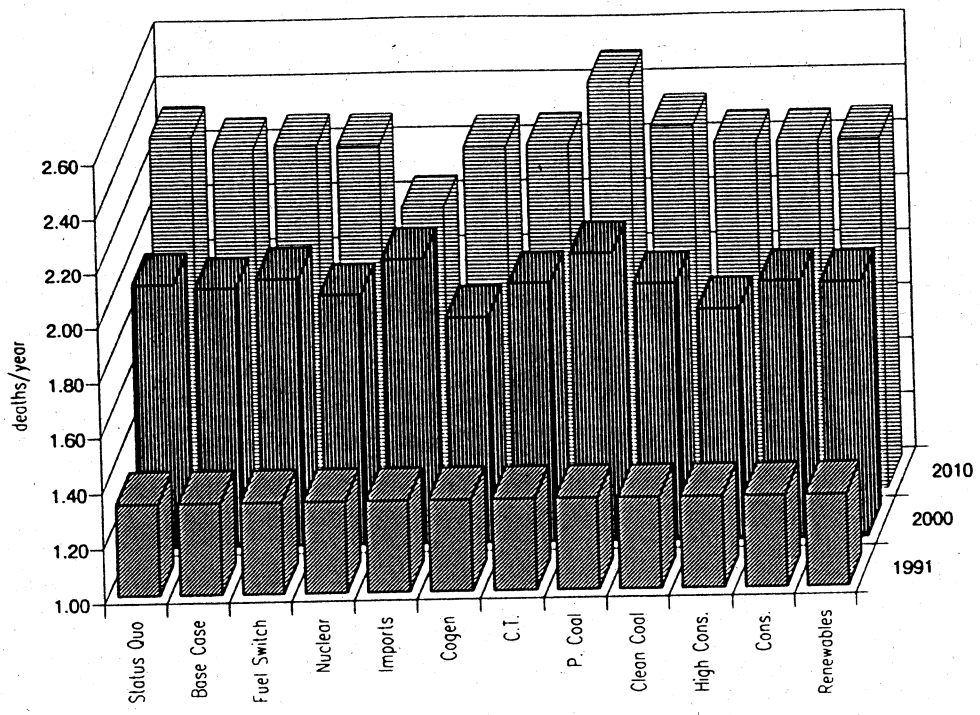
Regional Mink Mortality due to SOx Emissions



Alternatives

Figure A-6

Regional Beaver Mortality due to SOx Emissions



Alternatives

Figure A-7
Regional Elk Mortality due to TSP Emissions

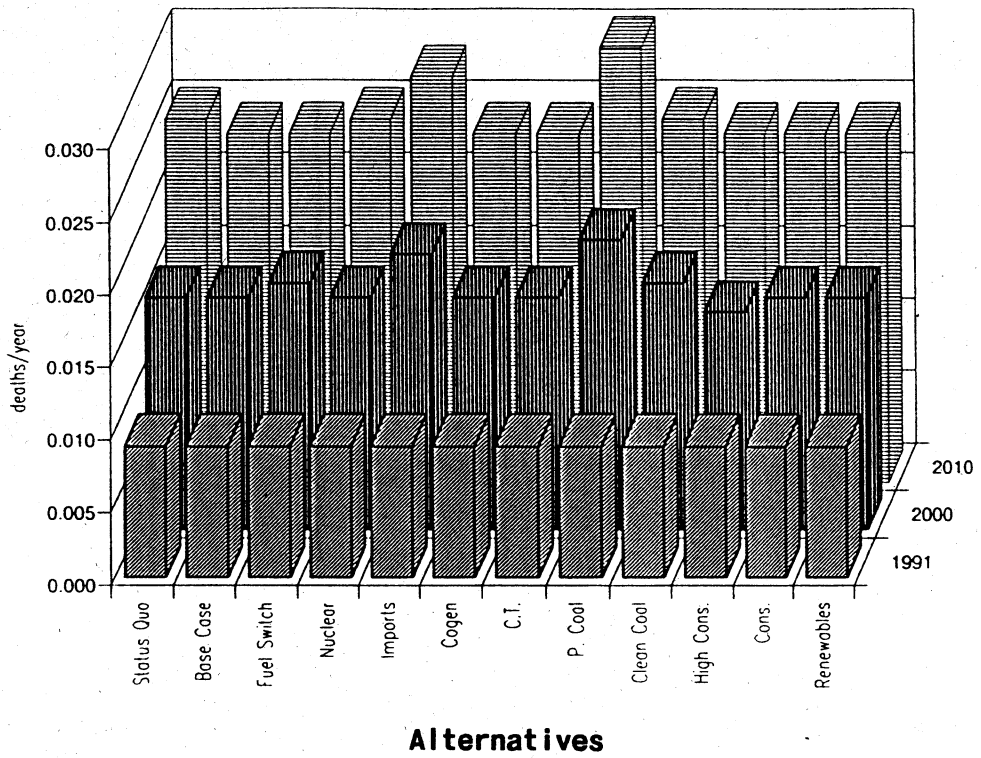


Figure A-8
Regional Ground Squirrel Mortality due to TSP Emissions

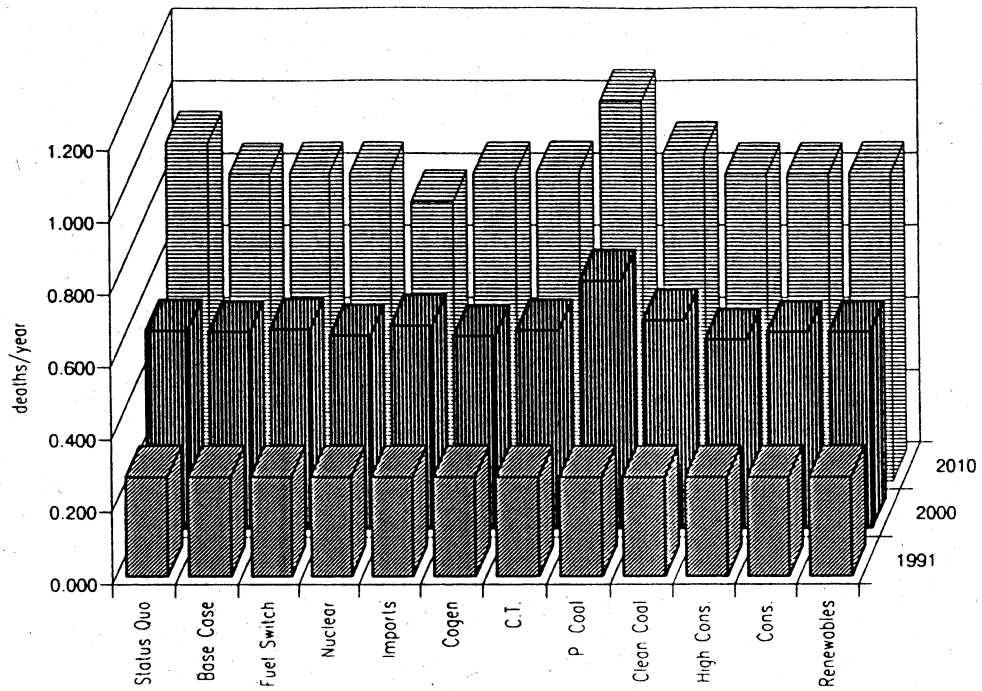


Figure A-9
Regional Mink Mortality due to TSP Emissions

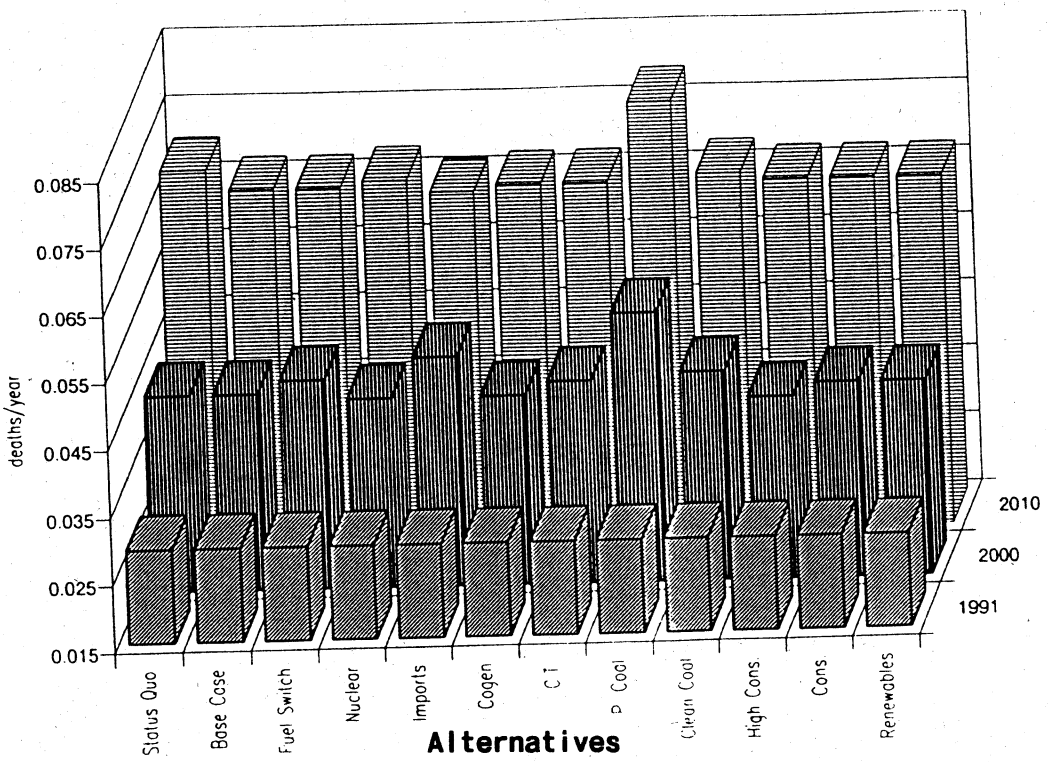
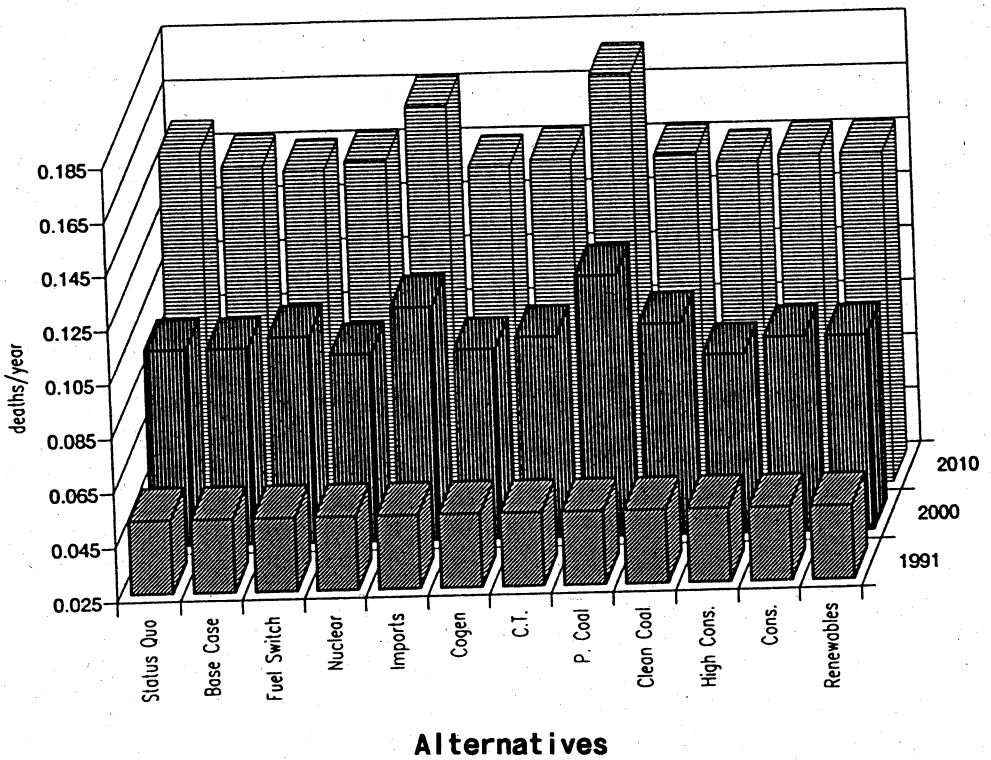


Figure A-10
Regional Beaver Mortality due to TSP Emissions



United States Department of the Interior

FISH AND WILDLIFE SERVICE

FISH AND WILDLIFE ENHANCEMENT
FEDERAL BUILDING, US COURTHOUSE
301 S PARK
P O BOX 10023
HELENA MT 59626

IN REPLY REFER TO:

M.03 (I)

November 15, 1991

Ms. Katherine S. Pierce
Bonneville Power Administration
P.O. Box 3621
Portland, OR 97208-3621

Dear Ms. Pierce,

This is in response to your letter of October 9, 1991 regarding Bonneville's preparation of a Resource Programs Environmental Impact Statement. Your letter was received by the Montana-Wyoming Field Office on October 11, 1991.

In accordance with Section 7(c) of the Endangered Species Act of 1973, as amended (ESA), we have determined that the following listed, proposed and category 1 candidate threatened or endangered (T/E) species may be present in the project area.

Listed Species	Expected Occurrence
Grizzly bear (Ursus arctos horribilis)	resident
Bald eagle (Haliaeetus leucocephalus)	resident, migrant, wintering
Peregrine falcon (Falco peregrinus)	migrant
Gray wolf (Canis lupus)	resident and transient
Black-footed ferret (Mustela nigripes)	potential resident of prairie dog towns

Proposed Species

None

Category 1 Candidate Species

None

Section 7(c) of ESA requires that Federal agencies proposing major construction activities complete a biological assessment to determine the effects of the proposed actions on listed and proposed species and use the biological assessment to determine whether formal consultation is required. A major construction activity is defined as "a construction project (or other undertaking having similar physical impacts) which is a major Federal action

significantly affecting the quality of the human environment as referred to in the National Environmental Policy Act" (50 CFR Part 402). If a biological assessment is not required (i.e. all other actions), the Federal agency is still required to review their proposed activities to determine whether listed species may be affected. If such a determination is made, formal consultation with the Fish and Wildlife Service (Service) is required.

For those actions wherein a biological assessment is required, it should be completed within 180 days of initiation, but can be extended by mutual agreement between the Federal agency or its designated non-Federal representative and the Service. If the assessment is not initiated within 90 days, the list of T/E species should be verified with the Service prior to initiation of the assessment. The biological assessment may be undertaken as part of the Federal agency's compliance of Section 102 of the National Environment Policy Act (NEPA) and incorporated into the NEPA documents. We recommend that biological assessments include the following:

1. A description of the project,

2. A description of the specific area that may be affected by the action,

3. The current status, habitat use, and behavior of T/E species in the project area,

4. Discussion of the methods used to determine the information in Item 3,

5. An analysis of the affects of the action on listed species and proposed species and their habitats, including an analysis of any cumulative effects,

6. Coordination/mitigation measures that will reduce/eliminate adverse impacts to T/E species,

7. The expected status of T/E species in the future (short and long term) during and after project completion,

8. A determination of "is likely to adversely affect" or "is not likely to adversely affect" for listed species,

9. A determination of "is likely to jeopardize" or "is not likely to jeopardize" for proposed species.

10. Citation of literature and personal contacts used in developing the assessment.

If it is determined that the proposed program or project "is likely to adversely affect" any listed species, formal consultation should be initiated with this office. If it is concluded that the project "is not likely to adversely affect" listed species, we should be asked to review the assessment and concur with the determination of no adverse effect.

Pursuant to Section 7(a) (4) of ESA, if it is determined that any proposed species may be jeopardized, the Federal agency should initiate a conference with us to discuss conservation measures for those species. Although candidate species have no legal status and are accorded no protection under ESA, they are included here to alert your agency of potential proposals or listings.

A Federal agency may designate a non-Federal representative to conduct informal consultation or prepare biological assessments. However, the ultimate responsibility for Section 7 compliance remains with the Federal agency and written notice should be provided to the Service upon such a designation. We recommend that Federal agencies provide their non-Federal representatives with proper guidance and oversight during preparation of biological assessments and evaluation of potential impacts to listed species.

Section 7(d) of ESA requires that the Federal agency and permit/license applicant shall not make any irreversible or irretrievable commitment of resources which would preclude the formulation of reasonable and prudent alternatives until consultation on listed species is completed.

Please contact us by mail at the above-referenced letterhead address or call Larry Lockard at (406) 755-7870 if we can be of further assistance. Your interest and cooperation in meeting our joint responsibilities under the Endangered Species Act are appreciated.

Sincerely,

Dale Harms

Dale R. Harms
State Supervisor
Montana State Office

LLL/ndg

PIERCE.LTR

cc: Kalispell Suboffice

"TAKE PRIDE IN AMERICA"

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Portland Field Station
2600 S.E. 98th Avenue, Suite 100
Portland, Oregon 97266

November 7, 1991

Ref: 1-7-92-SP-4

Ms. Katherine S. Pierce
Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

RE: Resource Programs Environmental Impact Statement

Dear Ms. Pierce:

This response regards your letter, dated October 9, 1991, which was received by us on October 10, 1991. The Portland Field Station handles Section 7 consultation requests for Oregon only. We have attached a list (Attachment A) of endangered and threatened species that may be present within Oregon under consideration in your Resource Programs Environmental Impact Statement. The list fulfills the requirement of the Fish and Wildlife Service under Section 7(c) of the Endangered Species Act of 1973, as amended (16 USC 1531 et.seq.) for Oregon. Your requirements under the Act are outlined in Attachment B.

Should your biological assessment determine that a listed species is likely to be adversely affected by the project, the Bonneville Power Administration (BPA) should request formal Section 7 consultation through this office. Even if your biological assessment shows a "no effect" or "beneficial effect" situation, we would appreciate receiving a copy for our information.

Attachment A includes a list of candidate species presently under review by this Service. Candidate species have no protection under the Endangered Species Act but are included for your consideration as it is possible candidates could become formal proposals and be listed prior to project completion. If you determine your project may affect candidate species, you are not required to perform a biological assessment or to consult with the Fish and Wildlife Service. However, if early evaluation of your project indicates that it is likely to adversely impact a candidate species, you may wish to request technical assistance from this office.

Your interest in endangered species is appreciated. If you have any additional questions regarding your responsibilities under the Act, please contact Laura Todd at our office, phone (503) 231-6179 or FTS 429-6179. All correspondence should include the above referenced case number.

Sincerely,

Russell D. Peterson

Russell D. Peterson
Field Supervisor

Attachments

LT4:792SP4.LTR

cc: PFO-ES
BFO-SE
ODFW (Nongame)
ONHP

LISTED AND PROPOSED ENDANGERED AND THREATENED SPECIES AND CANDIDATE SPECIES THAT MAY OCCUR IN OREGON IN THE AREA OF THE PROPOSED RESOURCE PROGRAMS ENVIRONMENTAL IMPACT STATEMENT 1-7-92-SP-4

LISTED[1/] AND CANDIDATE ANIMAL[3/] SPECIES

Name		Category
SUMMER BASIN TUI CHUB	GILA BICOLOR SSP 13	C1
TRICOLORED BLACKBIRD	AGELAIUS TRICOLOR	C2
WHITE-FOOTED VOLE	ARBORIMUS ALBIPES	C2
MARBLED MURRELET	BRACHYRAMPHUS MARMORATUS	C2
FERRUGINOUS HAWK	BUTEO REGALIS	C2
GOOSE LAKE SUCKER	CATOSTOMUS OCCIDENTALIS LACUSANSERINUS	C2
JENNY CREEK SUCKER	CATOSTOMUS RIMICULUS SSP 1	C2
KLAMATH LARGESCALE SUCKER	CATOSTOMUS SNYDERI	C2
SAGE GROUSE	CENTROCERCUS UROPHASIANUS	C2
WESTERN SAGE GROUSE	CENTROCERCUS UROPHASIANUS PHAIOS	C2
SNOWY PLOVER	CHARADRIUS ALEXANDRINUS	C2
WESTERN SNOWY PLOVER	CHARADRIUS ALEXANDRINUS NIVOSUS	C2
MOUNTAIN PLOVER	CHARADRIUS MONTANUS	C2
WESTERN POND TURTLE	CLEMMYS MARMORATA	C2
WESTERN YELLOW-BILLED CUCKOO	COCCYZUS AMERICANUS OCCIDENTALIS	C2
MALHEUR MOTTLED SCULPIN	COTTUS BAIRDI SSP 1	C2
SLENDER SCULPIN	COTTUS TENUIS	C2
FULVOUS WHISTLING-DUCK	DENDROCYGNA BICOLOR	C2
SPOTTED BAT	EUDERMA MACULATUM	C2
LYNX	FELIS LYNX	C2
ALVORD CHUB	GILA ALVORDENSIS	C2
SHELDON TUI CHUB	GILA BICOLOR EURYSOMA	C2
OREGON LAKES TUI CHUB	GILA BICOLOR OREGONENSIS	C2
CATLOW TUI CHUB	GILA BICOLOR SSP 2	C2
WOLVERINE	GULO GULO	C2
LONG-BILLED CURLEW	NUMENIUS AMERICANUS	C2
WHITEHORSE CUTTHROAT TROUT	ONCORHYNCHUS CLARKI SSP 1	C2
INLAND REDBAND TROUT	ONCORHYNCHUS MYKISS GIBBSI	C2
GOOSE LAKE REDBAND TROUT	ONCORHYNCHUS MYKISS SSP 1	C2
OREGON CHUB	OREGONICHTHYS CRAMERI	C2
CALIFORNIA BIGHORN	OVIS CANADENSIS CALIFORNIANA	C2
TOWNSEND'S BIG-EARED BAT	PLECOTUS TOWNSENDII	C2
TOWNSEND'S WESTERN BIG-EARED BAT	PLECOTUS TOWNSENDII TOWNSENDII	C2
WHITE-FACED IBIS	PLEGADIS CHIHI	C2
DEL NORTE SALAMANDER	PLETHODON ELONGATUS	C2
LARCH MOUNTAIN SALAMANDER	PLETHODON LARSELLI	C2
SISKIYOU MOUNTAINS SALAMANDER	PLETHODON STORMI	C2
BULL TROUT	SALVELINUS CONFLUENTUS	C2
PREBLE'S SHREW	SOREX PREBLEI	C2
VAGRANT SHREW	SOREX VAGRANS	C2
PISTOL RIVER POCKET GOPHER	THOMOMYS BOTTAE DETUMIDUS	C2
GOLD BEACH POCKET GOPHER	THOMOMYS MAZAMA HELLERI	C2

Name		Category
COLUMBIAN SHARP-TAILED GROUSE	TYMPANUCHUS PHASIANELLUS COLUMBIANUS	C2
BLACK RIGHT WHALE	BALAENA GLACIALIS	LE*
SEI WHALE	BALAENOPTERA BOREALIS	LE*
BLUE WHALE	BALAENOPTERA MUSCULUS	LE*
FIN WHALE	BALAENOPTERA PHYSALUS	LE*
ALEUTIAN CANADA GOOSE	BRANTA CANADENSIS LEUCOPAREIA	LE
SHORTNOSE SUCKER	CHASMISTES BREVIROSTRIS	LE
LOST RIVER SUCKER	DELTISTES LUXATUS	LE
LEATHERBACK TURTLE	DERMOCHELYS CORIACEA	LE*
SHORT-TAILED ALBATROSS	DIOMEDEA ALBATRUS	LE
GRAY WHALE	ESCHRICHTIUS ROBUSTUS	LE*
PEREGRINE FALCON	FALCO PEREGRINUS	LE
AMERICAN PEREGRINE FALCON	FALCO PEREGRINUS ANATUM	LE
PEALE'S PEREGRINE FALCON	FALCO PEREGRINUS PEALEI	LE
BORAX LAKE CHUB	GILA BORAXOBIUS	LE
CALIFORNIA CONDOR	GYMNOGYPS CALIFORNIANUS	LE
HUMPBACK WHALE	MEGAPTERA NOVAEANGLIAE	LE*
COLUMBIAN WHITE-TAILED DEER	ODOCOILEUS VIRGINIANUS LEUCURUS	LE
BROWN PELICAN	PELECANUS OCCIDENTALIS	LE
SPERM WHALE	PHYSETER MACROCEPHALUS	LE*
LEAST TERN	STERNA ANTILLARUM	LE
GRAY WOLF	CANIS LUPUS	LELT
LOGGERHEAD SEA TURTLE	CARETTA CARETTA	LT*
WARNER SUCKER	CATOSTOMUS WARNERENSIS	LT
GREEN SEA TURTLE	CHELONIA MYDAS	LT*
SOUTHERN SEA OTTER	ENHYDRA LUTRIS NEREIS	LT*
HUTTON SPRING TUI CHUB	GILA BICOLOR SSP 1	LT
BALD EAGLE	HALIAEETUS LEUCOCEPHALUS	LT
PACIFIC RIDLEY SEA TURTLE	LEPIDOCHELYS OLIVACEA	LT*
FOSKETT SPRING SPECKLED DACE	RHINICHTHYS OSCULUS SSP 3	LT
SPOTTED OWL	STRIX OCCIDENTALIS	LT

Listed[1/] and Candidate Plant[4/] Species

Name		Category
MALHEUR VALLEY FIDDLENECK	AMSINCKIA CARINATA	C1
NORTHERN WORMWOOD	ARTEMISIA CAMPESTRIS VAR WORMSKIOLD	C1
APPLEGATE'S MILK-VETCH	ASTRAGALUS APPLEGATEI	C1
PUMICE GRAPE-FERN	BOTRYCHIUM PUMICOLA	C1
GOLDEN INDIAN-PAINTBRUSH	CASTILLEJA LEVISECTA	C1
WILLAMETTE VALLEY DAISY	ERIGERON DECUMBENS SSP DECUMBENS	C1
GOLDEN BUCKWHEAT	ERIOGONUM CHRYSOPS	C1
CRONQUIST'S STICKSEED	HACKELIA CRONQUISTII	C1
SNAKE RIVER GOLDENWEED	HAPLOPAPPUS RADIATUS	C1
LARGE-FLOWERED RUSH-LILY	HASTINGSIA BRACTEOSA	C1
HOWELLIA	HOWELLIA AQUATILIS	C1
WESTERN LILY	LILIUM OCCIDENTALE	C1
DWARF WOOLY MEADOW-FOAM	LIMNANTHES FLOCCOSA SSP PUMILA	C1
AGATE DESERT LOMATIUM	LOMATIUM COOKII	C1
RED-FRUITED LOMATIUM	LOMATIUM ERYTHROCARPUM	C1
GREENMAN'S LOMATIUM	LOMATIUM GREENMANII	C1
COLONIAL LUINA	LUINA SERPENTINA	C1
MT. ASHLAND LUPINE	LUPINUS ARIDUS SSP ASHLANDENSIS	C1
WOLF'S EVENING-PRIMROSE	OENOTHERA WOLFII	C1
ROUGH POPCORN FLOWER	PLAGIOBOTHRYS HIRTUS	C1
OREGON SEMAPHORE GRASS	PLEUROPOGON OREGONUS	C1
DALLES MT. BUTTERCUP	RANUNCULUS RECONDITUS	C1
ERTTER'S SENECIO	SENECIO ERTTERAE	C1
NELSON'S SIDALCEA	SIDALCEA NELSONIANA	C1
HOWELL'S SPECTACULAR THELYPODY	THELYPODIUM HOWELLII SSP SPECTABILI	C1
PINK SANDVERBENA	ABRONIA UMBELLATA SSP BREVIFLORA	C2
HENDERSON'S BENTGRASS	AGROSTIS MICROPHYLLA VAR HENDERSONI	C2
AROMATIC ANTENNARIA	ANTENNARIA AROMATICA	C2
KOEHLER'S ROCKCRESS	ARABIS KOEHLERI VAR KOEHLERI	C2
PRESTON PEAK ROCK CRESS	ARABIS SERPENTINICOLA	C2
CRATER LAKE ROCKCRESS	ARABIS SUFFRUTESCENS VAR HORIZONTAL	C2
ESTES' ARTEMISIA	ARTEMISIA LUDOVICIANA SSP ESTESII	C2
WHITE-TOPPED ASTER	ASTER CURTUS	C2
GORMAN'S ASTER	ASTER GORMANII	C2
WAYSIDE ASTER	ASTER VIALIS	C2
LAURENCE'S MILK-VETCH	ASTRAGALUS COLLINUS VAR LAURENTII	C2
SOUTH JOHN DAY MILK-VETCH	ASTRAGALUS DIAPHANUS VAR DIURNUS	C2
MULFORD'S MILK-VETCH	ASTRAGALUS MULFORDIAE	C2
PECK'S MILK-VETCH	ASTRAGALUS PECKII	C2
WEAK MILK-VETCH	ASTRAGALUS SOLITARIUS	C2
STERILE MILK-VETCH	ASTRAGALUS STERILIS	C2
BASTARD KENTROPHYTA	ASTRAGALUS TEGETARIOIDES	C2
TYGH VALLEY MILK-VETCH	ASTRAGALUS TYGHENSIS	C2
BENSONIA	BENSONIELLA OREGONA	C2
UPWARD-LOBED MOONWORT	BOTRYCHIUM ASCENDENS	C2
CRENULATE GRAPE-FERN	BOTRYCHIUM CRENULATUM	C2
STALKED MOONWORT	BOTRYCHIUM PEDUNCULOSUM	C2
THURBER'S REED GRASS	CALAMAGROSTIS CRASSIGLUMIS	C2
COX'S MARIPOSA LILY	CALOCHORTUS COXII	C2
GREENE'S MARIPOSA LILY	CALOCHORTUS GREENEI	C2

Name		Category
HOWELL'S MARIPOSA LILY	CALOCHORTUS HOWELLII	C2
PECK'S MARIPOSA-LILY	CALOCHORTUS LONGEBARBATUS VAR PECKI	C2
UMPQUA MARIPOSA-LILY	CALOCHORTUS UMPQUAENSIS	C2
HOWELL CAMASSIA	CAMASSIA HOWELLII	C2
PURPLE TOOTHWORT	CARDAMINE GEMMATA	C2
SADDLE MT. BITTERCRESS	CARDAMINE PATTERSONII	C2
GREEN-TINGED PAINTBRUSH	CASTILLEJA CHLOROTICA	C2
STEENS MT. PAINTBRUSH	CASTILLEJA PILOSA VAR STEENENSIS	C2
MT. MAZAMA COLLOMIA	COLLOMIA MAZAMA	C2
BARREN VALLEY COLLOMIA	COLLOMIA RENACTA	C2
SALT-MARSH BIRD'S-BEAK	CORDYLANTHUS MARITIMUS SSP PALUSTRI	C2
COLD-WATER CORYDALIS	CORYDALIS AQUAE-GELIDAE	C2
WHITE ROCK LARKSPUR	DELPHINIUM LEUCOPHAEUM	C2
PEACOCK LARKSPUR	DELPHINIUM PAVONACEUM	C2
HOWELL'S DAISY	ERIGERON HOWELLII	C2
CROSBY'S BUCKWHEAT	ERIOGONUM CROSBYAE	C2
CUSICK'S ERIGONUM	ERIOGONUM CUSICKII	C2
COAST RANGE FAWN-LILY	ERYTHRONIUM ELEGANS	C2
UMPQUA SWERTIA	FRASERA UMPQUAENSIS	C2
TALUS FRITILLARY	FRITILLARIA FALCATA	C2
GENTNER'S FRITILLARIA	FRITILLARIA GENTNERI	C2
ELEGANT GENTIAN	GENTIANA SETIGERA	C2
BOGGS LAKE HEDGE-HYSSOP	GRATIOLA HETEROSEPALA	C2
HENDERSON'S HORKELIA	HORKELIA HENDERSONII	C2
GRIMY IVESIA	IVESIA RHYPARA VAR RHYPARA	C2
SHELLY'S IVESIA	IVESIA RHYPARA VAR SHELLYI	C2
DAVIS' PEPPERGRASS	LEPIDIUM DAVISII	C2
HAZEL'S PRICKLY-PHLOX	LEPTODACTYLON PUNGENS SSP HAZELIAE	C2
PURDY'S LEWISIA	LEWISIA COTYLEDON VAR PURDYI	C2
BELLINGER'S MEADOW-FOAM	LIMNANTHES FLOCCOSA SSP BELLINGERIA	C2
BIG-FLOWERED WOOLY MEADOWFOAM	LIMNANTHES FLOCCOSA SSP GRANDIFLORA	C2
SMOOTH DESERT PARSLEY	LOMATIUM LAEVIGATUM	C2
SUKSDORF'S LOMATIUM	LOMATIUM SUKSDORFII	C2
BIDDLE'S LUPINE	LUPINUS BIDDLEI	C2
CUSICK'S LUPINE	LUPINUS CUSICKII	C2
KINCAID'S LUPINE	LUPINUS SULPHUREUS VAR KINCAIDII	C2
SMOOTH MENTZELIA	MENTZELIA MOLLIS	C2
PACKARD'S MENTZELIA	MENTZELIA PACKARDIAE	C2
HOWELL'S MICROSERIS	MICROSERIS HOWELLII	C2
BANK MONKEYFLOWER	MIMULUS CLIVICOLA	C2
MEMBRANE-LEAVED MONKEYFLOWER	MIMULUS HYMENOPHYLLUS	C2
STALK-LEAVED MONKEYFLOWER	MIMULUS PATULUS	C2
PYGMY MONKEYFLOWER	MIMULUS PYGMAEUS	C2
WASHINGTON MONKEYFLOWER	MIMULUS WASHINGTONENSIS VAR WASHING	C2
HOWELL'S MONTIA	MONTIA HOWELLII	C2
SESSILE MOUSETAIL	MYOSURUS MINIMUS VAR SESSILIFLORUS	C2
BARRETT'S PENSTEMON	PENSTEMON BARRETTIAE	C2
BLUE-LEAVED PENSTEMON	PENSTEMON GLAUCINUS	C2
PECK'S PENSTEMON	PENSTEMON PECKII	C2
RED-ROOT YAMPAH	PERIDERIDIA ERYTHRORHIZA	C2
SILVERY PHACELIA	PHACELIA ARGENTEA	C2

Name		Category
A POPCORNFLOWER	PLAGIOBOTHRYS LAMPROCARPUS	C2
SOUTHERN OREGON BUTTERCUP	RANUNCULUS AUSTRO-OREGANUS	C2
COLUMBIA CRESS	RORIPPA COLUMBIAE	C2
SADDLE MT. SAXIFRAGE	SAXIFRAGA HITCHCOCKIANA	C2
ROGUE RIVER STONECROP	SEDUM MORANII	C2
APPLEGATE STONECROP	SEDUM OBLANCEOLATUM	C2
	SEDUM RADIATUM SSP DEPAUPERATUM	C2
WESTERN SENECIO	SENECIO HESPERIUS	C2
BRISTLY SIDALCEA	SIDALCEA SETOSA SSP SETOSA	C2
CASCADE HEAD CATCHFLY	SILENE DOUGLASII VAR ORARIA	C2
SPALDING'S CAMPION	SILENE SPALDINGII	C2
PALE BLUE-EYED GRASS	SISYRINCHIUM SARMENTOSUM	C2
WESTERN NECKLACE	SOPHORA LEACHIANA	C2
OREGON SULLIVANTIA	SULLIVANTIA OREGANA	C2
HOWELL'S TAUSCHIA	TAUSCHIA HOWELLII	C2
ARROW-LEAF THELYPODY	THELYPODIUM EUCOSMUM	C2
LEIBERG'S CLOVER	TRIFOLIUM LEIBERGII	C2
OWYHEE CLOVER	TRIFOLIUM OWYHEENSE	C2
SEXTON MT. MARIPOSA-LILY	CALOCHORTUS INDECORUS	C2*
CORAL SEEDED ALLOCARYA	PLAGIOBOTHRYS FIGURATUS VAR CORALLI	C2*
RED MT. ROCKCRESS	ARABIS MCDONALDIANA	LE
BRADSHAW'S LOMATIUM	LOMATIUM BRADSHAWII	LE
MACFARLANE'S FOUR-O'CLOCK	MIRABILIS MACFARLANEI	LE
MALHEUR WIRE-LETTUCE	STEPHANOMERIA MALHEURENSIS	LE

LE - Endangered

LT - Threatened

C1 - Category 1: Taxa for which the Fish and Wildlife Service has sufficient biological information to support a proposal to list as endangered or threatened.

C2 - Category 2: Taxa for which existing information indicates may warrant listing, but for which substantial biological information to support a proposed rule is lacking.

* Consultation with National Marine Fisheries Service required.

1/ U. S. Department of Interior, Fish and Wildlife Service, April 15, 1990, Endangered and Threatened Wildlife and Plants, 50 CFR 17.11 and 17.12.
2/ Federal Register Vol. 55, No. 123, June 26, 1990 Final Rule-Northern Spotted Owl
3/ Federal Register Vol. 54, No. 4, January 6, 1989 Notice of Review-Animals
4/ Federal Register Vol. 55, No. 38, February 21, 1990 Notice of Review-Plants

FEDERAL AGENCIES RESPONSIBILITIES UNDER SECTIONS 7(a) and (c) OF THE ENDANGERED SPECIES ACT

SECTION 7(a) - Consultation/Conference

Requires: 1) Federal agencies to utilize their authorities to carry out programs to conserve endangered and threatened species;

2) Consultation with FWS when a Federal action may affect a listed endangered or threatened species to insure that any action authorized, funded or carried out by a Federal agency is not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of Critical Habitat. The process is initiated by the Federal agency after they have determined if their action may affect (adversely or beneficially) a listed species; and

3) Conference with FWS when a Federal action is likely to jeopardize the continued existence of a proposed species or result in destruction or adverse modification of proposed Critical Habitat.

SECTION 7(c) - Biological Assessment for Major Construction Projects [1/]

Requires Federal agencies or their designees to prepare a Biological Assessment (BA) for construction projects only. The purpose of the BA is to identify any proposed and/or listed species which are/is likely to be affected by a construction project. The process is initiated by a Federal agency in requesting a list of proposed and listed threatened and endangered species (list attached). The BA should be completed within 180 days after its initiation (or within such a time period as is mutually agreeable). If the BA is not initiated within 90 days of receipt of the species list, the accuracy of the species list should be informally verified with our Service. No irreversible commitment of resources is to be made during the BA process which would foreclose reasonable and prudent alternatives to protect endangered species. Planning, design, and administrative actions may be taken; however, no construction may begin.

To complete the BA, your agency or its designee should: (1) conduct an on-site inspection of the area to be affected by the proposal which may include a detailed survey of the area to determine if the species is present and whether suitable habitat exists for either expanding the existing population or for potential reintroduction of the species; (2) review literature and scientific data to determine species distribution, habitat needs, and other biological requirements; (3) interview experts including those within FWS, National Marine Fisheries Service, State conservation departments, universities, and others who may have data not yet published in scientific literature; (4) review and analyze the effects of the proposal on the species in terms of individuals and populations, including consideration of cumulative effects of the proposal on the species and its habitat; (5) analyze alternative actions that may provide conservation measures and (6) prepare a report documenting the results, including a discussion of study methods used, any problems encountered, and other relevant information. The BA should conclude whether or not a listed or proposed species will be affected. Upon completion, the report should be forwarded to our Portland Office.

[1/] A construction project (or other undertaking having similar physical impacts) which is a major Federal action significantly affecting the quality of the human environment as referred to in NEPA (42 U S C 4332.(2)c). On projects other than construction, it is suggested that a biological evaluation similar to the biological assessment be undertaken to conserve species influenced by the Endangered Species Act.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Fish and Wildlife Enhancement
3704 Griffin Lane SE, Suite 102
Olympia, Washington 98501
(206) 753-9440
FAX: 753-9008

October 31, 1991

Katherine S. Pierce
Environmental Specialist
Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

FWS Reference
1-3-92-SP-11

Dear Ms. Pierce:

In response to your letter, dated October 9, 1991 and received in this office on October 11, enclosed is a list of endangered and threatened species (listed and proposed), and candidate species in Washington State. A more detailed list can be prepared if the Fish and Wildlife Service (Service) is provided with more detailed project information, including County, Township, Range, and Section. The list fulfills the requirements of the Service under Section 7(c) of the Endangered Species Act of 1973, as amended (Act). We have also enclosed a copy of the requirements for Bonneville Power Administration compliance under the Act.

Should the biological assessment determine that a listed species is likely to be affected (adversely or beneficially) by the project, the Bonneville Power Administration should request Section 7 consultation through this office. If the biological assessment shows a "no effect" situation, we would appreciate receiving a copy for our information.

Since listed species may also be found within the project area, and pursuant to the regulations implementing the Act, the Bonneville Power Administration is required to address impacts to proposed species and/or proposed critical habitat in a biological assessment.

Formal conference with the Service is required if the Bonneville Power Administration determines that the proposed action is likely to jeopardize the continued existence of a proposed species.

Candidate species are included simply as advance notice to federal agencies of species which may be proposed and listed in the future. However, protection provided to candidate species now may preclude possible listing in the future. If early evaluation of your project indicates that it is likely to adversely impact a candidate species, the Bonneville Power Administration may wish to request technical assistance from this office.

Your interest in endangered species is appreciated. If you have additional questions regarding your responsibilities under the Act, please contact Jim Michaels or Richard Carlson of my staff at the letterhead phone/address.

Sincerely,

John R. Kerbow
for David C. Frederick
Field Supervisor

rc/kr

Enclosures

c: WDW, Olympia (Nongame)
WNHP, Olympia

FEDERALLY LISTED ENDANGERED, THREATENED, AND CANDIDATE SPECIES IN WASHINGTON STATE
(Revised - July 1991)

Endangered

Brown pelican (*Pelecanus occidentalis*)
Columbian white-tailed deer (*Odocoileus virginianus leucurus*)
Gray wolf (*Canis lupus*)
Leatherback sea turtle (*Dermochelys coriacea*)
Peregrine falcon (*Falco peregrinus*)
Woodland caribou (*Rangifer tarandus caribou*)

Threatened

Aleutian Canada goose (*Branta canadensis leucopareia*)
Bald eagle (*Haliaeetus leucocephalus*)
Green sea turtle (*Chelonia mydas*)
Grizzly bear (*Ursus arctos = U.a. horribilis*)
Loggerhead sea turtle (*Caretta caretta*)
Northern spotted owl (*Strix occidentalis caurina*)
Olive ridley sea turtle (*Lepidochelys olivacea*)
Oregon silverspot butterfly (*Speyeria zerene hippolyta*)

Proposed

Critical habitat for the northern spotted owl
Marbled murrelet (*Brachyramphus marmoratus*)

Candidate Animals

Beller's ground beetle (*Agonum belleri*)
Bull trout (*Salvelinus confluentus*)
California bighorn sheep (*Ovis canadensis californiana*)
California wolverine (*Gulo gulo luteus*)
Columbia pebblesnail (*Fluminicola (=Lithoglyphus) columbianus*)
[great Columbia River spire snail]
Columbian sharp-tailed grouse (*Tympanuchus phasianellus columbianus*)
Destruction Island shrew (*Sorex trowbridgii destructioni*)
Fender's soliperlan stonefly (*Soliperla fenderi*)
Ferruginous hawk (*Buteo regalis*)
Hatch's click beetle (*Eanus hatchi*)
Larch Mountain salamander (*Plethodon larselli*)
Long-billed curlew (*Numenius americanus*)
Louie's western pocket gopher (*Thomomys mazama louiei*)
Newcomb's littorine snail (*Algamorda newcombiana*)
North American lynx (*Felis lynx canadensis*)
Northwestern pond turtle (*Clemmys marmorata marmorata*)
Olympic mudminnow (*Novumbra hubbsi*)

Pacific western big-eared bat (*Plecotus townsendii townsendii*)
Potholes meadow vole (*Microtus pennsylvanicus kincaidi*)
Preble's shrew (*Sorex preblei*)
Redband trout (*Salmo sp.*)
Roy Prairie pocket gopher (*Thomomys mazama glacialis*)
Shaw Island Townsend's vole (*Microtus townsendii pugeti*)
Shortface lanx (*Fisherola nuttalli*)
[giant Columbia River limpet]
Tacoma western pocket gopher (*Thomomys mazama tacomensis*)
Western sage grouse (*Centrocercus urophasianus phaios*)
Western snowy plover (*Charadrius alexandrinus nivosus*)

Candidate Plants

Abronia umbellata spp. acutalata (rose-purple sand-verbena)
Allium constrictum (Douglas' constricted onion)
Allium dictuon (Blue Mountain onion)
Arenaria paludicola (marsh sandwort)
Artemisia campestris var. wormskioldii (northern wormwood)
Aster curtus (white-top aster)
Aster jessicae (Jessica's aster)
Astragalus australis var. olympicus (Cotton's milk-vetch)
Astragalus columbianus (Columbia milk-vetch)
Astragalus diaphanus var. diurnus (transparent milk-vetch)
Astragalus sinuatus (whited milk-vetch)
Calamagrostis crassiglumis (Thurber's reedgrass)
Calamagrostis tweedyi (reedgrass)
Calochortus nitidus (broad-fruit mariposa)
Castilleja cryptantha (obscure Indian paintbrush)
Castilleja levisecta (golden paintbrush)
Corydalis aquae-gelidae (Clackamas corydalis)
Delphinium leucophaeum (pale larkspur)
Delphinium viridescens (Wenatchee larkspur)
Erigeron basalticus (basalt daisy)
Erigeron howellii (Howell's fleabane)
Hackelia venusta (showy stickseed)
Haplopappus liatriformis (Palouse goldenweed)
Howellia aquatilis (Howellia)
Lomatium laevigatum (smooth desert-parsley)
Lomatium suksdorfii (Suksdorf's desert-parsley)
Lomatium tuberosum (Hoover's desert-parsley)
Lupinus cusickii (Cusick's lupine)
Mimulus clivicola (bank monkey-flower)
Mimulus patulus (stalk-leaved monkey-flower)
Mimulus washingtonensis var. washingtonensis (Washington's monkey-flower)
Montia howellii (Howell's montia)
Penstemon barrettiae (Barrett's beardtongue)
Petrophytum cinerascens (Chelan rockmat)
Phacelia lenta (sticky phacelia)
Poa unilateralis (sea cliff bluegrass)
Polemonium pectinatum (Washington polemonium)

Ranunculus reconditus (obscure buttercup)
Rorippa columbiae (Columbia yellow-cress)
Rubus nigerrimus (northwest raspberry)
Sidalcea oregana var. calva (Oregon checker-mallow)
Silene seelyi (Seely's silene)
Silene spaldingii (Spalding's silene)
Sisyrinchium sarmentosum (pale blue-eyed grass)
Sullivantia oregana (Oregon sullivantia)
Tauschia hooveri (Hoover's tauschia)
Trifolium thompsonii (Thompson's clover)

FEDERAL AGENCIES' RESPONSIBILITIES UNDER SECTIONS 7(a) AND 7(c) OF THE ENDANGERED SPECIES ACT

SECTION 7(A) - Consultation/Conference

Requires:

1. Federal agencies to utilize their authorities to carry out programs to conserve endangered and threatened species;

2. Consultation with FWS when a federal action may affect a listed endangered or threatened species to ensure that any action authorized, funded, or carried out by a federal agency is not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. The process is initiated by the federal agency after it has determined if its action may affect (adversely or beneficially) a listed species; and

3. Conference with FWS when a federal action is likely to jeopardize the continued existence of a proposed species or result in destruction or an adverse modification of proposed critical habitat.

SECTION 7(c) - Biological Assessment for Construction Projects *

Requires federal agencies or their designees to prepare a Biological Assessment (BA) for construction projects only. The purpose of the BA is to identify any proposed and/or listed species which is/are likely to be affected by a construction project. The process is initiated by a federal agency in requesting a list of proposed and listed threatened and endangered species (list attached). The BA should be completed within 180 days after its initiation (or within such a time period as is mutually agreeable). If the BA is not initiated within 90 days of receipt of the species list, please verify the accuracy of the list with our Service. No irreversible commitment of resources is to be made during the BA process which would result in violation of the requirements under Section 7(a) of the Act. Planning, design, and administrative actions may be taken; however, no construction may begin.

To complete the BA, your agency or its designee should: (1) conduct an onsite inspection of the area to be affected by the proposal, which may include a detailed survey of the area to determine if the species is present and whether suitable habitat exists for either expanding the existing population or potential reintroduction of the species; (2) review literature and scientific data to determine species distribution, habitat needs, and other biological requirements; (3) interview experts including those within the FWS, National Marine Fisheries Service, state conservation department, universities, and others who may have data not yet published in scientific literature; (4) review and analyze the effects of the proposal on the species in terms of individuals and populations, including consideration of cumulative effects of the proposal on the species and its habitat; (5) analyze alternative actions that may provide conservation measures; and (6) prepare a report documenting the results, including a discussion of study methods used, any problems encountered, and other relevant information. Upon completion the report should be forwarded to our Endangered Species Division, 2625 Parkmont Lane SW, Bldg. B, Olympia, WA 98502.

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* "Construction project" means any major federal action which significantly affects the quality of the human environment (requiring an EIS), designed primarily to result in the building or erection of human-made structures such as dams, buildings, roads, pipelines, channels, and the like. This includes federal actions such as permits, grants, licenses, or other forms of federal authorization or approval which may result in construction.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Boise Field Station
4696 Overland Road, Room 576
Boise, Idaho 83705

October 29, 1991

Katherine S. Pierce
Environmental Specialist
Department of Energy
Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

Re: Resources Programs
Environmental Impact Statement
1-4-91-SP-44
SE File# 6003.0230
TF BFO# 92-0056

Dear Ms. Pierce:

As requested by your letter dated October 9, 1991, and received by this office on October 15, 1991, we have attached a list (Attachment A) of endangered and threatened, proposed, and/or candidate species that may be present in the State of Idaho. The list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under Section 7(c) of the Endangered Species Act of 1973, as amended (Act). The requirements for Federal agency compliance under the Act are outlined in Attachment B. Please reference the species list number on Attachment A in all subsequent correspondence, reports, environmental assessments, environmental impact statements, biological assessments (evaluations), Coordination Act reports, etc. If a construction project is not commenced within 180 days of this response, a subsequent species list request is required by regulations.

For the listed species that appear on Attachment A, a biological assessment (evaluation) would be prudent. Should your biological assessment (evaluation) determine that a listed species is likely to be affected adversely by the project, Bonneville Power Administration should request formal Section 7 consultation through this office. If a proposed species is likely to be jeopardized by a Federal action, regulations require a conference between the Federal agency and the Service. If the proposed species is under the jurisdiction of the National Marine Fisheries Service (NMFS), regulations require a conference between the Federal agency and NMFS.

Candidate species that appear on Attachment A have no protection under the Act, but are included for early planning consideration. Proposed species could be formally listed and candidate species could be formally proposed and listed during project planning, thereby, falling within the scope of Section 7 of the Endangered Species Act. Therefore, if they appear on Attachment A, we

recommend that additional surveys be made for proposed and/or candidate species that are likely to be in your project area. If the project is likely to adversely impact a candidate species, informal consultation with this office is recommended.

As development of individual site-specific environmental documents are prepared, we recommend that Bonneville Power Administration reinitiate the species list request for more specific information.

If you have any questions regarding Federal consultation responsibilities under the Act, please contact Jeri Williams of this office at FTS 554-1931 or 208-334-1931.

Thank you for your continued interest in the Endangered Species Program.

Sincerely,

Charles H. Lobdell
Field Supervisor

Enclosures

cc: IDFG, Hdqtrs., Boise

LISTED AND PROPOSED ENDANGERED AND THREATENED SPECIES, AND CANDIDATE SPECIES, THAT MAY OCCUR WITHIN THE AREA OF IDAHO
FWS-1-4-92-SP-44

LISTED SPECIES	COMMENTS
Bald Eagle (*Haliaeetus leucocephalus*)	
Peregrine Falcon (*Falco peregrinus*)	
Whooping Crane (*Grus americana*)	
Gray Wolf (*Canis lupus*)	
Grizzly Bear (*Ursus arctos*)	
Woodland Caribou (*Rangifer tarandus caribou*)	
Macfarlane's four-o'clock (*Mirabilis macfarlanei*)	

PROPOSED SPECIES	
Spring, Summer, and Fall Chinook Salmon (*Oncorhynchus tshawytscha*)	"NMFS jurisdiction"
Sockeye Salmon (*Oncorhynchus nerka*)	"NMFS jurisdiction"

CANDIDATE SPECIES

Bonneville Cutthroat Trout
(*Oncorhynchus clarki utah*)

Snake River Fine-spotted Cutthroat Trout
(*Oncorhynchus clarki* ssp.)

Redband Trout
(*Oncorhynchus mykiss* ssp.)

Leatherside Chub
(*Gila copei*)

Wood River Sculpin
(*Cottus leiopomus*)

White-faced Ibis
(*Plegadis chihi*)

Ferruginous Hawk
(*Buteo regalis*)

Columbian Sharp-tailed Grouse
(*Tympanuchus phaianellus columbianus*)

Long-billed Curlew
(*Numenius americnus*)

Western Yellow-billed Cuckoo
(*Coccyzus americanus occidentalis*)

Preble's Shrew
(*Sorex preblei*)

Spotted Bat
(*Euderma maculatum*)

Townsend's Big-eared Bat
(*Plecotus townsendii*)

Northern Idaho Ground Squirrel
(*Spermophilus brunneus* ssp.)

Southern Idaho Ground Squirrel
(*Spermophilus brunneus* ssp.)

Wolverine
(*Gulo gulo*)

Lynx
(*Felis lynx*)

Idaho Pointheaded Grasshopper
(Acrolophitus pulchellus)

Idaho Dunes Tiger Beetle
(Cicindela arenicola)

Blind Cave Leiodid Beetle
(Glacicavicola bathysciodes)

Snail, No Common Name
(Valvata utahensis)

Columbia Pebblesnail
(Fluminicola columbianus)

Idaho Springsnail
(Pyrgulopsis idahoensis)

Bliss Rapids Snail
(undescribed species)

Homedale Creek Spring Snail
(Fontelicella idahoensis)

Shortface Lanx
(Fisherola nuttalli)

Snake River Physa Snail
(Physa natricina)

Marbled Disc
(Discus marmorensis)

Mission Creek Oregonian
(Cryptomastix magnidentata)

Idaho Banded Mountainsnail
(Oreohelix idaho)

Boulder Pile Mountainsnail
(Oreohelix jugalis)

Carinated Striate Banded Mountainsnail
(Oreohelix strigosa goniogyra)

Whorled Mountainsnail
(Oreohelix vortex)

Lava Rock Mountainsnail
(Oreohelix waltoni)

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Fish and Wildlife Enhancement
2617 East Lincolnway, Suite A
Cheyenne, Wyoming 82001

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
FWE/61411/W.03 BPA
Resource Programs EIS

November 6, 1991

Katherine S. Pierce
Environmental Specialist
Bonneville Power Administration
P.O. Box 3621
Portland, OR 97208-3621

Dear Ms. Pierce:

This responds to your letter of October 9, 1991, received by this office on October 15, 1991, regarding the Boneville Power Administration's Resource Programs Environmental Impact Statement, affecting portions of Teton and Lincoln counties, Wyoming.

In accordance with Section 7(c) of the Endangered Species Act of 1973, as amended (ESA), we have determined that the following listed and proposed threatened or endangered (T/E) species may be present in the project area.

Listed Species	Expected Occurrence
Bald eagle (*Haliaeetus leucocephalus*)	Nesting. Winter resident. Migrant.
Peregrine falcon (*Falco peregrinus*)	Nesting. Migrant.
Whooping crane (*Grus americana*)	Summer resident. Migrant.
Grizzly bear (*Ursus arctos*)	Resident
Gray Wolf (*Canis lupus*)	Potential resident

Proposed species (consultation required if species may be affected)

none

Candidate species (voluntary consideration requested)

Aster mollis (no common name) (T38N, R114W)
Boreal western toad (*Bufo boreas boreas*)
White-faced ibis (*Plegadus chihi*)
Ferruginous hawk (*Buteo regalis*)
Mountain plover (*Charadrius montanus*)
Long-billed curlew (*Numenius americanus*)
Preble's shrew (*Sorex préblei*)

Wolverine (Gulo gulo luscus)
Lynx (Felis lynx canadensis)
Jackson Lake springsnail (Pyrgulopsis (Fontelicella) robusta)
Jackson Lake snail (Helisoma (=Carinifex) jacksonense)

Section 7(c) of ESA requires that Federal agencies proposing major construction actions, complete a biological assessment to determine the effects of the proposed actions on listed and proposed species. If a biological assessment is not required (i.e., all other actions), your agency is responsible for review of proposed activities to determine whether listed species will be affected. We would appreciate the opportunity to review your determination document.

For those actions where a biological assessment is necessary, it should be completed within 180 days of initiation, but can be extended by mutual agreement between your agency and the Fish and Wildlife Service (Service). If the assessment is not initiated within 90 days, the list of T/E species should be verified with the Service prior to initiation of the assessment. The biological assessment may be undertaken as part of your agency's compliance of Section 102 of the National Environmental Policy Act (NEPA), and incorporated into the NEPA documents. We recommend that biological assessments include:

1. a description of the project;
2. the current status, habitat use, and behavior of T/E species in the project area;
3. discussion of the methods used to determine the information in item 2;
4. direct and indirect impacts of the project to T/E species;
5. cumulative impacts from federal, state, or private projects in the area;
6. coordination measures that will reduce/eliminate adverse impacts to T/E species;
7. the expected status of T/E species in the future (short and long term) during and after project completion;
8. determination of "is likely to adversely affect"/"is not likely to adversely affect" for listed species;
9. citation of literature and personal contacts used in assessment.

If it is determined that any agency program or project "is likely to adversely affect" any listed species, formal consultation should be initiated with us. If it is concluded that the project "is not likely to adversely affect" listed species, we should be asked to review the assessment and concur with the determination of no adverse effect.

A Federal agency may designate a non-Federal representative to conduct informal consultation or prepare biological assessments. However, the ultimate responsibility for Section 7 compliance remains with the Federal agency, and written notice should be provided to the Service upon such a designation. We recommend that Federal agencies provide their non-Federal representatives with proper guidance and oversight during preparation of biological assessments and evaluation of potential impacts to listed species.

Section 7(d) of ESA requires that the Federal agency and permit or license applicant shall not make any irreversible or irretrievable commitment of resources which would preclude the formulation of reasonable and prudent alternatives until consultation on listed species is completed.

If you have any questions, contact me or Steve Brockmann of my staff at the letterhead address or FTS 328-2374/(307) 772-2374.

Sincerely,

Pedro Ramirez

Acting State Supervisor
Wyoming State Office

cc:
Assistant Regional Director, FWE, Denver, CO (60120)
Field Supervisor, MT/WY, FWE, Helena, MT (FWE-61125)
Director, WGFD, Cheyenne, WY
Nongame Coordinator, WGFD, Lander, WY

APPENDIX B

APPENDIX B

Generating Resources
Yearly Resource Acquisitions

Study ID : 15-JUL-91 06:40:41
Study Title: STATUS QUO ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	3888	4002	4120	4235	4355	4473	4591	4709	4826	4944	5058	5173	5286	5400	5514
Observed Rate		2.95%	2.94%	2.78%	2.84%	2.71%	2.63%	2.56%	2.50%	2.43%	2.32%	2.26%	2.20%	2.15%	2.10%
DSI Firm Load	2261	2268	2278	2288	2298	2308	2319	2329	2339	2350	2360	2371	2381	2392	2403
Existing Resources	8379	8546	8382	8219	8213	8208	8255	8302	8310	8319	8417	8515	8521	8527	8408
BPA Requirements	-1952	-2132	-2308	-2322	-2491	-2654	-2803	-2953	-3123	-3295	-3425	-3556	-3706	-3857	-3984
CONSERVATION PROGRAMS:															
SF Res MCS	0	5	11	16	22	27	33	40	46	53	60	67	75	82	89
MF Res MCS	0	1	1	2	2	3	4	4	5	6	6	7	8	8	9
New Manuf Housing	0	1	2	3	5	6	8	11	13	15	18	20	22	25	27
Water Heat	0	0	0	0	4	13	22	31	40	50	60	71	81	92	103
Refrigerators	0	0	0	0	1	4	6	8	11	13	16	19	22	25	28
Freezers	0	0	0	0	0	1	2	2	3	4	4	5	6	7	8
Irrigation	0	0	1	1	2	4	5	6	8	9	11	12	13	14	14
Industrial	0	2	8	17	27	38	49	60	71	82	92	103	114	125	136
New Commercial	0	7	19	31	42	53	63	74	86	98	109	119	130	141	153
Comm Lost Opps Exist	0	2	6	9	13	16	20	23	27	31	34	38	41	45	49
MF Res Weath	0	0	1	2	2	3	4	4	5	6	6	7	8	8	9
SF Res Weath	0	2	6	12	18	23	29	34	40	46	51	57	62	62	62
Comm Discret Ex	0	2	8	16	24	32	40	48	56	64	72	79	85	86	86
Subtotal	0	22	63	109	162	223	285	345	411	477	539	604	667	720	773
GENERATING RESOURCES:															
Hydro Eff Imp	0	0	20	40	60	80	80	100	100	100	100	100	100	100	100
Trans Eff Imp	0	0	11	22	23	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 West	0	0	0	10	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	0	0	0	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	0	0	0	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	0	0	0	11	14	14	14	14	14	14	14	14	14	14	14
Cogen1w	0	0	10	10	10	10	10	10	10	10	10	10	10	10	10
Combined Cycle Mix	0	0	0	0	349	349	349	349	349	349	349	349	349	349	349
Combined Cycle BPA	0	0	0	0	349	349	697	697	697	697	697	697	697	697	697
Cogen1e	0	0	10	10	10	10	10	10	10	10	10	10	10	10	10
Cogen2w	0	0	60	60	60	60	60	60	60	60	60	60	60	60	60
Small Hydro 3 West	0	0	0	0	0	0	0	11	11	11	11	11	11	11	11
WNP 1	0	0	0	0	0	0	0	0	0	813	813	813	813	813	813
WNP 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	806
Small Hydro 3 East	0	0	0	0	0	0	0	0	0	0	0	0	0	11	11
Cogen2e	0	0	0	0	0	0	0	60	60	60	60	60	60	60	60
Coal1 (E. Mont)	0	0	0	0	0	0	0	0	0	0	0	0	0	188	188
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	60	80	80
Small Hydro 4 West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 East	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45
Coal2 (E. Wash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	111	188	910	941	1289	1380	1380	2193	2193	2193	2253	2472	3323
Total Firm Resources	6428	6435	6248	6194	6795	6717	7025	7074	6978	7694	7723	7756	7734	7862	8519
Load/Resource Balance	278	165	-151	-330	142	-65	114	37	-189	397	305	213	67	70	601

Study ID : 15-JUL-91 06:40:41
Study Title: STATUS QUO ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	5642	5771	5898	6026	6153	6158	6164	6169	6173	6178	6182	6185	6189	6192	6195
Observed Rate	2.34%	2.27%	2.22%	2.16%	2.11%	0.09%	0.09%	0.08%	0.07%	0.07%	0.07%	0.06%	0.06%	0.05%	0.05%
DSI Firm Load	2413	2424	2435	2446	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	8289	8394	8500	8431	8362	8291	8220	8150	8079	8009	7920	7650	7579	7449	6727
BPA Requirements	-4138	-4313	-4487	-4661	-4849	-5000	-4992	-4985	-4979	-4973	-4967	-4962	-4957	-4952	-4948
CONSERVATION PROGRAMS:															
SF Res MCS	96	103	111	118	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	10	10	11	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	29	32	34	36	39	39	39	39	39	39	39	39	39	39	39
Water Heat	113	124	136	148	159	159	159	159	159	159	159	159	159	159	159
Refrigerators	31	34	37	41	45	45	45	45	45	45	45	45	45	45	45
Freezers	8	9	10	11	12	12	12	12	12	12	12	12	12	12	12
Irrigation	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Industrial	146	157	168	179	188	188	188	188	188	188	188	188	188	188	188
New Commercial	164	176	189	201	214	214	214	214	214	214	214	214	214	214	214
Comm Lost Opps Exist	52	56	59	63	67	67	67	67	67	67	67	67	67	67	67
MF Res Weath	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
SF Res Weath	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
Comm Discret Ex	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal	820	872	926	980	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033
GENERATING RESOURCES:															
Hydro Eff Imp	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Trans Eff Imp	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 West	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Cogen1w	10	10	10	10	10	10	10	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349
Combined Cycle BPA	697	697	697	697	697	697	697	697	697	697	697	697	697	697	697
Cogen1e	10	10	10	10	10	10	10	0	0	0	0	0	0	0	0
Cogen2w	60	60	60	60	60	60	60	0	0	0	0	0	0	0	0
Small Hydro 3 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
Small Hydro 3 East	11	11	11	19	19	19	19	19	19	19	19	19	19	19	19
Cogen2e	60	60	60	60	60	60	60	60	60	60	60	60	0	0	0
Coal1 (E. Mont)	188	188	375	375	375	375	375	375	375	375	375	375	375	375	375
Cogen3w	80	80	80	120	120	120	120	120	120	120	120	120	120	120	120
Small Hydro 4 West	0	0	0	7	7	7	7	7	7	7	7	7	7	7	7
Small Hydro 4 East	0	0	4	11	11	11	11	11	11	11	11	11	11	11	11
Cogen3e	0	0	0	60	120	120	120	120	120	120	120	120	120	120	120
Geothermal2	90	135	180	225	270	270	270	270	270	270	270	270	270	270	270
Coal2 (E. Wash)	0	0	0	0	188	188	188	188	188	188	188	188	188	188	188
Cogen4w	0	0	0	0	10	10	10	10	10	10	10	10	10	10	10
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	226	241	300	300	317	404	673	802	1030	1861
Subtotal	3368	3413	3649	3816	4119	4345	4360	4339	4339	4356	4443	4712	4781	5009	5840
Total Firm Resources	8339	8366	8587	8566	8665	8669	8621	8536	8472	8425	8429	8433	8436	8539	8652
Load/Resource Balance	285	172	253	93	55	53	0	-90	-158	-210	-210	-210	-210	-110	0

Study ID : 15-JUL-91 06:40:41
Study Title: STATUS QUO ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	6199	6202	6205	6208	6211	6214	6216	6218	6220	6222	6224	6226	6229	6231	6234
Observed Rate	0.05%	0.05%	0.05%	0.05%	0.04%	0.04%	0.04%	0.04%	0.03%	0.03%	0.03%	0.03%	0.04%	0.04%	0.04%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727
BPA Requirements	-4944	-4942	-4940	-4937	-4935	-4933	-4931	-4930	-4928	-4926	-4925	-4924	-4925	-4926	-4927
CONSERVATION PROGRAMS:															
SF Res MCS	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Water Heat	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159
Refrigerators	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Freezers	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Irrigation	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Industrial	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
New Commercial	214	214	214	214	214	214	214	214	214	214	214	214	214	214	214
Comm Lost Opps Exist	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67
MF Res Weath	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
SF Res Weath	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
Comm Discret Ex	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033
GENERATING RESOURCES:															
Hydro Eff Imp	100	100	80	60	40	20	20	0	0	0	0	0	0	0	0
Trans Eff Imp	34	34	23	12	11	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 West	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle BPA	697	697	697	697	349	349	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
Small Hydro 3 East	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375
Cogen3w	120	120	60	40	40	40	40	40	0	0	0	0	0	0	0
Small Hydro 4 West	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Small Hydro 4 East	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Cogen3e	120	120	120	120	120	120	120	120	60	0	0	0	0	0	0
Geothermal2	270	270	270	270	270	270	270	270	270	270	270	270	270	270	225
Coal2 (E. Wash)	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
Cogen4w	10	10	10	10	10	10	10	10	10	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	1862	1862	1954	2006	2725	2756	3105	3126	3226	3297	3297	3299	3302	3306	3354
Subtotal	5841	5841	5842	5843	5844	5844	5844	5845	5845	5846	5846	5848	5851	5855	5858
Total Firm Resources	8657	8659	8662	8666	8669	8671	8673	8675	8677	8680	8681	8684	8686	8689	8691
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: STATUS QUO ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	6236	6239	6241	6243	6245	6247	6248	6250	6252	6253	6255	6256	6257	6257	6258
Observed Rate	0.04%	0.04%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.02%	0.02%	0.01%	0.01%	0.01%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727
BPA Requirements	-4928	-4929	-4929	-4930	-4931	-4931	-4932	-4933	-4933	-4934	-4934	-4935	-4935	-4934	-4934
CONSERVATION PROGRAMS:															
SF Res MCS	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	39	38	37	36	34	32	31	28	26	24	21	19	17	14	12
Water Heat	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159
Refrigerators	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Freezers	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Irrigation	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Industrial	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
New Commercial	214	214	214	214	214	214	214	214	214	214	214	214	214	214	214
Comm Lost Opps Exist	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67
MF Res Weath	9	9	9	9	9	9	9	8	7	7	6	5	5	4	3
SF Res Weath	62	62	62	62	62	62	60	56	50	45	39	33	28	22	17
Comm Discret Ex	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal	1033	1032	1031	1030	1028	1026	1023	1015	1006	999	989	980	973	963	955
GENERATING RESOURCES:															
Hydro Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trans Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 West	10	10	10	10	10	10	10	10	0	0	0	0	0	0	0
Small Hydro 1 East	14	14	14	14	14	14	14	14	0	0	0	0	0	0	0
Small Hydro 2 West	11	11	11	11	11	11	11	11	0	0	0	0	0	0	0
Small Hydro 2 East	14	14	14	14	14	14	14	14	4	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle BPA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	11	11	11	11	11	11	11	11	11	11	11	11	0	0	0
WNP 1	813	813	813	813	0	0	0	0	0	0	0	0	0	0	0
WNP 3	806	806	806	806	806	806	806	806	806	0	0	0	0	0	0
Small Hydro 3 East	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	375	375	375	375	375	375	375	375	188	188	188	188	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Small Hydro 4 East	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	180	135	90	45	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	188	188	188	188	188	188	188	188	188	188	188	188	188	188	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	3402	3451	3500	3549	4411	4415	4421	4431	4675	5495	5506	5517	5725	5734	5930
Subtotal	5861	5865	5869	5873	5877	5881	5887	5897	5909	5919	5930	5941	5950	5959	5967
Total Firm Resources	8693	8695	8698	8700	8701	8703	8705	8706	8709	8711	8712	8713	8715	8715	8715
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: STATUS QUO ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	9551	9881	10214	10558	10916	11253	11590	11927	12264	12600	12946	13291	13638	13984	14331
Observed Rate		3.45%	3.37%	3.37%	3.39%	3.09%	3.00%	2.91%	2.82%	2.74%	2.74%	2.67%	2.60%	2.54%	2.48%
Existing Resources	9685	9681	9795	9910	9353	8791	8795	8798	8710	8621	8652	8683	8448	8214	8306
BPA Requirements	47	77	127	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	0	3	6	10	14	17	21	25	30	34	39	44	50	55	60
MF Res MCS	0	1	2	4	5	6	7	9	10	11	13	14	16	17	18
New Manuf Housing	0	1	2	4	5	7	9	12	14	17	20	22	25	28	31
Refrigerators	0	0	0	0	2	5	8	12	15	19	23	27	32	36	41
Freezers	0	0	0	0	1	1	2	3	4	5	6	8	9	10	11
Water Heat	0	0	0	0	5	16	28	39	51	63	76	90	104	117	131
Irrigation	0	0	1	2	3	5	7	10	12	14	16	18	20	21	22
Industrial	0	2	8	19	31	43	55	68	80	92	104	116	129	141	153
New Commercial	0	11	32	52	72	89	108	127	146	166	185	203	222	241	260
Comm Lost Opps Exist	0	2	6	10	14	18	21	25	29	33	37	41	45	49	53
MF Res Weath	0	1	3	5	7	9	11	13	15	17	19	21	23	25	27
SF Res Weath	0	1	4	8	11	15	18	22	26	29	33	36	39	40	40
Comm Discret Ex	0	2	7	14	21	28	35	42	49	56	63	71	76	76	76
Subtotal	0	24	71	128	191	259	330	407	481	556	634	711	790	856	923
GENERATING RESOURCES:															
Small Hydro 1 West	0	0	0	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	0	0	0	34	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	0	0	0	25	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	0	0	0	25	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	0	0	30	30	30	30	30	30	30	30	30	30	30	30	30
Combined Cycle Mix	0	0	0	0	349	349	349	349	349	349	349	349	349	349	349
Cogen1e	0	0	30	30	30	30	30	30	30	30	30	30	30	30	30
Cogen2w	0	0	180	180	180	180	180	180	180	180	180	180	180	180	180
Small Hydro 3 West	0	0	0	0	0	0	26	37	37	37	37	37	37	37	37
Small Hydro 3 East	0	0	0	0	0	0	26	52	52	52	52	52	56	56	56
Cogen2e	0	0	0	180	180	180	180	180	180	180	180	180	180	180	180
Coal1 (E. Mont)	0	0	0	0	0	0	0	188	375	563	750	938	1125	1313	1313
Cogen3w	0	0	0	0	360	360	360	360	360	360	360	360	360	360	360
Small Hydro 4 West	0	0	0	0	0	0	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	0	0	0	0	0	0	25	32	32	32	32	32	32	32	32
Cogen3e	0	0	0	0	140	360	360	360	360	360	360	360	360	360	360
Coal2 (E. Wash)	0	0	0	0	0	0	0	188	375	563	563	563	563	563	563
Cogen4w	0	0	0	0	0	620	780	780	780	780	780	780	1000	1330	1330
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	188
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	240	533	1420	2260	2522	2942	3316	3692	3879	4067	4478	4996	5184
Total Firm Resources	9732	9782	10233	10571	10964	11310	11647	12147	12507	12869	13165	13461	13716	14066	14413
Load/Resource Balance	181	-98	21	11	47	58	59	218	243	271	221	171	77	81	79

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Study Title: STATUS QUO ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	14754	15178	15604	16030	16458	16460	16462	16464	16466	16468	16470	16471	16473	16474	16475
Observed Rate	2.95%	2.87%	2.80%	2.73%	2.67%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
Existing Resources	8398	8383	8368	8513	8542	7194	6872	6543	6477	6261	5838	5194	5139	5051	4589
BPA Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	66	71	77	83	89	89	89	89	89	89	89	89	89	89	89
MF Res MCS	20	21	22	24	25	25	25	25	25	25	25	25	25	25	25
New Manuf Housing	33	36	38	41	44	44	44	44	44	44	44	44	44	44	44
Refrigerators	45	49	53	59	65	65	65	65	65	65	65	65	65	65	65
Freezers	12	13	14	16	18	18	18	18	18	18	18	18	18	18	18
Water Heat	144	158	173	188	203	203	203	203	203	203	203	203	203	203	203
Irrigation	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Industrial	165	177	189	202	212	212	212	212	212	212	212	212	212	212	212
New Commercial	280	300	321	343	365	365	365	365	365	365	365	365	365	365	365
Comm Lost Opps Exist	57	60	64	68	72	72	72	72	72	72	72	72	72	72	72
MF Res Weath	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
SF Res Weath	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Comm Discret Ex	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Subtotal	987	1050	1116	1189	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258
GENERATING RESOURCES:															
Small Hydro 1 West	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	30	30	30	30	30	30	30	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349
Cogen1e	30	30	30	30	30	30	30	0	0	0	0	0	0	0	0
Cogen2w	180	180	180	180	180	180	180	0	0	0	0	0	0	0	0
Small Hydro 3 West	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56
Cogen2e	180	180	180	180	180	180	180	180	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Cogen3w	360	360	360	360	360	360	360	360	360	0	0	0	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Cogen3e	360	360	360	360	360	360	360	360	360	220	0	0	0	0	0
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4w	1400	1500	1500	1500	1500	1500	1500	1500	1500	1500	880	720	720	720	720
Coal3 (E. Oregon)	375	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4e	0	80	450	670	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	1352	1607	1831	1831	2643	3907	4714	4980	5279	5822
Subtotal	5441	5809	6179	6399	6729	8081	8336	8320	8140	8452	8876	9523	9789	10088	10631
Total Firm Resources	14826	15242	15663	16101	16529	16533	16466	16121	15875	15971	15972	15975	16186	16397	16478
Load/Resource Balance	69	63	60	67	68	69	0	-346	-595	-500	-500	-500	-290	-80	0

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Study Title: STATUS QUO ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	16475	16474	16474	16473	16472	16472	16471	16471	16470	16470	16469	16468	16464	16461	16457
Observed Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.01%	-0.02%	-0.02%	-0.02%
Existing Resources	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143
BPA Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89
MF Res MCS	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
New Manuf Housing	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44
Refrigerators	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
Freezers	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Water Heat	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203
Irrigation	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Industrial	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212
New Commercial	365	365	365	365	365	365	365	365	365	365	365	365	365	365	365
Comm Lost Opps Exist	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72
MF Res Weath	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
SF Res Weath	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Comm Discret Ex	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Subtotal	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258
GENERATING RESOURCES:															
Small Hydro 1 West	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4w	720	720	500	170	170	100	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4e	1000	1000	1000	1000	1000	1000	920	550	330	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	6268	6268	6486	6816	7164	7233	7413	7782	8002	8331	8331	8331	8331	8331	8331
Subtotal	11077	11077	11075	11075	11074	11073	11073	11072	11072	11071	11071	11071	11071	11071	11071
Total Firm Resources	16478	16478	16476	16476	16475	16474	16474	16473	16473	16472	16472	16472	16472	16472	16472
Load/Resource Balance	0	1	0	0	0	0	0	0	0	0	0	2	5	9	12

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Study Title: STATUS QUO ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	16454	16451	16448	16446	16443	16441	16438	16436	16434	16431	16429	16428	16427	16427	16427
Observed Rate	-0.02%	-0.02%	-0.02%	-0.02%	-0.02%	-0.02%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	0.00%	0.00%
Existing Resources	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143
BPA Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89
MF Res MCS	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
New Manuf Housing	44	43	42	40	38	37	34	32	29	27	24	21	19	16	13
Refrigerators	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
Freezers	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Water Heat	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203
Irrigation	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Industrial	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212
New Commercial	365	365	365	365	365	365	365	365	365	365	365	365	365	365	365
Comm Lost Opps Exist	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72
MF Res Weath	27	27	27	27	27	27	26	24	22	20	18	16	14	12	10
SF Res Weath	40	40	40	40	40	40	39	36	32	29	25	21	18	14	11
Comm Discret Ex	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Subtotal	1258	1257	1256	1254	1252	1251	1246	1239	1230	1223	1214	1205	1198	1189	1181
GENERATING RESOURCES:															
Small Hydro 1 West	29	29	29	29	29	29	29	29	0	0	0	0	0	0	0
Small Hydro 1 East	43	43	43	43	43	43	43	43	10	0	0	0	0	0	0
Small Hydro 2 West	32	32	32	32	32	32	32	32	7	0	0	0	0	0	0
Small Hydro 2 East	47	47	47	47	47	47	47	47	22	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	37	37	37	37	37	37	37	37	37	37	37	11	0	0	0
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	30	4	4	4
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1125	938	750	563	375	188	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	0	0	0	0
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	7	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	563	563	375	188	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	375	188	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	8331	8331	8687	9061	9435	9622	9811	10004	10310	10542	10736	11032	11083	11092	11100
Subtotal	11071	11071	11051	11051	11049	11049	11050	11056	11062	11067	11074	11080	11087	11096	11104
Total Firm Resources	16472	16471	16450	16448	16444	16443	16439	16438	16435	16433	16431	16428	16428	16428	16428
Load/Resource Balance	15	17	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: STATUS QUO ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	4284	4434	4588	4758	4922	5085	5249	5414	5579	5744	5895	6045	6196	6346	6496
Observed Rate		3.49%	3.48%	3.70%	3.44%	3.32%	3.23%	3.13%	3.05%	2.97%	2.62%	2.55%	2.49%	2.42%	2.37%
Existing Resources	2380	2378	2407	2436	2431	2431	2446	2461	2455	2449	2469	2490	2489	2489	2512
BPA Requirements	1905	2055	2181	2322	2491	2654	2803	2953	3123	3295	3425	3556	3706	3857	3984
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	4284	4434	4588	4758	4922	5085	5249	5414	5579	5744	5895	6045	6196	6346	6496
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: STATUS QUO ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	6672	6847	7022	7195	7368	7361	7353	7346	7340	7333	7328	7322	7317	7313	7308
Observed Rate	2.71%	2.63%	2.55%	2.47%	2.40%	-0.11%	-0.10%	-0.09%	-0.09%	-0.08%	-0.08%	-0.07%	-0.07%	-0.06%	-0.06%
Existing Resources	2534	2534	2534	2534	2520	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4138	4313	4487	4661	4849	5000	4992	4985	4979	4973	4967	4962	4957	4952	4948
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	6672	6847	7022	7195	7368	7361	7353	7346	7340	7334	7328	7322	7317	7313	7308
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Study ID : 15-JUL-91 06:40:41
Study Title: STATUS QUO ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	7305	7303	7300	7298	7296	7294	7292	7290	7289	7287	7286	7285	7286	7287	7288
Observed Rate	-0.04%	-0.04%	-0.03%	-0.03%	-0.03%	-0.03%	-0.03%	-0.02%	-0.02%	-0.02%	-0.02%	-0.01%	0.01%	0.01%	0.01%
Existing Resources	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4944	4942	4940	4937	4935	4933	4931	4930	4928	4926	4925	4924	4925	4926	4927
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	7305	7303	7300	7298	7296	7294	7292	7290	7289	7287	7286	7285	7286	7287	7288
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: STATUS QUO ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), 0100 Games PARTY = Generating Publics

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	7288	7289	7290	7291	7291	7292	7293	7293	7294	7294	7295	7295	7295	7295	7295
Observed Rate	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.00%	-0.01%	-0.01%
Existing Resources	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4928	4929	4929	4930	4931	4931	4932	4933	4933	4934	4934	4935	4935	4934	4934
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	7288	7289	7290	7291	7291	7292	7293	7293	7294	7294	7295	7295	7295	7295	7295
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Study ID : 15-JUL-91 06:40:41
Study Title: STATUS QUO ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	17723	18317	18922	19551	20193	20811	21431	22050	22669	23288	23899	24509	25120	25730	26341
Observed Rate		3.35%	3.30%	3.32%	3.28%	3.07%	2.97%	2.89%	2.81%	2.73%	2.62%	2.56%	2.49%	2.43%	2.37%
DSI Firm Load	2261	2268	2278	2288	2298	2308	2319	2329	2339	2350	2360	2371	2381	2392	2403
Existing Resources	20443	20605	20585	20564	19997	19429	19495	19560	19475	19389	19538	19687	19458	19229	19225
CONSERVATION PROGRAMS:															
SF Res MCS	0	8	17	26	36	44	54	65	76	87	99	111	125	137	149
MF Res MCS	0	2	3	6	7	9	11	13	15	17	19	21	24	25	27
Water Heat	0	0	0	0	9	29	50	70	91	113	136	161	185	209	234
Refrigerators	0	0	0	0	3	9	14	20	26	32	39	46	54	61	69
Freezers	0	0	0	0	1	2	4	5	7	9	10	13	15	17	19
New Manuf Housing	0	2	4	7	10	13	17	23	27	32	38	42	47	53	58
Irrigation	0	0	2	3	5	9	12	16	20	23	27	30	33	35	36
Industrial	0	4	16	36	58	81	104	128	151	174	196	219	243	266	289
New Commercial	0	18	51	83	114	142	171	201	232	264	294	322	352	382	413
Comm Discret Ex	0	4	15	30	45	60	75	90	105	120	135	150	161	162	162
Comm Lost Opps Exist	0	4	12	19	27	34	41	48	56	64	71	79	86	94	102
SF Res Weath	0	3	10	20	29	38	47	56	66	75	84	93	101	102	102
MF Res Weath	0	1	4	7	9	12	15	17	20	23	25	28	31	33	36
Subtotal	0	46	134	237	353	482	615	752	892	1033	1173	1315	1457	1576	1696
GENERATING RESOURCES:															
Hydro Eff Imp	0	0	20	40	60	80	80	100	100	100	100	100	100	100	100
Trans Eff Imp	0	0	11	22	23	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 East	0	0	0	48	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	0	0	0	36	61	61	61	61	61	61	61	61	61	61	61
Small Hydro 3 East	0	0	0	0	0	0	26	52	52	52	52	52	56	67	67
Small Hydro 4 East	0	0	0	0	0	0	25	32	32	32	32	32	32	32	32
Small Hydro 1 West	0	0	0	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	0	0	0	36	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	0	0	0	0	0	0	26	48	48	48	48	48	48	48	48
Small Hydro 4 West	0	0	0	0	0	0	25	25	25	25	25	25	25	25	25
Combined Cycle BPA	0	0	0	0	349	349	697	697	697	697	697	697	697	697	697
Combined Cycle Mix	0	0	0	0	698	698	698	698	698	698	698	698	698	698	698
Cogen1e	0	0	40	40	40	40	40	40	40	40	40	40	40	40	40
Cogen2e	0	0	0	180	180	180	180	240	240	240	240	240	240	240	240
Cogen3e	0	0	0	0	140	360	360	360	360	360	360	360	360	360	360
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1w	0	0	40	40	40	40	40	40	40	40	40	40	40	40	40
Cogen2w	0	0	240	240	240	240	240	240	240	240	240	240	240	240	240
Cogen3w	0	0	0	0	360	360	360	360	360	360	360	360	420	440	440
Cogen4w	0	0	0	0	0	620	780	780	780	780	780	780	1000	1330	1330
Coal1 (E. Mont)	0	0	0	0	0	0	0	188	375	563	750	938	1125	1501	1501
Coal2 (E. Wash)	0	0	0	0	0	0	0	188	375	563	563	563	563	563	563
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	188
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	806
WNP 3	0	0	0	0	0	0	0	0	0	813	813	813	813	813	813
WNP 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45
Geothermal2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	351	721	2330	3201	3811	4322	4696	5885	6072	6260	6731	7468	8507
Total Firm Resources	20443	20652	21069	21520	22680	23113	23922	24634	25062	26306	26784	27264	27645	28273	29424
Load/Resource Balance	459	67	-130	-318	189	-7	173	255	54	668	526	384	143	151	680

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	27069	27796	28524	29251	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979
Observed Rate	2.76%	2.69%	2.62%	2.55%	2.49%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DSI Firm Load	2413	2424	2435	2446	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	19221	19312	19402	19478	19423	17845	17453	17054	16917	16631	16119	15204	15079	14861	13677
CONSERVATION PROGRAMS:															
SF Res MCS	162	174	188	201	215	215	215	215	215	215	215	215	215	215	215
MF Res MCS	30	31	33	36	37	37	37	37	37	37	37	37	37	37	37
Water Heat	257	282	309	336	362	362	362	362	362	362	362	362	362	362	362
Refrigerators	76	83	90	100	110	110	110	110	110	110	110	110	110	110	110
Freezers	20	22	24	27	30	30	30	30	30	30	30	30	30	30	30
New Manuf Housing	62	68	72	77	83	83	83	83	83	83	83	83	83	83	83
Irrigation	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Industrial	311	334	357	381	400	400	400	400	400	400	400	400	400	400	400
New Commercial	444	476	510	544	579	579	579	579	579	579	579	579	579	579	579
Comm Discret Ex	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
Comm Lost Opps Exist	109	116	123	131	139	139	139	139	139	139	139	139	139	139	139
SF Res Weath	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102
MF Res Weath	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Subtotal	1807	1922	2042	2169	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291
GENERATING RESOURCES:															
Hydro Eff Imp	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Trans Eff Imp	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 East	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61
Small Hydro 3 East	67	67	67	75	75	75	75	75	75	75	75	75	75	75	75
Small Hydro 4 East	32	32	36	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 1 West	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
Small Hydro 4 West	25	25	25	32	32	32	32	32	32	32	32	32	32	32	32
Combined Cycle BPA	697	697	697	697	697	697	697	697	697	697	697	697	697	697	697
Combined Cycle Mix	698	698	698	698	698	698	698	698	698	698	698	698	698	698	698
Cogen1e	40	40	40	40	40	40	40	0	0	0	0	0	0	0	0
Cogen2e	240	240	240	240	240	240	240	240	60	60	60	60	0	0	0
Cogen3e	360	360	360	420	480	480	480	480	480	340	120	120	120	120	120
Cogen4e	0	80	450	670	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Cogen1w	40	40	40	40	40	40	40	0	0	0	0	0	0	0	0
Cogen2w	240	240	240	240	240	240	240	0	0	0	0	0	0	0	0
Cogen3w	440	440	440	480	480	480	480	480	480	120	120	120	120	120	120
Cogen4w	1400	1500	1500	1500	1510	1510	1510	1510	1510	1510	890	730	730	730	730
Coal1 (E. Mont)	1501	1501	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688
Coal2 (E. Wash)	563	563	563	563	751	751	751	751	751	751	751	751	751	751	751
Coal3 (E. Oregon)	375	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	1578	1848	2131	2131	2960	4311	5387	5782	6309	7683
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	90	135	180	225	270	270	270	270	270	270	270	270	270	270	270
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	8809	9222	9828	10215	10848	12426	12696	12659	12479	12808	13319	14235	14570	15097	16471
Total Firm Resources	29836	30456	31272	31858	32559	32559	32436	32000	31683	31726	31725	31726	31936	32246	32435
Load/Resource Balance	354	235	313	161	123	123	1	-436	-753	-710	-711	-710	-500	-190	-1

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979
Observed Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231
CONSERVATION PROGRAMS:															
SF Res MCS	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215
MF Res MCS	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Water Heat	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362
Refrigerators	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
Freezers	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
New Manuf Housing	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83
Irrigation	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Industrial	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
New Commercial	579	579	579	579	579	579	579	579	579	579	579	579	579	579	579
Comm Discret Ex	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
Comm Lost Opps Exist	139	139	139	139	139	139	139	139	139	139	139	139	139	139	139
SF Res Weath	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102
MF Res Weath	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Subtotal	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291
GENERATING RESOURCES:															
Hydro Eff Imp	100	100	80	60	40	20	20	0	0	0	0	0	0	0	0
Trans Eff Imp	34	34	23	12	11	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 East	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61
Small Hydro 3 East	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
Small Hydro 4 East	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 1 West	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
Small Hydro 4 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Combined Cycle BPA	697	697	697	697	349	349	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	698	698	698	698	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	120	120	120	120	120	120	120	120	60	0	0	0	0	0	0
Cogen4e	1000	1000	1000	1000	1000	1000	920	550	330	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	120	120	60	40	40	40	40	40	0	0	0	0	0	0	0
Cogen4w	730	730	510	180	180	110	10	10	10	0	0	0	0	0	0
Coal1 (E. Mont)	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688
Coal2 (E. Wash)	751	751	751	751	751	751	751	751	751	751	751	751	751	751	751
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	8130	8130	8440	8822	9889	9989	10518	10908	11228	11628	11628	11630	11633	11637	11685
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	270	270	270	270	270	270	270	270	270	270	270	270	270	270	225
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	16918	16918	16917	16918	16918	16917	16917	16917	16917	16917	16917	16919	16922	16926	16929
Total Firm Resources	32436	32436	32435	32436	32437	32436	32436	32436	32436	32436	32436	32438	32441	32445	32448
Load/Resource Balance	0	0	-1	0	1	0	0	0	0	0	0	2	5	9	12

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979
Observed Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231
CONSERVATION PROGRAMS:															
SF Res MCS	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215
MF Res MCS	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Water Heat	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362
Refrigerators	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
Freezers	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
New Manuf Housing	83	81	79	76	72	69	65	60	55	51	45	40	36	30	25
Irrigation	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Industrial	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
New Commercial	579	579	579	579	579	579	579	579	579	579	579	579	579	579	579
Comm Discret Ex	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
Comm Lost Opps Exist	139	139	139	139	139	139	139	139	139	139	139	139	139	139	139
SF Res Weath	102	102	102	102	102	102	99	92	82	74	64	54	46	36	28
MF Res Weath	36	36	36	36	36	36	35	32	29	27	24	21	19	16	13
Subtotal	2291	2289	2287	2284	2280	2277	2269	2254	2236	2222	2203	2185	2171	2152	2136
GENERATING RESOURCES:															
Hydro Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trans Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 East	57	57	57	57	57	57	57	57	10	0	0	0	0	0	0
Small Hydro 2 East	61	61	61	61	61	61	61	61	26	0	0	0	0	0	0
Small Hydro 3 East	75	75	75	75	75	75	75	75	75	75	75	49	23	23	23
Small Hydro 4 East	43	43	43	43	43	43	43	43	43	43	43	18	11	11	11
Small Hydro 1 West	39	39	39	39	39	39	39	39	0	0	0	0	0	0	0
Small Hydro 2 West	43	43	43	43	43	43	43	43	7	0	0	0	0	0	0
Small Hydro 3 West	48	48	48	48	48	48	48	48	48	48	48	22	0	0	0
Small Hydro 4 West	32	32	32	32	32	32	32	32	32	32	32	7	7	7	7
Combined Cycle BPA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1688	1688	1500	1313	1125	938	750	563	188	188	188	188	0	0	0
Coal2 (E. Wash)	751	751	563	376	188	188	188	188	188	188	188	188	188	188	0
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	375	188	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	11733	11782	12187	12610	13846	14037	14232	14435	14985	16037	16242	16549	16808	16826	17030
WNP 3	806	806	806	806	806	806	806	806	806	0	0	0	0	0	0
WNP 1	813	813	813	813	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	180	135	90	45	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	16932	16936	16920	16924	16926	16930	16937	16953	16971	16986	17004	17021	17037	17055	17071
Total Firm Resources	32451	32453	32436	32436	32436	32436	32435	32436	32436	32436	32436	32437	32436	32436	32436
Load/Resource Balance	15	17	0	0	0	0	-1	0	0	0	0	1	0	1	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	3888	4002	4120	4235	4355	4473	4591	4709	4826	4944	5058	5173	5286	5400	5514
Observed Rate		2.95%	2.94%	2.78%	2.84%	2.71%	2.63%	2.56%	2.50%	2.43%	2.32%	2.26%	2.20%	2.15%	2.10%
DSI Firm Load	2261	2268	2278	2288	2298	2308	2319	2329	2339	2350	2360	2371	2381	2392	2403
Existing Resources	8379	8546	8382	8219	8213	8208	8255	8302	8310	8319	8417	8515	8521	8527	8408
BPA Requirements	-1952	-2132	-2308	-2322	-2491	-2654	-2803	-2953	-3123	-3295	-3425	-3556	-3706	-3857	-3984
CONSERVATION PROGRAMS:															
SF Res MCS	0	5	11	16	22	27	33	40	46	53	60	67	75	82	89
MF Res MCS	0	1	1	2	2	3	4	4	5	6	6	7	8	8	9
New Manuf Housing	0	1	2	3	5	6	8	11	13	15	18	20	22	25	27
Water Heat	0	0	0	0	4	13	22	31	40	50	60	71	81	92	103
Refrigerators	0	0	0	0	1	4	6	8	11	13	16	19	22	25	28
Freezers	0	0	0	0	0	1	2	2	3	4	4	5	6	7	8
Irrigation	0	0	1	1	2	4	5	6	8	9	11	12	13	14	14
Industrial	0	2	8	17	27	38	49	60	71	82	92	103	114	125	136
New Commercial	0	7	19	31	42	53	63	74	86	98	109	119	130	141	153
Comm Lost Opps Exist	0	2	6	9	13	16	20	23	27	31	34	38	41	45	49
MF Res Weath	0	0	1	2	2	3	4	4	5	6	6	7	8	8	9
SF Res Weath	0	2	6	12	18	23	29	34	40	46	51	57	62	62	62
Comm Discret Ex	0	2	8	16	24	32	40	48	56	64	72	79	85	86	86
Subtotal	0	22	63	109	162	223	285	345	411	477	539	604	667	720	773
GENERATING RESOURCES:															
Hydro Eff Imp	0	0	20	40	60	80	80	100	100	100	100	100	100	100	100
Trans Eff Imp	0	0	11	22	23	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 West	0	0	0	10	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	0	0	0	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	0	0	0	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	0	0	0	11	14	14	14	14	14	14	14	14	14	14	14
Cogen1w	0	0	10	10	10	10	10	10	10	10	10	10	10	10	10
Combined Cycle Mix	0	0	0	0	349	349	349	349	349	349	349	349	349	349	349
Combined Cycle BPA	0	0	0	0	349	349	697	697	697	697	697	697	697	697	697
Cogen1e	0	0	10	10	10	10	10	10	10	10	10	10	10	10	10
Cogen2w	0	0	60	60	60	60	60	60	60	60	60	60	60	60	60
Small Hydro 3 West	0	0	0	0	0	0	0	11	11	11	11	11	11	11	11
WNP 1	0	0	0	0	0	0	0	0	0	813	813	813	813	813	813
WNP 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	806
Small Hydro 3 East	0	0	0	0	0	0	0	0	0	0	0	0	0	11	11
Cogen2e	0	0	0	0	0	0	0	60	60	60	60	60	60	60	60
Cogen3w	0	0	0	0	0	0	0	20	120	120	120	120	120	120	120
Geothermal2	0	0	0	0	0	0	0	0	45	45	45	45	90	135	157
Small Hydro 4 West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 East	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	111	188	910	941	1289	1400	1545	2358	2358	2358	2403	2469	3297
Total Firm Resources	6428	6435	6248	6194	6795	6717	7025	7094	7143	7859	7888	7921	7884	7859	8493
Load/Resource Balance	278	165	-151	-330	142	-65	114	57	-24	562	470	378	217	67	576

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	5642	5771	5898	6026	6153	6158	6164	6169	6173	6178	6182	6185	6189	6192	6195
Observed Rate	2.34%	2.27%	2.22%	2.16%	2.11%	0.09%	0.09%	0.08%	0.07%	0.07%	0.07%	0.06%	0.06%	0.05%	0.05%
DSI Firm Load	2413	2424	2435	2446	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	8289	8394	8500	8431	8362	8291	8220	8150	8079	8009	7920	7650	7579	7449	6727
BPA Requirements	-4138	-4313	-4487	-4661	-4849	-5000	-4992	-4985	-4979	-4973	-4967	-4962	-4957	-4952	-4948
CONSERVATION PROGRAMS:															
SF Res MCS	96	103	111	118	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	10	10	11	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	29	32	34	36	39	39	39	39	39	39	39	39	39	39	39
Water Heat	113	124	136	148	159	159	159	159	159	159	159	159	159	159	159
Refrigerators	31	34	37	41	45	45	45	45	45	45	45	45	45	45	45
Freezers	8	9	10	11	12	12	12	12	12	12	12	12	12	12	12
Irrigation	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Industrial	146	157	168	179	188	188	188	188	188	188	188	188	188	188	188
New Commercial	164	176	189	201	214	214	214	214	214	214	214	214	214	214	214
Comm Lost Opps Exist	52	56	59	63	67	67	67	67	67	67	67	67	67	67	67
MF Res Weath	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
SF Res Weath	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
Comm Discret Ex	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal	820	872	926	980	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033
GENERATING RESOURCES:															
Hydro Eff Imp	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Trans Eff Imp	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 West	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Cogen1w	10	10	10	10	10	10	10	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349
Combined Cycle BPA	697	697	697	697	697	697	697	697	697	697	697	697	697	697	697
Cogen1e	10	10	10	10	10	10	10	0	0	0	0	0	0	0	0
Cogen2w	60	60	60	60	60	60	60	0	0	0	0	0	0	0	0
Small Hydro 3 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
Small Hydro 3 East	11	11	19	19	19	19	19	19	19	19	19	19	19	19	19
Cogen2e	60	60	60	60	60	60	60	60	60	60	60	60	0	0	0
Cogen3w	120	120	120	120	120	120	120	120	120	120	120	120	100	0	0
Geothermal2	202	248	293	338	383	383	383	383	383	383	383	383	383	383	383
Small Hydro 4 West	0	0	7	7	7	7	7	7	7	7	7	7	7	7	7
Small Hydro 4 East	0	0	4	11	11	11	11	11	11	11	11	11	11	11	11
Cogen3e	10	10	10	120	120	120	120	120	120	120	120	120	120	120	120
Cogen4w	0	0	0	160	460	460	460	460	460	460	460	460	460	460	460
Coal1 (E. Mont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	226	241	390	401	401	401	401	572	1130	1981
Subtotal	3342	3388	3452	3774	4119	4345	4360	4429	4440	4440	4440	4440	4531	4989	5840
Total Firm Resources	8313	8341	8390	8524	8665	8669	8621	8626	8573	8509	8426	8161	8186	8519	8652
Load/Resource Balance	260	147	55	51	55	53	0	0	-57	-126	-213	-482	-460	-130	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	6199	6202	6205	6208	6211	6214	6216	6218	6220	6222	6224	6226	6229	6231	6234
Observed Rate	0.05%	0.05%	0.05%	0.05%	0.04%	0.04%	0.04%	0.04%	0.03%	0.03%	0.03%	0.03%	0.04%	0.04%	0.04%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727
BPA Requirements	-4944	-4942	-4940	-4937	-4935	-4933	-4931	-4930	-4928	-4926	-4925	-4924	-4925	-4926	-4927
CONSERVATION PROGRAMS:															
SF Res MCS	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Water Heat	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159
Refrigerators	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Freezers	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Irrigation	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Industrial	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
New Commercial	214	214	214	214	214	214	214	214	214	214	214	214	214	214	214
Comm Lost Opps Exist	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67
MF Res Weath	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
SF Res Weath	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
Comm Discret Ex	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033
GENERATING RESOURCES:															
Hydro Eff Imp	100	100	80	60	40	20	20	0	0	0	0	0	0	0	0
Trans Eff Imp	34	34	23	12	11	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 West	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle BPA	697	697	697	697	349	349	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
Small Hydro 3 East	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	383	383	383	383	383	383	383	383	338	338	338	338	293	248	225
Small Hydro 4 West	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Small Hydro 4 East	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Cogen3e	120	120	120	110	110	110	110	110	0	0	0	0	0	0	0
Cogen4w	460	460	460	460	460	460	460	460	300	0	0	0	0	0	0
Coal1 (E. Mont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	1982	1982	2014	2056	2775	2806	3155	3176	3491	3792	3792	3794	3842	3891	3917
Subtotal	5841	5841	5842	5843	5844	5844	5844	5845	5845	5846	5846	5848	5851	5855	5858
Total Firm Resources	8657	8659	8662	8666	8669	8671	8673	8675	8677	8680	8681	8684	8686	8689	8691
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	6236	6239	6241	6243	6245	6247	6248	6250	6252	6253	6255	6256	6257	6257	6258
Observed Rate	0.04%	0.04%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.02%	0.02%	0.01%	0.01%	0.01%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727
BPA Requirements	-4928	-4929	-4929	-4930	-4931	-4931	-4932	-4933	-4933	-4934	-4934	-4935	-4935	-4934	-4934
CONSERVATION PROGRAMS:															
SF Res MCS	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	39	38	37	36	34	32	31	28	26	24	21	19	17	14	12
Water Heat	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159
Refrigerators	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Freezers	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Irrigation	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Industrial	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
New Commercial	214	214	214	214	214	214	214	214	214	214	214	214	214	214	214
Comm Lost Opps Exist	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67
MF Res Weath	9	9	9	9	9	9	9	8	7	7	6	5	5	4	3
SF Res Weath	62	62	62	62	62	62	60	56	50	45	39	33	28	22	17
Comm Discret Ex	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal	1033	1032	1031	1030	1028	1026	1023	1015	1006	999	989	980	973	963	955
GENERATING RESOURCES:															
Hydro Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trans Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 West	10	10	10	10	10	10	10	10	0	0	0	0	0	0	0
Small Hydro 1 East	14	14	14	14	14	14	14	14	0	0	0	0	0	0	0
Small Hydro 2 West	11	11	11	11	11	11	11	11	0	0	0	0	0	0	0
Small Hydro 2 East	14	14	14	14	14	14	14	14	4	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle BPA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	11	11	11	11	11	11	11	11	11	11	11	11	0	0	0
WNP 1	813	813	813	813	0	0	0	0	0	0	0	0	0	0	0
WNP 3	806	806	806	806	806	806	806	806	806	0	0	0	0	0	0
Small Hydro 3 East	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	180	135	90	45	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Small Hydro 4 East	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	3965	4014	4063	4112	4973	4977	4984	4994	5050	5870	5881	5892	5912	5921	5930
Subtotal	5861	5865	5869	5873	5876	5880	5887	5897	5908	5918	5929	5940	5949	5958	5967
Total Firm Resources	8693	8695	8698	8700	8700	8702	8705	8706	8708	8710	8711	8712	8714	8714	8715
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	9551	9881	10214	10558	10916	11253	11590	11927	12264	12600	12946	13291	13638	13984	14331
Observed Rate		3.45%	3.37%	3.37%	3.39%	3.09%	3.00%	2.91%	2.82%	2.74%	2.74%	2.67%	2.60%	2.54%	2.48%
Existing Resources	9685	9681	9795	9910	9353	8791	8795	8798	8710	8621	8652	8683	8448	8214	8306
BPA Requirements	47	77	127	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	0	3	6	10	14	17	21	25	30	34	39	44	50	55	60
MF Res MCS	0	1	2	4	5	6	7	9	10	11	13	14	16	17	18
New Manuf Housing	0	1	2	4	5	7	9	12	14	17	20	22	25	28	31
Refrigerators	0	0	0	0	2	5	8	12	15	19	23	27	32	36	41
Freezers	0	0	0	0	1	1	2	3	4	5	6	8	9	10	11
Water Heat	0	0	0	0	5	16	28	39	51	63	76	90	104	117	131
Irrigation	0	0	1	2	3	5	7	10	12	14	16	18	20	21	22
Industrial	0	2	8	19	31	43	55	68	80	92	104	116	129	141	153
New Commercial	0	11	32	52	72	89	108	127	146	166	185	203	222	241	260
Comm Lost Opps Exist	0	2	6	10	14	18	21	25	29	33	37	41	45	49	53
MF Res Weath	0	1	3	5	7	9	11	13	15	17	19	21	23	25	27
SF Res Weath	0	1	4	8	11	15	18	22	26	29	33	36	39	40	40
Comm Discret Ex	0	2	7	14	21	28	35	42	49	56	63	71	76	76	76
Subtotal	0	24	71	128	191	259	330	407	481	556	634	711	790	856	923
GENERATING RESOURCES:															
Small Hydro 1 West	0	0	0	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	0	0	0	34	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	0	0	0	25	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	0	0	0	25	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	0	0	30	30	30	30	30	30	30	30	30	30	30	30	30
Combined Cycle Mix	0	0	0	0	349	349	349	349	349	349	349	349	349	349	349
Cogen1e	0	0	30	30	30	30	30	30	30	30	30	30	30	30	30
Cogen2w	0	0	180	180	180	180	180	180	180	180	180	180	180	180	180
Small Hydro 3 West	0	0	0	0	0	0	26	37	37	37	37	37	37	37	37
Small Hydro 3 East	0	0	0	0	0	0	26	52	52	52	52	52	56	56	56
Cogen2e	0	0	0	180	180	180	180	180	180	180	180	180	180	180	180
Coal1 (E. Mont)	0	0	0	0	0	0	0	188	375	563	750	938	1125	1313	1313
Cogen3w	0	0	0	0	360	360	360	360	360	360	360	360	360	360	360
Small Hydro 4 West	0	0	0	0	0	0	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	0	0	0	0	0	0	25	32	32	32	32	32	32	32	32
Cogen3e	0	0	0	0	140	360	360	360	360	360	360	360	360	360	360
Coal2 (E. Wash)	0	0	0	0	0	0	0	188	375	563	563	563	563	563	563
Cogen4w	0	0	0	0	0	620	780	780	780	780	780	780	1000	1330	1330
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	188
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	240	533	1420	2260	2522	2942	3316	3692	3879	4067	4478	4996	5184
Total Firm Resources	9732	9782	10233	10571	10964	11310	11647	12147	12507	12869	13165	13461	13716	14066	14413
Load/Resource Balance	181	-98	21	11	47	58	59	218	243	271	221	171	77	81	79

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	14754	15178	15604	16030	16458	16460	16462	16464	16466	16468	16470	16471	16473	16474	16475
Observed Rate	2.95%	2.87%	2.80%	2.73%	2.67%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
Existing Resources	8398	8383	8368	8513	8542	7194	6872	6543	6477	6261	5838	5194	5139	5051	4589
BPA Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	66	71	77	83	89	89	89	89	89	89	89	89	89	89	89
MF Res MCS	20	21	22	24	25	25	25	25	25	25	25	25	25	25	25
New Manuf Housing	33	36	38	41	44	44	44	44	44	44	44	44	44	44	44
Refrigerators	45	49	53	59	65	65	65	65	65	65	65	65	65	65	65
Freezers	12	13	14	16	18	18	18	18	18	18	18	18	18	18	18
Water Heat	144	158	173	188	203	203	203	203	203	203	203	203	203	203	203
Irrigation	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Industrial	165	177	189	202	212	212	212	212	212	212	212	212	212	212	212
New Commercial	280	300	321	343	365	365	365	365	365	365	365	365	365	365	365
Comm Lost Opps Exist	57	60	64	68	72	72	72	72	72	72	72	72	72	72	72
MF Res Weath	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
SF Res Weath	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Comm Discret Ex	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Subtotal	987	1050	1116	1189	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258
GENERATING RESOURCES:															
Small Hydro 1 West	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	30	30	30	30	30	30	30	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349
Cogen1e	30	30	30	30	30	30	30	0	0	0	0	0	0	0	0
Cogen2w	180	180	180	180	180	180	180	0	0	0	0	0	0	0	0
Small Hydro 3 West	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56
Cogen2e	180	180	180	180	180	180	180	180	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Cogen3w	360	360	360	360	360	360	360	360	360	0	0	0	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Cogen3e	360	360	360	360	360	360	360	360	360	220	0	0	0	0	0
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4w	1400	1500	1500	1500	1500	1500	1500	1500	1500	1500	880	720	720	720	720
Coal3 (E. Oregon)	375	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4e	0	80	450	670	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	1352	1607	1831	1831	2643	3907	4714	4980	5279	5822
Subtotal	5441	5809	6179	6399	6729	8081	8336	8320	8140	8452	8876	9523	9789	10088	10631
Total Firm Resources	14826	15242	15663	16101	16529	16533	16466	16121	15875	15971	15972	15975	16186	16397	16478
Load/Resource Balance	69	63	60	67	68	69	0	-346	-595	-500	-500	-500	-290	-80	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	16475	16474	16474	16473	16472	16472	16471	16471	16470	16470	16469	16468	16464	16461	16457
Observed Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.01%	-0.02%	-0.02%	-0.02%
Existing Resources	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143
BPA Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89
MF Res MCS	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
New Manuf Housing	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44
Refrigerators	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
Freezers	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Water Heat	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203
Irrigation	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Industrial	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212
New Commercial	365	365	365	365	365	365	365	365	365	365	365	365	365	365	365
Comm Lost Opps Exist	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72
MF Res Weath	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
SF Res Weath	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Comm Discret Ex	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Subtotal	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258
GENERATING RESOURCES:															
Small Hydro 1 West	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4w	720	720	500	170	170	100	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4e	1000	1000	1000	1000	1000	1000	920	550	330	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	6268	6268	6486	6816	7164	7233	7413	7782	8002	8331	8331	8331	8331	8331	8331
Subtotal	11077	11077	11075	11075	11074	11073	11073	11072	11072	11071	11071	11071	11071	11071	11071
Total Firm Resources	16478	16478	16476	16476	16475	16474	16474	16473	16473	16472	16472	16472	16472	16472	16472
Load/Resource Balance	0	1	0	0	0	0	0	0	0	0	0	2	5	9	12

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Study Title: HIGH LOAD NEW BASE CASE 4

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	4284	4434	4588	4758	4922	5085	5249	5414	5579	5744	5895	6045	6196	6346	6496
Observed Rate		3.49%	3.48%	3.70%	3.44%	3.32%	3.23%	3.13%	3.05%	2.97%	2.62%	2.55%	2.49%	2.42%	2.37%
Existing Resources	2380	2378	2407	2436	2431	2431	2446	2461	2455	2449	2469	2490	2489	2489	2512
BPA Requirements	1905	2055	2181	2322	2491	2654	2803	2953	3123	3295	3425	3556	3706	3857	3984
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	4284	4434	4588	4758	4922	5085	5249	5414	5579	5744	5895	6045	6196	6346	6496
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	6672	6847	7022	7195	7368	7361	7353	7346	7340	7333	7328	7322	7317	7313	7308
Observed Rate	2.71%	2.63%	2.55%	2.47%	2.40%	-0.11%	-0.10%	-0.09%	-0.09%	-0.08%	-0.08%	-0.07%	-0.07%	-0.06%	-0.06%
Existing Resources	2534	2534	2534	2534	2520	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4138	4313	4487	4661	4849	5000	4992	4985	4979	4973	4967	4962	4957	4952	4948
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	6672	6847	7022	7195	7368	7361	7353	7346	7340	7334	7328	7322	7317	7313	7308
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: HIGH LOAD NEW BASE CASE 4

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	7305	7303	7300	7298	7296	7294	7292	7290	7289	7287	7286	7285	7286	7287	7288
Observed Rate	-0.04%	-0.04%	-0.03%	-0.03%	-0.03%	-0.03%	-0.03%	-0.02%	-0.02%	-0.02%	-0.02%	-0.01%	0.01%	0.01%	0.01%
Existing Resources	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4944	4942	4940	4937	4935	4933	4931	4930	4928	4926	4925	4924	4925	4926	4927
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	7305	7303	7300	7298	7296	7294	7292	7290	7289	7287	7286	7285	7286	7287	7288
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: HIGH LOAD NEW BASE CASE 4

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	7288	7289	7290	7291	7291	7292	7293	7293	7294	7294	7295	7295	7295	7295	7295
Observed Rate	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.00%	-0.01%	-0.01%
Existing Resources	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4928	4929	4929	4930	4931	4931	4932	4933	4933	4934	4934	4935	4935	4934	4934
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	7288	7289	7290	7291	7291	7292	7293	7293	7294	7294	7295	7295	7295	7295	7295
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: HIGH LOAD NEW BASE CASE 4

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	17723	18317	18922	19551	20193	20811	21431	22050	22669	23288	23899	24509	25120	25730	26341
Observed Rate		3.35%	3.30%	3.32%	3.28%	3.07%	2.97%	2.89%	2.81%	2.73%	2.62%	2.56%	2.49%	2.43%	2.37%
DSI Firm Load	2261	2268	2278	2288	2298	2308	2319	2329	2339	2350	2360	2371	2381	2392	2403
Existing Resources	20443	20605	20585	20564	19997	19429	19495	19560	19475	19389	19538	19687	19458	19229	19225
CONSERVATION PROGRAMS:															
SF Res MCS	0	8	17	26	36	44	54	65	76	87	99	111	125	137	149
MF Res MCS	0	2	3	6	7	9	11	13	15	17	19	21	24	25	27
Water Heat	0	0	0	0	9	29	50	70	91	113	136	161	185	209	234
Refrigerators	0	0	0	0	3	9	14	20	26	32	39	46	54	61	69
Freezers	0	0	0	0	1	2	4	5	7	9	10	13	15	17	19
New Manuf Housing	0	2	4	7	10	13	17	23	27	32	38	42	47	53	58
Irrigation	0	0	2	3	5	9	12	16	20	23	27	30	33	35	36
Industrial	0	4	16	36	58	81	104	128	151	174	196	219	243	266	289
New Commercial	0	18	51	83	114	142	171	201	232	264	294	322	352	382	413
Comm Discret Ex	0	4	15	30	45	60	75	90	105	120	135	150	161	162	162
Comm Lost Opps Exist	0	4	12	19	27	34	41	48	56	64	71	79	86	94	102
SF Res Weath	0	3	10	20	29	38	47	56	66	75	84	93	101	102	102
MF Res Weath	0	1	4	7	9	12	15	17	20	23	25	28	31	33	36
Subtotal	0	46	134	237	353	482	615	752	892	1033	1173	1315	1457	1576	1696
GENERATING RESOURCES:															
Hydro Eff Imp	0	0	20	40	60	80	80	100	100	100	100	100	100	100	100
Trans Eff Imp	0	0	11	22	23	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 East	0	0	0	48	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	0	0	0	36	61	61	61	61	61	61	61	61	61	61	61
Small Hydro 3 East	0	0	0	0	0	0	26	52	52	52	52	52	56	67	67
Small Hydro 4 East	0	0	0	0	0	0	25	32	32	32	32	32	32	32	32
Small Hydro 1 West	0	0	0	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	0	0	0	36	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	0	0	0	0	0	0	26	48	48	48	48	48	48	48	48
Small Hydro 4 West	0	0	0	0	0	0	25	25	25	25	25	25	25	25	25
Combined Cycle BPA	0	0	0	0	349	349	697	697	697	697	697	697	697	697	697
Combined Cycle Mix	0	0	0	0	698	698	698	698	698	698	698	698	698	698	698
Cogen1e	0	0	40	40	40	40	40	40	40	40	40	40	40	40	40
Cogen2e	0	0	0	180	180	180	180	240	240	240	240	240	240	240	240
Cogen3e	0	0	0	0	140	360	360	360	360	360	360	360	360	370	370
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1w	0	0	40	40	40	40	40	40	40	40	40	40	40	40	40
Cogen2w	0	0	240	240	240	240	240	240	240	240	240	240	240	240	240
Cogen3w	0	0	0	0	360	360	360	380	480	480	480	480	480	480	480
Cogen4w	0	0	0	0	0	620	780	780	780	780	780	780	1000	1330	1330
Coal1 (E. Mont)	0	0	0	0	0	0	0	188	375	563	750	938	1125	1313	1313
Coal2 (E. Wash)	0	0	0	0	0	0	0	188	375	563	563	563	563	563	563
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	188
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNP 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	806
WNP 1	0	0	0	0	0	0	0	0	0	813	813	813	813	813	813
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	0	0	0	0	0	0	0	0	45	45	45	45	90	135	157
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	351	721	2330	3201	3811	4342	4861	6050	6237	6425	6881	7465	8481
Total Firm Resources	20443	20652	21069	21520	22680	23113	23922	24654	25227	26471	26949	27429	27795	28271	29399
Load/Resource Balance	459	67	-130	-318	189	-7	173	275	219	833	691	549	293	148	655

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Study Title: HIGH LOAD NEW BASE CASE 4

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-5
Observed Load	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	2997
Observed Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	245
Existing Resources	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	1323
CONSERVATION PROGRAMS:															
SF Res MCS	215	215	215	215	215	215	215	215	215	215	215	215	215	215	21
MF Res MCS	37	37	37	37	37	37	37	37	37	37	37	37	37	37	3
Water Heat	362	362	362	362	362	362	362	362	362	362	362	362	362	362	36
Refrigerators	110	110	110	110	110	110	110	110	110	110	110	110	110	110	11
Freezers	30	30	30	30	30	30	30	30	30	30	30	30	30	30	3
New Manuf Housing	83	81	79	76	72	69	65	60	55	51	45	40	36	30	2
Irrigation	36	36	36	36	36	36	36	36	36	36	36	36	36	36	3
Industrial	400	400	400	400	400	400	400	400	400	400	400	400	400	400	40
New Commercial	579	579	579	579	579	579	579	579	579	579	579	579	579	579	57
Comm Discret Ex	162	162	162	162	162	162	162	162	162	162	162	162	162	162	16
Comm Lost Opps Exist	139	139	139	139	139	139	139	139	139	139	139	139	139	139	1
SF Res Weath	102	102	102	102	102	102	99	92	82	74	64	54	46	36	3
MF Res Weath	36	36	36	36	36	36	35	32	29	27	24	21	19	16	
Subtotal	2291	2289	2287	2284	2280	2277	2269	2254	2236	2222	2203	2185	2171	2152	21
GENERATING RESOURCES:															
Hydro Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Trans Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Small Hydro 1 East	57	57	57	57	57	57	57	57	10	0	0	0	0	0	
Small Hydro 2 East	61	61	61	61	61	61	61	61	26	0	0	0	0	0	
Small Hydro 3 East	75	75	75	75	75	75	75	75	75	75	75	49	23	23	
Small Hydro 4 East	43	43	43	43	43	43	43	43	43	43	43	18	11	11	
Small Hydro 1 West	39	39	39	39	39	39	39	39	0	0	0	0	0	0	
Small Hydro 2 West	43	43	43	43	43	43	43	43	7	0	0	0	0	0	
Small Hydro 3 West	48	48	48	48	48	48	48	48	48	48	48	22	0	0	
Small Hydro 4 West	32	32	32	32	32	32	32	32	32	32	32	7	7	7	
Combined Cycle BPA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Coal1 (E. Mont)	1313	1313	1125	938	750	563	375	188	0	0	0	0	0	0	
Coal2 (E. Wash)	563	563	375	188	0	0	0	0	0	0	0	0	0	0	
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	375	188	0	0	0	
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Replacement	12296	12345	12750	13173	14408	14599	14795	14998	15360	16412	16617	16924	16995	17013	17
WNP 3	806	806	806	806	806	806	806	806	806	0	0	0	0	0	
WNP 1	813	813	813	813	0	0	0	0	0	0	0	0	0	0	
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Geothermal2	180	135	90	45	0	0	0	0	0	0	0	0	0	0	
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Subtotal	16932	16936	16920	16924	16925	16929	16937	16953	16970	16985	17003	17020	17036	17054	17
Total Firm Resources	32451	32454	32436	32436	32436	32436	32436	32437	32436	32436	32436	32437	32435	32436	32
Load/Resource Balance	16	18	0	0	0	0	0	1	0	0	0	1	-1	0	

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979
Observed Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231
CONSERVATION PROGRAMS:															
SF Res MCS	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215
MF Res MCS	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Water Heat	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362
Refrigerators	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
Freezers	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
New Manuf Housing	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83
Irrigation	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Industrial	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
New Commercial	579	579	579	579	579	579	579	579	579	579	579	579	579	579	579
Comm Discret Ex	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
Comm Lost Opps Exist	139	139	139	139	139	139	139	139	139	139	139	139	139	139	139
SF Res Weath	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102
MF Res Weath	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Subtotal	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291
GENERATING RESOURCES:															
Hydro Eff Imp	100	100	80	60	40	20	20	0	0	0	0	0	0	0	0
Trans Eff Imp	34	34	23	12	11	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 East	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61
Small Hydro 3 East	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
Small Hydro 4 East	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 1 West	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
Small Hydro 4 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Combined Cycle BPA	697	697	697	697	349	349	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	698	698	698	698	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	120	120	120	110	110	110	110	110	0	0	0	0	0	0	0
Cogen4e	1000	1000	1000	1000	1000	1000	920	550	330	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	1180	1180	960	630	630	560	460	460	300	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	8250	8250	8500	8872	9939	10039	10568	10958	11493	12123	12123	12125	12173	12222	12248
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	383	383	383	383	383	383	383	383	338	338	338	338	293	248	225
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	16918	16918	16917	16918	16918	16917	16917	16917	16917	16917	16917	16919	16922	16926	16929
Total Firm Resources	32436	32436	32435	32436	32437	32436	32436	32436	32436	32436	32436	32438	32441	32445	32448
Load/Resource Balance	0	0	-1	0	1	0	0	0	0	0	0	2	5	9	13

Study ID : 15-JUL-91 07:09:02
Study Title: HIGH LOAD NEW BASE CASE 4

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	27069	27796	28524	29251	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979
Observed Rate	2.76%	2.69%	2.62%	2.55%	2.49%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DSI Firm Load	2413	2424	2435	2446	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	19221	19312	19402	19478	19423	17845	17453	17054	16917	16631	16119	15204	15079	14861	13677
CONSERVATION PROGRAMS:															
SF Res MCS	162	174	188	201	215	215	215	215	215	215	215	215	215	215	215
MF Res MCS	30	31	33	36	37	37	37	37	37	37	37	37	37	37	37
Water Heat	257	282	309	336	362	362	362	362	362	362	362	362	362	362	362
Refrigerators	76	83	90	100	110	110	110	110	110	110	110	110	110	110	110
Freezers	20	22	24	27	30	30	30	30	30	30	30	30	30	30	30
New Manuf Housing	62	68	72	77	83	83	83	83	83	83	83	83	83	83	83
Irrigation	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Industrial	311	334	357	381	400	400	400	400	400	400	400	400	400	400	400
New Commercial	444	476	510	544	579	579	579	579	579	579	579	579	579	579	579
Comm Discret Ex	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
Comm Lost Opps Exist	109	116	123	131	139	139	139	139	139	139	139	139	139	139	139
SF Res Weath	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102
MF Res Weath	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Subtotal	1807	1922	2042	2169	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291
GENERATING RESOURCES:															
Hydro Eff Imp	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Trans Eff Imp	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 East	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61
Small Hydro 3 East	67	67	75	75	75	75	75	75	75	75	75	75	75	75	75
Small Hydro 4 East	32	32	36	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 1 West	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
Small Hydro 4 West	25	25	32	32	32	32	32	32	32	32	32	32	32	32	32
Combined Cycle BPA	697	697	697	697	697	697	697	697	697	697	697	697	697	697	697
Combined Cycle Mix	698	698	698	698	698	698	698	698	698	698	698	698	698	698	698
Cogen1e	40	40	40	40	40	40	40	0	0	0	0	0	0	0	0
Cogen2e	240	240	240	240	240	240	240	240	60	60	60	60	0	0	0
Cogen3e	370	370	370	480	480	480	480	480	480	340	120	120	120	120	120
Cogen4e	0	80	450	670	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Cogen1w	40	40	40	40	40	40	40	0	0	0	0	0	0	0	0
Cogen2w	240	240	240	240	240	240	240	0	0	0	0	0	0	0	0
Cogen3w	480	480	480	480	480	480	480	480	480	120	120	120	100	0	0
Cogen4w	1400	1500	1500	1660	1960	1960	1960	1960	1960	1960	1340	1180	1180	1180	1180
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal3 (E. Oregon)	375	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	1578	1848	2221	2232	3044	4308	5115	5552	6409	7803
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	202	248	293	338	383	383	383	383	383	383	383	383	383	383	383
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	8783	9197	9631	10173	10848	12426	12696	12749	12580	12892	13316	13963	14320	15077	16471
Total Firm Resources	29811	30431	31074	31815	32559	32559	32436	32090	31784	31810	31722	31454	31686	32226	32435
Load/Resource Balance	329	210	115	118	123	123	1	-346	-652	-626	-714	-982	-750	-210	-1

Study ID : 15-JUL-91 07:59:56
Study Title: conservation alternative

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	3888	4002	4120	4235	4355	4473	4591	4709	4826	4944	5058	5173	5286	5400	5514
Observed Rate		2.95%	2.94%	2.78%	2.84%	2.71%	2.63%	2.56%	2.50%	2.43%	2.32%	2.26%	2.20%	2.15%	2.10%
DSI Firm Load	2261	2268	2278	2288	2298	2308	2319	2329	2339	2350	2360	2371	2381	2392	2403
Existing Resources	8379	8546	8382	8219	8213	8208	8255	8302	8310	8319	8417	8515	8521	8527	8408
BPA Requirements	-1952	-2132	-2308	-2322	-2491	-2654	-2803	-2953	-3123	-3295	-3425	-3556	-3706	-3857	-3984
CONSERVATION PROGRAMS:															
SF Res MCS	0	5	11	16	22	27	33	40	46	53	60	67	75	82	89
MF Res MCS	0	1	1	2	2	3	4	4	5	6	6	7	8	8	9
New Manuf Housing	0	1	2	3	5	6	8	11	13	15	18	20	22	25	27
Water Heat	0	0	0	0	4	13	22	31	40	50	60	71	81	92	103
Refrigerators	0	0	0	0	1	4	6	8	11	13	16	19	22	25	28
Freezers	0	0	0	0	0	1	2	2	3	4	4	5	6	7	8
Irrigation	0	0	1	1	2	4	5	6	8	9	11	12	13	14	14
Industrial	0	2	8	17	27	38	49	60	71	82	92	103	114	125	136
New Commercial	0	7	19	31	42	53	63	74	86	98	109	119	130	141	153
Comm Lost Opps Exist	0	2	6	9	13	16	20	23	27	31	34	38	41	45	49
MF Res Weath	0	0	1	2	2	3	4	4	5	6	6	7	8	8	9
SF Res Weath	0	2	6	12	18	23	29	34	40	46	51	57	62	62	62
Comm Discret Ex	0	2	8	16	24	32	40	48	56	64	72	79	85	86	86
Subtotal	0	22	63	109	162	223	285	345	411	477	539	604	667	720	773
GENERATING RESOURCES:															
Hydro Eff Imp	0	0	20	40	60	80	80	100	100	100	100	100	100	100	100
Trans Eff Imp	0	0	11	22	23	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 West	0	0	0	10	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	0	0	0	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	0	0	0	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	0	0	0	11	14	14	14	14	14	14	14	14	14	14	14
Cogen1w	0	0	10	10	10	10	10	10	10	10	10	10	10	10	10
Combined Cycle Mix	0	0	0	0	349	349	349	349	349	349	349	349	349	349	349
Combined Cycle BPA	0	0	0	0	349	349	697	697	697	697	697	697	697	697	697
Cogen1e	0	0	10	10	10	10	10	10	10	10	10	10	10	10	10
Cogen2w	0	0	60	60	60	60	60	60	60	60	60	60	60	60	60
Small Hydro 3 West	0	0	0	0	0	0	0	11	11	11	11	11	11	11	11
WNP 1	0	0	0	0	0	0	0	0	0	813	813	813	813	813	813
WNP 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	806
Small Hydro 3 East	0	0	0	0	0	0	0	0	0	0	0	0	0	11	11
Cogen2e	0	0	0	0	0	0	0	60	60	60	60	60	60	60	60
Cogen3w	0	0	0	0	0	0	0	20	120	120	120	120	120	120	120
Geothermal2	0	0	0	0	0	0	0	0	45	45	45	45	90	135	157
Small Hydro 4 West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 East	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	111	188	910	941	1289	1400	1545	2358	2358	2358	2403	2469	3297
Total Firm Resources	6428	6435	6248	6194	6795	6717	7025	7094	7143	7859	7888	7921	7884	7859	8493
Load/Resource Balance	278	165	-151	-330	142	-65	114	57	-24	562	470	378	217	67	576

Study ID : 15-JUL-91 07:59:56
Study Title: conservation alternative

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	5642	5771	5898	6026	6153	6158	6164	6169	6173	6178	6182	6185	6189	6192	6195
Observed Rate	2.34%	2.27%	2.22%	2.16%	2.11%	0.09%	0.09%	0.08%	0.07%	0.07%	0.07%	0.06%	0.06%	0.05%	0.05%
DSI Firm Load	2413	2424	2435	2446	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	8289	8394	8500	8431	8362	8291	8220	8150	8079	8009	7920	7650	7579	7449	6727
BPA Requirements	-4138	-4313	-4487	-4661	-4849	-5000	-4992	-4985	-4979	-4973	-4967	-4962	-4957	-4952	-4948
CONSERVATION PROGRAMS:															
SF Res MCS	96	103	111	118	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	10	10	11	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	29	32	34	36	39	39	39	39	39	39	39	39	39	39	39
Water Heat	113	124	136	148	159	159	159	159	159	159	159	159	159	159	159
Refrigerators	31	34	37	41	45	45	45	45	45	45	45	45	45	45	45
Freezers	8	9	10	11	12	12	12	12	12	12	12	12	12	12	12
Irrigation	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Industrial	146	157	168	179	188	188	188	188	188	188	188	188	188	188	188
New Commercial	164	176	189	201	214	214	214	214	214	214	214	214	214	214	214
Comm Lost Opps Exist	52	56	59	63	67	67	67	67	67	67	67	67	67	67	67
MF Res Weath	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
SF Res Weath	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
Comm Discret Ex	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal	820	872	926	980	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033
GENERATING RESOURCES:															
Hydro Eff Imp	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Trans Eff Imp	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 West	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Cogen1w	10	10	10	10	10	10	10	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349
Combined Cycle BPA	697	697	697	697	697	697	697	697	697	697	697	697	697	697	697
Cogen1e	10	10	10	10	10	10	10	0	0	0	0	0	0	0	0
Cogen2w	60	60	60	60	60	60	60	0	0	0	0	0	0	0	0
Small Hydro 3 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
Small Hydro 3 East	11	11	19	19	19	19	19	19	19	19	19	19	19	19	19
Cogen2e	60	60	60	60	60	60	60	60	60	60	60	60	0	0	0
Cogen3w	120	120	120	120	120	120	120	120	120	120	120	120	100	0	0
Geothermal2	202	248	293	338	383	383	383	383	383	383	383	383	383	383	383
Small Hydro 4 West	0	0	7	7	7	7	7	7	7	7	7	7	7	7	7
Small Hydro 4 East	0	0	4	11	11	11	11	11	11	11	11	11	11	11	11
Cogen3e	10	10	10	120	120	120	120	120	120	120	120	120	120	120	120
Cogen4w	0	0	0	160	460	460	460	460	460	460	460	460	460	460	460
Coal1 (E. Mont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	226	241	390	401	401	401	401	572	1130	1981
Subtotal	3342	3388	3452	3774	4119	4345	4360	4429	4440	4440	4440	4440	4531	4989	5840
Total Firm Resources	8313	8341	8390	8524	8665	8669	8621	8626	8573	8509	8426	8161	8186	8519	8652
Load/Resource Balance	260	147	55	51	55	53	0	0	-57	-126	-213	-482	-460	-130	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	6199	6202	6205	6208	6211	6214	6216	6218	6220	6222	6224	6226	6229	6231	6234
Observed Rate	0.05%	0.05%	0.05%	0.05%	0.04%	0.04%	0.04%	0.04%	0.03%	0.03%	0.03%	0.03%	0.04%	0.04%	0.04%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727
BPA Requirements	-4944	-4942	-4940	-4937	-4935	-4933	-4931	-4930	-4928	-4926	-4925	-4924	-4925	-4926	-4927
CONSERVATION PROGRAMS:															
SF Res MCS	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Water Heat	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159
Refrigerators	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Freezers	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Irrigation	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Industrial	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
New Commercial	214	214	214	214	214	214	214	214	214	214	214	214	214	214	214
Comm Lost Opps Exist	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67
MF Res Weath	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
SF Res Weath	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
Comm Discret Ex	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033
GENERATING RESOURCES:															
Hydro Eff Imp	100	100	80	60	40	20	20	0	0	0	0	0	0	0	0
Trans Eff Imp	34	34	23	12	11	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 West	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle BPA	697	697	697	697	349	349	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
Small Hydro 3 East	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	383	383	383	383	383	383	383	383	338	338	338	338	293	248	225
Small Hydro 4 West	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Small Hydro 4 East	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Cogen3e	120	120	120	110	110	110	110	110	0	0	0	0	0	0	0
Cogen4w	460	460	460	460	460	460	460	460	300	0	0	0	0	0	0
Coal1 (E. Mont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	1982	1982	2014	2056	2775	2806	3155	3176	3491	3792	3792	3794	3842	3891	3917
Subtotal	5841	5841	5842	5843	5844	5844	5844	5845	5845	5846	5846	5848	5851	5855	5858
Total Firm Resources	8657	8659	8662	8666	8669	8671	8673	8675	8677	8680	8681	8684	8686	8689	8691
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
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Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	6236	6239	6241	6243	6245	6247	6248	6250	6252	6253	6255	6256	6257	6257	6258
Observed Rate	0.04%	0.04%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.02%	0.02%	0.01%	0.01%	0.01%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727
BPA Requirements	-4928	-4929	-4929	-4930	-4931	-4931	-4932	-4933	-4933	-4934	-4934	-4935	-4935	-4934	-4934
CONSERVATION PROGRAMS:															
SF Res MCS	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	39	38	37	36	34	32	31	28	26	24	21	19	17	14	12
Water Heat	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159
Refrigerators	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Freezers	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Irrigation	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Industrial	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
New Commercial	214	214	214	214	214	214	214	214	214	214	214	214	214	214	214
Comm Lost Opps Exist	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67
MF Res Weath	9	9	9	9	9	9	9	8	7	7	6	5	5	4	3
SF Res Weath	62	62	62	62	62	62	60	56	50	45	39	33	28	22	17
Comm Discret Ex	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal	1033	1032	1031	1030	1028	1026	1023	1015	1006	999	989	980	973	963	955
GENERATING RESOURCES:															
Hydro Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trans Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 West	10	10	10	10	10	10	10	10	0	0	0	0	0	0	0
Small Hydro 1 East	14	14	14	14	14	14	14	14	0	0	0	0	0	0	0
Small Hydro 2 West	11	11	11	11	11	11	11	11	0	0	0	0	0	0	0
Small Hydro 2 East	14	14	14	14	14	14	14	14	4	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle BPA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	11	11	11	11	11	11	11	11	11	11	11	11	0	0	0
WNP 1	813	813	813	813	0	0	0	0	0	0	0	0	0	0	0
WNP 3	806	806	806	806	806	806	806	806	806	0	0	0	0	0	0
Small Hydro 3 East	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	180	135	90	45	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Small Hydro 4 East	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	3965	4014	4063	4112	4973	4977	4984	4994	5050	5870	5881	5892	5912	5921	5930
Subtotal	5861	5865	5869	5873	5876	5880	5887	5897	5908	5918	5929	5940	5949	5958	5967
Total Firm Resources	8693	8695	8698	8700	8700	8702	8705	8706	8708	8710	8711	8712	8714	8714	8715
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
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Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	9551	9881	10214	10558	10916	11253	11590	11927	12264	12600	12946	13291	13638	13984	14331
Observed Rate		3.45%	3.37%	3.37%	3.39%	3.09%	3.00%	2.91%	2.82%	2.74%	2.74%	2.67%	2.60%	2.54%	2.48%
Existing Resources	9685	9681	9795	9910	9353	8791	8795	8798	8710	8621	8652	8683	8448	8214	8306
BPA Requirements	47	77	127	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	0	3	6	10	14	17	21	25	30	34	39	44	50	55	60
MF Res MCS	0	1	2	4	5	6	7	9	10	11	13	14	16	17	18
New Manuf Housing	0	1	2	4	5	7	9	12	14	17	20	22	25	28	31
Refrigerators	0	0	0	0	2	5	8	12	15	19	23	27	32	36	41
Freezers	0	0	0	0	1	1	2	3	4	5	6	8	9	10	11
Water Heat	0	0	0	0	5	16	28	39	51	63	76	90	104	117	131
Irrigation	0	0	1	2	3	5	7	10	12	14	16	18	20	21	22
Industrial	0	2	8	19	31	43	55	68	80	92	104	116	129	141	153
New Commercial	0	11	32	52	72	89	108	127	146	166	185	203	222	241	260
Comm Lost Opps Exist	0	2	6	10	14	18	21	25	29	33	37	41	45	49	53
MF Res Weath	0	1	3	5	7	9	11	13	15	17	19	21	23	25	27
SF Res Weath	0	1	4	8	11	15	18	22	26	29	33	36	39	40	40
Comm Discret Ex	0	2	7	14	21	28	35	42	49	56	63	71	76	76	76
Subtotal	0	24	71	128	191	259	330	407	481	556	634	711	790	856	923
GENERATING RESOURCES:															
Small Hydro 1 West	0	0	0	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	0	0	0	34	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	0	0	0	25	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	0	0	0	25	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	0	0	30	30	30	30	30	30	30	30	30	30	30	30	30
Combined Cycle Mix	0	0	0	0	349	349	349	349	349	349	349	349	349	349	349
Cogen1e	0	0	30	30	30	30	30	30	30	30	30	30	30	30	30
Cogen2w	0	0	180	180	180	180	180	180	180	180	180	180	180	180	180
Small Hydro 3 West	0	0	0	0	0	0	26	37	37	37	37	37	37	37	37
Small Hydro 3 East	0	0	0	0	0	0	26	52	52	52	52	52	56	56	56
Cogen2e	0	0	0	180	180	180	180	180	180	180	180	180	180	180	180
Coal1 (E. Mont)	0	0	0	0	0	0	0	188	375	563	750	938	1125	1313	1313
Cogen3w	0	0	0	0	360	360	360	360	360	360	360	360	360	360	360
Small Hydro 4 West	0	0	0	0	0	0	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	0	0	0	0	0	0	25	32	32	32	32	32	32	32	32
Cogen3e	0	0	0	0	140	360	360	360	360	360	360	360	360	360	360
Coal2 (E. Wash)	0	0	0	0	0	0	0	188	375	563	563	563	563	563	563
Cogen4w	0	0	0	0	0	620	780	780	780	780	780	780	1000	1330	1330
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	188
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	240	533	1420	2260	2522	2942	3316	3692	3879	4067	4478	4996	5184
Total Firm Resources	9732	9782	10233	10571	10964	11310	11647	12147	12507	12869	13165	13461	13716	14066	14413
Load/Resource Balance	181	-98	21	11	47	58	59	218	243	271	221	171	77	81	79

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	14754	15178	15604	16030	16458	16460	16462	16464	16466	16468	16470	16471	16473	16474	16475
Observed Rate	2.95%	2.87%	2.80%	2.73%	2.67%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
Existing Resources	8398	8383	8368	8513	8542	7194	6872	6543	6477	6261	5838	5194	5139	5051	4589
BPA Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	66	71	77	83	89	89	89	89	89	89	89	89	89	89	89
MF Res MCS	20	21	22	24	25	25	25	25	25	25	25	25	25	25	25
New Manuf Housing	33	36	38	41	44	44	44	44	44	44	44	44	44	44	44
Refrigerators	45	49	53	59	65	65	65	65	65	65	65	65	65	65	65
Freezers	12	13	14	16	18	18	18	18	18	18	18	18	18	18	18
Water Heat	144	158	173	188	203	203	203	203	203	203	203	203	203	203	203
Irrigation	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Industrial	165	177	189	202	212	212	212	212	212	212	212	212	212	212	212
New Commercial	280	300	321	343	365	365	365	365	365	365	365	365	365	365	365
Comm Lost Opps Exist	57	60	64	68	72	72	72	72	72	72	72	72	72	72	72
MF Res Weath	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
SF Res Weath	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Comm Discret Ex	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Subtotal	987	1050	1116	1189	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258
GENERATING RESOURCES:															
Small Hydro 1 West	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	30	30	30	30	30	30	30	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349
Cogen1e	30	30	30	30	30	30	30	0	0	0	0	0	0	0	0
Cogen2w	180	180	180	180	180	180	180	0	0	0	0	0	0	0	0
Small Hydro 3 West	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56
Cogen2e	180	180	180	180	180	180	180	180	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Cogen3w	360	360	360	360	360	360	360	360	360	0	0	0	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Cogen3e	360	360	360	360	360	360	360	360	360	220	0	0	0	0	0
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4w	1400	1500	1500	1500	1500	1500	1500	1500	1500	1500	880	720	720	720	720
Coal3 (E. Oregon)	375	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4e	0	80	450	670	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	1352	1607	1831	1831	2643	3907	4714	4980	5279	5822
Subtotal	5441	5809	6179	6399	6729	8081	8336	8320	8140	8452	8876	9523	9789	10088	10631
Total Firm Resources	14826	15242	15663	16101	16529	16533	16466	16121	15875	15971	15972	15975	16186	16397	16478
Load/Resource Balance	69	63	60	67	68	69	0	-346	-595	-500	-500	-500	-290	-80	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	16475	16474	16474	16473	16472	16472	16471	16471	16470	16470	16469	16468	16464	16461	16457
Observed Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.01%	-0.02%	-0.02%	-0.02%
Existing Resources	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143
BPA Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89
MF Res MCS	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
New Manuf Housing	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44
Refrigerators	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
Freezers	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Water Heat	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203
Irrigation	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Industrial	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212
New Commercial	365	365	365	365	365	365	365	365	365	365	365	365	365	365	365
Comm Lost Opps Exist	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72
MF Res Weath	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
SF Res Weath	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Comm Discret Ex	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Subtotal	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258
GENERATING RESOURCES:															
Small Hydro 1 West	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4w	720	720	500	170	170	100	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4e	1000	1000	1000	1000	1000	1000	920	550	330	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	6268	6268	6486	6816	7164	7233	7413	7782	8002	8331	8331	8331	8331	8331	8331
Subtotal	11077	11077	11075	11075	11074	11073	11073	11072	11072	11071	11071	11071	11071	11071	11071
Total Firm Resources	16478	16478	16476	16476	16475	16474	16474	16473	16473	16472	16472	16472	16472	16472	16472
Load/Resource Balance	0	1	0	0	0	0	0	0	0	0	0	2	5	9	12

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	16454	16451	16448	16446	16443	16441	16438	16436	16434	16431	16429	16428	16427	16427	16427
Observed Rate	-0.02%	-0.02%	-0.02%	-0.02%	-0.02%	-0.02%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	0.00%	0.00%
Existing Resources	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143
BPA Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89
MF Res MCS	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
New Manuf Housing	44	43	42	40	38	37	34	32	29	27	24	21	19	16	13
Refrigerators	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
Freezers	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Water Heat	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203
Irrigation	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Industrial	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212
New Commercial	365	365	365	365	365	365	365	365	365	365	365	365	365	365	365
Comm Lost Opps Exist	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72
MF Res Weath	27	27	27	27	27	27	26	24	22	20	18	16	14	12	10
SF Res Weath	40	40	40	40	40	40	39	36	32	29	25	21	18	14	11
Comm Discret Ex	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Subtotal	1258	1257	1256	1254	1252	1251	1246	1239	1230	1223	1214	1205	1198	1189	1181
GENERATING RESOURCES:															
Small Hydro 1 West	29	29	29	29	29	29	29	29	0	0	0	0	0	0	0
Small Hydro 1 East	43	43	43	43	43	43	43	43	10	0	0	0	0	0	0
Small Hydro 2 West	32	32	32	32	32	32	32	32	7	0	0	0	0	0	0
Small Hydro 2 East	47	47	47	47	47	47	47	47	22	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	37	37	37	37	37	37	37	37	37	37	37	11	0	0	0
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	30	4	4	4
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1125	938	750	563	375	188	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	0	0	0	0
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	7	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	563	563	375	188	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	375	188	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	8331	8331	8687	9061	9435	9622	9811	10004	10310	10542	10736	11032	11083	11092	11100
Subtotal	11071	11071	11051	11051	11049	11049	11050	11056	11062	11067	11074	11080	11087	11096	11104
Total Firm Resources	16472	16471	16450	16448	16444	16443	16439	16438	16435	16433	16431	16428	16428	16428	16428
Load/Resource Balance	15	17	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	4284	4434	4588	4758	4922	5085	5249	5414	5579	5744	5895	6045	6196	6346	6496
Observed Rate		3.49%	3.48%	3.70%	3.44%	3.32%	3.23%	3.13%	3.05%	2.97%	2.62%	2.55%	2.49%	2.42%	2.37%
Existing Resources	2380	2378	2407	2436	2431	2431	2446	2461	2455	2449	2469	2490	2489	2489	2512
BPA Requirements	1905	2055	2181	2322	2491	2654	2803	2953	3123	3295	3425	3556	3706	3857	3984
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	4284	4434	4588	4758	4922	5085	5249	5414	5579	5744	5895	6045	6196	6346	6496
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	6672	6847	7022	7195	7368	7361	7353	7346	7340	7333	7328	7322	7317	7313	7308
Observed Rate	2.71%	2.63%	2.55%	2.47%	2.40%	-0.11%	-0.10%	-0.09%	-0.09%	-0.08%	-0.08%	-0.07%	-0.07%	-0.06%	-0.06%
Existing Resources	2534	2534	2534	2534	2520	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4138	4313	4487	4661	4849	5000	4992	4985	4979	4973	4967	4962	4957	4952	4948
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	6672	6847	7022	7195	7368	7361	7353	7346	7340	7334	7328	7322	7317	7313	7308
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: conservation alternative

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	7305	7303	7300	7298	7296	7294	7292	7290	7289	7287	7286	7285	7286	7287	7288
Observed Rate	-0.04%	-0.04%	-0.03%	-0.03%	-0.03%	-0.03%	-0.03%	-0.02%	-0.02%	-0.02%	-0.02%	-0.01%	0.01%	0.01%	0.01%
Existing Resources	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4944	4942	4940	4937	4935	4933	4931	4930	4928	4926	4925	4924	4925	4926	4927
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	7305	7303	7300	7298	7296	7294	7292	7290	7289	7287	7286	7285	7286	7287	7288
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: conservation alternative

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	7288	7289	7290	7291	7291	7292	7293	7293	7294	7294	7295	7295	7295	7295	7295
Observed Rate	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.00%	-0.01%	-0.01%
Existing Resources	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4928	4929	4929	4930	4931	4931	4932	4933	4933	4934	4934	4935	4935	4934	4934
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	7288	7289	7290	7291	7291	7292	7293	7293	7294	7294	7295	7295	7295	7295	7295
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: conservation alternative

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	17723	18317	18922	19551	20193	20811	21431	22050	22669	23288	23899	24509	25120	25730	26341
Observed Rate		3.35%	3.30%	3.32%	3.28%	3.07%	2.97%	2.89%	2.81%	2.73%	2.62%	2.56%	2.49%	2.43%	2.37%
DSI Firm Load	2261	2268	2278	2288	2298	2308	2319	2329	2339	2350	2360	2371	2381	2392	2403
Existing Resources	20443	20605	20585	20564	19997	19429	19495	19560	19475	19389	19538	19687	19458	19229	19225
CONSERVATION PROGRAMS:															
SF Res MCS	0	8	17	26	36	44	54	65	76	87	99	111	125	137	149
MF Res MCS	0	2	3	6	7	9	11	13	15	17	19	21	24	25	27
Water Heat	0	0	0	0	9	29	50	70	91	113	136	161	185	209	234
Refrigerators	0	0	0	0	3	9	14	20	26	32	39	46	54	61	69
Freezers	0	0	0	0	1	2	4	5	7	9	10	13	15	17	19
New Manuf Housing	0	2	4	7	10	13	17	23	27	32	38	42	47	53	58
Irrigation	0	0	2	3	5	9	12	16	20	23	27	30	33	35	36
Industrial	0	4	16	36	58	81	104	128	151	174	196	219	243	266	289
New Commercial	0	18	51	83	114	142	171	201	232	264	294	322	352	382	413
Comm Discret Ex	0	4	15	30	45	60	75	90	105	120	135	150	161	162	162
Comm Lost Opps Exist	0	4	12	19	27	34	41	48	56	64	71	79	86	94	102
SF Res Weath	0	3	10	20	29	38	47	56	66	75	84	93	101	102	102
MF Res Weath	0	1	4	7	9	12	15	17	20	23	25	28	31	33	36
Subtotal	0	46	134	237	353	482	615	752	892	1033	1173	1315	1457	1576	1696
GENERATING RESOURCES:															
Hydro Eff Imp	0	0	20	40	60	80	80	100	100	100	100	100	100	100	100
Trans Eff Imp	0	0	11	22	23	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 East	0	0	0	48	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	0	0	0	36	61	61	61	61	61	61	61	61	61	61	61
Small Hydro 3 East	0	0	0	0	0	0	26	52	52	52	52	52	56	67	67
Small Hydro 4 East	0	0	0	0	0	0	25	32	32	32	32	32	32	32	32
Small Hydro 1 West	0	0	0	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	0	0	0	36	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	0	0	0	0	0	0	26	48	48	48	48	48	48	48	48
Small Hydro 4 West	0	0	0	0	0	0	25	25	25	25	25	25	25	25	25
Combined Cycle BPA	0	0	0	0	349	349	697	697	697	697	697	697	697	697	697
Combined Cycle Mix	0	0	0	0	698	698	698	698	698	698	698	698	698	698	698
Cogen1e	0	0	40	40	40	40	40	40	40	40	40	40	40	40	40
Cogen2e	0	0	0	180	180	180	180	240	240	240	240	240	240	240	240
Cogen3e	0	0	0	0	140	360	360	360	360	360	360	360	360	370	370
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1w	0	0	40	40	40	40	40	40	40	40	40	40	40	40	40
Cogen2w	0	0	240	240	240	240	240	240	240	240	240	240	240	240	240
Cogen3w	0	0	0	0	360	360	360	380	480	480	480	480	480	480	480
Cogen4w	0	0	0	0	0	620	780	780	780	780	780	780	1000	1330	1330
Coal1 (E. Mont)	0	0	0	0	0	0	0	188	375	563	750	938	1125	1313	1313
Coal2 (E. Wash)	0	0	0	0	0	0	0	188	375	563	563	563	563	563	563
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	188
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNP 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	806
WNP 1	0	0	0	0	0	0	0	0	0	813	813	813	813	813	813
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	0	0	0	0	0	0	0	0	45	45	45	45	90	135	157
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	351	721	2330	3201	3811	4342	4861	6050	6237	6425	6881	7465	8481
Total Firm Resources	20443	20652	21069	21520	22680	23113	23922	24654	25227	26471	26949	27429	27795	28271	29399
Load/Resource Balance	459	67	-130	-318	189	-7	173	275	219	833	691	549	293	148	655

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	27069	27796	28524	29251	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979
Observed Rate	2.76%	2.69%	2.62%	2.55%	2.49%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DSI Firm Load	2413	2424	2435	2446	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	19221	19312	19402	19478	19423	17845	17453	17054	16917	16631	16119	15204	15079	14861	13677
CONSERVATION PROGRAMS:															
SF Res MCS	162	174	188	201	215	215	215	215	215	215	215	215	215	215	215
MF Res MCS	30	31	33	36	37	37	37	37	37	37	37	37	37	37	37
Water Heat	257	282	309	336	362	362	362	362	362	362	362	362	362	362	362
Refrigerators	76	83	90	100	110	110	110	110	110	110	110	110	110	110	110
Freezers	20	22	24	27	30	30	30	30	30	30	30	30	30	30	30
New Manuf Housing	62	68	72	77	83	83	83	83	83	83	83	83	83	83	83
Irrigation	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Industrial	311	334	357	381	400	400	400	400	400	400	400	400	400	400	400
New Commercial	444	476	510	544	579	579	579	579	579	579	579	579	579	579	579
Comm Discret Ex	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
Comm Lost Opps Exist	109	116	123	131	139	139	139	139	139	139	139	139	139	139	139
SF Res Weath	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102
MF Res Weath	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Subtotal	1807	1922	2042	2169	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291
GENERATING RESOURCES:															
Hydro Eff Imp	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Trans Eff Imp	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 East	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61
Small Hydro 3 East	67	67	75	75	75	75	75	75	75	75	75	75	75	75	75
Small Hydro 4 East	32	32	36	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 1 West	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
Small Hydro 4 West	25	25	32	32	32	32	32	32	32	32	32	32	32	32	32
Combined Cycle BPA	697	697	697	697	697	697	697	697	697	697	697	697	697	697	697
Combined Cycle Mix	698	698	698	698	698	698	698	698	698	698	698	698	698	698	698
Cogen1e	40	40	40	40	40	40	40	0	0	0	0	0	0	0	0
Cogen2e	240	240	240	240	240	240	240	240	60	60	60	60	0	0	0
Cogen3e	370	370	370	480	480	480	480	480	480	340	120	120	120	120	120
Cogen4e	0	80	450	670	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Cogen1w	40	40	40	40	40	40	40	0	0	0	0	0	0	0	0
Cogen2w	240	240	240	240	240	240	240	0	0	0	0	0	0	0	0
Cogen3w	480	480	480	480	480	480	480	480	480	120	120	120	100	0	0
Cogen4w	1400	1500	1500	1660	1960	1960	1960	1960	1960	1960	1340	1180	1180	1180	1180
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal3 (E. Oregon)	375	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	1578	1848	2221	2232	3044	4308	5115	5552	6409	7803
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	202	248	293	338	383	383	383	383	383	383	383	383	383	383	383
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	8783	9197	9631	10173	10848	12426	12696	12749	12580	12892	13316	13963	14320	15077	16471
Total Firm Resources	29811	30431	31074	31815	32559	32559	32436	32090	31784	31810	31722	31454	31686	32226	32435
Load/Resource Balance	329	210	115	118	123	123	1	-346	-652	-626	-714	-982	-750	-210	-1

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979
Observed Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231
CONSERVATION PROGRAMS:															
SF Res MCS	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215
MF Res MCS	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Water Heat	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362
Refrigerators	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
Freezers	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
New Manuf Housing	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83
Irrigation	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Industrial	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
New Commercial	579	579	579	579	579	579	579	579	579	579	579	579	579	579	579
Comm Discret Ex	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
Comm Lost Opps Exist	139	139	139	139	139	139	139	139	139	139	139	139	139	139	139
SF Res Weath	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102
MF Res Weath	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Subtotal	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291
GENERATING RESOURCES:															
Hydro Eff Imp	100	100	80	60	40	20	20	0	0	0	0	0	0	0	0
Trans Eff Imp	34	34	23	12	11	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 East	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61
Small Hydro 3 East	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
Small Hydro 4 East	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 1 West	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
Small Hydro 4 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Combined Cycle BPA	697	697	697	697	349	349	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	698	698	698	698	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	120	120	120	110	110	110	110	110	0	0	0	0	0	0	0
Cogen4e	1000	1000	1000	1000	1000	1000	920	550	330	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	1180	1180	960	630	630	560	460	460	300	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	8250	8250	8500	8872	9939	10039	10568	10958	11493	12123	12123	12125	12173	12222	12248
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	383	383	383	383	383	383	383	383	338	338	338	338	293	248	225
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	16918	16918	16917	16918	16918	16917	16917	16917	16917	16917	16917	16919	16922	16926	16929
Total Firm Resources	32436	32436	32435	32436	32437	32436	32436	32436	32436	32436	32436	32438	32441	32445	32448
Load/Resource Balance	0	0	-1	0	1	0	0	0	0	0	0	2	5	9	13

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979
Observed Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231
CONSERVATION PROGRAMS:															
SF Res MCS	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215
MF Res MCS	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Water Heat	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362
Refrigerators	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
Freezers	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
New Manuf Housing	83	81	79	76	72	69	65	60	55	51	45	40	36	30	25
Irrigation	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Industrial	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
New Commercial	579	579	579	579	579	579	579	579	579	579	579	579	579	579	579
Comm Discret Ex	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
Comm Lost Opps Exist	139	139	139	139	139	139	139	139	139	139	139	139	139	139	139
SF Res Weath	102	102	102	102	102	102	99	92	82	74	64	54	46	36	28
MF Res Weath	36	36	36	36	36	36	35	32	29	27	24	21	19	16	13
Subtotal	2291	2289	2287	2284	2280	2277	2269	2254	2236	2222	2203	2185	2171	2152	2136
GENERATING RESOURCES:															
Hydro Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trans Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 East	57	57	57	57	57	57	57	57	10	0	0	0	0	0	0
Small Hydro 2 East	61	61	61	61	61	61	61	61	26	0	0	0	0	0	0
Small Hydro 3 East	75	75	75	75	75	75	75	75	75	75	75	49	23	23	23
Small Hydro 4 East	43	43	43	43	43	43	43	43	43	43	43	18	11	11	11
Small Hydro 1 West	39	39	39	39	39	39	39	39	0	0	0	0	0	0	0
Small Hydro 2 West	43	43	43	43	43	43	43	43	7	0	0	0	0	0	0
Small Hydro 3 West	48	48	48	48	48	48	48	48	48	48	48	22	0	0	0
Small Hydro 4 West	32	32	32	32	32	32	32	32	32	32	32	7	7	7	7
Combined Cycle BPA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1125	938	750	563	375	188	0	0	0	0	0	0	0
Coal2 (E. Wash)	563	563	375	188	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	375	188	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	12296	12345	12750	13173	14408	14599	14795	14998	15360	16412	16617	16924	16995	17013	17030
WNP 3	806	806	806	806	806	806	806	806	806	0	0	0	0	0	0
WNP 1	813	813	813	813	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	180	135	90	45	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	16932	16936	16920	16924	16925	16929	16937	16953	16970	16985	17003	17020	17036	17054	17071
Total Firm Resources	32451	32454	32436	32436	32436	32436	32436	32437	32436	32436	32436	32437	32435	32436	32436
Load/Resource Balance	16	18	0	0	0	0	0	1	0	0	0	1	-1	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	3888	4002	4120	4235	4355	4473	4591	4709	4826	4944	5058	5173	5286	5400	5514
Observed Rate		2.95%	2.94%	2.78%	2.84%	2.71%	2.63%	2.56%	2.50%	2.43%	2.32%	2.26%	2.20%	2.15%	2.10%
DSI Firm Load	2261	2268	2278	2288	2298	2308	2319	2329	2339	2350	2360	2371	2381	2392	2403
Existing Resources	8379	8546	8382	8219	8213	8208	8255	8302	8310	8319	8417	8515	8521	8527	8408
BPA Requirements	-1952	-2132	-2308	-2322	-2491	-2654	-2803	-2953	-3123	-3295	-3425	-3556	-3706	-3857	-3984
CONSERVATION PROGRAMS:															
SF Res MCS	0	5	11	16	22	27	33	40	46	53	60	67	75	82	89
MF Res MCS	0	1	1	2	2	3	4	4	5	6	6	7	8	8	9
New Manuf Housing	0	1	2	3	5	6	8	11	13	15	18	20	22	25	27
Water Heat	0	0	0	0	4	13	22	31	40	50	60	71	81	92	103
High Refrigerators	0	0	0	0	3	9	15	21	27	33	40	48	57	64	72
High Freezers	0	0	0	0	1	4	6	8	11	13	16	19	22	25	28
Other Appliances	0	0	0	0	0	15	32	49	67	84	102	120	139	157	176
Irrigation	0	0	1	1	2	4	5	6	8	9	11	12	13	14	14
High Industrial	0	2	9	21	35	49	63	78	92	106	120	134	148	162	176
High New Commercial	0	18	53	88	123	158	193	228	264	299	334	369	404	439	475
Comm Lost Opps Exist	0	2	6	9	13	16	20	23	27	31	34	38	41	45	49
MF Res Weath	0	0	1	2	2	3	4	4	5	6	6	7	8	8	9
SF Res Weath	0	2	6	12	18	23	29	34	40	46	51	57	62	62	62
Comm Discret Ex	0	2	8	16	24	32	40	48	56	64	72	79	85	86	86
Subtotal	0	33	98	170	254	362	474	585	701	815	930	1048	1165	1269	1375
GENERATING RESOURCES:															
Hydro Eff Imp	0	0	20	40	60	80	100	100	100	100	100	100	100	100	100
Trans Eff Imp	0	0	11	22	33	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 West	0	0	0	10	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	0	0	0	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	0	0	0	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	0	0	0	11	14	14	14	14	14	14	14	14	14	14	14
Cogen1w	0	0	10	10	10	10	10	10	10	10	10	10	10	10	10
Combined Cycle Mix	0	0	0	0	349	349	349	349	349	349	349	349	349	349	349
Combined Cycle BPA	0	0	0	0	0	349	349	349	697	697	697	697	697	697	697
Cogen1e	0	0	10	10	10	10	10	10	10	10	10	10	10	10	10
Cogen2w	0	0	60	60	60	60	60	60	60	60	60	60	60	60	60
Small Hydro 3 West	0	0	0	0	0	0	11	11	11	11	11	11	11	11	11
WNP 1	0	0	0	0	0	0	0	0	0	0	0	0	0	813	813
WNP 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 East	0	0	0	0	0	0	0	0	0	0	0	11	19	19	19
Cogen2e	0	0	0	50	60	60	60	60	60	60	60	60	60	60	60
Cogen3w	0	0	0	0	0	0	40	120	120	120	120	120	120	120	120
Geothermal2	0	0	0	0	0	0	0	0	0	0	45	90	135	135	135
Small Hydro 4 West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 East	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	120	120	120
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	111	238	631	1001	1072	1152	1500	1500	1545	1601	1774	2587	2587
Total Firm Resources	6428	6446	6283	6305	6608	6916	6997	7086	7388	7339	7466	7608	7753	8526	8385
Load/Resource Balance	278	176	-115	-218	-45	135	86	48	220	44	48	66	85	735	468

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	5642	5771	5898	6026	6153	6158	6164	6169	6173	6178	6182	6185	6189	6192	6195
Observed Rate	2.34%	2.27%	2.22%	2.16%	2.11%	0.09%	0.09%	0.08%	0.07%	0.07%	0.07%	0.06%	0.06%	0.05%	0.05%
DSI Firm Load	2413	2424	2435	2446	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	8289	8394	8500	8431	8362	8291	8220	8150	8079	8009	7920	7650	7579	7449	6727
BPA Requirements	-4138	-4313	-4487	-4661	-4849	-5000	-4992	-4985	-4979	-4973	-4967	-4962	-4957	-4952	-4948
CONSERVATION PROGRAMS:															
SF Res MCS	96	103	111	118	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	10	10	11	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	29	32	34	36	39	39	39	39	39	39	39	39	39	39	39
Water Heat	113	124	136	148	159	159	159	159	159	159	159	159	159	159	159
High Refrigerators	79	86	94	104	115	115	115	115	115	115	115	115	115	115	115
High Freezers	31	34	37	41	45	45	45	45	45	45	45	45	45	45	45
Other Appliances	194	213	231	250	270	270	270	270	270	270	270	270	270	270	270
Irrigation	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
High Industrial	190	204	219	227	227	227	227	227	227	227	227	227	227	227	227
High New Commercial	510	545	580	615	650	650	650	650	650	650	650	650	650	650	650
Comm Lost Opps Exist	52	56	59	63	67	67	67	67	67	67	67	67	67	67	67
MF Res Weath	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
SF Res Weath	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
Comm Discret Ex	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal	1475	1578	1683	1785	1881	1881	1881	1881	1881	1881	1881	1881	1881	1881	1881
GENERATING RESOURCES:															
Hydro Eff Imp	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Trans Eff Imp	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 West	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Cogen1w	10	10	10	10	10	10	10	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349
Combined Cycle BPA	697	697	697	697	697	697	697	697	697	697	697	697	697	697	697
Cogen1e	10	10	10	10	10	10	10	0	0	0	0	0	0	0	0
Cogen2w	60	60	60	60	60	60	60	0	0	0	0	0	0	0	0
Small Hydro 3 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
WNP 3	0	0	0	806	806	806	806	806	806	806	806	806	806	806	806
Small Hydro 3 East	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Cogen2e	60	60	60	60	60	60	60	60	10	0	0	0	0	0	0
Cogen3w	120	120	120	120	120	120	120	120	120	120	120	80	0	0	0
Geothermal2	180	225	270	270	270	270	270	270	270	270	270	270	270	270	270
Small Hydro 4 West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 East	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
Cogen4w	0	0	20	20	20	20	20	20	20	20	20	20	20	20	20
Coal1 (E. Mont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	106	106	106	237	545	854	983	1704
Subtotal	2632	2677	2742	3548	3548	3548	3548	3574	3524	3514	3645	3913	4142	4271	4992
Total Firm Resources	8258	8336	8437	9103	8942	8720	8657	8619	8505	8431	8479	8482	8645	8649	8652
Load/Resource Balance	203	142	103	630	333	105	37	-6	-125	-203	-160	-160	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	6199	6202	6205	6208	6211	6214	6216	6218	6220	6222	6224	6226	6229	6231	6234
Observed Rate	0.05%	0.05%	0.05%	0.05%	0.04%	0.04%	0.04%	0.04%	0.03%	0.03%	0.03%	0.03%	0.04%	0.04%	0.04%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727
BPA Requirements	-4944	-4942	-4940	-4937	-4935	-4933	-4931	-4930	-4928	-4926	-4925	-4924	-4925	-4926	-4927
CONSERVATION PROGRAMS:															
SF Res MCS	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Water Heat	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159
High Refrigerators	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
High Freezers	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Other Appliances	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270
Irrigation	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
High Industrial	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227
High New Commercial	650	650	650	650	650	650	650	650	650	650	650	650	650	650	650
Comm Lost Opps Exist	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67
MF Res Weath	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
SF Res Weath	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
Comm Discret Ex	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal	1881	1881	1881	1881	1881	1881	1881	1881	1881	1881	1881	1881	1881	1881	1881
GENERATING RESOURCES:															
Hydro Eff Imp	100	100	80	60	40	20	0	0	0	0	0	0	0	0	0
Trans Eff Imp	34	34	23	12	1	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 West	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle BPA	697	697	697	697	697	349	349	349	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
Small Hydro 3 East	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	270	270	270	270	270	270	270	270	270	270	225	180	135	135	135
Small Hydro 4 West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 East	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	120	120	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	20	20	20	20	20	20	20	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	1704	1705	1857	1888	2268	2639	2659	2680	3029	3029	3075	3121	3170	3173	3177
Subtotal	4992	4993	4994	4994	4994	4996	4996	4997	4997	4997	4998	4999	5003	5006	5010
Total Firm Resources	8656	8659	8662	8665	8667	8671	8673	8675	8677	8679	8681	8683	8686	8688	8691
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	6236	6239	6241	6243	6245	6247	6248	6250	6252	6253	6255	6256	6257	6257	6258
Observed Rate	0.04%	0.04%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.02%	0.02%	0.01%	0.01%	0.01%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727
BPA Requirements	-4928	-4929	-4929	-4930	-4931	-4931	-4932	-4933	-4933	-4934	-4934	-4935	-4935	-4934	-4934
CONSERVATION PROGRAMS:															
SF Res MCS	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	39	38	37	36	34	32	31	28	26	24	21	19	17	14	12
Water Heat	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159
High Refrigerators	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
High Freezers	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Other Appliances	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270
Irrigation	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
High Industrial	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227
High New Commercial	650	650	650	650	650	650	650	650	650	650	650	650	650	650	650
Comm Lost Opps Exist	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67
MF Res Weath	9	9	9	9	9	9	9	8	7	7	6	5	5	4	3
SF Res Weath	62	62	62	62	62	62	60	56	50	45	39	33	28	22	17
Comm Discret Ex	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal	1881	1880	1879	1878	1876	1874	1871	1863	1854	1847	1837	1828	1821	1811	1803
GENERATING RESOURCES:															
Hydro Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trans Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 West	10	10	10	10	10	10	10	10	0	0	0	0	0	0	0
Small Hydro 1 East	14	14	14	14	14	14	14	14	0	0	0	0	0	0	0
Small Hydro 2 West	11	11	11	11	11	11	11	11	0	0	0	0	0	0	0
Small Hydro 2 East	14	14	14	14	14	14	14	14	4	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle BPA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	11	11	11	11	11	11	11	11	11	11	11	0	0	0	0
WNP 1	813	813	813	813	813	813	813	813	0	0	0	0	0	0	0
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	0	0
Small Hydro 3 East	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	90	45	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 East	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	3225	3274	3323	3327	3331	3335	3341	3351	4220	4234	4245	4267	4276	5091	5100
Subtotal	5013	5017	5021	5025	5029	5033	5039	5049	5060	5070	5081	5092	5101	5110	5119
Total Firm Resources	8693	8695	8698	8700	8701	8703	8705	8706	8708	8710	8711	8712	8714	8714	8715
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	9551	9881	10214	10558	10916	11253	11590	11927	12264	12600	12946	13291	13638	13984	14331
Observed Rate		3.45%	3.37%	3.37%	3.39%	3.09%	3.00%	2.91%	2.82%	2.74%	2.74%	2.67%	2.60%	2.54%	2.48%
Existing Resources	9685	9681	9795	9910	9353	8791	8795	8798	8710	8621	8652	8683	8448	8214	8306
BPA Requirements	47	77	127	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	0	3	6	10	14	17	21	25	30	34	39	44	50	55	60
MF Res MCS	0	1	2	4	5	6	7	9	10	11	13	14	16	17	18
New Manuf Housing	0	1	2	4	5	7	9	12	14	17	20	22	25	28	31
Refrigerators	0	0	0	0	2	5	8	12	15	19	23	27	32	36	41
Freezers	0	0	0	0	1	1	2	3	4	5	6	8	9	10	11
Water Heat	0	0	0	0	5	16	28	39	51	63	76	90	104	117	131
Irrigation	0	0	1	2	3	5	7	10	12	14	16	18	20	21	22
Industrial	0	2	8	19	31	43	55	68	80	92	104	116	129	141	153
New Commercial	0	11	32	52	72	89	108	127	146	166	185	203	222	241	260
Comm Lost Opps Exist	0	2	6	10	14	18	21	25	29	33	37	41	45	49	53
MF Res Weath	0	1	3	5	7	9	11	13	15	17	19	21	23	25	27
SF Res Weath	0	1	4	8	11	15	18	22	26	29	33	36	39	40	40
Comm Discret Ex	0	2	7	14	21	28	35	42	49	56	63	71	76	76	76
Subtotal	0	24	71	128	191	259	330	407	481	556	634	711	790	856	923
GENERATING RESOURCES:															
Small Hydro 1 West	0	0	0	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	0	0	0	34	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	0	0	0	25	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	0	0	0	25	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	0	0	30	30	30	30	30	30	30	30	30	30	30	30	30
Combined Cycle Mix	0	0	0	0	349	349	349	349	349	349	349	349	349	349	349
Cogen1e	0	0	30	30	30	30	30	30	30	30	30	30	30	30	30
Cogen2w	0	0	180	180	180	180	180	180	180	180	180	180	180	180	180
Small Hydro 3 West	0	0	0	0	0	0	26	37	37	37	37	37	37	37	37
Small Hydro 3 East	0	0	0	0	0	0	26	52	52	52	52	52	56	56	56
Cogen2e	0	0	0	180	180	180	180	180	180	180	180	180	180	180	180
Coal1 (E. Mont)	0	0	0	0	0	0	0	188	375	563	750	938	1125	1313	1313
Cogen3w	0	0	0	0	360	360	360	360	360	360	360	360	360	360	360
Small Hydro 4 West	0	0	0	0	0	0	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	0	0	0	0	0	0	25	32	32	32	32	32	32	32	32
Cogen3e	0	0	0	0	140	360	360	360	360	360	360	360	360	360	360
Coal2 (E. Wash)	0	0	0	0	0	0	0	188	375	563	563	563	563	563	563
Cogen4w	0	0	0	0	0	620	780	780	780	780	780	780	1000	1330	1330
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	188
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	240	533	1420	2260	2522	2942	3316	3692	3879	4067	4478	4996	5184
Total Firm Resources	9732	9782	10233	10571	10964	11310	11647	12147	12507	12869	13165	13461	13716	14066	14413
Load/Resource Balance	181	-98	21	11	47	58	59	218	243	271	221	171	77	81	79

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	14754	15178	15604	16030	16458	16460	16462	16464	16466	16468	16470	16471	16473	16474	16475
Observed Rate	2.95%	2.87%	2.80%	2.73%	2.67%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
Existing Resources	8398	8383	8368	8513	8542	7194	6872	6543	6477	6261	5838	5194	5139	5051	4589
BPA Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	66	71	77	83	89	89	89	89	89	89	89	89	89	89	89
MF Res MCS	20	21	22	24	25	25	25	25	25	25	25	25	25	25	25
New Manuf Housing	33	36	38	41	44	44	44	44	44	44	44	44	44	44	44
Refrigerators	45	49	53	59	65	65	65	65	65	65	65	65	65	65	65
Freezers	12	13	14	16	18	18	18	18	18	18	18	18	18	18	18
Water Heat	144	158	173	188	203	203	203	203	203	203	203	203	203	203	203
Irrigation	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Industrial	165	177	189	202	212	212	212	212	212	212	212	212	212	212	212
New Commercial	280	300	321	343	365	365	365	365	365	365	365	365	365	365	365
Comm Lost Opps Exist	57	60	64	68	72	72	72	72	72	72	72	72	72	72	72
MF Res Weath	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
SF Res Weath	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Comm Discret Ex	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Subtotal	987	1050	1116	1189	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258
GENERATING RESOURCES:															
Small Hydro 1 West	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	30	30	30	30	30	30	30	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349
Cogen1e	30	30	30	30	30	30	30	0	0	0	0	0	0	0	0
Cogen2w	180	180	180	180	180	180	180	0	0	0	0	0	0	0	0
Small Hydro 3 West	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56
Cogen2e	180	180	180	180	180	180	180	180	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Cogen3w	360	360	360	360	360	360	360	360	360	0	0	0	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Cogen3e	360	360	360	360	360	360	360	360	360	220	0	0	0	0	0
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4w	1400	1500	1500	1500	1500	1500	1500	1500	1500	1500	880	720	720	720	720
Coal3 (E. Oregon)	375	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4e	0	80	450	670	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	1352	1607	1831	1831	2643	3907	4714	4980	5279	5822
Subtotal	5441	5809	6179	6399	6729	8081	8336	8320	8140	8452	8876	9523	9789	10088	10631
Total Firm Resources	14826	15242	15663	16101	16529	16533	16466	16121	15875	15971	15972	15975	16186	16397	16478
Load/Resource Balance	69	63	60	67	68	69	0	-346	-595	-500	-500	-500	-290	-80	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	16475	16474	16474	16473	16472	16472	16471	16471	16470	16470	16469	16468	16464	16461	16457
Observed Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.01%	-0.02%	-0.02%	-0.02%
Existing Resources	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143
BPA Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89
MF Res MCS	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
New Manuf Housing	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44
Refrigerators	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
Freezers	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Water Heat	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203
Irrigation	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Industrial	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212
New Commercial	365	365	365	365	365	365	365	365	365	365	365	365	365	365	365
Comm Lost Opps Exist	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72
MF Res Weath	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
SF Res Weath	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Comm Discret Ex	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Subtotal	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258
GENERATING RESOURCES:															
Small Hydro 1 West	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4w	720	720	500	170	170	100	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4e	1000	1000	1000	1000	1000	1000	920	550	330	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	6268	6268	6486	6816	7164	7233	7413	7782	8002	8331	8331	8331	8331	8331	8331
Subtotal	11077	11077	11075	11075	11074	11073	11073	11072	11072	11071	11071	11071	11071	11071	11071
Total Firm Resources	16478	16478	16476	16476	16475	16474	16474	16473	16473	16472	16472	16472	16472	16472	16472
Load/Resource Balance	0	1	0	0	0	0	0	0	0	0	0	2	5	9	12

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Study Title: HIGH CONSERVATION ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	16454	16451	16448	16446	16443	16441	16438	16436	16434	16431	16429	16428	16427	16427	16427
Observed Rate	-0.02%	-0.02%	-0.02%	-0.02%	-0.02%	-0.02%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	0.00%	0.00%
Existing Resources	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143
BPA Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89
MF Res MCS	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
New Manuf Housing	44	43	42	40	38	37	34	32	29	27	24	21	19	16	13
Refrigerators	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
Freezers	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Water Heat	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203
Irrigation	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Industrial	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212
New Commercial	365	365	365	365	365	365	365	365	365	365	365	365	365	365	365
Comm Lost Opps Exist	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72
MF Res Weath	27	27	27	27	27	27	26	24	22	20	18	16	14	12	10
SF Res Weath	40	40	40	40	40	40	39	36	32	29	25	21	18	14	11
Comm Discret Ex	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Subtotal	1258	1257	1256	1254	1252	1251	1246	1239	1230	1223	1214	1205	1198	1189	1181
GENERATING RESOURCES:															
Small Hydro 1 West	29	29	29	29	29	29	29	29	0	0	0	0	0	0	0
Small Hydro 1 East	43	43	43	43	43	43	43	43	10	0	0	0	0	0	0
Small Hydro 2 West	32	32	32	32	32	32	32	32	7	0	0	0	0	0	0
Small Hydro 2 East	47	47	47	47	47	47	47	47	22	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	37	37	37	37	37	37	37	37	37	37	37	11	0	0	0
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	30	4	4	4
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1125	938	750	563	375	188	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	0	0	0	0
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	7	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	563	563	375	188	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	375	188	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	8331	8331	8687	9061	9435	9622	9811	10004	10310	10542	10736	11032	11083	11092	11100
Subtotal	11071	11071	11051	11051	11049	11049	11050	11056	11062	11067	11074	11080	11087	11096	11104
Total Firm Resources	16472	16471	16450	16448	16444	16443	16439	16438	16435	16433	16431	16428	16428	16428	16428
Load/Resource Balance	15	17	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: HIGH CONSERVATION ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	4284	4434	4588	4758	4922	5085	5249	5414	5579	5744	5895	6045	6196	6346	6496
Observed Rate		3.49%	3.48%	3.70%	3.44%	3.32%	3.23%	3.13%	3.05%	2.97%	2.62%	2.55%	2.49%	2.42%	2.37%
Existing Resources	2380	2378	2407	2436	2431	2431	2446	2461	2455	2449	2469	2490	2489	2489	2512
BPA Requirements	1905	2055	2181	2322	2491	2654	2803	2953	3123	3295	3425	3556	3706	3857	3984
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	4284	4434	4588	4758	4922	5085	5249	5414	5579	5744	5895	6045	6196	6346	6496
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: HIGH CONSERVATION ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	6672	6847	7022	7195	7368	7361	7353	7346	7340	7333	7328	7322	7317	7313	7308
Observed Rate	2.71%	2.63%	2.55%	2.47%	2.40%	-0.11%	-0.10%	-0.09%	-0.09%	-0.08%	-0.08%	-0.07%	-0.07%	-0.06%	-0.06%
Existing Resources	2534	2534	2534	2534	2520	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4138	4313	4487	4661	4849	5000	4992	4985	4979	4973	4967	4962	4957	4952	4948
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	6672	6847	7022	7195	7368	7361	7353	7346	7340	7334	7328	7322	7317	7313	7308
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: HIGH CONSERVATION ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	7305	7303	7300	7298	7296	7294	7292	7290	7289	7287	7286	7285	7286	7287	7288
Observed Rate	-0.04%	-0.04%	-0.03%	-0.03%	-0.03%	-0.03%	-0.03%	-0.02%	-0.02%	-0.02%	-0.02%	-0.01%	0.01%	0.01%	0.01%
Existing Resources	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4944	4942	4940	4937	4935	4933	4931	4930	4928	4926	4925	4924	4925	4926	4927
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	7305	7303	7300	7298	7296	7294	7292	7290	7289	7287	7286	7285	7286	7287	7288
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: HIGH CONSERVATION ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	7288	7289	7290	7291	7291	7292	7293	7293	7294	7294	7295	7295	7295	7295	7295
Observed Rate	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.00%	-0.01%	-0.01%
Existing Resources	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4928	4929	4929	4930	4931	4931	4932	4933	4933	4934	4934	4935	4935	4934	4934
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	7288	7289	7290	7291	7291	7292	7293	7293	7294	7294	7295	7295	7295	7295	7295
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: HIGH CONSERVATION ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	17723	18317	18922	19551	20193	20811	21431	22050	22669	23288	23899	24509	25120	25730	26341
Observed Rate		3.35%	3.30%	3.32%	3.28%	3.07%	2.97%	2.89%	2.81%	2.73%	2.62%	2.56%	2.49%	2.43%	2.37%
DSI Firm Load	2261	2268	2278	2288	2298	2308	2319	2329	2339	2350	2360	2371	2381	2392	2403
Existing Resources	20443	20605	20585	20564	19997	19429	19495	19560	19475	19389	19538	19687	19458	19229	19225
CONSERVATION PROGRAMS:															
SF Res MCS	0	8	17	26	36	44	54	65	76	87	99	111	125	137	149
MF Res MCS	0	2	3	6	7	9	11	13	15	17	19	21	24	25	27
Water Heat	0	0	0	0	9	29	50	70	91	113	136	161	185	209	234
Refrigerators	0	0	0	0	2	5	8	12	15	19	23	27	32	36	41
High Refrigerators	0	0	0	0	3	9	15	21	27	33	40	48	57	64	72
Other Appliances	0	0	0	0	0	15	32	49	67	84	102	120	139	157	176
Freezers	0	0	0	0	1	1	2	3	4	5	6	8	9	10	11
High Freezers	0	0	0	0	1	4	6	8	11	13	16	19	22	25	28
New Manuf Housing	0	2	4	7	10	13	17	23	27	32	38	42	47	53	58
Irrigation	0	0	2	3	5	9	12	16	20	23	27	30	33	35	36
Industrial	0	2	8	19	31	43	55	68	80	92	104	116	129	141	153
High Industrial	0	2	9	21	35	49	63	78	92	106	120	134	148	162	176
New Commercial	0	11	32	52	72	89	108	127	146	166	185	203	222	241	260
High New Commercial	0	18	53	88	123	158	193	228	264	299	334	369	404	439	475
Comm Discret Ex	0	4	15	30	45	60	75	90	105	120	135	150	161	162	162
Comm Lost Opps Exist	0	4	12	19	27	34	41	48	56	64	71	79	86	94	102
SF Res Weath	0	3	10	20	29	38	47	56	66	75	84	93	101	102	102
MF Res Weath	0	1	4	7	9	12	15	17	20	23	25	28	31	33	36
Subtotal	0	57	169	298	445	621	804	992	1182	1371	1564	1759	1955	2125	2298
GENERATING RESOURCES:															
Hydro Eff Imp	0	0	20	40	60	80	100	100	100	100	100	100	100	100	100
Trans Eff Imp	0	0	11	22	33	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 East	0	0	0	48	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	0	0	0	36	61	61	61	61	61	61	61	61	61	61	61
Small Hydro 3 East	0	0	0	0	0	0	26	52	52	52	52	63	75	75	75
Small Hydro 4 East	0	0	0	0	0	0	25	32	32	32	32	32	32	32	32
Small Hydro 1 West	0	0	0	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	0	0	0	36	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	0	0	0	0	0	0	37	48	48	48	48	48	48	48	48
Small Hydro 4 West	0	0	0	0	0	0	25	25	25	25	25	25	25	25	25
Combined Cycle BPA	0	0	0	0	0	349	349	349	697	697	697	697	697	697	697
Combined Cycle Mix	0	0	0	0	698	698	698	698	698	698	698	698	698	698	698
Cogen1e	0	0	40	40	40	40	40	40	40	40	40	40	40	40	40
Cogen2e	0	0	0	230	240	240	240	240	240	240	240	240	240	240	240
Cogen3e	0	0	0	0	140	360	360	360	360	360	360	360	480	480	480
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1w	0	0	40	40	40	40	40	40	40	40	40	40	40	40	40
Cogen2w	0	0	240	240	240	240	240	240	240	240	240	240	240	240	240
Cogen3w	0	0	0	0	360	360	400	480	480	480	480	480	480	480	480
Cogen4w	0	0	0	0	0	620	780	780	780	780	780	780	1000	1330	1330
Coal1 (E. Mont)	0	0	0	0	0	0	0	188	375	563	750	938	1125	1313	1313
Coal2 (E. Wash)	0	0	0	0	0	0	0	188	375	563	563	563	563	563	563
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	188
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNP 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNP 1	0	0	0	0	0	0	0	0	0	0	0	0	0	813	813
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	0	0	0	0	0	0	0	0	0	0	45	90	135	135	135
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	351	771	2051	3261	3594	4094	4816	5192	5424	5668	6252	7583	7771
Total Firm Resources	20443	20663	21105	21632	22493	23313	23894	24645	25472	25952	26528	27117	27663	28938	29290
Load/Resource Balance	459	78	-94	-207	2	193	145	266	464	314	269	237	162	816	547

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	27069	27796	28524	29251	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979
Observed Rate	2.76%	2.69%	2.62%	2.55%	2.49%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DSI Firm Load	2413	2424	2435	2446	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	19221	19312	19402	19478	19423	17845	17453	17054	16917	16631	16119	15204	15079	14861	13677
CONSERVATION PROGRAMS:															
SF Res MCS	162	174	188	201	215	215	215	215	215	215	215	215	215	215	215
MF Res MCS	30	31	33	36	37	37	37	37	37	37	37	37	37	37	37
Water Heat	257	282	309	336	362	362	362	362	362	362	362	362	362	362	362
Refrigerators	45	49	53	59	65	65	65	65	65	65	65	65	65	65	65
High Refrigerators	79	86	94	104	115	115	115	115	115	115	115	115	115	115	115
Other Appliances	194	213	231	250	270	270	270	270	270	270	270	270	270	270	270
Freezers	12	13	14	16	18	18	18	18	18	18	18	18	18	18	18
High Freezers	31	34	37	41	45	45	45	45	45	45	45	45	45	45	45
New Manuf Housing	62	68	72	77	83	83	83	83	83	83	83	83	83	83	83
Irrigation	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Industrial	165	177	189	202	212	212	212	212	212	212	212	212	212	212	212
High Industrial	190	204	219	227	227	227	227	227	227	227	227	227	227	227	227
New Commercial	280	300	321	343	365	365	365	365	365	365	365	365	365	365	365
High New Commercial	510	545	580	615	650	650	650	650	650	650	650	650	650	650	650
Comm Discret Ex	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
Comm Lost Opps Exist	109	116	123	131	139	139	139	139	139	139	139	139	139	139	139
SF Res Weath	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102
MF Res Weath	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Subtotal	2462	2628	2799	2974	3139	3139	3139	3139	3139	3139	3139	3139	3139	3139	3139
GENERATING RESOURCES:															
Hydro Eff Imp	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Trans Eff Imp	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 East	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61
Small Hydro 3 East	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 1 West	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Combined Cycle BPA	697	697	697	697	697	697	697	697	697	697	697	697	697	697	697
Combined Cycle Mix	698	698	698	698	698	698	698	698	698	698	698	698	698	698	698
Cogen1e	40	40	40	40	40	40	40	0	0	0	0	0	0	0	0
Cogen2e	240	240	240	240	240	240	240	240	10	0	0	0	0	0	0
Cogen3e	480	480	480	480	480	480	480	480	480	340	120	120	120	120	120
Cogen4e	0	80	450	670	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Cogen1w	40	40	40	40	40	40	40	0	0	0	0	0	0	0	0
Cogen2w	240	240	240	240	240	240	240	0	0	0	0	0	0	0	0
Cogen3w	480	480	480	480	480	480	480	480	480	120	120	80	0	0	0
Cogen4w	1400	1500	1520	1520	1520	1520	1520	1520	1520	1520	900	740	740	740	740
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal3 (E. Oregon)	375	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	1352	1607	1937	1937	2749	4144	5259	5834	6262	7526
WNP 3	0	0	0	806	806	806	806	806	806	806	806	806	806	806	806
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	180	225	270	270	270	270	270	270	270	270	270	270	270	270	270
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	8073	8486	8921	9947	10277	11629	11884	11894	11664	11966	12521	13436	13931	14359	15623
Total Firm Resources	29754	30425	31122	32395	32836	32610	32473	32084	31717	31733	31776	31776	32146	32356	32436
Load/Resource Balance	272	205	162	697	400	174	37	-352	-719	-703	-660	-660	-290	-80	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979
Observed Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231
CONSERVATION PROGRAMS:															
SF Res MCS	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215
MF Res MCS	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Water Heat	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362
Refrigerators	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
High Refrigerators	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
Other Appliances	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270
Freezers	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
High Freezers	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
New Manuf Housing	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83
Irrigation	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Industrial	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212
High Industrial	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227
New Commercial	365	365	365	365	365	365	365	365	365	365	365	365	365	365	365
High New Commercial	650	650	650	650	650	650	650	650	650	650	650	650	650	650	650
Comm Discret Ex	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
Comm Lost Opps Exist	139	139	139	139	139	139	139	139	139	139	139	139	139	139	139
SF Res Weath	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102
MF Res Weath	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Subtotal	3139	3139	3139	3139	3139	3139	3139	3139	3139	3139	3139	3139	3139	3139	3139
GENERATING RESOURCES:															
Hydro Eff Imp	100	100	80	60	40	20	0	0	0	0	0	0	0	0	0
Trans Eff Imp	34	34	23	12	1	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 East	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61
Small Hydro 3 East	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 1 West	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Combined Cycle BPA	697	697	697	697	697	349	349	349	0	0	0	0	0	0	0
Combined Cycle Mix	698	698	698	698	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	120	120	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	1000	1000	1000	1000	1000	1000	920	550	330	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	740	740	520	190	190	120	20	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	7972	7973	8343	8704	9432	9872	10072	10462	11031	11360	11406	11452	11501	11504	11508
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	270	270	270	270	270	270	270	270	270	270	225	180	135	135	135
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	16069	16070	16069	16069	16068	16069	16069	16069	16069	16068	16069	16070	16074	16077	16081
Total Firm Resources	32436	32437	32436	32436	32436	32436	32436	32436	32437	32436	32437	32438	32442	32445	32449
Load/Resource Balance	0	1	0	0	0	0	0	0	1	0	1	2	6	9	13

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979
Observed Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231
CONSERVATION PROGRAMS:															
SF Res MCS	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215
MF Res MCS	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Water Heat	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362
Refrigerators	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
High Refrigerators	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
Other Appliances	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270
Freezers	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
High Freezers	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
New Manuf Housing	83	81	79	76	72	69	65	60	55	51	45	40	36	30	25
Irrigation	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Industrial	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212
High Industrial	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227
New Commercial	365	365	365	365	365	365	365	365	365	365	365	365	365	365	365
High New Commercial	650	650	650	650	650	650	650	650	650	650	650	650	650	650	650
Comm Discret Ex	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
Comm Lost Opps Exist	139	139	139	139	139	139	139	139	139	139	139	139	139	139	139
SF Res Weath	102	102	102	102	102	102	99	92	82	74	64	54	46	36	28
MF Res Weath	36	36	36	36	36	36	35	32	29	27	24	21	19	16	13
Subtotal	3139	3137	3135	3132	3128	3125	3117	3102	3084	3070	3051	3033	3019	3000	2984
GENERATING RESOURCES:															
Hydro Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trans Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 East	57	57	57	57	57	57	57	57	10	0	0	0	0	0	0
Small Hydro 2 East	61	61	61	61	61	61	61	61	26	0	0	0	0	0	0
Small Hydro 3 East	75	75	75	75	75	75	75	75	75	75	75	49	23	23	23
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	7	0	0	0
Small Hydro 1 West	39	39	39	39	39	39	39	39	0	0	0	0	0	0	0
Small Hydro 2 West	43	43	43	43	43	43	43	43	7	0	0	0	0	0	0
Small Hydro 3 West	48	48	48	48	48	48	48	48	48	48	48	11	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	0	0	0	0
Combined Cycle BPA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1125	938	750	563	375	188	0	0	0	0	0	0	0
Coal2 (E. Wash)	563	563	375	188	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	375	188	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	11556	11605	12010	12388	12766	12957	13152	13355	14530	14776	14981	15299	15359	16183	16200
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	0	0
WNP 1	813	813	813	813	813	813	813	813	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	90	45	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	16084	16088	16072	16076	16078	16082	16089	16105	16122	16137	16155	16172	16188	16206	16223
Total Firm Resources	32452	32454	32436	32436	32436	32436	32435	32436	32436	32436	32436	32437	32435	32436	32436
Load/Resource Balance	16	18	0	0	0	0	0	0	0	0	0	1	-1	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	3888	4002	4120	4235	4355	4473	4591	4709	4826	4944	5058	5173	5286	5400	5514
Observed Rate		2.95%	2.94%	2.78%	2.84%	2.71%	2.63%	2.56%	2.50%	2.43%	2.32%	2.26%	2.20%	2.15%	2.10%
DSI Firm Load	2261	2268	2278	2288	2298	2308	2319	2329	2339	2350	2360	2371	2381	2392	2403
Existing Resources	8379	8546	8382	8219	8213	8208	8255	8302	8310	8319	8417	8515	8521	8527	8408
BPA Requirements	-1952	-2132	-2308	-2322	-2491	-2654	-2803	-2953	-3123	-3295	-3425	-3556	-3706	-3857	-3984
CONSERVATION PROGRAMS:															
SF Res MCS	0	5	11	16	22	27	33	40	46	53	60	67	75	82	89
MF Res MCS	0	1	1	2	2	3	4	4	5	6	6	7	8	8	9
New Manuf Housing	0	1	2	3	5	6	8	11	13	15	18	20	22	25	27
Water Heat	0	0	0	0	4	13	22	31	40	50	60	71	81	92	103
Refrigerators	0	0	0	0	1	4	6	8	11	13	16	19	22	25	28
Freezers	0	0	0	0	0	1	2	2	3	4	4	5	6	7	8
Irrigation	0	0	1	1	2	4	5	6	8	9	11	12	13	14	14
Industrial	0	2	8	17	27	38	49	60	71	82	92	103	114	125	136
New Commercial	0	7	19	31	42	53	63	74	86	98	109	119	130	141	153
Comm Lost Opps Exist	0	2	6	9	13	16	20	23	27	31	34	38	41	45	49
MF Res Weath	0	0	1	2	2	3	4	4	5	6	6	7	8	8	9
SF Res Weath	0	2	6	12	18	23	29	34	40	46	51	57	62	62	62
Comm Discret Ex	0	2	8	16	24	32	40	48	56	64	72	79	85	86	86
Subtotal	0	22	63	109	162	223	285	345	411	477	539	604	667	720	773
GENERATING RESOURCES:															
Small Hydro 1 West	0	0	0	10	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	0	0	0	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	0	0	0	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	0	0	0	11	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 3 West	0	0	0	0	0	0	11	11	11	11	11	11	11	11	11
Small Hydro 3 East	0	0	0	0	0	0	11	19	19	19	19	19	19	19	19
Small Hydro 4 West	0	0	0	0	0	0	7	7	7	7	7	7	7	7	7
Small Hydro 4 East	0	0	0	0	0	0	11	11	11	11	11	11	11	11	11
Geothermal2	0	0	0	0	45	90	135	180	225	270	315	360	383	383	383
Wind1	0	0	0	17	33	49	66	66	66	66	66	66	66	66	66
Geothermal1	0	0	0	27	27	27	27	27	27	27	27	27	27	0	27
Solar3	0	0	0	42	42	42	42	42	42	42	42	42	42	42	42
Solar1	0	0	0	22	22	22	22	22	22	22	22	22	22	22	22
Solar2	0	0	0	22	22	22	22	22	22	22	22	22	22	22	22
Hydro Eff Imp	0	0	20	40	60	80	80	100	100	100	100	100	100	100	100
Trans Eff Imp	0	0	11	22	33	34	34	34	34	34	34	34	34	34	34
Cogen1w	0	0	10	10	10	10	10	10	10	10	10	10	10	10	10
Combined Cycle Mix	0	0	0	0	349	349	349	349	349	349	349	349	349	349	349
Combined Cycle BPA	0	0	0	0	0	0	349	349	349	697	697	697	697	697	697
Cogen1e	0	0	0	10	10	10	10	10	10	10	10	10	10	10	10
Cogen2w	0	0	0	60	60	60	60	60	60	60	60	60	60	60	60
WNP 1	0	0	0	0	0	0	0	0	0	0	0	0	0	813	813
WNP 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2e	0	0	0	60	60	60	60	60	60	60	60	60	60	60	60
Cogen3w	0	0	0	0	0	0	0	0	0	0	40	40	40	40	40
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	41	378	822	904	1355	1428	1473	1866	1951	1996	2019	2805	2832
Total Firm Resources	6428	6435	6178	6384	6707	6680	7091	7122	7071	7367	7481	7559	7500	8195	8028
Load/Resource Balance	278	165	-221	-139	55	-101	181	85	-97	71	64	17	-167	403	111

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	5642	5771	5898	6026	6153	6158	6164	6169	6173	6178	6182	6185	6189	6192	6195
Observed Rate	2.34%	2.27%	2.22%	2.16%	2.11%	0.09%	0.09%	0.08%	0.07%	0.07%	0.07%	0.06%	0.06%	0.05%	0.05%
DSI Firm Load	2413	2424	2435	2446	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	8289	8394	8500	8431	8362	8291	8220	8150	8079	8009	7920	7650	7579	7449	6727
BPA Requirements	-4138	-4313	-4487	-4661	-4849	-5000	-4992	-4985	-4979	-4973	-4967	-4962	-4957	-4952	-4948
CONSERVATION PROGRAMS:															
SF Res MCS	96	103	111	118	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	10	10	11	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	29	32	34	36	39	39	39	39	39	39	39	39	39	39	39
Water Heat	113	124	136	148	159	159	159	159	159	159	159	159	159	159	159
Refrigerators	31	34	37	41	45	45	45	45	45	45	45	45	45	45	45
Freezers	8	9	10	11	12	12	12	12	12	12	12	12	12	12	12
Irrigation	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Industrial	146	157	168	179	188	188	188	188	188	188	188	188	188	188	188
New Commercial	164	176	189	201	214	214	214	214	214	214	214	214	214	214	214
Comm Lost Opps Exist	52	56	59	63	67	67	67	67	67	67	67	67	67	67	67
MF Res Weath	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
SF Res Weath	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
Comm Discret Ex	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal	820	872	926	980	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033
GENERATING RESOURCES:															
Small Hydro 1 West	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 3 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 3 East	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Small Hydro 4 West	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Small Hydro 4 East	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Geothermal2	383	383	383	383	383	383	383	383	383	383	383	383	383	383	383
Wind1	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66
Geothermal1	27	27	27	27	27	27	27	27	27	0	0	0	0	0	0
Solar3	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42
Solar1	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Solar2	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Hydro Eff Imp	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Trans Eff Imp	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Cogen1w	10	10	10	10	10	10	10	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349
Combined Cycle BPA	697	697	697	697	697	697	697	697	697	697	697	697	697	697	697
Cogen1e	10	10	10	10	10	10	10	10	0	0	0	0	0	0	0
Cogen2w	60	60	60	60	60	60	60	60	0	0	0	0	0	0	0
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
WNP 3	0	806	806	806	806	806	806	806	806	806	806	806	806	806	806
Cogen2e	60	60	60	60	60	60	60	60	0	0	0	0	0	0	0
Cogen3w	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
Cogen3e	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
Cogen4w	100	100	100	100	280	280	280	280	280	280	280	280	280	280	280
Coal1 (E. Mont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	226	241	320	325	325	571	840	909	1038	1889
Subtotal	3132	3938	3938	3938	4118	4344	4359	4428	4303	4276	4522	4791	4860	4989	5840
Total Firm Resources	8103	8891	8876	8688	8664	8668	8620	8625	8436	8345	8508	8512	8515	8519	8652
Load/Resource Balance	49	697	542	215	55	53	0	0	-193	-289	-130	-130	-130	-130	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	6199	6202	6205	6208	6211	6214	6216	6218	6220	6222	6224	6226	6229	6231	6234
Observed Rate	0.05%	0.05%	0.05%	0.05%	0.04%	0.04%	0.04%	0.04%	0.03%	0.03%	0.03%	0.03%	0.04%	0.04%	0.04%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727
BPA Requirements	-4944	-4942	-4940	-4937	-4935	-4933	-4931	-4930	-4928	-4926	-4925	-4924	-4925	-4926	-4927
CONSERVATION PROGRAMS:															
SF Res MCS	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Water Heat	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159
Refrigerators	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Freezers	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Irrigation	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Industrial	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
New Commercial	214	214	214	214	214	214	214	214	214	214	214	214	214	214	214
Comm Lost Opps Exist	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67
MF Res Weath	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
SF Res Weath	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
Comm Discret Ex	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033
GENERATING RESOURCES:															
Small Hydro 1 West	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 3 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 3 East	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Small Hydro 4 West	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Small Hydro 4 East	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Geothermal2	383	383	383	383	338	293	248	202	157	113	67	23	0	0	0
Wind1	66	66	66	66	66	66	66	66	66	66	66	66	66	49	33
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	42	42	42	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	22	22	22	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	22	22	22	0	0	0	0	0	0	0	0	0	0	0	0
Hydro Eff Imp	100	100	80	60	40	20	20	0	0	0	0	0	0	0	0
Trans Eff Imp	34	34	23	12	1	0	0	0	0	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle BPA	697	697	697	697	697	697	349	349	349	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	80	80	80	80	80	0	0	0	0	0	0	0	0	0	0
Cogen3e	120	120	120	120	120	0	0	0	0	0	0	0	0	0	0
Cogen4w	280	280	280	280	280	180	180	180	180	0	0	0	0	0	0
Coal1 (E. Mont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	1929	1930	1961	2080	2505	2872	3266	3331	3377	3951	3996	4043	4069	4089	4109
Subtotal	5840	5841	5841	5843	5843	5844	5845	5844	5845	5846	5845	5848	5851	5854	5858
Total Firm Resources	8656	8659	8661	8666	8668	8671	8674	8674	8677	8680	8680	8684	8686	8688	8691
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: RENEWABLES ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	6236	6239	6241	6243	6245	6247	6248	6250	6252	6253	6255	6256	6257	6257	6258
Observed Rate	0.04%	0.04%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.02%	0.02%	0.01%	0.01%	0.01%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727
BPA Requirements	-4928	-4929	-4929	-4930	-4931	-4931	-4932	-4933	-4933	-4934	-4934	-4935	-4935	-4934	-4934
CONSERVATION PROGRAMS:															
SF Res MCS	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	39	38	37	36	34	32	31	28	26	24	21	19	17	14	12
Water Heat	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159
Refrigerators	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Freezers	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Irrigation	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Industrial	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
New Commercial	214	214	214	214	214	214	214	214	214	214	214	214	214	214	214
Comm Lost Opps Exist	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67
MF Res Weath	9	9	9	9	9	9	9	8	7	7	6	5	5	4	3
SF Res Weath	62	62	62	62	62	62	60	56	50	45	39	33	28	22	17
Comm Discret Ex	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal	1033	1032	1031	1030	1028	1026	1023	1015	1006	999	989	980	973	963	955
GENERATING RESOURCES:															
Small Hydro 1 West	10	10	10	10	10	10	10	10	0	0	0	0	0	0	0
Small Hydro 1 East	14	14	14	14	14	14	14	14	0	0	0	0	0	0	0
Small Hydro 2 West	11	11	11	11	11	11	11	11	0	0	0	0	0	0	0
Small Hydro 2 East	14	14	14	14	14	14	14	14	4	0	0	0	0	0	0
Small Hydro 3 West	11	11	11	11	11	11	11	11	11	11	11	0	0	0	0
Small Hydro 3 East	19	19	19	19	19	19	19	19	19	19	19	7	0	0	0
Small Hydro 4 West	7	7	7	7	7	7	7	7	7	7	7	0	0	0	0
Small Hydro 4 East	11	11	11	11	11	11	11	11	11	11	11	0	0	0	0
Geothermal2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydro Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trans Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle BPA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNP 1	813	813	813	813	813	813	813	813	0	0	0	0	0	0	0
WNP 3	806	806	806	806	806	806	806	806	806	806	806	0	0	0	0
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	4128	4149	4153	4157	4161	4165	4171	4181	5050	5064	5075	5932	5949	5958	5966
Subtotal	5861	5865	5869	5873	5877	5881	5887	5897	5908	5918	5929	5939	5949	5958	5966
Total Firm Resources	8693	8695	8698	8700	8701	8703	8705	8706	8708	8710	8711	8711	8714	8714	8714
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	9551	9881	10214	10558	10916	11253	11590	11927	12264	12600	12946	13291	13638	13984	14331
Observed Rate		3.45%	3.37%	3.37%	3.39%	3.09%	3.00%	2.91%	2.82%	2.74%	2.74%	2.67%	2.60%	2.54%	2.48%
Existing Resources	9685	9681	9795	9910	9353	8791	8795	8798	8710	8621	8652	8683	8448	8214	8306
BPA Requirements	47	77	127	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	0	3	6	10	14	17	21	25	30	34	39	44	50	55	60
MF Res MCS	0	1	2	4	5	6	7	9	10	11	13	14	16	17	18
New Manuf Housing	0	1	2	4	5	7	9	12	14	17	20	22	25	28	31
Refrigerators	0	0	0	0	2	5	8	12	15	19	23	27	32	36	41
Freezers	0	0	0	0	1	1	2	3	4	5	6	8	9	10	11
Water Heat	0	0	0	0	5	16	28	39	51	63	76	90	104	117	131
Irrigation	0	0	1	2	3	5	7	10	12	14	16	18	20	21	22
Industrial	0	2	8	19	31	43	55	68	80	92	104	116	129	141	153
New Commercial	0	11	32	52	72	89	108	127	146	166	185	203	222	241	260
Comm Lost Opps Exist	0	2	6	10	14	18	21	25	29	33	37	41	45	49	53
MF Res Weath	0	1	3	5	7	9	11	13	15	17	19	21	23	25	27
SF Res Weath	0	1	4	8	11	15	18	22	26	29	33	36	39	40	40
Comm Discret Ex	0	2	7	14	21	28	35	42	49	56	63	71	76	76	76
Subtotal	0	24	71	128	191	259	330	407	481	556	634	711	790	856	923
GENERATING RESOURCES:															
Small Hydro 1 West	0	0	0	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	0	0	0	34	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	0	0	0	25	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	0	0	0	25	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	0	0	30	30	30	30	30	30	30	30	30	30	30	30	30
Combined Cycle Mix	0	0	0	0	349	349	349	349	349	349	349	349	349	349	349
Cogen1e	0	0	30	30	30	30	30	30	30	30	30	30	30	30	30
Cogen2w	0	0	180	180	180	180	180	180	180	180	180	180	180	180	180
Small Hydro 3 West	0	0	0	0	0	0	26	37	37	37	37	37	37	37	37
Small Hydro 3 East	0	0	0	0	0	0	26	52	52	52	52	52	56	56	56
Cogen2e	0	0	0	180	180	180	180	180	180	180	180	180	180	180	180
Coal1 (E. Mont)	0	0	0	0	0	0	0	188	375	563	750	938	1125	1313	1313
Cogen3w	0	0	0	0	360	360	360	360	360	360	360	360	360	360	360
Small Hydro 4 West	0	0	0	0	0	0	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	0	0	0	0	0	0	25	32	32	32	32	32	32	32	32
Cogen3e	0	0	0	0	140	360	360	360	360	360	360	360	360	360	360
Coal2 (E. Wash)	0	0	0	0	0	0	0	188	375	563	563	563	563	563	563
Cogen4w	0	0	0	0	0	620	780	780	780	780	780	780	1000	1330	1330
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	188
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	240	533	1420	2260	2522	2942	3316	3692	3879	4067	4478	4996	5184
Total Firm Resources	9732	9782	10233	10571	10964	11310	11647	12147	12507	12869	13165	13461	13716	14066	14413
Load/Resource Balance	181	-98	21	11	47	58	59	218	243	271	221	171	77	81	79

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	14754	15178	15604	16030	16458	16460	16462	16464	16466	16468	16470	16471	16473	16474	16475
Observed Rate	2.95%	2.87%	2.80%	2.73%	2.67%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
Existing Resources	8398	8383	8368	8513	8542	7194	6872	6543	6477	6261	5838	5194	5139	5051	4589
BPA Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	66	71	77	83	89	89	89	89	89	89	89	89	89	89	89
MF Res MCS	20	21	22	24	25	25	25	25	25	25	25	25	25	25	25
New Manuf Housing	33	36	38	41	44	44	44	44	44	44	44	44	44	44	44
Refrigerators	45	49	53	59	65	65	65	65	65	65	65	65	65	65	65
Freezers	12	13	14	16	18	18	18	18	18	18	18	18	18	18	18
Water Heat	144	158	173	188	203	203	203	203	203	203	203	203	203	203	203
Irrigation	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Industrial	165	177	189	202	212	212	212	212	212	212	212	212	212	212	212
New Commercial	280	300	321	343	365	365	365	365	365	365	365	365	365	365	365
Comm Lost Opps Exist	57	60	64	68	72	72	72	72	72	72	72	72	72	72	72
MF Res Weath	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
SF Res Weath	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Comm Discret Ex	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Subtotal	987	1050	1116	1189	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258
GENERATING RESOURCES:															
Small Hydro 1 West	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	30	30	30	30	30	30	30	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349
Cogen1e	30	30	30	30	30	30	30	0	0	0	0	0	0	0	0
Cogen2w	180	180	180	180	180	180	180	0	0	0	0	0	0	0	0
Small Hydro 3 West	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56
Cogen2e	180	180	180	180	180	180	180	180	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Cogen3w	360	360	360	360	360	360	360	360	360	0	0	0	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Cogen3e	360	360	360	360	360	360	360	360	360	220	0	0	0	0	0
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4w	1400	1500	1500	1500	1500	1500	1500	1500	1500	1500	880	720	720	720	720
Coal3 (E. Oregon)	375	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4e	0	80	450	670	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	1352	1607	1831	1831	2643	3907	4714	4980	5279	5822
Subtotal	5441	5809	6179	6399	6729	8081	8336	8320	8140	8452	8876	9523	9789	10088	10631
Total Firm Resources	14826	15242	15663	16101	16529	16533	16466	16121	15875	15971	15972	15975	16186	16397	16478
Load/Resource Balance	69	63	60	67	68	69	0	-346	-595	-500	-500	-500	-290	-80	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	16475	16474	16474	16473	16472	16472	16471	16471	16470	16470	16469	16468	16464	16461	16457
Observed Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.01%	-0.02%	-0.02%	-0.02%
Existing Resources	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143
BPA Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89
MF Res MCS	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
New Manuf Housing	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44
Refrigerators	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
Freezers	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Water Heat	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203
Irrigation	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Industrial	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212
New Commercial	365	365	365	365	365	365	365	365	365	365	365	365	365	365	365
Comm Lost Opps Exist	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72
MF Res Weath	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
SF Res Weath	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Comm Discret Ex	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Subtotal	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258
GENERATING RESOURCES:															
Small Hydro 1 West	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4w	720	720	500	170	170	100	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4e	1000	1000	1000	1000	1000	1000	920	550	330	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	6268	6268	6486	6816	7164	7233	7413	7782	8002	8331	8331	8331	8331	8331	8331
Subtotal	11077	11077	11075	11075	11074	11073	11073	11072	11072	11071	11071	11071	11071	11071	11071
Total Firm Resources	16478	16478	16476	16476	16475	16474	16474	16473	16473	16472	16472	16472	16472	16472	16472
Load/Resource Balance	0	1	0	0	0	0	0	0	0	0	0	2	5	9	12

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Study Title: RENEWABLES ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	16454	16451	16448	16446	16443	16441	16438	16436	16434	16431	16429	16428	16427	16427	16427
Observed Rate	-0.02%	-0.02%	-0.02%	-0.02%	-0.02%	-0.02%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	0.00%	0.00%
Existing Resources	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143
BPA Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89
MF Res MCS	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
New Manuf Housing	44	43	42	40	38	37	34	32	29	27	24	21	19	16	13
Refrigerators	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
Freezers	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Water Heat	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203
Irrigation	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Industrial	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212
New Commercial	365	365	365	365	365	365	365	365	365	365	365	365	365	365	365
Comm Lost Opps Exist	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72
MF Res Weath	27	27	27	27	27	27	26	24	22	20	18	16	14	12	10
SF Res Weath	40	40	40	40	40	40	39	36	32	29	25	21	18	14	11
Comm Discret Ex	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Subtotal	1258	1257	1256	1254	1252	1251	1246	1239	1230	1223	1214	1205	1198	1189	1181
GENERATING RESOURCES:															
Small Hydro 1 West	29	29	29	29	29	29	29	29	0	0	0	0	0	0	0
Small Hydro 1 East	43	43	43	43	43	43	43	43	10	0	0	0	0	0	0
Small Hydro 2 West	32	32	32	32	32	32	32	32	7	0	0	0	0	0	0
Small Hydro 2 East	47	47	47	47	47	47	47	47	22	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	37	37	37	37	37	37	37	37	37	37	37	11	0	0	0
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	30	4	4	4
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1125	938	750	563	375	188	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	0	0	0	0
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	7	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	563	563	375	188	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	375	188	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	8331	8331	8687	9061	9435	9622	9811	10004	10310	10542	10736	11032	11083	11092	11100
Subtotal	11071	11071	11051	11051	11049	11049	11050	11056	11062	11067	11074	11080	11087	11096	11104
Total Firm Resources	16472	16471	16450	16448	16444	16443	16439	16438	16435	16433	16431	16428	16428	16428	16428
Load/Resource Balance	15	17	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: RENEWABLES ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	4284	4434	4588	4758	4922	5085	5249	5414	5579	5744	5895	6045	6196	6346	6496
Observed Rate		3.49%	3.48%	3.70%	3.44%	3.32%	3.23%	3.13%	3.05%	2.97%	2.62%	2.55%	2.49%	2.42%	2.37%
Existing Resources	2380	2378	2407	2436	2431	2431	2446	2461	2455	2449	2469	2490	2489	2489	2512
BPA Requirements	1905	2055	2181	2322	2491	2654	2803	2953	3123	3295	3425	3556	3706	3857	3984
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	4284	4434	4588	4758	4922	5085	5249	5414	5579	5744	5895	6045	6196	6346	6496
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: RENEWABLES ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	6672	6847	7022	7195	7368	7361	7353	7346	7340	7333	7328	7322	7317	7313	7308
Observed Rate	2.71%	2.63%	2.55%	2.47%	2.40%	-0.11%	-0.10%	-0.09%	-0.09%	-0.08%	-0.08%	-0.07%	-0.07%	-0.06%	-0.06%
Existing Resources	2534	2534	2534	2534	2520	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4138	4313	4487	4661	4849	5000	4992	4985	4979	4973	4967	4962	4957	4952	4948
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	6672	6847	7022	7195	7368	7361	7353	7346	7340	7334	7328	7322	7317	7313	7308
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	7305	7303	7300	7298	7296	7294	7292	7290	7289	7287	7286	7285	7286	7287	7288
Observed Rate	-0.04%	-0.04%	-0.03%	-0.03%	-0.03%	-0.03%	-0.03%	-0.02%	-0.02%	-0.02%	-0.02%	-0.01%	0.01%	0.01%	0.01%
Existing Resources	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4944	4942	4940	4937	4935	4933	4931	4930	4928	4926	4925	4924	4925	4926	4927
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	7305	7303	7300	7298	7296	7294	7292	7290	7289	7287	7286	7285	7286	7287	7288
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: RENEWABLES ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	7288	7289	7290	7291	7291	7292	7293	7293	7294	7294	7295	7295	7295	7295	7295
Observed Rate	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.00%	-0.01%	-0.01%
Existing Resources	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4928	4929	4929	4930	4931	4931	4932	4933	4933	4934	4934	4935	4935	4934	4934
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	7288	7289	7290	7291	7291	7292	7293	7293	7294	7294	7295	7295	7295	7295	7295
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: RENEWABLES ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	17723	18317	18922	19551	20193	20811	21431	22050	22669	23288	23899	24509	25120	25730	26341
Observed Rate		3.35%	3.30%	3.32%	3.28%	3.07%	2.97%	2.89%	2.81%	2.73%	2.62%	2.56%	2.49%	2.43%	2.37%
DSI Firm Load	2261	2268	2278	2288	2298	2308	2319	2329	2339	2350	2360	2371	2381	2392	2403
Existing Resources	20443	20605	20585	20564	19997	19429	19495	19560	19475	19389	19538	19687	19458	19229	19225
CONSERVATION PROGRAMS:															
SF Res MCS	0	8	17	26	36	44	54	65	76	87	99	111	125	137	149
MF Res MCS	0	2	3	6	7	9	11	13	15	17	19	21	24	25	27
Water Heat	0	0	0	0	9	29	50	70	91	113	136	161	185	209	234
Refrigerators	0	0	0	0	3	9	14	20	26	32	39	46	54	61	69
Freezers	0	0	0	0	1	2	4	5	7	9	10	13	15	17	19
New Manuf Housing	0	2	4	7	10	13	17	23	27	32	38	42	47	53	58
Irrigation	0	0	2	3	5	9	12	16	20	23	27	30	33	35	36
Industrial	0	4	16	36	58	81	104	128	151	174	196	219	243	266	289
New Commercial	0	18	51	83	114	142	171	201	232	264	294	322	352	382	413
Comm Discret Ex	0	4	15	30	45	60	75	90	105	120	135	150	161	162	162
Comm Lost Opps Exist	0	4	12	19	27	34	41	48	56	64	71	79	86	94	102
SF Res Weath	0	3	10	20	29	38	47	56	66	75	84	93	101	102	102
MF Res Weath	0	1	4	7	9	12	15	17	20	23	25	28	31	33	36
Subtotal	0	46	134	237	353	482	615	752	892	1033	1173	1315	1457	1576	1696
GENERATING RESOURCES:															
Hydro Eff Imp	0	0	20	40	60	80	80	100	100	100	100	100	100	100	100
Trans Eff Imp	0	0	11	22	33	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 East	0	0	0	48	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	0	0	0	36	61	61	61	61	61	61	61	61	61	61	61
Small Hydro 3 East	0	0	0	0	0	0	37	71	71	71	71	71	75	75	75
Small Hydro 4 East	0	0	0	0	0	0	36	43	43	43	43	43	43	43	43
Small Hydro 1 West	0	0	0	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	0	0	0	36	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	0	0	0	0	0	0	37	48	48	48	48	48	48	48	48
Small Hydro 4 West	0	0	0	0	0	0	32	32	32	32	32	32	32	32	32
Combined Cycle BPA	0	0	0	0	0	0	349	349	349	697	697	697	697	697	697
Combined Cycle Mix	0	0	0	0	698	698	698	698	698	698	698	698	698	698	698
Cogen1e	0	0	30	40	40	40	40	40	40	40	40	40	40	40	40
Cogen2e	0	0	0	240	240	240	240	240	240	240	240	240	240	240	240
Cogen3e	0	0	0	0	140	360	360	360	360	360	360	360	360	360	360
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1w	0	0	40	40	40	40	40	40	40	40	40	40	40	40	40
Cogen2w	0	0	180	240	240	240	240	240	240	240	240	240	240	240	240
Cogen3w	0	0	0	0	360	360	360	360	360	360	400	400	400	400	400
Cogen4w	0	0	0	0	0	620	780	780	780	780	780	780	1000	1330	1330
Coal1 (E. Mont)	0	0	0	0	0	0	0	188	375	563	750	938	1125	1313	1313
Coal2 (E. Wash)	0	0	0	0	0	0	0	188	375	563	563	563	563	563	563
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	188
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNP 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNP 1	0	0	0	0	0	0	0	0	0	0	0	0	0	813	813
Geothermal1	0	0	0	27	27	27	27	27	27	27	27	27	27	0	27
Geothermal2	0	0	0	0	45	90	135	180	225	270	315	360	383	383	383
Solar1	0	0	0	22	22	22	22	22	22	22	22	22	22	22	22
Solar2	0	0	0	22	22	22	22	22	22	22	22	22	22	22	22
Solar3	0	0	0	42	42	42	42	42	42	42	42	42	42	42	42
Wind1	0	0	0	17	33	49	66	66	66	66	66	66	66	66	66
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	281	911	2242	3164	3877	4370	4789	5558	5830	6063	6497	7801	8016
Total Firm Resources	20443	20652	20999	21711	22593	23078	23989	24682	25155	25979	26543	27068	27411	28606	28933
Load/Resource Balance	459	67	-200	-128	102	-42	240	303	147	342	284	188	-90	484	189

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Study Title: RENEWABLES ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	27069	27796	28524	29251	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979
Observed Rate	2.76%	2.69%	2.62%	2.55%	2.49%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DSI Firm Load	2413	2424	2435	2446	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	19221	19312	19402	19478	19423	17845	17453	17054	16917	16631	16119	15204	15079	14861	13677
CONSERVATION PROGRAMS:															
SF Res MCS	162	174	188	201	215	215	215	215	215	215	215	215	215	215	215
MF Res MCS	30	31	33	36	37	37	37	37	37	37	37	37	37	37	37
Water Heat	257	282	309	336	362	362	362	362	362	362	362	362	362	362	362
Refrigerators	76	83	90	100	110	110	110	110	110	110	110	110	110	110	110
Freezers	20	22	24	27	30	30	30	30	30	30	30	30	30	30	30
New Manuf Housing	62	68	72	77	83	83	83	83	83	83	83	83	83	83	83
Irrigation	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Industrial	311	334	357	381	400	400	400	400	400	400	400	400	400	400	400
New Commercial	444	476	510	544	579	579	579	579	579	579	579	579	579	579	579
Comm Discret Ex	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
Comm Lost Opps Exist	109	116	123	131	139	139	139	139	139	139	139	139	139	139	139
SF Res Weath	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102
MF Res Weath	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Subtotal	1807	1922	2042	2169	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291
GENERATING RESOURCES:															
Hydro Eff Imp	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Trans Eff Imp	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 East	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61
Small Hydro 3 East	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
Small Hydro 4 East	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 1 West	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
Small Hydro 4 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Combined Cycle BPA	697	697	697	697	697	697	697	697	697	697	697	697	697	697	697
Combined Cycle Mix	698	698	698	698	698	698	698	698	698	698	698	698	698	698	698
Cogen1e	40	40	40	40	40	40	40	10	0	0	0	0	0	0	0
Cogen2e	240	240	240	240	240	240	240	240	0	0	0	0	0	0	0
Cogen3e	480	480	480	480	480	480	480	480	480	340	120	120	120	120	120
Cogen4e	0	80	450	670	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Cogen1w	40	40	40	40	40	40	40	0	0	0	0	0	0	0	0
Cogen2w	240	240	240	240	240	240	240	60	0	0	0	0	0	0	0
Cogen3w	480	480	480	480	480	480	480	480	480	120	120	120	120	120	120
Cogen4w	1500	1600	1600	1600	1780	1780	1780	1780	1780	1780	1160	1000	1000	1000	1000
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal3 (E. Oregon)	375	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	1578	1848	2151	2156	2968	4478	5554	5889	6317	7711
WNP 3	0	806	806	806	806	806	806	806	806	806	806	806	806	806	806
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
Geothermal1	27	27	27	27	27	27	27	27	27	0	0	0	0	0	0
Geothermal2	383	383	383	383	383	383	383	383	383	383	383	383	383	383	383
Solar1	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Solar2	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Solar3	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42
Wind1	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	8573	9747	10117	10337	10847	12425	12695	12748	12443	12728	13398	14314	14649	15077	16471
Total Firm Resources	29600	30981	31561	31980	32559	32558	32436	32090	31648	31647	31805	31806	32016	32226	32436
Load/Resource Balance	118	760	602	283	123	122	0	-346	-788	-789	-631	-630	-420	-210	0

Study ID : 15-JUL-91 06:11:56
Study Title: RENEWABLES ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979
Observed Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231
CONSERVATION PROGRAMS:															
SF Res MCS	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215
MF Res MCS	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Water Heat	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362
Refrigerators	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
Freezers	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
New Manuf Housing	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83
Irrigation	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Industrial	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
New Commercial	579	579	579	579	579	579	579	579	579	579	579	579	579	579	579
Comm Discret Ex	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
Comm Lost Opps Exist	139	139	139	139	139	139	139	139	139	139	139	139	139	139	139
SF Res Weath	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102
MF Res Weath	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Subtotal	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291
GENERATING RESOURCES:															
Hydro Eff Imp	100	100	80	60	40	20	20	0	0	0	0	0	0	0	0
Trans Eff Imp	34	34	23	12	1	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 East	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61
Small Hydro 3 East	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
Small Hydro 4 East	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 1 West	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
Small Hydro 4 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Combined Cycle BPA	697	697	697	697	697	697	349	349	349	0	0	0	0	0	0
Combined Cycle Mix	698	698	698	698	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	120	120	120	120	120	0	0	0	0	0	0	0	0	0	0
Cogen4e	1000	1000	1000	1000	1000	1000	920	550	330	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	80	80	80	80	80	0	0	0	0	0	0	0	0	0	0
Cogen4w	1000	1000	780	450	450	280	180	180	180	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	8197	8198	8447	8896	9669	10105	10679	11113	11379	12282	12327	12374	12400	12420	12440
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	383	383	383	383	338	293	248	202	157	113	67	23	0	0	0
Solar1	22	22	22	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	22	22	22	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	42	42	42	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	66	66	66	66	66	66	66	66	66	66	66	66	66	49	33
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	16917	16918	16916	16918	16917	16917	16918	16916	16917	16917	16916	16919	16922	16925	16929
Total Firm Resources	32436	32437	32435	32436	32436	32436	32437	32436	32437	32436	32436	32438	32441	32445	32448
Load/Resource Balance	0	1	-1	0	0	0	1	0	1	0	0	2	6	9	13

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Study Title: RENEWABLES ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979
Observed Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231
CONSERVATION PROGRAMS:															
SF Res MCS	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215
MF Res MCS	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Water Heat	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362
Refrigerators	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
Freezers	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
New Manuf Housing	83	81	79	76	72	69	65	60	55	51	45	40	36	30	25
Irrigation	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Industrial	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
New Commercial	579	579	579	579	579	579	579	579	579	579	579	579	579	579	579
Comm Discret Ex	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
Comm Lost Opps Exist	139	139	139	139	139	139	139	139	139	139	139	139	139	139	139
SF Res Weath	102	102	102	102	102	102	99	92	82	74	64	54	46	36	28
MF Res Weath	36	36	36	36	36	36	35	32	29	27	24	21	19	16	13
Subtotal	2291	2289	2287	2284	2280	2277	2269	2254	2236	2222	2203	2185	2171	2152	2136
GENERATING RESOURCES:															
Hydro Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trans Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 East	57	57	57	57	57	57	57	57	10	0	0	0	0	0	0
Small Hydro 2 East	61	61	61	61	61	61	61	61	26	0	0	0	0	0	0
Small Hydro 3 East	75	75	75	75	75	75	75	75	75	75	75	37	4	4	4
Small Hydro 4 East	43	43	43	43	43	43	43	43	43	43	43	7	0	0	0
Small Hydro 1 West	39	39	39	39	39	39	39	39	0	0	0	0	0	0	0
Small Hydro 2 West	43	43	43	43	43	43	43	43	7	0	0	0	0	0	0
Small Hydro 3 West	48	48	48	48	48	48	48	48	48	48	48	11	0	0	0
Small Hydro 4 West	32	32	32	32	32	32	32	32	32	32	32	0	0	0	0
Combined Cycle BPA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1125	938	750	563	375	188	0	0	0	0	0	0	0
Coal2 (E. Wash)	563	563	375	188	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	375	188	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	12459	12480	12840	13218	13596	13787	13982	14185	15360	15606	15811	16964	17032	17050	17066
WNP 3	806	806	806	806	806	806	806	806	806	806	806	0	0	0	0
WNP 1	813	813	813	813	813	813	813	813	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	16932	16936	16920	16924	16926	16930	16937	16953	16970	16985	17003	17019	17036	17054	17070
Total Firm Resources	32451	32454	32436	32436	32436	32436	32435	32436	32436	32436	32436	32436	32436	32436	32436
Load/Resource Balance	15	18	0	0	0	0	-1	0	0	0	0	0	0	1	0

Study ID : 15-JUL-91 07:20:50
Study Title: COGENERATION ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	3888	4002	4120	4235	4355	4473	4591	4709	4826	4944	5058	5173	5286	5400	5514
Observed Rate		2.95%	2.94%	2.78%	2.84%	2.71%	2.63%	2.56%	2.50%	2.43%	2.32%	2.26%	2.20%	2.15%	2.10%
DSI Firm Load	2261	2268	2278	2288	2298	2308	2319	2329	2339	2350	2360	2371	2381	2392	2403
Existing Resources	8379	8546	8382	8219	8213	8208	8255	8302	8310	8319	8417	8515	8521	8527	8408
BPA Requirements	-1952	-2132	-2308	-2322	-2491	-2654	-2803	-2953	-3123	-3295	-3425	-3556	-3706	-3857	-3984
CONSERVATION PROGRAMS:															
SF Res MCS	0	5	11	16	22	27	33	40	46	53	60	67	75	82	89
MF Res MCS	0	1	1	2	2	3	4	4	5	6	6	7	8	8	9
New Manuf Housing	0	1	2	3	5	6	8	11	13	15	18	20	22	25	27
Water Heat	0	0	0	0	4	13	22	31	40	50	60	71	81	92	103
Refrigerators	0	0	0	0	1	4	6	8	11	13	16	19	22	25	28
Freezers	0	0	0	0	0	1	2	2	3	4	4	5	6	7	8
Irrigation	0	0	1	1	2	4	5	6	8	9	11	12	13	14	14
Industrial	0	2	8	17	27	38	49	60	71	82	92	103	114	125	136
New Commercial	0	7	19	31	42	53	63	74	86	98	109	119	130	141	153
Comm Lost Opps Exist	0	0	2	6	9	13	16	20	23	27	31	34	38	41	45
MF Res Weath	0	0	0	1	2	2	3	4	4	5	6	6	7	8	8
SF Res Weath	0	0	2	6	12	18	23	29	34	40	46	51	57	62	62
Comm Discret Ex	0	0	2	8	16	24	32	40	48	56	64	72	79	85	86
Subtotal	0	16	48	91	144	206	266	329	392	458	523	586	652	715	768
GENERATING RESOURCES:															
Cogen1w	0	0	10	10	10	10	10	10	10	10	10	10	10	10	10
Cogen1e	0	0	10	10	10	10	10	10	10	10	10	10	10	10	10
Cogen2w	0	0	60	60	60	60	60	60	60	60	60	60	60	60	60
Cogen2e	0	0	60	60	60	60	60	60	60	60	60	60	60	60	60
Cogen3w	0	0	0	0	120	120	120	120	120	120	120	120	120	120	120
Cogen3e	0	0	0	0	120	120	120	120	120	120	120	120	120	120	120
Cogen4w	0	0	0	0	440	500	500	500	500	500	500	500	500	500	500
Cogen4e	0	0	0	0	0	160	340	500	500	500	500	500	500	500	500
Hydro Eff Imp	0	0	20	40	40	40	60	80	100	100	100	100	100	100	100
Trans Eff Imp	0	0	11	22	22	22	22	23	34	34	34	34	34	34	34
Small Hydro 1 West	0	0	0	10	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	0	0	0	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	0	0	0	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	0	0	0	11	11	11	11	11	14	14	14	14	14	14	14
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	349	349	349	349	349	349
Combined Cycle BPA	0	0	0	0	0	0	0	0	0	0	0	0	349	349	697
Small Hydro 3 West	0	0	0	0	0	0	0	0	0	0	11	11	11	11	11
WNP 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNP 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 East	0	0	0	0	0	0	0	0	0	0	11	11	11	11	19
Geothermal2	0	0	0	0	0	0	0	0	0	0	0	0	45	90	90
Small Hydro 4 West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
Small Hydro 4 East	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	171	248	928	1148	1348	1529	1563	1912	1934	1934	2328	2373	2736
Total Firm Resources	6428	6429	6293	6236	6795	6907	7065	7207	7142	7394	7448	7479	7794	7758	7927
Load/Resource Balance	278	159	-106	-287	142	124	155	168	-24	99	28	-63	127	-34	11

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	5642	5771	5898	6026	6153	6158	6164	6169	6173	6178	6182	6185	6189	6192	6195
Observed Rate	2.34%	2.27%	2.22%	2.16%	2.11%	0.09%	0.09%	0.08%	0.07%	0.07%	0.07%	0.06%	0.06%	0.05%	0.05%
DSI Firm Load	2413	2424	2435	2446	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	8289	8394	8500	8431	8362	8291	8220	8150	8079	8009	7920	7650	7579	7449	6727
BPA Requirements	-4138	-4313	-4487	-4661	-4849	-5000	-4992	-4985	-4979	-4973	-4967	-4962	-4957	-4952	-4948
CONSERVATION PROGRAMS:															
SF Res MCS	96	103	111	118	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	10	10	11	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	29	32	34	36	39	39	39	39	39	39	39	39	39	39	39
Water Heat	113	124	136	148	159	159	159	159	159	159	159	159	159	159	159
Refrigerators	31	34	37	41	45	45	45	45	45	45	45	45	45	45	45
Freezers	8	9	10	11	12	12	12	12	12	12	12	12	12	12	12
Irrigation	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Industrial	146	157	168	179	188	188	188	188	188	188	188	188	188	188	188
New Commercial	164	176	189	201	214	214	214	214	214	214	214	214	214	214	214
Comm Lost Opps Exist	49	52	56	59	63	63	63	63	63	63	63	63	63	63	63
MF Res Weath	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
SF Res Weath	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
Comm Discret Ex	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal	817	868	923	976	1029	1029	1029	1029	1029	1029	1029	1029	1029	1029	1029
GENERATING RESOURCES:															
Cogen1w	10	10	10	10	10	10	10	0	0	0	0	0	0	0	0
Cogen1e	10	10	10	10	10	10	10	0	0	0	0	0	0	0	0
Cogen2w	60	60	60	60	60	60	60	0	0	0	0	0	0	0	0
Cogen2e	60	60	60	60	60	60	60	0	0	0	0	0	0	0	0
Cogen3w	120	120	120	120	120	120	120	120	120	0	0	0	0	0	0
Cogen3e	120	120	120	120	120	120	120	120	120	0	0	0	0	0	0
Cogen4w	500	500	500	500	500	500	500	500	500	60	0	0	0	0	0
Cogen4e	500	500	500	500	500	500	500	500	500	500	340	160	0	0	0
Hydro Eff Imp	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Trans Eff Imp	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 West	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Combined Cycle Mix	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349
Combined Cycle BPA	697	697	697	697	697	697	697	697	697	697	697	697	697	697	697
Small Hydro 3 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
WNP 3	0	0	0	0	806	806	806	806	806	806	806	806	806	806	806
Small Hydro 3 East	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Geothermal2	135	180	225	270	270	270	270	270	270	270	270	270	270	270	270
Small Hydro 4 West	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Small Hydro 4 East	0	0	0	7	7	7	7	7	7	7	7	7	7	7	7
Coal1 (E. Mont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	17	33	33	33	33	33	33	33	33	33	33	33	33
Coal2 (E. Wash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	9	9	9	9	9	9	9	9	9	9	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	56	805	1112	1561	1790	1927	2648
Subtotal	3594	3639	3701	3778	4584	4584	4584	4444	4500	4569	4656	4925	4994	5122	5843
Total Firm Resources	8562	8588	8636	8524	9126	8904	8841	8637	8629	8634	8638	8642	8645	8648	8651
Load/Resource Balance	507	395	301	52	517	290	221	13	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	6199	6202	6205	6208	6211	6214	6216	6218	6220	6222	6224	6226	6229	6231	6234
Observed Rate	0.05%	0.05%	0.05%	0.05%	0.04%	0.04%	0.04%	0.04%	0.03%	0.03%	0.03%	0.03%	0.04%	0.04%	0.04%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727
BPA Requirements	-4944	-4942	-4940	-4937	-4935	-4933	-4931	-4930	-4928	-4926	-4925	-4924	-4925	-4926	-4927
CONSERVATION PROGRAMS:															
SF Res MCS	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Water Heat	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159
Refrigerators	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Freezers	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Irrigation	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Industrial	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
New Commercial	214	214	214	214	214	214	214	214	214	214	214	214	214	214	214
Comm Lost Opps Exist	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63
MF Res Weath	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
SF Res Weath	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
Comm Discret Ex	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal	1029	1029	1029	1029	1029	1029	1029	1029	1029	1029	1029	1029	1029	1029	1029
GENERATING RESOURCES:															
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydro Eff Imp	100	100	80	60	60	60	40	20	0	0	0	0	0	0	0
Trans Eff Imp	34	34	23	12	12	12	12	11	0	0	0	0	0	0	0
Small Hydro 1 West	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Combined Cycle Mix	349	349	349	349	349	349	349	349	349	0	0	0	0	0	0
Combined Cycle BPA	697	697	697	697	697	697	697	697	697	697	697	697	349	349	0
Small Hydro 3 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
Small Hydro 3 East	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Geothermal2	270	270	270	270	270	270	270	270	270	270	270	270	225	180	180
Small Hydro 4 West	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Small Hydro 4 East	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Coal1 (E. Mont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Coal2 (E. Wash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	2648	2649	2681	2713	2713	2714	2734	2756	2787	3136	3137	3138	3535	3584	3936
Subtotal	5843	5844	5845	5846	5846	5847	5847	5848	5848	5848	5849	5850	5854	5858	5861
Total Firm Resources	8655	8658	8661	8665	8667	8670	8672	8674	8676	8678	8680	8682	8685	8688	8690
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
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Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	6236	6239	6241	6243	6245	6247	6248	6250	6252	6253	6255	6256	6257	6257	6258
Observed Rate	0.04%	0.04%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.02%	0.02%	0.01%	0.01%	0.01%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727
BPA Requirements	-4928	-4929	-4929	-4930	-4931	-4931	-4932	-4933	-4933	-4934	-4934	-4935	-4935	-4934	-4934
CONSERVATION PROGRAMS:															
SF Res MCS	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	39	38	37	36	34	32	31	28	26	24	21	19	17	14	12
Water Heat	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159
Refrigerators	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Freezers	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Irrigation	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Industrial	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
New Commercial	214	214	214	214	214	214	214	214	214	214	214	214	214	214	214
Comm Lost Opps Exist	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63
MF Res Weath	9	9	9	9	9	9	9	9	8	7	7	6	5	5	4
SF Res Weath	62	62	62	62	62	62	62	60	56	50	45	39	33	28	22
Comm Discret Ex	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal	1029	1028	1027	1026	1024	1022	1021	1016	1009	1000	992	983	974	966	957
GENERATING RESOURCES:															
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydro Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trans Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 West	10	10	10	10	10	10	10	10	0	0	0	0	0	0	0
Small Hydro 1 East	14	14	14	14	14	14	14	14	0	0	0	0	0	0	0
Small Hydro 2 West	11	11	11	11	11	11	11	11	0	0	0	0	0	0	0
Small Hydro 2 East	14	14	14	14	14	14	14	14	4	4	4	4	4	0	0
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle BPA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
WNP 1	813	813	813	813	813	813	813	813	813	813	0	0	0	0	0
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	0
Small Hydro 3 East	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Geothermal2	135	90	45	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Small Hydro 4 East	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Coal1 (E. Mont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	33	33	33	33	33	33	33	33	33	33	33	33	17	0	0
Coal2 (E. Wash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	3984	4033	4082	4131	4135	4139	4143	4150	4205	4216	5039	5050	5076	5105	5919
Subtotal	5864	5868	5872	5876	5880	5884	5888	5895	5905	5916	5926	5937	5947	5955	5963
Total Firm Resources	8692	8694	8697	8699	8700	8702	8704	8705	8708	8709	8711	8712	8713	8714	8713
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	9551	9881	10214	10558	10916	11253	11590	11927	12264	12600	12946	13291	13638	13984	14331
Observed Rate		3.45%	3.37%	3.37%	3.39%	3.09%	3.00%	2.91%	2.82%	2.74%	2.74%	2.67%	2.60%	2.54%	2.48%
Existing Resources	9685	9681	9795	9910	9353	8791	8795	8798	8710	8621	8652	8683	8448	8214	8306
BPA Requirements	47	77	127	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	0	3	6	10	14	17	21	25	30	34	39	44	50	55	60
MF Res MCS	0	1	2	4	5	6	7	9	10	11	13	14	16	17	18
New Manuf Housing	0	1	2	4	5	7	9	12	14	17	20	22	25	28	31
Refrigerators	0	0	0	0	2	5	8	12	15	19	23	27	32	36	41
Freezers	0	0	0	0	1	1	2	3	4	5	6	8	9	10	11
Water Heat	0	0	0	0	5	16	28	39	51	63	76	90	104	117	131
Irrigation	0	0	1	2	3	5	7	10	12	14	16	18	20	21	22
Industrial	0	2	8	19	31	43	55	68	80	92	104	116	129	141	153
New Commercial	0	11	32	52	72	89	108	127	146	166	185	203	222	241	260
Comm Lost Opps Exist	0	2	6	10	14	18	21	25	29	33	37	41	45	49	53
MF Res Weath	0	1	3	5	7	9	11	13	15	17	19	21	23	25	27
SF Res Weath	0	1	4	8	11	15	18	22	26	29	33	36	39	40	40
Comm Discret Ex	0	2	7	14	21	28	35	42	49	56	63	71	76	76	76
Subtotal	0	24	71	128	191	259	330	407	481	556	634	711	790	856	923
GENERATING RESOURCES:															
Small Hydro 1 West	0	0	0	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	0	0	0	34	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	0	0	0	25	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	0	0	0	25	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	0	0	30	30	30	30	30	30	30	30	30	30	30	30	30
Combined Cycle Mix	0	0	0	0	349	349	349	349	349	349	349	349	349	349	349
Cogen1e	0	0	30	30	30	30	30	30	30	30	30	30	30	30	30
Cogen2w	0	0	180	180	180	180	180	180	180	180	180	180	180	180	180
Small Hydro 3 West	0	0	0	0	0	0	26	37	37	37	37	37	37	37	37
Small Hydro 3 East	0	0	0	0	0	0	26	52	52	52	52	52	56	56	56
Cogen2e	0	0	0	180	180	180	180	180	180	180	180	180	180	180	180
Coal1 (E. Mont)	0	0	0	0	0	0	0	188	375	563	750	938	1125	1313	1313
Cogen3w	0	0	0	0	360	360	360	360	360	360	360	360	360	360	360
Small Hydro 4 West	0	0	0	0	0	0	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	0	0	0	0	0	0	25	32	32	32	32	32	32	32	32
Cogen3e	0	0	0	0	140	360	360	360	360	360	360	360	360	360	360
Coal2 (E. Wash)	0	0	0	0	0	0	0	188	375	563	563	563	563	563	563
Cogen4w	0	0	0	0	0	620	780	780	780	780	780	780	1000	1330	1330
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	188
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	240	533	1420	2260	2522	2942	3316	3692	3879	4067	4478	4996	5184
Total Firm Resources	9732	9782	10233	10571	10964	11310	11647	12147	12507	12869	13165	13461	13716	14066	14413
Load/Resource Balance	181	-98	21	11	47	58	59	218	243	271	221	171	77	81	79

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	14754	15178	15604	16030	16458	16460	16462	16464	16466	16468	16470	16471	16473	16474	16475
Observed Rate	2.95%	2.87%	2.80%	2.73%	2.67%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
Existing Resources	8398	8383	8368	8513	8542	7194	6872	6543	6477	6261	5838	5194	5139	5051	4589
BPA Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	66	71	77	83	89	89	89	89	89	89	89	89	89	89	89
MF Res MCS	20	21	22	24	25	25	25	25	25	25	25	25	25	25	25
New Manuf Housing	33	36	38	41	44	44	44	44	44	44	44	44	44	44	44
Refrigerators	45	49	53	59	65	65	65	65	65	65	65	65	65	65	65
Freezers	12	13	14	16	18	18	18	18	18	18	18	18	18	18	18
Water Heat	144	158	173	188	203	203	203	203	203	203	203	203	203	203	203
Irrigation	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Industrial	165	177	189	202	212	212	212	212	212	212	212	212	212	212	212
New Commercial	280	300	321	343	365	365	365	365	365	365	365	365	365	365	365
Comm Lost Opps Exist	57	60	64	68	72	72	72	72	72	72	72	72	72	72	72
MF Res Weath	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
SF Res Weath	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Comm Discret Ex	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Subtotal	987	1050	1116	1189	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258
GENERATING RESOURCES:															
Small Hydro 1 West	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	30	30	30	30	30	30	30	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349
Cogen1e	30	30	30	30	30	30	30	0	0	0	0	0	0	0	0
Cogen2w	180	180	180	180	180	180	180	0	0	0	0	0	0	0	0
Small Hydro 3 West	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56
Cogen2e	180	180	180	180	180	180	180	180	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Cogen3w	360	360	360	360	360	360	360	360	360	0	0	0	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Cogen3e	360	360	360	360	360	360	360	360	360	220	0	0	0	0	0
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4w	1400	1500	1500	1500	1500	1500	1500	1500	1500	1500	880	720	720	720	720
Coal3 (E. Oregon)	375	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4e	0	80	450	670	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	1352	1607	1831	1831	2643	3907	4714	4980	5279	5822
Subtotal	5441	5809	6179	6399	6729	8081	8336	8320	8140	8452	8876	9523	9789	10088	10631
Total Firm Resources	14826	15242	15663	16101	16529	16533	16466	16121	15875	15971	15972	15975	16186	16397	16478
Load/Resource Balance	69	63	60	67	68	69	0	-346	-595	-500	-500	-500	-290	-80	0

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Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	16475	16474	16474	16473	16472	16472	16471	16471	16470	16470	16469	16468	16464	16461	16457
Observed Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.01%	-0.02%	-0.02%	-0.02%
Existing Resources	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143
BPA Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89
MF Res MCS	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
New Manuf Housing	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44
Refrigerators	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
Freezers	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Water Heat	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203
Irrigation	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Industrial	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212
New Commercial	365	365	365	365	365	365	365	365	365	365	365	365	365	365	365
Comm Lost Opps Exist	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72
MF Res Weath	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
SF Res Weath	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Comm Discret Ex	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Subtotal	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258
GENERATING RESOURCES:															
Small Hydro 1 West	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4w	720	720	500	170	170	100	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4e	1000	1000	1000	1000	1000	1000	920	550	330	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	6268	6268	6486	6816	7164	7233	7413	7782	8002	8331	8331	8331	8331	8331	8331
Subtotal	11077	11077	11075	11075	11074	11073	11073	11072	11072	11071	11071	11071	11071	11071	11071
Total Firm Resources	16478	16478	16476	16476	16475	16474	16474	16473	16473	16472	16472	16472	16472	16472	16472
Load/Resource Balance	0	1	0	0	0	0	0	0	0	0	0	2	5	9	12

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
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Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	16454	16451	16448	16446	16443	16441	16438	16436	16434	16431	16429	16428	16427	16427	16427
Observed Rate	-0.02%	-0.02%	-0.02%	-0.02%	-0.02%	-0.02%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	0.00%	0.00%
Existing Resources	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143
BPA Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89
MF Res MCS	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
New Manuf Housing	44	43	42	40	38	37	34	32	29	27	24	21	19	16	13
Refrigerators	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
Freezers	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Water Heat	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203
Irrigation	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Industrial	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212
New Commercial	365	365	365	365	365	365	365	365	365	365	365	365	365	365	365
Comm Lost Opps Exist	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72
MF Res Weath	27	27	27	27	27	27	26	24	22	20	18	16	14	12	10
SF Res Weath	40	40	40	40	40	40	39	36	32	29	25	21	18	14	11
Comm Discret Ex	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Subtotal	1258	1257	1256	1254	1252	1251	1246	1239	1230	1223	1214	1205	1198	1189	1181
GENERATING RESOURCES:															
Small Hydro 1 West	29	29	29	29	29	29	29	29	0	0	0	0	0	0	0
Small Hydro 1 East	43	43	43	43	43	43	43	43	10	0	0	0	0	0	0
Small Hydro 2 West	32	32	32	32	32	32	32	32	7	0	0	0	0	0	0
Small Hydro 2 East	47	47	47	47	47	47	47	47	22	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	37	37	37	37	37	37	37	37	37	37	37	11	0	0	0
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	30	4	4	4
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1125	938	750	563	375	188	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	0	0	0	0
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	7	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	563	563	375	188	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	375	188	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	8331	8331	8687	9061	9435	9622	9811	10004	10310	10542	10736	11032	11083	11092	11100
Subtotal	11071	11071	11051	11051	11049	11049	11050	11056	11062	11067	11074	11080	11087	11096	11104
Total Firm Resources	16472	16471	16450	16448	16444	16443	16439	16438	16435	16433	16431	16428	16428	16428	16428
Load/Resource Balance	15	17	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	4284	4434	4588	4758	4922	5085	5249	5414	5579	5744	5895	6045	6196	6346	6496
Observed Rate		3.49%	3.48%	3.70%	3.44%	3.32%	3.23%	3.13%	3.05%	2.97%	2.62%	2.55%	2.49%	2.42%	2.37%
Existing Resources	2380	2378	2407	2436	2431	2431	2446	2461	2455	2449	2469	2490	2489	2489	2512
BPA Requirements	1905	2055	2181	2322	2491	2654	2803	2953	3123	3295	3425	3556	3706	3857	3984
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	4284	4434	4588	4758	4922	5085	5249	5414	5579	5744	5895	6045	6196	6346	6496
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	6672	6847	7022	7195	7368	7361	7353	7346	7340	7333	7328	7322	7317	7313	7308
Observed Rate	2.71%	2.63%	2.55%	2.47%	2.40%	-0.11%	-0.10%	-0.09%	-0.09%	-0.08%	-0.08%	-0.07%	-0.07%	-0.06%	-0.06%
Existing Resources	2534	2534	2534	2534	2520	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4138	4313	4487	4661	4849	5000	4992	4985	4979	4973	4967	4962	4957	4952	4948
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	6672	6847	7022	7195	7368	7361	7353	7346	7340	7334	7328	7322	7317	7313	7308
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	7305	7303	7300	7298	7296	7294	7292	7290	7289	7287	7286	7285	7286	7287	7288
Observed Rate	-0.04%	-0.04%	-0.03%	-0.03%	-0.03%	-0.03%	-0.03%	-0.02%	-0.02%	-0.02%	-0.02%	-0.01%	0.01%	0.01%	0.01%
Existing Resources	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4944	4942	4940	4937	4935	4933	4931	4930	4928	4926	4925	4924	4925	4926	4927
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	7305	7303	7300	7298	7296	7294	7292	7290	7289	7287	7286	7285	7286	7287	7288
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	7288	7289	7290	7291	7291	7292	7293	7293	7294	7294	7295	7295	7295	7295	7295
Observed Rate	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.00%	-0.01%	-0.01%
Existing Resources	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4928	4929	4929	4930	4931	4931	4932	4933	4933	4934	4934	4935	4935	4934	4934
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	7288	7289	7290	7291	7291	7292	7293	7293	7294	7294	7295	7295	7295	7295	7295
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	17723	18317	18922	19551	20193	20811	21431	22050	22669	23288	23899	24509	25120	25730	26341
Observed Rate		3.35%	3.30%	3.32%	3.28%	3.07%	2.97%	2.89%	2.81%	2.73%	2.62%	2.56%	2.49%	2.43%	2.37%
DSI Firm Load	2261	2268	2278	2288	2298	2308	2319	2329	2339	2350	2360	2371	2381	2392	2403
Existing Resources	20443	20605	20585	20564	19997	19429	19495	19560	19475	19389	19538	19687	19458	19229	19225
CONSERVATION PROGRAMS:															
SF Res MCS	0	8	17	26	36	44	54	65	76	87	99	111	125	137	149
MF Res MCS	0	2	3	6	7	9	11	13	15	17	19	21	24	25	27
Water Heat	0	0	0	0	9	29	50	70	91	113	136	161	185	209	234
Refrigerators	0	0	0	0	3	9	14	20	26	32	39	46	54	61	69
Freezers	0	0	0	0	1	2	4	5	7	9	10	13	15	17	19
New Manuf Housing	0	2	4	7	10	13	17	23	27	32	38	42	47	53	58
Irrigation	0	0	2	3	5	9	12	16	20	23	27	30	33	35	36
Industrial	0	4	16	36	58	81	104	128	151	174	196	219	243	266	289
New Commercial	0	18	51	83	114	142	171	201	232	264	294	322	352	382	413
Comm Discret Ex	0	2	9	22	37	52	67	82	97	112	127	143	155	161	162
Comm Lost Opps Exist	0	2	8	16	23	31	37	45	52	60	68	75	83	90	98
SF Res Weath	0	1	6	14	23	33	41	51	60	69	79	87	96	102	102
MF Res Weath	0	1	3	6	9	11	14	17	19	22	25	27	30	33	35
Subtotal	0	40	119	219	335	465	596	736	873	1014	1157	1297	1442	1571	1691
GENERATING RESOURCES:															
Hydro Eff Imp	0	0	20	40	40	40	60	80	100	100	100	100	100	100	100
Trans Eff Imp	0	0	11	22	22	22	22	23	34	34	34	34	34	34	34
Small Hydro 1 East	0	0	0	48	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	0	0	0	36	58	58	58	58	61	61	61	61	61	61	61
Small Hydro 3 East	0	0	0	0	0	0	26	52	52	52	63	63	67	67	75
Small Hydro 4 East	0	0	0	0	0	0	25	32	32	32	32	32	32	32	32
Small Hydro 1 West	0	0	0	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	0	0	0	36	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	0	0	0	0	0	0	26	37	37	37	48	48	48	48	48
Small Hydro 4 West	0	0	0	0	0	0	25	25	25	25	25	25	25	25	32
Combined Cycle BPA	0	0	0	0	0	0	0	0	0	0	0	0	349	349	697
Combined Cycle Mix	0	0	0	0	349	349	349	349	349	698	698	698	698	698	698
Cogen1e	0	0	40	40	40	40	40	40	40	40	40	40	40	40	40
Cogen2e	0	0	60	240	240	240	240	240	240	240	240	240	240	240	240
Cogen3e	0	0	0	0	260	480	480	480	480	480	480	480	480	480	480
Cogen4e	0	0	0	0	0	160	340	500	500	500	500	500	500	500	500
Cogen1w	0	0	40	40	40	40	40	40	40	40	40	40	40	40	40
Cogen2w	0	0	240	240	240	240	240	240	240	240	240	240	240	240	240
Cogen3w	0	0	0	0	480	480	480	480	480	480	480	480	480	480	480
Cogen4w	0	0	0	0	440	1120	1280	1280	1280	1280	1280	1280	1500	1830	1830
Coal1 (E. Mont)	0	0	0	0	0	0	0	188	375	563	750	938	1125	1313	1313
Coal2 (E. Wash)	0	0	0	0	0	0	0	188	375	563	563	563	563	563	563
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	188
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNP 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNP 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	45	90	90
Geothermal2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	411	781	2348	3408	3870	4471	4879	5604	5813	6001	6806	7369	7920
Total Firm Resources	20443	20645	21115	21563	22680	23302	23963	24764	25227	26007	26508	26988	27705	28169	28834
Load/Resource Balance	459	61	-85	-276	190	183	214	386	219	369	249	108	203	47	90

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	27069	27796	28524	29251	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979
Observed Rate	2.76%	2.69%	2.62%	2.55%	2.49%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DSI Firm Load	2413	2424	2435	2446	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	19221	19312	19402	19478	19423	17845	17453	17054	16917	16631	16119	15204	15079	14861	13677
CONSERVATION PROGRAMS:															
SF Res MCS	162	174	188	201	215	215	215	215	215	215	215	215	215	215	215
MF Res MCS	30	31	33	36	37	37	37	37	37	37	37	37	37	37	37
Water Heat	257	282	309	336	362	362	362	362	362	362	362	362	362	362	362
Refrigerators	76	83	90	100	110	110	110	110	110	110	110	110	110	110	110
Freezers	20	22	24	27	30	30	30	30	30	30	30	30	30	30	30
New Manuf Housing	62	68	72	77	83	83	83	83	83	83	83	83	83	83	83
Irrigation	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Industrial	311	334	357	381	400	400	400	400	400	400	400	400	400	400	400
New Commercial	444	476	510	544	579	579	579	579	579	579	579	579	579	579	579
Comm Discret Ex	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
Comm Lost Opps Exist	106	112	120	127	135	135	135	135	135	135	135	135	135	135	135
SF Res Weath	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102
MF Res Weath	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Subtotal	1804	1918	2039	2165	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287
GENERATING RESOURCES:															
Hydro Eff Imp	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Trans Eff Imp	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 East	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61
Small Hydro 3 East	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
Small Hydro 4 East	32	32	32	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 1 West	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
Small Hydro 4 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Combined Cycle BPA	697	697	697	697	697	697	697	697	697	697	697	697	697	697	697
Combined Cycle Mix	698	698	698	698	698	698	698	698	698	698	698	698	698	698	698
Cogen1e	40	40	40	40	40	40	40	0	0	0	0	0	0	0	0
Cogen2e	240	240	240	240	240	240	240	180	0	0	0	0	0	0	0
Cogen3e	480	480	480	480	480	480	480	480	480	220	0	0	0	0	0
Cogen4e	500	580	950	1170	1500	1500	1500	1500	1500	1500	1340	1160	1000	1000	1000
Cogen1w	40	40	40	40	40	40	40	0	0	0	0	0	0	0	0
Cogen2w	240	240	240	240	240	240	240	0	0	0	0	0	0	0	0
Cogen3w	480	480	480	480	480	480	480	480	480	0	0	0	0	0	0
Cogen4w	1900	2000	2000	2000	2000	2000	2000	2000	2000	1560	880	720	720	720	720
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal3 (E. Oregon)	375	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	1352	1607	1831	1887	3448	5019	6275	6770	7206	8470
WNP 3	0	0	0	0	806	806	806	806	806	806	806	806	806	806	806
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
Geothermal1	0	0	0	9	9	9	9	9	9	9	9	9	9	0	0
Geothermal2	135	180	225	270	270	270	270	270	270	270	270	270	270	270	270
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	17	33	33	33	33	33	33	33	33	33	33	33	33
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	9035	9448	9880	10177	11313	12665	12920	12764	12640	13021	13532	14448	14783	15210	16474
Total Firm Resources	30059	30678	31320	31817	33021	32795	32658	32103	31841	31936	31936	31937	32147	32356	32436
Load/Resource Balance	577	458	361	119	585	359	222	-333	-595	-500	-500	-499	-289	-80	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979
Observed Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231
CONSERVATION PROGRAMS:															
SF Res MCS	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215
MF Res MCS	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Water Heat	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362
Refrigerators	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
Freezers	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
New Manuf Housing	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83
Irrigation	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Industrial	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
New Commercial	579	579	579	579	579	579	579	579	579	579	579	579	579	579	579
Comm Discret Ex	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
Comm Lost Opps Exist	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135
SF Res Weath	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102
MF Res Weath	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Subtotal	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287
GENERATING RESOURCES:															
Hydro Eff Imp	100	100	80	60	60	60	40	20	0	0	0	0	0	0	0
Trans Eff Imp	34	34	23	12	12	12	12	11	0	0	0	0	0	0	0
Small Hydro 1 East	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61
Small Hydro 3 East	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
Small Hydro 4 East	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 1 West	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
Small Hydro 4 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Combined Cycle BPA	697	697	697	697	697	697	697	697	697	697	697	697	349	349	0
Combined Cycle Mix	698	698	698	698	349	349	349	349	349	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	1000	1000	1000	1000	1000	1000	920	550	330	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	720	720	500	170	170	100	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	8916	8917	9167	9529	9877	9947	10147	10538	10789	11467	11468	11469	11866	11915	12267
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	270	270	270	270	270	270	270	270	270	270	270	270	225	180	180
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	16920	16921	16920	16921	16920	16920	16920	16920	16920	16919	16920	16921	16925	16929	16932
Total Firm Resources	32436	32437	32436	32437	32436	32436	32436	32436	32436	32435	32436	32437	32441	32445	32448
Load/Resource Balance	0	1	0	1	0	0	0	0	0	0	1	2	5	9	12

Study ID : 15-JUL-91 07:20:50
Study Title: COGENERATION ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979
Observed Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231
CONSERVATION PROGRAMS:															
SF Res MCS	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215
MF Res MCS	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Water Heat	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362
Refrigerators	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
Freezers	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
New Manuf Housing	83	81	79	76	72	69	65	60	55	51	45	40	36	30	25
Irrigation	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Industrial	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
New Commercial	579	579	579	579	579	579	579	579	579	579	579	579	579	579	579
Comm Discret Ex	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
Comm Lost Opps Exist	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135
SF Res Weath	102	102	102	102	102	102	101	96	88	79	70	60	51	42	33
MF Res Weath	36	36	36	36	36	36	35	33	30	27	25	22	19	17	14
Subtotal	2287	2285	2283	2280	2276	2273	2267	2255	2239	2223	2206	2188	2172	2155	2138
GENERATING RESOURCES:															
Hydro Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trans Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 East	57	57	57	57	57	57	57	57	10	0	0	0	0	0	0
Small Hydro 2 East	61	61	61	61	61	61	61	61	26	4	4	4	4	0	0
Small Hydro 3 East	75	75	75	75	75	75	75	75	75	75	75	49	23	23	23
Small Hydro 4 East	39	39	39	39	39	39	39	39	39	39	39	14	7	7	7
Small Hydro 1 West	39	39	39	39	39	39	39	39	0	0	0	0	0	0	0
Small Hydro 2 West	43	43	43	43	43	43	43	43	7	0	0	0	0	0	0
Small Hydro 3 West	48	48	48	48	48	48	48	48	48	48	48	22	11	11	11
Small Hydro 4 West	32	32	32	32	32	32	32	32	32	32	32	7	7	7	7
Combined Cycle BPA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1125	938	750	563	375	188	0	0	0	0	0	0	0
Coal2 (E. Wash)	563	563	375	188	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	375	188	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	12315	12364	12769	13192	13570	13761	13954	14154	14515	14758	15775	16082	16159	16197	17019
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	0
WNP 1	813	813	813	813	813	813	813	813	813	813	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	135	90	45	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	33	33	33	33	33	33	33	33	33	33	33	33		0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	16935	16939	16923	16927	16929	16933	16938	16951	16967	16983	17000	17017	17034	17051	17067
Total Firm Resources	32451	32453	32436	32436	32436	32436	32435	32436	32436	32436	32436	32436	32435	32436	32435
Load/Resource Balance	15	18	0	0	0	0	-1	0	0	0	0	0	0	0	-1

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Study Title: CTS ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	3888	4002	4120	4235	4355	4473	4591	4709	4826	4944	5058	5173	5286	5400	5514
Observed Rate		2.95%	2.94%	2.78%	2.84%	2.71%	2.63%	2.56%	2.50%	2.43%	2.32%	2.26%	2.20%	2.15%	2.10%
DSI Firm Load	2261	2268	2278	2288	2298	2308	2319	2329	2339	2350	2360	2371	2381	2392	2403
Existing Resources	8379	8546	8382	8219	8213	8208	8255	8302	8310	8319	8417	8515	8521	8527	8408
BPA Requirements	-1952	-2132	-2308	-2322	-2491	-2654	-2803	-2953	-3123	-3295	-3425	-3556	-3706	-3857	-3984
CONSERVATION PROGRAMS:															
SF Res MCS	0	5	11	16	22	27	33	40	46	53	60	67	75	82	89
MF Res MCS	0	1	1	2	2	3	4	4	5	6	6	7	8	8	9
New Manuf Housing	0	1	2	3	5	6	8	11	13	15	18	20	22	25	27
Water Heat	0	0	0	0	4	13	22	31	40	50	60	71	81	92	103
Refrigerators	0	0	0	0	1	4	6	8	11	13	16	19	22	25	28
Freezers	0	0	0	0	0	1	2	2	3	4	4	5	6	7	8
Irrigation	0	0	1	1	2	4	5	6	8	9	11	12	13	14	14
Industrial	0	2	8	17	27	38	49	60	71	82	92	103	114	125	136
New Commercial	0	7	19	31	42	53	63	74	86	98	109	119	130	141	153
Comm Lost Opps Exist	0	2	6	9	13	16	20	23	27	31	34	38	41	45	49
MF Res Weath	0	0	1	2	2	3	4	4	5	6	6	7	8	8	9
SF Res Weath	0	2	6	12	18	23	29	34	40	46	51	57	62	62	62
Comm Discret Ex	0	2	8	16	24	32	40	48	56	64	72	79	85	86	86
Subtotal	0	22	63	109	162	223	285	345	411	477	53	604	667	720	773
GENERATING RESOURCES:															
Combined Cycle Mix	0	0	0	0	349	349	349	349	349	349	349	349	349	349	349
Combined Cycle BPA	0	0	0	0	349	697	697	697	697	697	697	697	697	697	697
Hydro Eff Imp	0	0	20	40	60	80	81	100	100	100	100	100	100	100	100
Trans Eff Imp	0	0	11	22	22	23	23	34	34	34	34	34	34	34	34
Small Hydro 1 West	0	0	0	10	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	0	0	0	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	0	0	0	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	0	0	0	11	11	11	11	14	14	14	14	14	14	14	14
Cogen1w	0	0	10	10	10	10	10	10	10	10	10	10	10	10	10
Cogen1e	0	0	10	10	10	10	10	10	10	10	10	10	10	10	10
Cogen2w	0	0	60	60	60	60	60	60	60	60	60	60	60	60	60
Small Hydro 3 West	0	0	0	0	0	0	0	11	11	11	11	11	11	11	11
WNP 1	0	0	0	0	0	0	0	0	0	813	813	813	813	813	813
WNP 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	806
Small Hydro 3 East	0	0	0	0	0	0	0	0	0	0	0	0	0	11	11
Cogen2e	0	0	0	0	0	0	0	60	60	60	60	60	60	60	60
Cogen3w	0	0	0	0	0	0	0	20	120	120	120	120	120	120	120
Geothermal2	0	0	0	0	0	0	0	0	45	45	45	45	90	135	157
Small Hydro 4 West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 East	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	111	188	906	1275	1276	1400	1545	2358	2358	2358	2403	2469	3297
Total Firm Resources	6428	6435	6248	6194	6791	7051	7012	7094	7143	7859	7888	7921	7884	7859	8493
Load/Resource Balance	278	165	-151	-330	137	269	101	57	-24	562	470	378	217	67	576

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Study Title: CTS ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	5642	5771	5898	6026	6153	6158	6164	6169	6173	6178	6182	6185	6189	6192	6195
Observed Rate	2.34%	2.27%	2.22%	2.16%	2.11%	0.09%	0.09%	0.08%	0.07%	0.07%	0.07%	0.06%	0.06%	0.05%	0.05%
DSI Firm Load	2413	2424	2435	2446	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	8289	8394	8500	8431	8362	8291	8220	8150	8079	8009	7920	7650	7579	7449	6727
BPA Requirements	-4138	-4313	-4487	-4661	-4849	-5000	-4992	-4985	-4979	-4973	-4967	-4962	-4957	-4952	-4948
CONSERVATION PROGRAMS:															
SF Res MCS	96	103	111	118	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	10	10	11	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	29	32	34	36	39	39	39	39	39	39	39	39	39	39	39
Water Heat	113	124	136	148	159	159	159	159	159	159	159	159	159	159	159
Refrigerators	31	34	37	41	45	45	45	45	45	45	45	45	45	45	45
Freezers	8	9	10	11	12	12	12	12	12	12	12	12	12	12	12
Irrigation	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Industrial	146	157	168	179	188	188	188	188	188	188	188	188	188	188	188
New Commercial	164	176	189	201	214	214	214	214	214	214	214	214	214	214	214
Comm Lost Opps Exist	52	56	59	63	67	67	67	67	67	67	67	67	67	67	67
MF Res Weath	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
SF Res Weath	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
Comm Discret Ex	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal	820	872	926	980	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033
GENERATING RESOURCES:															
Combined Cycle Mix	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349
Combined Cycle BPA	697	697	697	697	697	697	697	697	697	697	697	697	697	697	697
Hydro Eff Imp	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Trans Eff Imp	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 West	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Cogen1w	10	10	10	10	10	10	10	0	0	0	0	0	0	0	0
Cogen1e	10	10	10	10	10	10	10	0	0	0	0	0	0	0	0
Cogen2w	60	60	60	60	60	60	60	0	0	0	0	0	0	0	0
Small Hydro 3 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
Small Hydro 3 East	11	11	19	19	19	19	19	19	19	19	19	19	19	19	19
Cogen2e	60	60	60	60	60	60	60	60	60	60	60	60	0	0	0
Cogen3w	120	120	120	120	120	120	120	120	120	120	120	120	100	0	0
Geothermal2	202	248	293	338	383	383	383	383	383	383	383	383	383	383	383
Small Hydro 4 West	0	0	7	7	7	7	7	7	7	7	7	7	7		7
Small Hydro 4 East	0	0	4	11	11	11	11	11	11	11	11	11	11	11	11
Cogen3e	10	10	10	120	120	120	120	120	120	120	120	120	120	120	120
Cogen4w	0	0	0	160	460	460	460	460	460	460	460	460	460	460	460
Coal1 (E. Mont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	226	241	390	401	401	401	401	572	1130	1981
Subtotal	3342	3388	3452	3774	4119	4345	4360	4429	4440	4440	4440	4440	4531	4989	5840
Total Firm Resources	8313	8341	8390	8524	8665	8669	8621	8626	8573	8509	8426	8161	8186	8519	8652
Load/Resource Balance	260	147	55	51	55	53	0	0	-57	-126	-213	-482	-460	-130	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	6199	6202	6205	6208	6211	6214	6216	6218	6220	6222	6224	6226	6229	6231	6234
Observed Rate	0.05%	0.05%	0.05%	0.05%	0.04%	0.04%	0.04%	0.04%	0.03%	0.03%	0.03%	0.03%	0.04%	0.04%	0.04%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727
BPA Requirements	-4944	-4942	-4940	-4937	-4935	-4933	-4931	-4930	-4928	-4926	-4925	-4924	-4925	-4926	-4927
CONSERVATION PROGRAMS:															
SF Res MCS	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Water Heat	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159
Refrigerators	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Freezers	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Irrigation	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Industrial	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
New Commercial	214	214	214	214	214	214	214	214	214	214	214	214	214	214	214
Comm Lost Opps Exist	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67
MF Res Weath	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
SF Res Weath	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
Comm Discret Ex	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033
GENERATING RESOURCES:															
Combined Cycle Mix	349	349	349	349	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle BPA	697	697	697	697	349	0	0	0	0	0	0	0	0	0	0
Hydro Eff Imp	100	100	80	60	40	20	19	0	0	0	0	0	0	0	0
Trans Eff Imp	34	34	23	12	12	11	11	0	0	0	0	0	0	0	0
Small Hydro 1 West	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
Small Hydro 3 East	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	383	383	383	383	383	383	383	383	338	338	338	338	293	248	225
Small Hydro 4 West	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Small Hydro 4 East	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Cogen3e	120	120	120	110	110	110	110	110	0	0	0	0	0	0	0
Cogen4w	460	460	460	460	460	460	460	460	300	0	0	0	0	0	0
Coal1 (E. Mont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	1982	1982	2014	2056	2774	3144	3145	3176	3491	3792	3792	3794	3842	3891	3917
Subtotal	5841	5841	5842	5843	5844	5844	5844	5845	5845	5846	5846	5848	5851	5855	5858
Total Firm Resources	8657	8659	8662	8666	8669	8671	8673	8675	8677	8680	8681	8684	8686	8689	8691
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	6236	6239	6241	6243	6245	6247	6248	6250	6252	6253	6255	6256	6257	6257	6258
Observed Rate	0.04%	0.04%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.02%	0.02%	0.01%	0.01%	0.01%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727
BPA Requirements	-4928	-4929	-4929	-4930	-4931	-4931	-4932	-4933	-4933	-4934	-4934	-4935	-4935	-4934	-4934
CONSERVATION PROGRAMS:															
SF Res MCS	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	39	38	37	36	34	32	31	28	26	24	21	19	17	14	12
Water Heat	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159
Refrigerators	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Freezers	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Irrigation	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Industrial	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
New Commercial	214	214	214	214	214	214	214	214	214	214	214	214	214	214	214
Comm Lost Opps Exist	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67
MF Res Weath	9	9	9	9	9	9	9	8	7	7	6	5	5	4	3
SF Res Weath	62	62	62	62	62	62	60	56	50	45	39	33	28	22	17
Comm Discret Ex	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal	1033	1032	1031	1030	1028	1026	1023	1015	1006	999	989	980	973	963	955
GENERATING RESOURCES:															
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle BPA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydro Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trans Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 West	10	10	10	10	10	10	10	10	0	0	0	0	0	0	0
Small Hydro 1 East	14	14	14	14	14	14	14	14	0	0	0	0	0	0	0
Small Hydro 2 West	11	11	11	11	11	11	11	11	0	0	0	0	0	0	0
Small Hydro 2 East	14	14	14	14	14	14	14	14	4	4	4	4	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	11	11	11	11	11	11	11	11	11	11	11	11	0	0	0
WNP 1	813	813	813	813	0	0	0	0	0	0	0	0	0	0	0
WNP 3	806	806	806	806	806	806	806	806	806	0	0	0	0	0	0
Small Hydro 3 East	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	180	135	90	45	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Small Hydro 4 East	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	3965	4014	4063	4112	4973	4977	4984	4994	5050	5867	5877	5888	5912	5921	5930
Subtotal	5861	5865	5869	5873	5876	5880	5887	5897	5908	5919	5929	5940	5949	5958	5967
Total Firm Resources	8693	8695	8698	8700	8700	8702	8705	8706	8708	8711	8711	8712	8714	8714	8715
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	9551	9881	10214	10558	10916	11253	11590	11927	12264	12600	12946	13291	13638	13984	14331
Observed Rate		3.45%	3.37%	3.37%	3.39%	3.09%	3.00%	2.91%	2.82%	2.74%	2.74%	2.67%	2.60%	2.54%	2.48%
Existing Resources	9685	9681	9795	9910	9353	8791	8795	8798	8710	8621	8652	8683	8448	8214	8306
BPA Requirements	47	77	127	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	0	3	6	10	14	17	21	25	30	34	39	44	50	55	60
MF Res MCS	0	1	2	4	5	6	7	9	10	11	13	14	16	17	18
New Manuf Housing	0	1	2	4	5	7	9	12	14	17	20	22	25	28	31
Refrigerators	0	0	0	0	2	5	8	12	15	19	23	27	32	36	41
Freezers	0	0	0	0	1	1	2	3	4	5	6	8	9	10	11
Water Heat	0	0	0	0	5	16	28	39	51	63	76	90	104	117	131
Irrigation	0	0	1	2	3	5	7	10	12	14	16	18	20	21	22
Industrial	0	2	8	19	31	43	55	68	80	92	104	116	129	141	153
New Commercial	0	11	32	52	72	89	108	127	146	166	185	203	222	241	260
Comm Lost Opps Exist	0	2	6	10	14	18	21	25	29	33	37	41	45	49	53
MF Res Weath	0	1	3	5	7	9	11	13	15	17	19	21	23	25	27
SF Res Weath	0	1	4	8	11	15	18	22	26	29	33	36	39	40	40
Comm Discret Ex	0	2	7	14	21	28	35	42	49	56	63	71	76	76	76
Subtotal	0	24	71	128	191	259	330	407	481	556	634	711	790	856	923
GENERATING RESOURCES:															
Small Hydro 1 West	0	0	0	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	0	0	0	34	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	0	0	0	25	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	0	0	0	25	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	0	0	30	30	30	30	30	30	30	30	30	30	30	30	30
Combined Cycle Mix	0	0	0	0	349	349	349	349	349	349	349	349	349	349	349
Cogen1e	0	0	30	30	30	30	30	30	30	30	30	30	30	30	30
Cogen2w	0	0	180	180	180	180	180	180	180	180	180	180	180	180	180
Small Hydro 3 West	0	0	0	0	0	0	26	37	37	37	37	37	37	37	37
Small Hydro 3 East	0	0	0	0	0	0	26	52	52	52	52	52	56	56	56
Cogen2e	0	0	0	180	180	180	180	180	180	180	180	180	180	180	180
Coal1 (E. Mont)	0	0	0	0	0	0	0	188	375	563	750	938	1125	1313	1313
Cogen3w	0	0	0	0	360	360	360	360	360	360	360	360	360	360	360
Small Hydro 4 West	0	0	0	0	0	0	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	0	0	0	0	0	0	25	32	32	32	32	32	32	32	32
Cogen3e	0	0	0	0	140	360	360	360	360	360	360	360	360	360	360
Coal2 (E. Wash)	0	0	0	0	0	0	0	188	375	563	563	563	563	563	563
Cogen4w	0	0	0	0	0	620	780	780	780	780	780	780	1000	1330	1330
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	188
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	240	533	1420	2260	2522	2942	3316	3692	3879	4067	4478	4996	5184
Total Firm Resources	9732	9782	10233	10571	10964	11310	11647	12147	12507	12869	13165	13461	13716	14066	14413
Load/Resource Balance	181	-98	21	11	47	58	59	218	243	271	221	171	77	81	79

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	14754	15178	15604	16030	16458	16460	16462	16464	16466	16468	16470	16471	16473	16474	16475
Observed Rate	2.95%	2.87%	2.80%	2.73%	2.67%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
Existing Resources	8398	8383	8368	8513	8542	7194	6872	6543	6477	6261	5838	5194	5139	5051	4589
BPA Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	66	71	77	83	89	89	89	89	89	89	89	89	89	89	89
MF Res MCS	20	21	22	24	25	25	25	25	25	25	25	25	25	25	25
New Manuf Housing	33	36	38	41	44	44	44	44	44	44	44	44	44	44	44
Refrigerators	45	49	53	59	65	65	65	65	65	65	65	65	65	65	65
Freezers	12	13	14	16	18	18	18	18	18	18	18	18	18	18	18
Water Heat	144	158	173	188	203	203	203	203	203	203	203	203	203	203	203
Irrigation	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Industrial	165	177	189	202	212	212	212	212	212	212	212	212	212	212	212
New Commercial	280	300	321	343	365	365	365	365	365	365	365	365	365	365	365
Comm Lost Opps Exist	57	60	64	68	72	72	72	72	72	72	72	72	72	72	72
MF Res Weath	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
SF Res Weath	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Comm Discret Ex	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Subtotal	987	1050	1116	1189	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258
GENERATING RESOURCES:															
Small Hydro 1 West	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	30	30	30	30	30	30	30	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349
Cogen1e	30	30	30	30	30	30	30	0	0	0	0	0	0	0	0
Cogen2w	180	180	180	180	180	180	180	0	0	0	0	0	0	0	0
Small Hydro 3 West	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56
Cogen2e	180	180	180	180	180	180	180	180	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Cogen3w	360	360	360	360	360	360	360	360	360	0	0	0	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Cogen3e	360	360	360	360	360	360	360	360	360	220	0	0	0	0	0
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4w	1400	1500	1500	1500	1500	1500	1500	1500	1500	1500	880	720	720	720	720
Coal3 (E. Oregon)	375	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4e	0	80	450	670	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	1352	1607	1831	1831	2643	3907	4714	4980	5279	5822
Subtotal	5441	5809	6179	6399	6729	8081	8336	8320	8140	8452	8876	9523	9789	10088	10631
Total Firm Resources	14826	15242	15663	16101	16529	16533	16466	16121	15875	15971	15972	15975	16186	16397	16478
Load/Resource Balance	69	63	60	67	68	69	0	-346	-595	-500	-500	-500	-290	-80	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	16475	16474	16474	16473	16472	16472	16471	16471	16470	16470	16469	16468	16464	16461	16457
Observed Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.01%	-0.02%	-0.02%	-0.02%
Existing Resources	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143
BPA Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89
MF Res MCS	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
New Manuf Housing	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44
Refrigerators	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
Freezers	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Water Heat	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203
Irrigation	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Industrial	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212
New Commercial	365	365	365	365	365	365	365	365	365	365	365	365	365	365	365
Comm Lost Opps Exist	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72
MF Res Weath	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
SF Res Weath	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Comm Discret Ex	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Subtotal	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258
GENERATING RESOURCES:															
Small Hydro 1 West	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4w	720	720	500	170	170	100	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4e	1000	1000	1000	1000	1000	1000	920	550	330	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	6268	6268	6486	6816	7164	7233	7413	7782	8002	8331	8331	8331	8331	8331	8331
Subtotal	11077	11077	11075	11075	11074	11073	11073	11072	11072	11071	11071	11071	11071	11071	11071
Total Firm Resources	16478	16478	16476	16476	16475	16474	16474	16473	16473	16472	16472	16472	16472	16472	16472
Load/Resource Balance	0	1	0	0	0	0	0	0	0	0	0	2	5	9	12

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	16454	16451	16448	16446	16443	16441	16438	16436	16434	16431	16429	16428	16427	16427	16427
Observed Rate	-0.02%	-0.02%	-0.02%	-0.02%	-0.02%	-0.02%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	0.00%	0.00%
Existing Resources	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143
BPA Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89
MF Res MCS	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
New Manuf Housing	44	43	42	40	38	37	34	32	29	27	24	21	19	16	13
Refrigerators	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
Freezers	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Water Heat	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203
Irrigation	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Industrial	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212
New Commercial	365	365	365	365	365	365	365	365	365	365	365	365	365	365	365
Comm Lost Opps Exist	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72
MF Res Weath	27	27	27	27	27	27	26	24	22	20	18	16	14	12	10
SF Res Weath	40	40	40	40	40	40	39	36	32	29	25	21	18	14	11
Comm Discret Ex	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Subtotal	1258	1257	1256	1254	1252	1251	1246	1239	1230	1223	1214	1205	1198	1189	1181
GENERATING RESOURCES:															
Small Hydro 1 West	29	29	29	29	29	29	29	29	0	0	0	0	0	0	0
Small Hydro 1 East	43	43	43	43	43	43	43	43	10	0	0	0	0	0	0
Small Hydro 2 West	32	32	32	32	32	32	32	32	7	0	0	0	0	0	0
Small Hydro 2 East	47	47	47	47	47	47	47	47	22	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	37	37	37	37	37	37	37	37	37	37	37	11	0	0	0
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	30	4	4	4
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1125	938	750	563	375	188	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	0	0	0	0
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	7	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	563	563	375	188	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	375	188	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	8331	8331	8687	9061	9435	9622	9811	10004	10310	10542	10736	11032	11083	11092	11100
Subtotal	11071	11071	11051	11051	11049	11049	11050	11056	11062	11067	11074	11080	11087	11096	11104
Total Firm Resources	16472	16471	16450	16448	16444	16443	16439	16438	16435	16433	16431	16428	16428	16428	16428
Load/Resource Balance	15	17	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	4284	4434	4588	4758	4922	5085	5249	5414	5579	5744	5895	6045	6196	6346	6496
Observed Rate		3.49%	3.48%	3.70%	3.44%	3.32%	3.23%	3.13%	3.05%	2.97%	2.62%	2.55%	2.49%	2.42%	2.37%
Existing Resources	2380	2378	2407	2436	2431	2431	2446	2461	2455	2449	2469	2490	2489	2489	2512
BPA Requirements	1905	2055	2181	2322	2491	2654	2803	2953	3123	3295	3425	3556	3706	3857	3984
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	4284	4434	4588	4758	4922	5085	5249	5414	5579	5744	5895	6045	6196	6346	6496
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	6672	6847	7022	7195	7368	7361	7353	7346	7340	7333	7328	7322	7317	7313	7308
Observed Rate	2.71%	2.63%	2.55%	2.47%	2.40%	-0.11%	-0.10%	-0.09%	-0.09%	-0.08%	-0.08%	-0.07%	-0.07%	-0.06%	-0.06%
Existing Resources	2534	2534	2534	2534	2520	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4138	4313	4487	4661	4849	5000	4992	4985	4979	4973	4967	4962	4957	4952	4948
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	6672	6847	7022	7195	7368	7361	7353	7346	7340	7334	7328	7322	7317	7313	7308
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	7305	7303	7300	7298	7296	7294	7292	7290	7289	7287	7286	7285	7286	7287	7288
Observed Rate	-0.04%	-0.04%	-0.03%	-0.03%	-0.03%	-0.03%	-0.03%	-0.02%	-0.02%	-0.02%	-0.02%	-0.01%	0.01%	0.01%	0.01%
Existing Resources	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4944	4942	4940	4937	4935	4933	4931	4930	4928	4926	4925	4924	4925	4926	4927
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	7305	7303	7300	7298	7296	7294	7292	7290	7289	7287	7286	7285	7286	7287	7288
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	7288	7289	7290	7291	7291	7292	7293	7293	7294	7294	7295	7295	7295	7295	7295
Observed Rate	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.00%	-0.01%	-0.01%
Existing Resources	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4928	4929	4929	4930	4931	4931	4932	4933	4933	4934	4934	4935	4935	4934	4934
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	7288	7289	7290	7291	7291	7292	7293	7293	7294	7294	7295	7295	7295	7295	7295
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: CTS ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	17723	18317	18922	19551	20193	20811	21431	22050	22669	23288	23899	24509	25120	25730	26341
Observed Rate		3.35%	3.30%	3.32%	3.28%	3.07%	2.97%	2.89%	2.81%	2.73%	2.62%	2.56%	2.49%	2.43%	2.37%
DSI Firm Load	2261	2268	2278	2288	2298	2308	2319	2329	2339	2350	2360	2371	2381	2392	2403
Existing Resources	20443	20605	20585	20564	19997	19429	19495	19560	19475	19389	19538	19687	19458	19229	19225
CONSERVATION PROGRAMS:															
SF Res MCS	0	8	17	26	36	44	54	65	76	87	99	111	125	137	149
MF Res MCS	0	2	3	6	7	9	11	13	15	17	19	21	24	25	27
Water Heat	0	0	0	0	9	29	50	70	91	113	136	161	185	209	234
Refrigerators	0	0	0	0	3	9	14	20	26	32	39	46	54	61	69
Freezers	0	0	0	0	1	2	4	5	7	9	10	13	15	17	19
New Manuf Housing	0	2	4	7	10	13	17	23	27	32	38	42	47	53	58
Irrigation	0	0	2	3	5	9	12	16	20	23	27	30	33	35	36
Industrial	0	4	16	36	58	81	104	128	151	174	196	219	243	266	289
New Commercial	0	18	51	83	114	142	171	201	232	264	294	322	352	382	413
Comm Discret Ex	0	4	15	30	45	60	75	90	105	120	135	150	161	162	162
Comm Lost Opps Exist	0	4	12	19	27	34	41	48	56	64	71	79	86	94	102
SF Res Weath	0	3	10	20	29	38	47	56	66	75	84	93	101	102	102
MF Res Weath	0	1	4	7	9	12	15	17	20	23	25	28	31	33	36
Subtotal	0	46	134	237	353	482	615	752	892	1033	1173	1315	1457	1576	1696
GENERATING RESOURCES:															
Hydro Eff Imp	0	0	20	40	60	80	81	100	100	100	100	100	100	100	100
Trans Eff Imp	0	0	11	22	22	23	23	34	34	34	34	34	34	34	34
Small Hydro 1 East	0	0	0	48	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	0	0	0	36	58	58	58	61	61	61	61	61	61	61	61
Small Hydro 3 East	0	0	0	0	0	0	26	52	52	52	52	52	56	67	67
Small Hydro 4 East	0	0	0	0	0	0	25	32	32	32	32	32	32	32	32
Small Hydro 1 West	0	0	0	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	0	0	0	36	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	0	0	0	0	0	0	26	48	48	48	48	48	48	48	48
Small Hydro 4 West	0	0	0	0	0	0	25	25	25	25	25	25	25	25	25
Combined Cycle BPA	0	0	0	0	349	697	697	697	697	697	697	697	697	697	697
Combined Cycle Mix	0	0	0	0	698	698	698	698	698	698	698	698	698	698	698
Cogen1e	0	0	40	40	40	40	40	40	40	40	40	40	40	40	40
Cogen2e	0	0	0	180	180	180	180	240	240	240	240	240	240	240	240
Cogen3e	0	0	0	0	140	360	360	360	360	360	360	360	360	370	370
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1w	0	0	40	40	40	40	40	40	40	40	40	40	40	40	40
Cogen2w	0	0	240	240	240	240	240	240	240	240	240	240	240	240	240
Cogen3w	0	0	0	0	360	360	360	380	480	480	480	480	480	480	480
Cogen4w	0	0	0	0	0	620	780	780	780	780	780	780	1000	1330	1330
Coal1 (E. Mont)	0	0	0	0	0	0	0	188	375	563	750	938	1125	1313	1313
Coal2 (E. Wash)	0	0	0	0	0	0	0	188	375	563	563	563	563	563	563
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	188
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	806
WNP 3	0	0	0	0	0	0	0	0	0	813	813	813	813	813	813
WNP 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	45	45	45	45	90	135	157
Geothermal2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	351	721	2326	3535	3798	4342	4861	6050	6237	6425	6881	7465	8481
Total Firm Resources	20443	20652	21069	21520	22675	23447	23909	24654	25227	26471	26949	27429	27795	28271	29399
Load/Resource Balance	459	67	-130	-318	185	327	160	275	219	833	691	549	293	148	655

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	27069	27796	28524	29251	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979
Observed Rate	2.76%	2.69%	2.62%	2.55%	2.49%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DSI Firm Load	2413	2424	2435	2446	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	19221	19312	19402	19478	19423	17845	17453	17054	16917	16631	16119	15204	15079	14861	13677
CONSERVATION PROGRAMS:															
SF Res MCS	162	174	188	201	215	215	215	215	215	215	215	215	215	215	215
MF Res MCS	30	31	33	36	37	37	37	37	37	37	37	37	37	37	37
Water Heat	257	282	309	336	362	362	362	362	362	362	362	362	362	362	362
Refrigerators	76	83	90	100	110	110	110	110	110	110	110	110	110	110	110
Freezers	20	22	24	27	30	30	30	30	30	30	30	30	30	30	30
New Manuf Housing	62	68	72	77	83	83	83	83	83	83	83	83	83	83	83
Irrigation	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Industrial	311	334	357	381	400	400	400	400	400	400	400	400	400	400	400
New Commercial	444	476	510	544	579	579	579	579	579	579	579	579	579	579	579
Comm Discret Ex	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
Comm Lost Opps Exist	109	116	123	131	139	139	139	139	139	139	139	139	139	139	139
SF Res Weath	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102
MF Res Weath	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Subtotal	1807	1922	2042	2169	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291
GENERATING RESOURCES:															
Hydro Eff Imp	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Trans Eff Imp	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 East	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61
Small Hydro 3 East	67	67	75	75	75	75	75	75	75	75	75	75	75	75	75
Small Hydro 4 East	32	32	36	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 1 West	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
Small Hydro 4 West	25	25	32	32	32	32	32	32	32	32	32	32	32	32	32
Combined Cycle BPA	697	697	697	697	697	697	697	697	697	697	697	697	697	697	697
Combined Cycle Mix	698	698	698	698	698	698	698	698	698	698	698	698	698	698	698
Cogen1e	40	40	40	40	40	40	40	0	0	0	0	0	0	0	0
Cogen2e	240	240	240	240	240	240	240	240	60	60	60	60	0	0	0
Cogen3e	370	370	370	480	480	480	480	480	480	340	120	120	120	120	120
Cogen4e	0	80	450	670	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Cogen1w	40	40	40	40	40	40	40	0	0	0	0	0	0	0	0
Cogen2w	240	240	240	240	240	240	240	0	0	0	0	0	0	0	0
Cogen3w	480	480	480	480	480	480	480	480	480	120	120	120	100	0	0
Cogen4w	1400	1500	1500	1660	1960	1960	1960	1960	1960	1960	1340	1180	1180	1180	1180
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal3 (E. Oregon)	375	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	1578	1848	2221	2232	3044	4308	5115	5552	6409	7803
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	202	248	293	338	383	383	383	383	383	383	383	383	383	383	383
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	8783	9197	9631	10173	10848	12426	12696	12749	12580	12892	13316	13963	14320	15077	16471
Total Firm Resources	29811	30431	31074	31815	32559	32559	32436	32090	31784	31810	31722	31454	31686	32226	32435
Load/Resource Balance	329	210	115	118	123	123	1	-346	-652	-626	-714	-982	-750	-210	-1

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979
Observed Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231
CONSERVATION PROGRAMS:															
SF Res MCS	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215
MF Res MCS	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Water Heat	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362
Refrigerators	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
Freezers	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
New Manuf Housing	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83
Irrigation	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Industrial	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
New Commercial	579	579	579	579	579	579	579	579	579	579	579	579	579	579	579
Comm Discret Ex	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
Comm Lost Opps Exist	139	139	139	139	139	139	139	139	139	139	139	139	139	139	139
SF Res Weath	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102
MF Res Weath	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Subtotal	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291
GENERATING RESOURCES:															
Hydro Eff Imp	100	100	80	60	40	20	19	0	0	0	0	0	0	0	0
Trans Eff Imp	34	34	23	12	12	11	11	0	0	0	0	0	0	0	0
Small Hydro 1 East	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61
Small Hydro 3 East	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
Small Hydro 4 East	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 1 West	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
Small Hydro 4 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Combined Cycle BPA	697	697	697	697	349	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	698	698	698	698	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	120	120	120	110	110	110	110	110	0	0	0	0	0	0	0
Cogen4e	1000	1000	1000	1000	1000	1000	920	550	330	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	1180	1180	960	630	630	560	460	460	300	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	8250	8250	8500	8872	9938	10377	10558	10958	11493	12123	12123	12125	12173	12222	12248
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	383	383	383	383	383	383	383	383	338	338	338	338	293	248	225
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	16918	16918	16917	16918	16918	16917	16917	16917	16917	16917	16917	16919	16922	16926	16929
Total Firm Resources	32436	32436	32435	32436	32437	32436	32436	32436	32436	32436	32436	32438	32441	32445	32448
Load/Resource Balance	0	0	-1	0	1	0	0	0	0	0	0	2	5	9	13

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979
Observed Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231
CONSERVATION PROGRAMS:															
SF Res MCS	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215
MF Res MCS	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Water Heat	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362
Refrigerators	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
Freezers	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
New Manuf Housing	83	81	79	76	72	69	65	60	55	51	45	40	36	30	25
Irrigation	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Industrial	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
New Commercial	579	579	579	579	579	579	579	579	579	579	579	579	579	579	579
Comm Discret Ex	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
Comm Lost Opps Exist	139	139	139	139	139	139	139	139	139	139	139	139	139	139	139
SF Res Weath	102	102	102	102	102	102	99	92	82	74	64	54	46	36	28
MF Res Weath	36	36	36	36	36	36	35	32	29	27	24	21	19	16	13
Subtotal	2291	2289	2287	2284	2280	2277	2269	2254	2236	2222	2203	2185	2171	2152	2136
GENERATING RESOURCES:															
Hydro Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trans Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 East	57	57	57	57	57	57	57	57	10	0	0	0	0	0	0
Small Hydro 2 East	61	61	61	61	61	61	61	61	26	4	4	4	0	0	0
Small Hydro 3 East	75	75	75	75	75	75	75	75	75	75	75	49	23	23	23
Small Hydro 4 East	43	43	43	43	43	43	43	43	43	43	43	18	11	11	11
Small Hydro 1 West	39	39	39	39	39	39	39	39	0	0	0	0	0	0	0
Small Hydro 2 West	43	43	43	43	43	43	43	43	7	0	0	0	0	0	0
Small Hydro 3 West	48	48	48	48	48	48	48	48	48	48	48	22	0	0	0
Small Hydro 4 West	32	32	32	32	32	32	32	32	32	32	32	7	7	7	7
Combined Cycle BPA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1125	938	750	563	375	188	0	0	0	0	0	0	0
Coal2 (E. Wash)	563	563	375	188	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	375	188	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	12296	12345	12750	13173	14408	14599	14795	14998	15360	16409	16613	16920	16995	17013	17030
WNP 3	806	806	806	806	806	806	806	806	806	0	0	0	0	0	0
WNP 1	813	813	813	813	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	180	135	90	45	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	16932	16936	16920	16924	16925	16929	16937	16953	16970	16986	17003	17020	17036	17054	17071
Total Firm Resources	32451	32454	32436	32436	32436	32436	32436	32437	32436	32436	32436	32436	32435	32436	32436
Load/Resource Balance	16	18	0	0	0	0	0	1	0	0	0	0	-1	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	3888	4002	4120	4235	4355	4473	4591	4709	4826	4944	5058	5173	5286	5400	5514
Observed Rate		2.95%	2.94%	2.78%	2.84%	2.71%	2.63%	2.56%	2.50%	2.43%	2.32%	2.26%	2.20%	2.15%	2.10%
DSI Firm Load	2261	2268	2278	2288	2298	2308	2319	2329	2339	2350	2360	2371	2381	2392	2403
Existing Resources	8379	8546	8382	8219	8213	8208	8255	8302	8310	8319	8417	8515	8521	8527	8408
BPA Requirements	-1952	-2132	-2308	-2322	-2491	-2654	-2803	-2953	-3123	-3295	-3425	-3556	-3706	-3857	-3984
CONSERVATION PROGRAMS:															
SF Res MCS	0	5	11	16	22	27	33	40	46	53	60	67	75	82	89
MF Res MCS	0	1	1	2	2	3	4	4	5	6	6	7	8	8	9
New Manuf Housing	0	1	2	3	5	6	8	11	13	15	18	20	22	25	27
Water Heat	0	0	0	0	4	13	22	31	40	50	60	71	81	92	103
Refrigerators	0	0	0	0	1	4	6	8	11	13	16	19	22	25	28
Freezers	0	0	0	0	0	1	2	2	3	4	4	5	6	7	8
Irrigation	0	0	1	1	2	4	5	6	8	9	11	12	13	14	14
Industrial	0	1	6	15	25	36	47	58	68	79	90	101	112	122	133
New Commercial	0	0	7	19	31	41	52	63	74	86	97	108	119	130	141
Comm Lost Opps Exist	0	0	0	2	6	9	13	16	20	23	27	31	34	38	41
MF Res Weath	0	0	0	0	1	2	2	3	4	4	5	6	6	7	8
SF Res Weath	0	0	0	2	6	12	18	23	29	34	40	46	51	57	62
Comm Discret Ex	0	0	0	2	6	8	9	13	20	28	36	44	52	59	67
Subtotal	0	8	28	62	111	166	221	278	341	404	470	537	601	666	730
GENERATING RESOURCES:															
WNP 1	0	0	0	0	0	0	813	813	813	813	813	813	813	813	813
WNP 3	0	0	0	0	0	0	806	806	806	806	806	806	806	806	806
Hydro Eff Imp	0	0	20	40	60	80	80	80	80	80	80	98	100	100	100
Trans Eff Imp	0	0	11	22	33	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 West	0	0	0	0	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	0	0	0	0	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	0	0	0	0	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	0	0	0	0	11	11	11	11	11	11	11	11	14	14	14
Cogen1w	0	0	0	10	10	10	10	10	10	10	10	10	10	10	10
Combined Cycle Mix	0	0	0	0	349	349	349	349	349	349	349	349	349	349	349
Combined Cycle BPA	0	0	0	0	0	0	0	0	0	0	0	0	0	349	349
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	10	10	10
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	60	60	60
Small Hydro 3 West	0	0	0	0	0	0	0	0	0	0	0	0	11	11	11
Small Hydro 3 East	0	0	0	0	0	0	0	0	0	0	0	0	11	11	11
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	60	60	60
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	10	10	120
Geothermal2	0	0	0	0	0	0	0	0	0	0	0	0	0	45	90
Small Hydro 4 West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 East	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	31	72	498	519	2138	2138	2138	2138	2138	2156	2323	2717	2872
Total Firm Resources	6428	6421	6133	6031	6332	6238	7810	7765	7666	7566	7599	7652	7738	8053	8025
Load/Resource Balance	278	152	-265	-491	-322	-545	898	725	498	272	179	106	70	261	109

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	5642	5771	5898	6026	6153	6158	6164	6169	6173	6178	6182	6185	6189	6192	6195
Observed Rate	2.34%	2.27%	2.22%	2.16%	2.11%	0.09%	0.09%	0.08%	0.07%	0.07%	0.07%	0.06%	0.06%	0.05%	0.05%
DSI Firm Load	2413	2424	2435	2446	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	8289	8394	8500	8431	8362	8291	8220	8150	8079	8009	7920	7650	7579	7449	6727
BPA Requirements	-4138	-4313	-4487	-4661	-4849	-5000	-4992	-4985	-4979	-4973	-4967	-4962	-4957	-4952	-4948
CONSERVATION PROGRAMS:															
SF Res MCS	96	103	111	118	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	10	10	11	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	29	32	34	36	39	39	39	39	39	39	39	39	39	39	39
Water Heat	113	124	136	148	159	159	159	159	159	159	159	159	159	159	159
Refrigerators	31	34	37	41	45	45	45	45	45	45	45	45	45	45	45
Freezers	8	9	10	11	12	12	12	12	12	12	12	12	12	12	12
Irrigation	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Industrial	144	155	166	176	185	185	185	185	185	185	185	185	185	185	185
New Commercial	153	165	177	190	203	203	203	203	203	203	203	203	203	203	203
Comm Lost Opps Exist	45	49	52	56	59	59	59	59	59	59	59	59	59	59	59
MF Res Weath	8	9	9	9	9	9	9	9	9	9	9	9	9	9	9
SF Res Weath	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
Comm Discret Ex	75	83	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal	788	849	905	959	1011	1011	1011	1011	1011	1011	1011	1011	1011	1011	1011
GENERATING RESOURCES:															
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
Hydro Eff Imp	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Trans Eff Imp	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 West	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Cogen1w	10	10	10	10	10	10	10	10	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349
Combined Cycle BPA	697	697	697	697	697	697	697	697	697	697	697	697	697	697	697
Cogen1e	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Cogen2w	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Small Hydro 3 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 3 East	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Cogen2e	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Cogen3w	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
Geothermal2	135	180	225	270	315	315	315	315	315	315	315	315	315	315	315
Small Hydro 4 West	0	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Small Hydro 4 East	0	4	11	11	11	11	11	11	11	11	11	11	11	11	11
Cogen3e	0	0	100	120	120	120	120	120	120	120	120	120	120	120	120
Cogen4w	0	0	0	260	500	500	500	500	500	500	500	500	500	500	500
Coal1 (E. Mont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	50	50	50	50	50	50	50	50	50	50	50
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	225	239	308	387	456	474	474	611	1009	1730
Subtotal	3273	3329	3481	3806	4141	4366	4380	4449	4518	4587	4605	4605	4742	5140	5861
Total Firm Resources	8212	8259	8398	8535	8665	8668	8619	8624	8629	8634	8569	8304	8375	8648	8651
Load/Resource Balance	158	64	64	62	56	54	0	0	0	0	-69	-337	-270	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	6199	6202	6205	6208	6211	6214	6216	6218	6220	6222	6224	6226	6229	6231	6234
Observed Rate	0.05%	0.05%	0.05%	0.05%	0.04%	0.04%	0.04%	0.04%	0.03%	0.03%	0.03%	0.03%	0.04%	0.04%	0.04%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727
BPA Requirements	-4944	-4942	-4940	-4937	-4935	-4933	-4931	-4930	-4928	-4926	-4925	-4924	-4925	-4926	-4927
CONSERVATION PROGRAMS:															
SF Res MCS	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Water Heat	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159
Refrigerators	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Freezers	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Irrigation	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Industrial	185	185	185	185	185	185	185	185	185	185	185	185	185	185	185
New Commercial	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203
Comm Lost Opps Exist	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59
MF Res Weath	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
SF Res Weath	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
Comm Discret Ex	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal	1011	1011	1011	1011	1011	1011	1011	1011	1011	1011	1011	1011	1011	1011	1011
GENERATING RESOURCES:															
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
Hydro Eff Imp	100	100	80	60	40	20	20	20	20	20	20	2	0	0	0
Trans Eff Imp	34	34	23	12	1	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 West	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle BPA	697	697	697	697	697	697	697	697	697	697	697	697	697	349	349
Cogen1e	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	60	60	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 3 East	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Cogen2e	60	60	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	120	120	110	110	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	315	315	315	315	315	315	315	315	315	315	315	315	315	270	225
Small Hydro 4 West	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Small Hydro 4 East	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Cogen3e	120	120	120	120	120	120	120	20	0	0	0	0	0	0	0
Cogen4w	500	500	500	500	500	500	500	500	240	0	0	0	0	0	0
Coal1 (E. Mont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	50	50	50	50	50	50	50	50	50	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	1730	1731	1903	1934	2425	2446	2447	2547	2828	3118	3119	3138	3144	3541	3589
Subtotal	5861	5862	5863	5863	5864	5864	5865	5865	5866	5866	5867	5868	5872	5876	5879
Total Firm Resources	8655	8658	8661	8664	8667	8669	8672	8673	8676	8678	8680	8682	8685	8688	8690
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	6236	6239	6241	6243	6245	6247	6248	6250	6252	6253	6255	6256	6257	6257	6258
Observed Rate	0.04%	0.04%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.02%	0.02%	0.01%	0.01%	0.01%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727
BPA Requirements	-4928	-4929	-4929	-4930	-4931	-4931	-4932	-4933	-4933	-4934	-4934	-4935	-4935	-4934	-4934
CONSERVATION PROGRAMS:															
SF Res MCS	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	39	38	37	36	34	32	31	28	26	24	21	19	17	14	12
Water Heat	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159
Refrigerators	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Freezers	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Irrigation	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Industrial	185	185	185	185	185	185	185	185	185	185	185	185	185	185	185
New Commercial	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203
Comm Lost Opps Exist	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59
MF Res Weath	9	9	9	9	9	9	9	9	9	8	7	7	6	5	5
SF Res Weath	62	62	62	62	62	62	62	62	60	56	50	45	39	33	28
Comm Discret Ex	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal	1011	1010	1009	1008	1006	1004	1003	1000	996	989	979	972	963	953	946
GENERATING RESOURCES:															
WNP 1	813	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNP 3	806	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydro Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trans Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 West	10	10	10	10	10	10	10	10	10	0	0	0	0	0	0
Small Hydro 1 East	14	14	14	14	14	14	14	14	14	0	0	0	0	0	0
Small Hydro 2 West	11	11	11	11	11	11	11	11	11	0	0	0	0	0	0
Small Hydro 2 East	14	14	14	14	14	14	14	14	14	4	4	4	4	4	4
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle BPA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 3 East	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	180	135	90	45	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Small Hydro 4 East	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	3986	5653	5702	5751	5800	5804	5809	5813	5820	5875	5886	5896	5906	5915	5923
Subtotal	5882	5885	5889	5893	5897	5901	5906	5910	5917	5927	5938	5948	5958	5967	5975
Total Firm Resources	8692	8693	8696	8698	8699	8701	8704	8704	8707	8709	8710	8712	8713	8713	8714
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	9551	9881	10214	10558	10916	11253	11590	11927	12264	12600	12946	13291	13638	13984	14331
Observed Rate		3.45%	3.37%	3.37%	3.39%	3.09%	3.00%	2.91%	2.82%	2.74%	2.74%	2.67%	2.60%	2.54%	2.48%
Existing Resources	9685	9681	9795	9910	9353	8791	8795	8798	8710	8621	8652	8683	8448	8214	8306
BPA Requirements	47	77	127	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	0	3	6	10	14	17	21	25	30	34	39	44	50	55	60
MF Res MCS	0	1	2	4	5	6	7	9	10	11	13	14	16	17	18
New Manuf Housing	0	1	2	4	5	7	9	12	14	17	20	22	25	28	31
Refrigerators	0	0	0	0	2	5	8	12	15	19	23	27	32	36	41
Freezers	0	0	0	0	1	1	2	3	4	5	6	8	9	10	11
Water Heat	0	0	0	0	5	16	28	39	51	63	76	90	104	117	131
Irrigation	0	0	1	2	3	5	7	10	12	14	16	18	20	21	22
Industrial	0	2	8	19	31	43	55	68	80	92	104	116	129	141	153
New Commercial	0	11	32	52	72	89	108	127	146	166	185	203	222	241	260
Comm Lost Opps Exist	0	2	6	10	14	18	21	25	29	33	37	41	45	49	53
MF Res Weath	0	1	3	5	7	9	11	13	15	17	19	21	23	25	27
SF Res Weath	0	1	4	8	11	15	18	22	26	29	33	36	39	40	40
Comm Discret Ex	0	2	7	14	21	28	35	42	49	56	63	71	76	76	76
Subtotal	0	24	71	128	191	259	330	407	481	556	634	711	790	856	923
GENERATING RESOURCES:															
Small Hydro 1 West	0	0	0	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	0	0	0	34	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	0	0	0	25	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	0	0	0	25	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	0	0	30	30	30	30	30	30	30	30	30	30	30	30	30
Combined Cycle Mix	0	0	0	0	349	349	349	349	349	349	349	349	349	349	349
Cogen1e	0	0	30	30	30	30	30	30	30	30	30	30	30	30	30
Cogen2w	0	0	180	180	180	180	180	180	180	180	180	180	180	180	180
Small Hydro 3 West	0	0	0	0	0	0	26	37	37	37	37	37	37	37	37
Small Hydro 3 East	0	0	0	0	0	0	26	52	52	52	52	52	56	56	56
Cogen2e	0	0	0	180	180	180	180	180	180	180	180	180	180	180	180
Coal1 (E. Mont)	0	0	0	0	0	0	0	188	375	563	750	938	1125	1313	1313
Cogen3w	0	0	0	0	360	360	360	360	360	360	360	360	360	360	360
Small Hydro 4 West	0	0	0	0	0	0	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	0	0	0	0	0	0	25	32	32	32	32	32	32	32	32
Cogen3e	0	0	0	0	140	360	360	360	360	360	360	360	360	360	360
Coal2 (E. Wash)	0	0	0	0	0	0	0	188	375	563	563	563	563	563	563
Cogen4w	0	0	0	0	0	620	780	780	780	780	780	780	1000	1330	1330
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	188
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	240	533	1420	2260	2522	2942	3316	3692	3879	4067	4478	4996	5184
Total Firm Resources	9732	9782	10233	10571	10964	11310	11647	12147	12507	12869	13165	13461	13716	14066	14413
Load/Resource Balance	181	-98	21	11	47	58	59	218	243	271	221	171	77	81	79

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	14754	15178	15604	16030	16458	16460	16462	16464	16466	16468	16470	16471	16473	16474	16475
Observed Rate	2.95%	2.87%	2.80%	2.73%	2.67%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
Existing Resources	8398	8383	8368	8513	8542	7194	6872	6543	6477	6261	5838	5194	5139	5051	4589
BPA Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	66	71	77	83	89	89	89	89	89	89	89	89	89	89	89
MF Res MCS	20	21	22	24	25	25	25	25	25	25	25	25	25	25	25
New Manuf Housing	33	36	38	41	44	44	44	44	44	44	44	44	44	44	44
Refrigerators	45	49	53	59	65	65	65	65	65	65	65	65	65	65	65
Freezers	12	13	14	16	18	18	18	18	18	18	18	18	18	18	18
Water Heat	144	158	173	188	203	203	203	203	203	203	203	203	203	203	203
Irrigation	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Industrial	165	177	189	202	212	212	212	212	212	212	212	212	212	212	212
New Commercial	280	300	321	343	365	365	365	365	365	365	365	365	365	365	365
Comm Lost Opps Exist	57	60	64	68	72	72	72	72	72	72	72	72	72	72	72
MF Res Weath	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
SF Res Weath	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Comm Discret Ex	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Subtotal	987	1050	1116	1189	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258
GENERATING RESOURCES:															
Small Hydro 1 West	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	30	30	30	30	30	30	30	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349
Cogen1e	30	30	30	30	30	30	30	0	0	0	0	0	0	0	0
Cogen2w	180	180	180	180	180	180	180	0	0	0	0	0	0	0	0
Small Hydro 3 West	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56
Cogen2e	180	180	180	180	180	180	180	180	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Cogen3w	360	360	360	360	360	360	360	360	360	0	0	0	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Cogen3e	360	360	360	360	360	360	360	360	360	220	0	0	0	0	0
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4w	1400	1500	1500	1500	1500	1500	1500	1500	1500	1500	880	720	720	720	720
Coal3 (E. Oregon)	375	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4e	0	80	450	670	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	1352	1607	1831	1831	2643	3907	4714	4980	5279	5822
Subtotal	5441	5809	6179	6399	6729	8081	8336	8320	8140	8452	8876	9523	9789	10088	10631
Total Firm Resources	14826	15242	15663	16101	16529	16533	16466	16121	15875	15971	15972	15975	16186	16397	16478
Load/Resource Balance	69	63	60	67	68	69	0	-346	-595	-500	-500	-500	-290	-80	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
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Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	16475	16474	16474	16473	16472	16472	16471	16471	16470	16470	16469	16468	16464	16461	16457
Observed Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.01%	-0.02%	-0.02%	-0.02%
Existing Resources	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143
BPA Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89
MF Res MCS	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
New Manuf Housing	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44
Refrigerators	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
Freezers	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Water Heat	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203
Irrigation	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Industrial	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212
New Commercial	365	365	365	365	365	365	365	365	365	365	365	365	365	365	365
Comm Lost Opps Exist	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72
MF Res Weath	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
SF Res Weath	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Comm Discret Ex	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Subtotal	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258
GENERATING RESOURCES:															
Small Hydro 1 West	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4w	720	720	500	170	170	100	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4e	1000	1000	1000	1000	1000	1000	920	550	330	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	6268	6268	6486	6816	7164	7233	7413	7782	8002	8331	8331	8331	8331	8331	8331
Subtotal	11077	11077	11075	11075	11074	11073	11073	11072	11072	11071	11071	11071	11071	11071	11071
Total Firm Resources	16478	16478	16476	16476	16475	16474	16474	16473	16473	16472	16472	16472	16472	16472	16472
Load/Resource Balance	0	1	0	0	0	0	0	0	0	0	0	2	5	9	12

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Study Title: NUCLEAR ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	16454	16451	16448	16446	16443	16441	16438	16436	16434	16431	16429	16428	16427	16427	16427
Observed Rate	-0.02%	-0.02%	-0.02%	-0.02%	-0.02%	-0.02%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	0.00%	0.00%
Existing Resources	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143
BPA Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89
MF Res MCS	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
New Manuf Housing	44	43	42	40	38	37	34	32	29	27	24	21	19	16	13
Refrigerators	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
Freezers	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Water Heat	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203
Irrigation	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Industrial	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212
New Commercial	365	365	365	365	365	365	365	365	365	365	365	365	365	365	365
Comm Lost Opps Exist	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72
MF Res Weath	27	27	27	27	27	27	26	24	22	20	18	16	14	12	10
SF Res Weath	40	40	40	40	40	40	39	36	32	29	25	21	18	14	11
Comm Discret Ex	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Subtotal	1258	1257	1256	1254	1252	1251	1246	1239	1230	1223	1214	1205	1198	1189	1181
GENERATING RESOURCES:															
Small Hydro 1 West	29	29	29	29	29	29	29	29	0	0	0	0	0	0	0
Small Hydro 1 East	43	43	43	43	43	43	43	43	10	0	0	0	0	0	0
Small Hydro 2 West	32	32	32	32	32	32	32	32	7	0	0	0	0	0	0
Small Hydro 2 East	47	47	47	47	47	47	47	47	22	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	37	37	37	37	37	37	37	37	37	37	37	11	0	0	0
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	30	4	4	4
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1125	938	750	563	375	188	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	0	0	0	0
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	7	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	563	563	375	188	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	375	188	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	8331	8331	8687	9061	9435	9622	9811	10004	10310	10542	10736	11032	11083	11092	11100
Subtotal	11071	11071	11051	11051	11049	11049	11050	11056	11062	11067	11074	11080	11087	11096	11104
Total Firm Resources	16472	16471	16450	16448	16444	16443	16439	16438	16435	16433	16431	16428	16428	16428	16428
Load/Resource Balance	15	17	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: NUCLEAR ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	4284	4434	4588	4758	4922	5085	5249	5414	5579	5744	5895	6045	6196	6346	6496
Observed Rate		3.49%	3.48%	3.70%	3.44%	3.32%	3.23%	3.13%	3.05%	2.97%	2.62%	2.55%	2.49%	2.42%	2.37%
Existing Resources	2380	2378	2407	2436	2431	2431	2446	2461	2455	2449	2469	2490	2489	2489	2512
BPA Requirements	1905	2055	2181	2322	2491	2654	2803	2953	3123	3295	3425	3556	3706	3857	3984
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	4284	4434	4588	4758	4922	5085	5249	5414	5579	5744	5895	6045	6196	6346	6496
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: NUCLEAR ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	6672	6847	7022	7195	7368	7361	7353	7346	7340	7333	7328	7322	7317	7313	7308
Observed Rate	2.71%	2.63%	2.55%	2.47%	2.40%	-0.11%	-0.10%	-0.09%	-0.09%	-0.08%	-0.08%	-0.07%	-0.07%	-0.06%	-0.06%
Existing Resources	2534	2534	2534	2534	2520	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4138	4313	4487	4661	4849	5000	4992	4985	4979	4973	4967	4962	4957	4952	4948
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	6672	6847	7022	7195	7368	7361	7353	7346	7340	7334	7328	7322	7317	7313	7308
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: NUCLEAR ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	7305	7303	7300	7298	7296	7294	7292	7290	7289	7287	7286	7285	7286	7287	7288
Observed Rate	-0.04%	-0.04%	-0.03%	-0.03%	-0.03%	-0.03%	-0.03%	-0.02%	-0.02%	-0.02%	-0.02%	-0.01%	0.01%	0.01%	0.01%
Existing Resources	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4944	4942	4940	4937	4935	4933	4931	4930	4928	4926	4925	4924	4925	4926	4927
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	7305	7303	7300	7298	7296	7294	7292	7290	7289	7287	7286	7285	7286	7287	7288
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: NUCLEAR ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	7288	7289	7290	7291	7291	7292	7293	7293	7294	7294	7295	7295	7295	7295	7295
Observed Rate	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.00%	-0.01%	-0.01%
Existing Resources	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4928	4929	4929	4930	4931	4931	4932	4933	4933	4934	4934	4935	4935	4934	4934
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	7288	7289	7290	7291	7291	7292	7293	7293	7294	7294	7295	7295	7295	7295	7295
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Study ID : 15-JUL-91 07:36:52
Study Title: NUCLEAR ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	17723	18317	18922	19551	20193	20811	21431	22050	22669	23288	23899	24509	25120	25730	26341
Observed Rate		3.35%	3.30%	3.32%	3.28%	3.07%	2.97%	2.89%	2.81%	2.73%	2.62%	2.56%	2.49%	2.43%	2.37%
DSI Firm Load	2261	2268	2278	2288	2298	2308	2319	2329	2339	2350	2360	2371	2381	2392	2403
Existing Resources	20443	20605	20585	20564	19997	19429	19495	19560	19475	19389	19538	19687	19458	19229	19225
CONSERVATION PROGRAMS:															
SF Res MCS	0	8	17	26	36	44	54	65	76	87	99	111	125	137	149
MF Res MCS	0	2	3	6	7	9	11	13	15	17	19	21	24	25	27
Water Heat	0	0	0	0	9	29	50	70	91	113	136	161	185	209	234
Refrigerators	0	0	0	0	3	9	14	20	26	32	39	46	54	61	69
Freezers	0	0	0	0	1	2	4	5	7	9	10	13	15	17	19
New Manuf Housing	0	2	4	7	10	13	17	23	27	32	38	42	47	53	58
Irrigation	0	0	2	3	5	9	12	16	20	23	27	30	33	35	36
Industrial	0	3	14	34	56	79	102	126	148	171	194	217	241	263	286
New Commercial	0	11	39	71	103	130	160	190	220	252	282	311	341	371	401
Comm Discret Ex	0	2	7	16	27	36	44	55	69	84	99	115	128	135	143
Comm Lost Opps Exist	0	2	6	12	20	27	34	41	49	56	64	72	79	87	94
SF Res Weath	0	1	4	10	17	27	36	45	55	63	73	82	90	97	102
MF Res Weath	0	1	3	5	8	11	13	16	19	21	24	27	29	32	35
Subtotal	0	32	99	190	302	425	551	685	822	960	1104	1248	1391	1522	1653
GENERATING RESOURCES:															
Hydro Eff Imp	0	0	20	40	60	80	80	80	80	80	80	98	100	100	100
Trans Eff Imp	0	0	11	22	33	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 East	0	0	0	34	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	0	0	0	25	58	58	58	58	58	58	58	58	61	61	61
Small Hydro 3 East	0	0	0	0	0	0	26	52	52	52	52	52	67	67	67
Small Hydro 4 East	0	0	0	0	0	0	25	32	32	32	32	32	32	32	32
Small Hydro 1 West	0	0	0	29	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	0	0	0	25	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	0	0	0	0	0	0	26	37	37	37	37	37	48	48	48
Small Hydro 4 West	0	0	0	0	0	0	25	25	25	25	25	25	25	25	25
Combined Cycle BPA	0	0	0	0	0	0	0	0	0	0	0	0	0	349	349
Combined Cycle Mix	0	0	0	0	698	698	698	698	698	698	698	698	698	698	698
Cogen1e	0	0	30	30	30	30	30	30	30	30	30	30	40	40	40
Cogen2e	0	0	0	180	180	180	180	180	180	180	180	180	240	240	240
Cogen3e	0	0	0	0	140	360	360	360	360	360	360	360	360	360	360
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1w	0	0	30	40	40	40	40	40	40	40	40	40	40	40	40
Cogen2w	0	0	180	180	180	180	180	180	180	180	180	180	240	240	240
Cogen3w	0	0	0	0	360	360	360	360	360	360	360	360	370	370	480
Cogen4w	0	0	0	0	0	620	780	780	780	780	780	780	1000	1330	1330
Coal1 (E. Mont)	0	0	0	0	0	0	0	188	375	563	750	938	1125	1313	1313
Coal2 (E. Wash)	0	0	0	0	0	0	0	188	375	563	563	563	563	563	563
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	188
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNP 3	0	0	0	0	0	0	806	806	806	806	806	806	806	806	806
WNP 1	0	0	0	0	0	0	813	813	813	813	813	813	813	813	813
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	0	0	0	0	0	0	0	0	0	0	0	0	0	45	90
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	271	605	1918	2779	4660	5080	5454	5830	6017	6223	6801	7713	8056
Total Firm Resources	20443	20638	20955	21359	22216	22633	24706	25322	25749	26180	26659	27157	27648	28464	28932
Load/Resource Balance	459	54	-244	-480	-274	-486	956	943	741	542	400	277	147	341	188

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	27069	27796	28524	29251	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979
Observed Rate	2.76%	2.69%	2.62%	2.55%	2.49%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DSI Firm Load	2413	2424	2435	2446	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	19221	19312	19402	19478	19423	17845	17453	17054	16917	16631	16119	15204	15079	14861	13677
CONSERVATION PROGRAMS:															
SF Res MCS	162	174	188	201	215	215	215	215	215	215	215	215	215	215	215
MF Res MCS	30	31	33	36	37	37	37	37	37	37	37	37	37	37	37
Water Heat	257	282	309	336	362	362	362	362	362	362	362	362	362	362	362
Refrigerators	76	83	90	100	110	110	110	110	110	110	110	110	110	110	110
Freezers	20	22	24	27	30	30	30	30	30	30	30	30	30	30	30
New Manuf Housing	62	68	72	77	83	83	83	83	83	83	83	83	83	83	83
Irrigation	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Industrial	309	332	355	378	397	397	397	397	397	397	397	397	397	397	397
New Commercial	433	465	498	533	568	568	568	568	568	568	568	568	568	568	568
Comm Discret Ex	151	159	162	162	162	162	162	162	162	162	162	162	162	162	162
Comm Lost Opps Exist	102	109	116	124	131	131	131	131	131	131	131	131	131	131	131
SF Res Weath	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102
MF Res Weath	35	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Subtotal	1775	1899	2021	2148	2269	2269	2269	2269	2269	2269	2269	2269	2269	2269	2269
GENERATING RESOURCES:															
Hydro Eff Imp	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Trans Eff Imp	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 East	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61
Small Hydro 3 East	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
Small Hydro 4 East	32	36	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 1 West	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
Small Hydro 4 West	25	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Combined Cycle BPA	697	697	697	697	697	697	697	697	697	697	697	697	697	697	697
Combined Cycle Mix	698	698	698	698	698	698	698	698	698	698	698	698	698	698	698
Cogen1e	40	40	40	40	40	40	40	10	10	10	10	10	10	10	10
Cogen2e	240	240	240	240	240	240	240	240	60	60	60	60	60	60	60
Cogen3e	360	360	460	480	480	480	480	480	480	340	120	120	120	120	120
Cogen4e	0	80	450	670	1050	1050	1050	1050	1050	1050	1050	1050	1050	1050	1050
Cogen1w	40	40	40	40	40	40	40	10	0	0	0	0	0	0	0
Cogen2w	240	240	240	240	240	240	240	60	60	60	60	60	60	60	60
Cogen3w	480	480	480	480	480	480	480	480	480	120	120	120	120	120	120
Cogen4w	1400	1500	1500	1760	2000	2000	2000	2000	2000	2000	1380	1220	1220	1220	1220
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal3 (E. Oregon)	375	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	1577	1846	2139	2218	3099	4381	5188	5591	6288	7552
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	135	180	225	270	315	315	315	315	315	315	315	315	315	315	315
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	8714	9138	9660	10205	10870	12447	12716	12769	12658	13039	13481	14128	14531	15228	16492
Total Firm Resources	29709	30348	31083	31827	32560	32559	32436	32090	31842	31937	31867	31599	31877	32356	32436
Load/Resource Balance	227	127	123	129	124	123	0	-346	-594	-499	-569	-837	-559	-80	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979
Observed Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231
CONSERVATION PROGRAMS:															
SF Res MCS	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215
MF Res MCS	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Water Heat	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362
Refrigerators	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
Freezers	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
New Manuf Housing	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83
Irrigation	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Industrial	397	397	397	397	397	397	397	397	397	397	397	397	397	397	397
New Commercial	568	568	568	568	568	568	568	568	568	568	568	568	568	568	568
Comm Discret Ex	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
Comm Lost Opps Exist	131	131	131	131	131	131	131	131	131	131	131	131	131	131	131
SF Res Weath	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102
MF Res Weath	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Subtotal	2269	2269	2269	2269	2269	2269	2269	2269	2269	2269	2269	2269	2269	2269	2269
GENERATING RESOURCES:															
Hydro Eff Imp	100	100	80	60	40	20	20	20	20	20	20	2	0	0	0
Trans Eff Imp	34	34	23	12	1	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 East	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61
Small Hydro 3 East	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
Small Hydro 4 East	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 1 West	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
Small Hydro 4 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Combined Cycle BPA	697	697	697	697	697	697	697	697	697	697	697	697	697	349	349
Combined Cycle Mix	698	698	698	698	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2e	60	60	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	120	120	120	120	120	120	120	20	0	0	0	0	0	0	0
Cogen4e	1050	1050	1050	1050	1050	1050	970	600	380	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	60	60	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	120	120	110	110	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	1220	1220	1000	670	670	600	500	500	240	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	7998	7999	8389	8750	9589	9679	9860	10329	10830	11449	11450	11469	11475	11872	11920
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	315	315	315	315	315	315	315	315	315	315	315	315	315	270	225
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	16938	16939	16938	16938	16938	16937	16938	16937	16938	16937	16938	16939	16943	16947	16950
Total Firm Resources	32436	32437	32436	32436	32437	32436	32437	32436	32437	32436	32437	32438	32442	32445	32448
Load/Resource Balance	0	1	0	0	1	0	1	0	1	0	1	2	6	9	12

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979
Observed Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231
CONSERVATION PROGRAMS:															
SF Res MCS	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215
MF Res MCS	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Water Heat	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362
Refrigerators	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
Freezers	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
New Manuf Housing	83	81	79	76	72	69	65	60	55	51	45	40	36	30	25
Irrigation	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Industrial	397	397	397	397	397	397	397	397	397	397	397	397	397	397	397
New Commercial	568	568	568	568	568	568	568	568	568	568	568	568	568	568	568
Comm Discret Ex	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
Comm Lost Opps Exist	131	131	131	131	131	131	131	131	131	131	131	131	131	131	131
SF Res Weath	102	102	102	102	102	102	101	98	92	85	75	66	57	47	39
MF Res Weath	36	36	36	36	36	36	35	33	31	28	25	23	20	17	15
Subtotal	2269	2267	2265	2262	2258	2255	2249	2239	2226	2212	2193	2177	2161	2142	2127
GENERATING RESOURCES:															
Hydro Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trans Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 East	57	57	57	57	57	57	57	57	24	0	0	0	0	0	0
Small Hydro 2 East	61	61	61	61	61	61	61	61	36	4	4	4	4	4	4
Small Hydro 3 East	75	75	75	75	75	75	75	75	75	75	75	49	23	23	23
Small Hydro 4 East	43	43	43	43	43	43	43	43	43	43	43	18	11	11	11
Small Hydro 1 West	39	39	39	39	39	39	39	39	10	0	0	0	0	0	0
Small Hydro 2 West	43	43	43	43	43	43	43	43	18	0	0	0	0	0	0
Small Hydro 3 West	48	48	48	48	48	48	48	48	48	48	48	22	11	11	11
Small Hydro 4 West	32	32	32	32	32	32	32	32	32	32	32	7	7	7	7
Combined Cycle BPA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1125	938	750	563	375	188	0	0	0	0	0	0	0
Coal2 (E. Wash)	563	563	375	188	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	375	188	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	12317	13984	14389	14812	15235	15426	15620	15817	16130	16417	16622	16928	16989	17007	17023
WNP 3	806	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNP 1	813	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	180	135	90	45	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	16953	16956	16940	16944	16946	16950	16956	16966	16979	16994	17012	17028	17045	17063	17079
Total Firm Resources	32451	32453	32436	32436	32436	32436	32436	32436	32436	32436	32436	32436	32435	32436	32435
Load/Resource Balance	16	17	0	0	0	0	0	0	0	0	0	0	0	0	-1

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	3888	4002	4120	4235	4355	4473	4591	4709	4826	4944	5058	5173	5286	5400	5514
Observed Rate		2.95%	2.94%	2.78%	2.84%	2.71%	2.63%	2.56%	2.50%	2.43%	2.32%	2.26%	2.20%	2.15%	2.10%
DSI Firm Load	2261	2268	2278	2288	2298	2308	2319	2329	2339	2350	2360	2371	2381	2392	2403
Existing Resources	8379	8546	8382	8219	8213	8208	8255	8302	8310	8319	8417	8515	8521	8527	8408
BPA Requirements	-1952	-2132	-2308	-2322	-2491	-2654	-2803	-2953	-3123	-3295	-3425	-3556	-3706	-3857	-3984
CONSERVATION PROGRAMS:															
SF Res MCS	0	5	11	16	22	27	33	40	46	53	60	67	75	82	89
MF Res MCS	0	1	1	2	2	3	4	4	5	6	6	7	8	8	9
New Manuf Housing	0	1	2	3	5	6	8	11	13	15	18	20	22	25	27
Water Heat	0	0	0	0	4	13	22	31	40	50	60	71	81	92	103
Refrigerators	0	0	0	0	1	4	6	8	11	13	16	19	22	25	28
Freezers	0	0	0	0	0	1	2	2	3	4	4	5	6	7	8
Irrigation	0	0	1	1	2	4	5	6	8	9	11	12	13	14	14
Industrial	0	2	8	17	27	38	49	60	71	82	92	103	114	125	136
New Commercial	0	7	19	31	42	53	63	74	86	98	109	119	130	141	153
Comm Lost Opps Exist	0	2	6	9	11	13	17	20	24	27	31	35	38	42	45
MF Res Weath	0	0	1	2	2	3	3	4	4	5	6	6	7	8	8
SF Res Weath	0	2	6	12	17	20	22	25	30	35	41	46	52	58	62
Comm Discret Ex	0	2	8	16	22	24	25	29	36	44	52	59	67	75	83
Subtotal	0	22	63	109	157	209	259	314	377	441	506	569	635	702	765
GENERATING RESOURCES:															
Coal1 (E. Mont)	0	0	0	0	0	0	0	188	375	375	375	375	375	375	375
Coal2 (E. Wash)	0	0	0	0	0	0	0	188	188	188	188	188	188	188	188
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	188	188	188	188	188	188	188
Coal4 (Nevada)	0	0	0	0	0	0	0	0	188	188	188	188	188	188	188
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	188	188	188	188	188	188
Hydro Eff Imp	0	0	20	40	60	80	100	100	100	100	100	100	100	100	100
Trans Eff Imp	0	0	11	22	23	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 West	0	0	0	10	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	0	0	0	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	0	0	0	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	0	0	0	11	14	14	14	14	14	14	14	14	14	14	14
Cogen1w	0	0	10	10	10	10	10	10	10	10	10	10	10	10	10
Combined Cycle Mix	0	0	0	0	349	349	349	349	349	349	349	349	349	349	349
Combined Cycle BPA	0	0	0	0	349	349	349	349	349	349	349	349	349	697	697
Cogen1e	0	0	10	10	10	10	10	10	10	10	10	10	10	10	10
Cogen2w	0	0	60	60	60	60	60	60	60	60	60	60	60	60	60
Small Hydro 3 West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
WNP 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNP 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 East	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2e	0	0	60	60	60	60	60	60	60	60	60	60	60	60	60
Cogen3w	0	0	0	0	0	0	0	30	30	30	30	30	120	120	120
Geothermal2	0	0	0	0	0	0	0	0	0	0	0	0	45	45	45
Small Hydro 4 West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 East	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	171	248	970	1001	1021	1427	1990	2178	2178	2178	2313	2661	2672
Total Firm Resources	6428	6435	6308	6254	6850	6763	6731	7090	7554	7643	7675	7706	7762	8033	7860
Load/Resource Balance	278	165	-91	-270	197	-20	-180	50	384	345	253	161	93	238	-57

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	5642	5771	5898	6026	6153	6158	6164	6169	6173	6178	6182	6185	6189	6192	6195
Observed Rate	2.34%	2.27%	2.22%	2.16%	2.11%	0.09%	0.09%	0.08%	0.07%	0.07%	0.07%	0.06%	0.06%	0.05%	0.05%
DSI Firm Load	2413	2424	2435	2446	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	8289	8394	8500	8431	8362	8291	8220	8150	8079	8009	7920	7650	7579	7449	6727
BPA Requirements	-4138	-4313	-4487	-4661	-4849	-5000	-4992	-4985	-4979	-4973	-4967	-4962	-4957	-4952	-4948
CONSERVATION PROGRAMS:															
SF Res MCS	96	103	111	118	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	10	10	11	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	29	32	34	36	39	39	39	39	39	39	39	39	39	39	39
Water Heat	113	124	136	148	159	159	159	159	159	159	159	159	159	159	159
Refrigerators	31	34	37	41	45	45	45	45	45	45	45	45	45	45	45
Freezers	8	9	10	11	12	12	12	12	12	12	12	12	12	12	12
Irrigation	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Industrial	146	157	168	179	188	188	188	188	188	188	188	188	188	188	188
New Commercial	164	176	189	201	214	214	214	214	214	214	214	214	214	214	214
Comm Lost Opps Exist	49	53	56	60	63	63	63	63	63	63	63	63	63	63	63
MF Res Weath	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
SF Res Weath	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
Comm Discret Ex	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal	817	869	923	977	1029	1029	1029	1029	1029	1029	1029	1029	1029	1029	1029
GENERATING RESOURCES:															
Coal1 (E. Mont)	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375
Coal2 (E. Wash)	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
Coal3 (E. Oregon)	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
Coal4 (Nevada)	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
Coal5 (W. Wa/Or)	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
Hydro Eff Imp	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Trans Eff Imp	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 West	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Cogen1w	10	10	10	10	10	10	10	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349
Combined Cycle BPA	697	697	697	697	697	697	697	697	697	697	697	697	697	697	697
Cogen1e	10	10	10	10	10	10	10	0	0	0	0	0	0	0	0
Cogen2w	60	60	60	60	60	60	60	0	0	0	0	0	0	0	0
Small Hydro 3 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
WNP 3	0	0	0	0	806	806	806	806	806	806	806	806	806	806	806
Small Hydro 3 East	0	0	0	11	11	11	11	11	11	11	11	11	11	11	11
Cogen2e	60	60	60	60	60	60	60	0	0	0	0	0	0	0	0
Cogen3w	120	120	120	120	120	120	120	120	120	120	120	120	90	90	90
Geothermal2	90	135	180	225	225	225	225	225	225	225	225	225	225	225	225
Small Hydro 4 West	0	0	0	7	7	7	7	7	7	7	7	7	7	7	7
Small Hydro 4 East	0	0	0	11	11	11	11	11	11	11	11	11	11	11	11
Cogen3e	0	0	0	80	80	80	80	80	80	80	80	80	80	80	80
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	126	335	714	1435
Subtotal	3530	3575	3620	3774	4580	4580	4580	4440	4440	4440	4440	4566	4745	5124	5845
Total Firm Resources	8498	8525	8555	8521	9122	8900	8837	8633	8569	8505	8422	8283	8396	8650	8653
Load/Resource Balance	442	329	219	47	512	284	216	7	-61	-130	-217	-360	-250	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	6199	6202	6205	6208	6211	6214	6216	6218	6220	6222	6224	6226	6229	6231	6234
Observed Rate	0.05%	0.05%	0.05%	0.05%	0.04%	0.04%	0.04%	0.04%	0.03%	0.03%	0.03%	0.03%	0.04%	0.04%	0.04%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727
BPA Requirements	-4944	-4942	-4940	-4937	-4935	-4933	-4931	-4930	-4928	-4926	-4925	-4924	-4925	-4926	-4927
CONSERVATION PROGRAMS:															
SF Res MCS	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Water Heat	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159
Refrigerators	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Freezers	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Irrigation	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Industrial	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
New Commercial	214	214	214	214	214	214	214	214	214	214	214	214	214	214	214
Comm Lost Opps Exist	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63
MF Res Weath	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
SF Res Weath	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
Comm Discret Ex	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal	1029	1029	1029	1029	1029	1029	1029	1029	1029	1029	1029	1029	1029	1029	1029
GENERATING RESOURCES:															
Coal1 (E. Mont)	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375
Coal2 (E. Wash)	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
Coal3 (E. Oregon)	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
Coal4 (Nevada)	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
Coal5 (W. Wa/Or)	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
Hydro Eff Imp	100	100	80	60	40	20	0	0	0	0	0	0	0	0	0
Trans Eff Imp	34	34	23	12	11	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 West	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle BPA	697	697	697	697	349	349	349	349	349	349	349	349	349	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
Small Hydro 3 East	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	90	90	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	225	225	225	225	225	225	225	225	225	225	225	225	180	180	180
Small Hydro 4 West	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Small Hydro 4 East	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Cogen3e	80	80	80	80	80	80	80	80	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	1435	1436	1557	1589	2308	2339	2360	2360	2441	2441	2442	2443	2492	2844	2847
Subtotal	5845	5846	5846	5847	5848	5848	5849	5849	5850	5850	5851	5852	5856	5859	5862
Total Firm Resources	8657	8660	8662	8666	8669	8671	8674	8675	8678	8680	8682	8684	8687	8689	8691
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	6236	6239	6241	6243	6245	6247	6248	6250	6252	6253	6255	6256	6257	6257	6258
Observed Rate	0.04%	0.04%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.02%	0.02%	0.01%	0.01%	0.01%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727
BPA Requirements	-4928	-4929	-4929	-4930	-4931	-4931	-4932	-4933	-4933	-4934	-4934	-4935	-4935	-4934	-4934
CONSERVATION PROGRAMS:															
SF Res MCS	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	39	38	37	36	34	32	31	28	26	24	21	19	17	14	12
Water Heat	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159
Refrigerators	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Freezers	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Irrigation	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Industrial	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
New Commercial	214	214	214	214	214	214	214	214	214	214	214	214	214	214	214
Comm Lost Opps Exist	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63
MF Res Weath	9	9	9	9	9	9	9	8	7	7	7	6	5	5	4
SF Res Weath	62	62	62	62	62	62	60	56	50	46	43	40	37	33	27
Comm Discret Ex	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal	1029	1028	1027	1026	1024	1022	1019	1011	1002	996	990	984	978	971	962
GENERATING RESOURCES:															
Coal1 (E. Mont)	375	375	188	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	188	188	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	188	188	188	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	188	188	188	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	188	188	188	188	0	0	0	0	0	0	0	0	0	0	0
Hydro Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trans Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 West	10	10	10	10	10	10	10	10	0	0	0	0	0	0	0
Small Hydro 1 East	14	14	14	14	14	14	14	14	0	0	0	0	0	0	0
Small Hydro 2 West	11	11	11	11	11	11	11	11	0	0	0	0	0	0	0
Small Hydro 2 East	14	14	14	14	14	14	14	14	4	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle BPA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
WNP 1	813	813	813	813	813	813	813	813	813	813	0	0	0	0	0
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	0
Small Hydro 3 East	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	135	90	45	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Small Hydro 4 East	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	2895	2944	3368	3980	4172	4176	4182	4192	4248	4262	5082	5089	5095	5103	5918
Subtotal	5865	5869	5873	5876	5880	5884	5890	5900	5911	5921	5928	5935	5941	5949	5958
Total Firm Resources	8693	8695	8698	8699	8700	8702	8704	8705	8707	8710	8711	8711	8711	8713	8713
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	9551	9881	10214	10558	10916	11253	11590	11927	12264	12600	12946	13291	13638	13984	14331
Observed Rate		3.45%	3.37%	3.37%	3.39%	3.09%	3.00%	2.91%	2.82%	2.74%	2.74%	2.67%	2.60%	2.54%	2.48%
Existing Resources	9685	9681	9795	9910	9353	8791	8795	8798	8710	8621	8652	8683	8448	8214	8306
BPA Requirements	47	77	127	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	0	3	6	10	14	17	21	25	30	34	39	44	50	55	60
MF Res MCS	0	1	2	4	5	6	7	9	10	11	13	14	16	17	18
New Manuf Housing	0	1	2	4	5	7	9	12	14	17	20	22	25	28	31
Refrigerators	0	0	0	0	2	5	8	12	15	19	23	27	32	36	41
Freezers	0	0	0	0	1	1	2	3	4	5	6	8	9	10	11
Water Heat	0	0	0	0	5	16	28	39	51	63	76	90	104	117	131
Irrigation	0	0	1	2	3	5	7	10	12	14	16	18	20	21	22
Industrial	0	2	8	19	31	43	55	68	80	92	104	116	129	141	153
New Commercial	0	11	32	52	72	89	108	127	146	166	185	203	222	241	260
Comm Lost Opps Exist	0	2	6	10	14	18	21	25	29	33	37	41	45	49	53
MF Res Weath	0	1	3	5	7	9	11	13	15	17	19	21	23	25	27
SF Res Weath	0	1	4	8	11	15	18	22	26	29	33	36	39	40	40
Comm Discret Ex	0	2	7	14	21	28	35	42	49	56	63	71	76	76	76
Subtotal	0	24	71	128	191	259	330	407	481	556	634	711	790	856	923
GENERATING RESOURCES:															
Small Hydro 1 West	0	0	0	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	0	0	0	34	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	0	0	0	25	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	0	0	0	25	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	0	0	30	30	30	30	30	30	30	30	30	30	30	30	30
Combined Cycle Mix	0	0	0	0	349	349	349	349	349	349	349	349	349	349	349
Cogen1e	0	0	30	30	30	30	30	30	30	30	30	30	30	30	30
Cogen2w	0	0	180	180	180	180	180	180	180	180	180	180	180	180	180
Small Hydro 3 West	0	0	0	0	0	0	26	37	37	37	37	37	37	37	37
Small Hydro 3 East	0	0	0	0	0	0	26	52	52	52	52	52	56	56	56
Cogen2e	0	0	0	180	180	180	180	180	180	180	180	180	180	180	180
Coal1 (E. Mont)	0	0	0	0	0	0	0	188	375	563	750	938	1125	1313	1313
Cogen3w	0	0	0	0	360	360	360	360	360	360	360	360	360	360	360
Small Hydro 4 West	0	0	0	0	0	0	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	0	0	0	0	0	0	25	32	32	32	32	32	32	32	32
Cogen3e	0	0	0	0	140	360	360	360	360	360	360	360	360	360	360
Coal2 (E. Wash)	0	0	0	0	0	0	0	188	375	563	563	563	563	563	563
Cogen4w	0	0	0	0	0	620	780	780	780	780	780	780	1000	1330	1330
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	188
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	240	533	1420	2260	2522	2942	3316	3692	3879	4067	4478	4996	5184
Total Firm Resources	9732	9782	10233	10571	10964	11310	11647	12147	12507	12869	13165	13461	13716	14066	14413
Load/Resource Balance	181	-98	21	11	47	58	59	218	243	271	221	171	77	81	79

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
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Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	14754	15178	15604	16030	16458	16460	16462	16464	16466	16468	16470	16471	16473	16474	16475
Observed Rate	2.95%	2.87%	2.80%	2.73%	2.67%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
Existing Resources	8398	8383	8368	8513	8542	7194	6872	6543	6477	6261	5838	5194	5139	5051	4589
BPA Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	66	71	77	83	89	89	89	89	89	89	89	89	89	89	89
MF Res MCS	20	21	22	24	25	25	25	25	25	25	25	25	25	25	25
New Manuf Housing	33	36	38	41	44	44	44	44	44	44	44	44	44	44	44
Refrigerators	45	49	53	59	65	65	65	65	65	65	65	65	65	65	65
Freezers	12	13	14	16	18	18	18	18	18	18	18	18	18	18	18
Water Heat	144	158	173	188	203	203	203	203	203	203	203	203	203	203	203
Irrigation	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Industrial	165	177	189	202	212	212	212	212	212	212	212	212	212	212	212
New Commercial	280	300	321	343	365	365	365	365	365	365	365	365	365	365	365
Comm Lost Opps Exist	57	60	64	68	72	72	72	72	72	72	72	72	72	72	72
MF Res Weath	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
SF Res Weath	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Comm Discret Ex	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Subtotal	987	1050	1116	1189	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258
GENERATING RESOURCES:															
Small Hydro 1 West	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	30	30	30	30	30	30	30	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349
Cogen1e	30	30	30	30	30	30	30	0	0	0	0	0	0	0	0
Cogen2w	180	180	180	180	180	180	180	0	0	0	0	0	0	0	0
Small Hydro 3 West	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56
Cogen2e	180	180	180	180	180	180	180	180	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Cogen3w	360	360	360	360	360	360	360	360	360	0	0	0	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Cogen3e	360	360	360	360	360	360	360	360	360	220	0	0	0	0	0
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4w	1400	1500	1500	1500	1500	1500	1500	1500	1500	1500	880	720	720	720	720
Coal3 (E. Oregon)	375	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4e	0	80	450	670	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	1352	1607	1831	1831	2643	3907	4714	4980	5279	5822
Subtotal	5441	5809	6179	6399	6729	8081	8336	8320	8140	8452	8876	9523	9789	10088	10631
Total Firm Resources	14826	15242	15663	16101	16529	16533	16466	16121	15875	15971	15972	15975	16186	16397	16478
Load/Resource Balance	69	63	60	67	68	69	0	-346	-595	-500	-500	-500	-290	-80	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
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Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	16475	16474	16474	16473	16472	16472	16471	16471	16470	16470	16469	16468	16464	16461	16457
Observed Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.01%	-0.02%	-0.02%	-0.02%
Existing Resources	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143
BPA Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89
MF Res MCS	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
New Manuf Housing	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44
Refrigerators	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
Freezers	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Water Heat	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203
Irrigation	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Industrial	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212
New Commercial	365	365	365	365	365	365	365	365	365	365	365	365	365	365	365
Comm Lost Opps Exist	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72
MF Res Weath	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
SF Res Weath	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Comm Discret Ex	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Subtotal	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258
GENERATING RESOURCES:															
Small Hydro 1 West	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4w	720	720	500	170	170	100	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4e	1000	1000	1000	1000	1000	1000	920	550	330	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	6268	6268	6486	6816	7164	7233	7413	7782	8002	8331	8331	8331	8331	8331	8331
Subtotal	11077	11077	11075	11075	11074	11073	11073	11072	11072	11071	11071	11071	11071	11071	11071
Total Firm Resources	16478	16478	16476	16476	16475	16474	16474	16473	16473	16472	16472	16472	16472	16472	16472
Load/Resource Balance	0	1	0	0	0	0	0	0	0	0	0	2	5	9	12

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
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Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	16454	16451	16448	16446	16443	16441	16438	16436	16434	16431	16429	16428	16427	16427	16427
Observed Rate	-0.02%	-0.02%	-0.02%	-0.02%	-0.02%	-0.02%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	0.00%	0.00%
Existing Resources	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143
BPA Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89
MF Res MCS	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
New Manuf Housing	44	43	42	40	38	37	34	32	29	27	24	21	19	16	13
Refrigerators	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
Freezers	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Water Heat	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203
Irrigation	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Industrial	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212
New Commercial	365	365	365	365	365	365	365	365	365	365	365	365	365	365	365
Comm Lost Opps Exist	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72
MF Res Weath	27	27	27	27	27	27	26	24	22	20	18	16	14	12	10
SF Res Weath	40	40	40	40	40	40	39	36	32	29	25	21	18	14	11
Comm Discret Ex	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Subtotal	1258	1257	1256	1254	1252	1251	1246	1239	1230	1223	1214	1205	1198	1189	1181
GENERATING RESOURCES:															
Small Hydro 1 West	29	29	29	29	29	29	29	29	0	0	0	0	0	0	0
Small Hydro 1 East	43	43	43	43	43	43	43	43	10	0	0	0	0	0	0
Small Hydro 2 West	32	32	32	32	32	32	32	32	7	0	0	0	0	0	0
Small Hydro 2 East	47	47	47	47	47	47	47	47	22	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	37	37	37	37	37	37	37	37	37	37	37	11	0	0	0
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	30	4	4	4
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1125	938	750	563	375	188	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	0	0	0	0
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	7	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	563	563	375	188	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	375	188	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	8331	8331	8687	9061	9435	9622	9811	10004	10310	10542	10736	11032	11083	11092	11100
Subtotal	11071	11071	11051	11051	11049	11049	11050	11056	11062	11067	11074	11080	11087	11096	11104
Total Firm Resources	16472	16471	16450	16448	16444	16443	16439	16438	16435	16433	16431	16428	16428	16428	16428
Load/Resource Balance	15	17	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	4284	4434	4588	4758	4922	5085	5249	5414	5579	5744	5895	6045	6196	6346	6496
Observed Rate		3.49%	3.48%	3.70%	3.44%	3.32%	3.23%	3.13%	3.05%	2.97%	2.62%	2.55%	2.49%	2.42%	2.37%
Existing Resources	2380	2378	2407	2436	2431	2431	2446	2461	2455	2449	2469	2490	2489	2489	2512
BPA Requirements	1905	2055	2181	2322	2491	2654	2803	2953	3123	3295	3425	3556	3706	3857	3984
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	4284	4434	4588	4758	4922	5085	5249	5414	5579	5744	5895	6045	6196	6346	6496
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: COAL ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	6672	6847	7022	7195	7368	7361	7353	7346	7340	7333	7328	7322	7317	7313	7308
Observed Rate	2.71%	2.63%	2.55%	2.47%	2.40%	-0.11%	-0.10%	-0.09%	-0.09%	-0.08%	-0.08%	-0.07%	-0.07%	-0.06%	-0.06%
Existing Resources	2534	2534	2534	2534	2520	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4138	4313	4487	4661	4849	5000	4992	4985	4979	4973	4967	4962	4957	4952	4948
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	6672	6847	7022	7195	7368	7361	7353	7346	7340	7334	7328	7322	7317	7313	7308
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	7305	7303	7300	7298	7296	7294	7292	7290	7289	7287	7286	7285	7286	7287	7288
Observed Rate	-0.04%	-0.04%	-0.03%	-0.03%	-0.03%	-0.03%	-0.03%	-0.02%	-0.02%	-0.02%	-0.02%	-0.01%	0.01%	0.01%	0.01%
Existing Resources	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4944	4942	4940	4937	4935	4933	4931	4930	4928	4926	4925	4924	4925	4926	4927
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	7305	7303	7300	7298	7296	7294	7292	7290	7289	7287	7286	7285	7286	7287	7288
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	7288	7289	7290	7291	7291	7292	7293	7293	7294	7294	7295	7295	7295	7295	7295
Observed Rate	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.00%	-0.01%	-0.01%
Existing Resources	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4928	4929	4929	4930	4931	4931	4932	4933	4933	4934	4934	4935	4935	4934	4934
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	7288	7289	7290	7291	7291	7292	7293	7293	7294	7294	7295	7295	7295	7295	7295
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: COAL ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	17723	18317	18922	19551	20193	20811	21431	22050	22669	23288	23899	24509	25120	25730	26341
Observed Rate		3.35%	3.30%	3.32%	3.28%	3.07%	2.97%	2.89%	2.81%	2.73%	2.62%	2.56%	2.49%	2.43%	2.37%
DSI Firm Load	2261	2268	2278	2288	2298	2308	2319	2329	2339	2350	2360	2371	2381	2392	2403
Existing Resources	20443	20605	20585	20564	19997	19429	19495	19560	19475	19389	19538	19687	19458	19229	19225
CONSERVATION PROGRAMS:															
SF Res MCS	0	8	17	26	36	44	54	65	76	87	99	111	125	137	149
MF Res MCS	0	2	3	6	7	9	11	13	15	17	19	21	24	25	27
Water Heat	0	0	0	0	9	29	50	70	91	113	136	161	185	209	234
Refrigerators	0	0	0	0	3	9	14	20	26	32	39	46	54	61	69
Freezers	0	0	0	0	1	2	4	5	7	9	10	13	15	17	19
New Manuf Housing	0	2	4	7	10	13	17	23	27	32	38	42	47	53	58
Irrigation	0	0	2	3	5	9	12	16	20	23	27	30	33	35	36
Industrial	0	4	16	36	58	81	104	128	151	174	196	219	243	266	289
New Commercial	0	18	51	83	114	142	171	201	232	264	294	322	352	382	413
Comm Discret Ex	0	4	15	30	43	52	60	71	85	100	115	130	143	151	159
Comm Lost Opps Exist	0	4	12	19	25	31	38	45	53	60	68	76	83	91	98
SF Res Weath	0	3	10	20	28	35	40	47	56	64	74	82	91	98	102
MF Res Weath	0	1	4	7	9	12	14	17	19	22	25	27	30	33	35
Subtotal	0	46	134	237	348	468	589	721	858	997	1140	1280	1425	1558	1688
GENERATING RESOURCES:															
Hydro Eff Imp	0	0	20	40	60	80	100	100	100	100	100	100	100	100	100
Trans Eff Imp	0	0	11	22	23	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 East	0	0	0	48	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	0	0	0	36	61	61	61	61	61	61	61	61	61	61	61
Small Hydro 3 East	0	0	0	0	0	0	26	52	52	52	52	52	56	56	56
Small Hydro 4 East	0	0	0	0	0	0	25	32	32	32	32	32	32	32	32
Small Hydro 1 West	0	0	0	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	0	0	0	36	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	0	0	0	0	0	0	26	37	37	37	37	37	37	37	48
Small Hydro 4 West	0	0	0	0	0	0	25	25	25	25	25	25	25	25	25
Combined Cycle BPA	0	0	0	0	349	349	349	349	349	349	349	349	349	697	697
Combined Cycle Mix	0	0	0	0	698	698	698	698	698	698	698	698	698	698	698
Cogen1e	0	0	40	40	40	40	40	40	40	40	40	40	40	40	40
Cogen2e	0	0	60	240	240	240	240	240	240	240	240	240	240	240	240
Cogen3e	0	0	0	0	140	360	360	360	360	360	360	360	360	360	360
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1w	0	0	40	40	40	40	40	40	40	40	40	40	40	40	40
Cogen2w	0	0	240	240	240	240	240	240	240	240	240	240	240	240	240
Cogen3w	0	0	0	0	360	360	360	390	390	390	390	390	480	480	480
Cogen4w	0	0	0	0	0	620	780	780	780	780	780	780	1000	1330	1330
Coal1 (E. Mont)	0	0	0	0	0	0	0	376	750	938	1125	1313	1500	1688	1688
Coal2 (E. Wash)	0	0	0	0	0	0	0	376	563	751	751	751	751	751	751
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	188	188	188	188	188	188	376
Coal4 (Nevada)	0	0	0	0	0	0	0	0	188	188	188	188	188	188	188
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	188	188	188	188	188	188
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNP 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNP 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	45	45	45
Geothermal2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	411	781	2390	3261	3543	4369	5306	5870	6057	6245	6791	7657	7856
Total Firm Resources	20443	20652	21129	21580	22735	23158	23628	24646	25635	26254	26733	27212	27671	28442	28765
Load/Resource Balance	459	67	-70	-258	245	38	-121	268	627	616	474	332	169	319	22

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	27069	27796	28524	29251	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979
Observed Rate	2.76%	2.69%	2.62%	2.55%	2.49%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DSI Firm Load	2413	2424	2435	2446	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	19221	19312	19402	19478	19423	17845	17453	17054	16917	16631	16119	15204	15079	14861	13677
CONSERVATION PROGRAMS:															
SF Res MCS	162	174	188	201	215	215	215	215	215	215	215	215	215	215	215
MF Res MCS	30	31	33	36	37	37	37	37	37	37	37	37	37	37	37
Water Heat	257	282	309	336	362	362	362	362	362	362	362	362	362	362	362
Refrigerators	76	83	90	100	110	110	110	110	110	110	110	110	110	110	110
Freezers	20	22	24	27	30	30	30	30	30	30	30	30	30	30	30
New Manuf Housing	62	68	72	77	83	83	83	83	83	83	83	83	83	83	83
Irrigation	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Industrial	311	334	357	381	400	400	400	400	400	400	400	400	400	400	400
New Commercial	444	476	510	544	579	579	579	579	579	579	579	579	579	579	579
Comm Discret Ex	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
Comm Lost Opps Exist	106	113	120	128	135	135	135	135	135	135	135	135	135	135	135
SF Res Weath	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102
MF Res Weath	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Subtotal	1804	1919	2039	2166	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287
GENERATING RESOURCES:															
Hydro Eff Imp	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Trans Eff Imp	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 East	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61
Small Hydro 3 East	56	56	56	67	67	67	67	67	67	67	67	67	67	67	67
Small Hydro 4 East	32	32	32	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 1 West	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
Small Hydro 4 West	25	25	25	32	32	32	32	32	32	32	32	32	32	32	32
Combined Cycle BPA	697	697	697	697	697	697	697	697	697	697	697	697	697	697	697
Combined Cycle Mix	698	698	698	698	698	698	698	698	698	698	698	698	698	698	698
Cogen1e	40	40	40	40	40	40	40	0	0	0	0	0	0	0	0
Cogen2e	240	240	240	240	240	240	240	180	0	0	0	0	0	0	0
Cogen3e	360	360	360	440	440	440	440	440	440	300	80	80	80	80	80
Cogen4e	0	80	450	670	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Cogen1w	40	40	40	40	40	40	40	0	0	0	0	0	0	0	0
Cogen2w	240	240	240	240	240	240	240	0	0	0	0	0	0	0	0
Cogen3w	480	480	480	480	480	480	480	480	480	120	120	120	90	90	90
Cogen4w	1400	1500	1500	1500	1500	1500	1500	1500	1500	1500	880	720	720	720	720
Coal1 (E. Mont)	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688
Coal2 (E. Wash)	751	751	751	751	751	751	751	751	751	751	751	751	751	751	751
Coal3 (E. Oregon)	563	751	751	751	751	751	751	751	751	751	751	751	751	751	751
Coal4 (Nevada)	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
Coal5 (W. Wa/Or)	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	1352	1607	1831	1831	2643	3907	4840	5315	5993	7257
WNP 3	0	0	0	0	806	806	806	806	806	806	806	806	806	806	806
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	90	135	180	225	225	225	225	225	225	225	225	225	225	225	225
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	8971	9384	9799	10173	11309	12661	12916	12760	12580	12892	13316	14089	14534	15212	16476
Total Firm Resources	29993	30613	31238	31811	33016	32789	32652	32097	31780	31806	31718	31576	31896	32356	32436
Load/Resource Balance	511	392	279	114	580	354	216	-339	-656	-630	-718	-860	-540	-80	0

Study ID : 9-OCT-91 20:08:29
Study Title: COAL ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979
Observed Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231
CONSERVATION PROGRAMS:															
SF Res MCS	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215
MF Res MCS	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Water Heat	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362
Refrigerators	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
Freezers	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
New Manuf Housing	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83
Irrigation	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Industrial	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
New Commercial	579	579	579	579	579	579	579	579	579	579	579	579	579	579	579
Comm Discret Ex	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
Comm Lost Opps Exist	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135
SF Res Weath	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102
MF Res Weath	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Subtotal	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287
GENERATING RESOURCES:															
Hydro Eff Imp	100	100	80	60	40	20	0	0	0	0	0	0	0	0	0
Trans Eff Imp	34	34	23	12	11	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 East	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61
Small Hydro 3 East	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67
Small Hydro 4 East	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 1 West	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
Small Hydro 4 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Combined Cycle BPA	697	697	697	697	349	349	349	349	349	349	349	349	349	0	0
Combined Cycle Mix	698	698	698	698	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	80	80	80	80	80	80	80	80	0	0	0	0	0	0	0
Cogen4e	1000	1000	1000	1000	1000	1000	920	550	330	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	90	90	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	720	720	500	170	170	100	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688
Coal2 (E. Wash)	751	751	751	751	751	751	751	751	751	751	751	751	751	751	751
Coal3 (E. Oregon)	751	751	751	751	751	751	751	751	751	751	751	751	751	751	751
Coal4 (Nevada)	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
Coal5 (W. Wa/Or)	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	7703	7704	8043	8405	9472	9572	9773	10142	10443	10772	10773	10774	10823	11175	11178
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	225	225	225	225	225	225	225	225	225	225	225	225	180	180	180
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	16922	16923	16921	16922	16922	16921	16922	16921	16922	16921	16922	16923	16927	16930	16933
Total Firm Resources	32436	32437	32435	32436	32436	32435	32436	32435	32436	32435	32436	32437	32441	32445	32448
Load/Resource Balance	0	1	-1	0	0	-1	0	-1	0	-1	0	1	5	9	12

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Study Title: HIGH COAL ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	3888	4002	4120	4235	4355	4473	4591	4709	4826	4944	5058	5173	5286	5400	5514
Observed Rate		2.95%	2.94%	2.78%	2.84%	2.71%	2.63%	2.56%	2.50%	2.43%	2.32%	2.26%	2.20%	2.15%	2.10%
DSI Firm Load	2261	2268	2278	2288	2298	2308	2319	2329	2339	2350	2360	2371	2381	2392	2403
Existing Resources	8379	8546	8382	8219	8213	8208	8255	8302	8310	8319	8417	8515	8521	8527	8408
BPA Requirements	-1952	-2132	-2308	-2322	-2491	-2654	-2803	-2953	-3123	-3295	-3425	-3556	-3706	-3857	-3984
CONSERVATION PROGRAMS:															
SF Res MCS	0	5	11	16	22	27	33	40	46	53	60	67	75	82	89
MF Res MCS	0	1	1	2	2	3	4	4	5	6	6	7	8	8	9
New Manuf Housing	0	1	2	3	5	6	8	11	13	15	18	20	22	25	27
Water Heat	0	0	0	0	4	13	22	31	40	50	60	71	81	92	103
Refrigerators	0	0	0	0	1	4	6	8	11	13	16	19	22	25	28
Freezers	0	0	0	0	0	1	2	2	3	4	4	5	6	7	8
Irrigation	0	0	1	1	2	4	5	6	8	9	11	12	13	14	14
Industrial	0	2	8	17	27	38	49	60	71	82	92	103	114	125	136
New Commercial	0	7	19	31	42	53	63	74	86	98	109	119	130	141	153
Comm Lost Opps Exist	0	2	6	9	13	16	20	23	27	31	34	38	41	45	49
MF Res Weath	0	0	1	2	2	3	3	4	4	5	6	6	7	8	8
SF Res Weath	0	2	6	12	18	22	26	31	36	42	48	53	59	62	62
Comm Discret Ex	0	2	8	16	24	30	32	33	37	44	52	59	67	75	83
Subtotal	0	22	63	109	162	220	273	327	387	452	516	579	645	709	769
GENERATING RESOURCES:															
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	162	162	162	162	162	162	162	162
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	162	162	162	162	162	162	162	162
GCoal1 (EMont)	0	0	0	0	0	0	0	0	160	160	160	160	160	160	160
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	162	162	162	162	162	162	162
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	160	160	160	160	160	160
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	160	160	160	160	160
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	160	160	160	160
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	160	160	160
Hydro Eff Imp	0	0	20	40	60	80	100	100	100	100	100	100	100	100	100
Trans Eff Imp	0	0	11	22	23	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 West	0	0	0	10	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	0	0	0	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	0	0	0	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	0	0	0	11	14	14	14	14	14	14	14	14	14	14	14
Cogen1w	0	0	10	10	10	10	10	10	10	10	10	10	10	10	10
Combined Cycle Mix	0	0	0	0	349	349	349	349	349	349	349	349	349	349	349
Combined Cycle BPA	0	0	0	0	349	349	349	349	349	349	349	349	349	349	697
Cogen1e	0	0	10	10	10	10	10	10	10	10	10	10	10	10	10
Cogen2w	0	0	60	60	60	60	60	60	60	60	60	60	60	60	60
Small Hydro 3 West	0	0	0	0	0	0	0	0	0	11	11	11	11	11	11
WNP 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNP 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 East	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2e	0	0	0	60	60	60	60	60	60	60	60	60	60	60	60
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	120	120
Geothermal2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 East	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	111	248	970	1001	1021	1345	1667	1838	1998	2158	2318	2438	2786
Total Firm Resources	6428	6435	6248	6254	6855	6774	6745	7021	7241	7314	7505	7696	7777	7817	7978
Load/Resource Balance	278	165	-151	-270	202	-8	-165	-19	72	16	84	152	109	24	61

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Study Title: HIGH COAL ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	5642	5771	5898	6026	6153	6158	6164	6169	6173	6178	6182	6185	6189	6192	6195
Observed Rate	2.34%	2.27%	2.22%	2.16%	2.11%	0.09%	0.09%	0.08%	0.07%	0.07%	0.07%	0.06%	0.06%	0.05%	0.05%
DSI Firm Load	2413	2424	2435	2446	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	8289	8394	8500	8431	8362	8291	8220	8150	8079	8009	7920	7650	7579	7449	6727
BPA Requirements	-4138	-4313	-4487	-4661	-4849	-5000	-4992	-4985	-4979	-4973	-4967	-4962	-4957	-4952	-4948
CONSERVATION PROGRAMS:															
SF Res MCS	96	103	111	118	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	10	10	11	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	29	32	34	36	39	39	39	39	39	39	39	39	39	39	39
Water Heat	113	124	136	148	159	159	159	159	159	159	159	159	159	159	159
Refrigerators	31	34	37	41	45	45	45	45	45	45	45	45	45	45	45
Freezers	8	9	10	11	12	12	12	12	12	12	12	12	12	12	12
Irrigation	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Industrial	146	157	168	179	188	188	188	188	188	188	188	188	188	188	188
New Commercial	164	176	189	201	214	214	214	214	214	214	214	214	214	214	214
Comm Lost Opps Exist	52	56	59	63	67	67	67	67	67	67	67	67	67	67	67
MF Res Weath	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
SF Res Weath	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
Comm Discret Ex	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal	820	872	926	980	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033
GENERATING RESOURCES:															
FBCoal1 (E. Mnt)	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
FBCoal2 (E. Wa)	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
GCoal1 (EMont)	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
FBCoal3 (E. Ore)	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
GCoal2 (EWash)	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
GCoal3 (EOre)	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
GCoal4 (Nev)	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
GCoal5 (WWaOr)	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Hydro Eff Imp	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Trans Eff Imp	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 West	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Cogen1w	10	10	10	10	10	10	10	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349
Combined Cycle BPA	697	697	697	697	697	697	697	697	697	697	697	697	697	697	697
Cogen1e	10	10	10	10	10	10	10	0	0	0	0	0	0	0	0
Cogen2w	60	60	60	60	60	60	60	0	0	0	0	0	0	0	0
Small Hydro 3 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
WNP 3	0	0	0	0	806	806	806	806	806	806	806	806	806	806	806
Small Hydro 3 East	0	0	0	11	11	11	11	11	11	11	11	11	11	11	11
Cogen2e	60	60	60	60	60	60	60	60	0	0	0	0	0	0	0
Cogen3w	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
Geothermal2	45	45	90	135	135	135	135	135	135	135	135	135	135	135	135
Small Hydro 4 West	0	0	0	7	7	7	7	7	7	7	7	7	7	7	7
Small Hydro 4 East	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	0	0	0	20	20	20	20	20	20	20	20	20	20	20	20
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	114	293	682	1403
Subtotal	3644	3644	3689	3772	4578	4578	4578	4498	4438	4438	4438	4552	4731	5120	5841
Total Firm Resources	8615	8597	8627	8522	9124	8902	8839	8695	8571	8507	8424	8273	8386	8650	8653
Load/Resource Balance	560	402	292	49	514	286	218	69	-59	-128	-215	-370	-260	0	0

Study ID : 15-JUL-91 07:05:23
Study Title: HIGH COAL ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	6199	6202	6205	6208	6211	6214	6216	6218	6220	6222	6224	6226	6229	6231	6234
Observed Rate	0.05%	0.05%	0.05%	0.05%	0.04%	0.04%	0.04%	0.04%	0.03%	0.03%	0.03%	0.03%	0.04%	0.04%	0.04%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727
BPA Requirements	-4944	-4942	-4940	-4937	-4935	-4933	-4931	-4930	-4928	-4926	-4925	-4924	-4925	-4926	-4927
CONSERVATION PROGRAMS:															
SF Res MCS	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Water Heat	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159
Refrigerators	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Freezers	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Irrigation	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Industrial	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
New Commercial	214	214	214	214	214	214	214	214	214	214	214	214	214	214	214
Comm Lost Opps Exist	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67
MF Res Weath	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
SF Res Weath	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
Comm Discret Ex	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033	1033
GENERATING RESOURCES:															
FBCoal1 (E. Mnt)	162	162	162	162	162	162	162	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	162	162	162	162	162	162	162	0	0	0	0	0	0	0	0
GCoal1 (EMont)	160	160	160	160	160	160	160	160	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	162	162	162	162	162	162	162	162	0	0	0	0	0	0	0
GCoal2 (EWash)	160	160	160	160	160	160	160	160	160	0	0	0	0	0	0
GCoal3 (EOre)	160	160	160	160	160	160	160	160	160	160	0	0	0	0	0
GCoal4 (Nev)	160	160	160	160	160	160	160	160	160	160	160	0	0	0	0
GCoal5 (WWaOr)	160	160	160	160	160	160	160	160	160	160	160	160	0	0	0
Hydro Eff Imp	100	100	80	60	40	20	0	0	0	0	0	0	0	0	0
Trans Eff Imp	34	34	23	12	11	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 West	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle BPA	697	697	697	697	349	349	349	349	349	349	349	349	349	349	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
Small Hydro 3 East	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	120	120	120	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135
Small Hydro 4 West	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Small Hydro 4 East	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	20	20	20	20	20	20	20	20	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	1403	1404	1435	1587	2306	2337	2358	2681	3023	3184	3344	3506	3670	3673	4025
Subtotal	5841	5842	5842	5843	5844	5844	5845	5844	5844	5845	5845	5847	5851	5854	5857
Total Firm Resources	8657	8660	8662	8666	8669	8671	8674	8674	8676	8679	8680	8683	8686	8688	8690
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: HIGH COAL ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	6236	6239	6241	6243	6245	6247	6248	6250	6252	6253	6255	6256	6257	6257	6258
Observed Rate	0.04%	0.04%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.02%	0.02%	0.01%	0.01%	0.01%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727
BPA Requirements	-4928	-4929	-4929	-4930	-4931	-4931	-4932	-4933	-4933	-4934	-4934	-4935	-4935	-4934	-4934
CONSERVATION PROGRAMS:															
SF Res MCS	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	39	38	37	36	34	32	31	28	26	24	21	19	17	14	12
Water Heat	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159
Refrigerators	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Freezers	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Irrigation	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Industrial	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
New Commercial	214	214	214	214	214	214	214	214	214	214	214	214	214	214	214
Comm Lost Opps Exist	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67
MF Res Weath	9	9	9	9	9	9	9	8	7	7	6	6	5	5	4
SF Res Weath	62	62	62	62	62	62	60	56	50	45	40	36	31	26	20
Comm Discret Ex	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal	1033	1032	1031	1030	1028	1026	1023	1015	1006	999	990	984	976	968	959
GENERATING RESOURCES:															
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydro Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trans Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 West	10	10	10	10	10	10	10	10	0	0	0	0	0	0	0
Small Hydro 1 East	14	14	14	14	14	14	14	14	0	0	0	0	0	0	0
Small Hydro 2 West	11	11	11	11	11	11	11	11	0	0	0	0	0	0	0
Small Hydro 2 East	14	14	14	14	14	14	14	14	4	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle BPA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	0
WNP 1	813	813	813	813	813	813	813	813	813	813	0	0	0	0	0
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	0
Small Hydro 3 East	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	90	90	45	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Small Hydro 4 East	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	4073	4077	4126	4175	4179	4183	4190	4199	4256	4270	5092	5101	5109	5118	5944
Subtotal	5860	5864	5868	5872	5876	5880	5887	5896	5908	5918	5927	5936	5944	5953	5962
Total Firm Resources	8692	8694	8697	8699	8700	8702	8705	8705	8708	8710	8710	8712	8712	8714	8714
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: HIGH COAL ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	9551	9881	10214	10558	10916	11253	11590	11927	12264	12600	12946	13291	13638	13984	14331
Observed Rate		3.45%	3.37%	3.37%	3.39%	3.09%	3.00%	2.91%	2.82%	2.74%	2.74%	2.67%	2.60%	2.54%	2.48%
Existing Resources	9685	9681	9795	9910	9353	8791	8795	8798	8710	8621	8652	8683	8448	8214	8306
BPA Requirements	47	77	127	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	0	3	6	10	14	17	21	25	30	34	39	44	50	55	60
MF Res MCS	0	1	2	4	5	6	7	9	10	11	13	14	16	17	18
New Manuf Housing	0	1	2	4	5	7	9	12	14	17	20	22	25	28	31
Refrigerators	0	0	0	0	2	5	8	12	15	19	23	27	32	36	41
Freezers	0	0	0	0	1	1	2	3	4	5	6	8	9	10	11
Water Heat	0	0	0	0	5	16	28	39	51	63	76	90	104	117	131
Irrigation	0	0	1	2	3	5	7	10	12	14	16	18	20	21	22
Industrial	0	2	8	19	31	43	55	68	80	92	104	116	129	141	153
New Commercial	0	11	32	52	72	89	108	127	146	166	185	203	222	241	260
Comm Lost Opps Exist	0	2	6	10	14	18	21	25	29	33	37	41	45	49	53
MF Res Weath	0	1	3	5	7	9	11	13	15	17	19	21	23	25	27
SF Res Weath	0	1	4	8	11	15	18	22	26	29	33	36	39	40	40
Comm Discret Ex	0	2	7	14	21	28	35	42	49	56	63	71	76	76	76
Subtotal	0	24	71	128	191	259	330	407	481	556	634	711	790	856	923
GENERATING RESOURCES:															
Small Hydro 1 West	0	0	0	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	0	0	0	34	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	0	0	0	25	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	0	0	0	25	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	0	0	30	30	30	30	30	30	30	30	30	30	30	30	30
Combined Cycle Mix	0	0	0	0	349	349	349	349	349	349	349	349	349	349	349
Cogen1e	0	0	30	30	30	30	30	30	30	30	30	30	30	30	30
Cogen2w	0	0	180	180	180	180	180	180	180	180	180	180	180	180	180
Small Hydro 3 West	0	0	0	0	0	0	26	37	37	37	37	37	37	37	37
Small Hydro 3 East	0	0	0	0	0	0	26	52	52	52	52	52	56	56	56
Cogen2e	0	0	0	180	180	180	180	180	180	180	180	180	180	180	180
Coal1 (E. Mont)	0	0	0	0	0	0	0	188	375	563	750	938	1125	1313	1313
Cogen3w	0	0	0	0	360	360	360	360	360	360	360	360	360	360	360
Small Hydro 4 West	0	0	0	0	0	0	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	0	0	0	0	0	0	25	32	32	32	32	32	32	32	32
Cogen3e	0	0	0	0	140	360	360	360	360	360	360	360	360	360	360
Coal2 (E. Wash)	0	0	0	0	0	0	0	188	375	563	563	563	563	563	563
Cogen4w	0	0	0	0	0	620	780	780	780	780	780	780	1000	1330	1330
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	188
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	240	533	1420	2260	2522	2942	3316	3692	3879	4067	4478	4996	5184
Total Firm Resources	9732	9782	10233	10571	10964	11310	11647	12147	12507	12869	13165	13461	13716	14066	14413
Load/Resource Balance	181	-98	21	11	47	58	59	218	243	271	221	171	77	81	79

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	14754	15178	15604	16030	16458	16460	16462	16464	16466	16468	16470	16471	16473	16474	16475
Observed Rate	2.95%	2.87%	2.80%	2.73%	2.67%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
Existing Resources	8398	8383	8368	8513	8542	7194	6872	6543	6477	6261	5838	5194	5139	5051	4589
BPA Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	66	71	77	83	89	89	89	89	89	89	89	89	89	89	89
MF Res MCS	20	21	22	24	25	25	25	25	25	25	25	25	25	25	25
New Manuf Housing	33	36	38	41	44	44	44	44	44	44	44	44	44	44	44
Refrigerators	45	49	53	59	65	65	65	65	65	65	65	65	65	65	65
Freezers	12	13	14	16	18	18	18	18	18	18	18	18	18	18	18
Water Heat	144	158	173	188	203	203	203	203	203	203	203	203	203	203	203
Irrigation	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Industrial	165	177	189	202	212	212	212	212	212	212	212	212	212	212	212
New Commercial	280	300	321	343	365	365	365	365	365	365	365	365	365	365	365
Comm Lost Opps Exist	57	60	64	68	72	72	72	72	72	72	72	72	72	72	72
MF Res Weath	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
SF Res Weath	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Comm Discret Ex	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Subtotal	987	1050	1116	1189	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258
GENERATING RESOURCES:															
Small Hydro 1 West	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	30	30	30	30	30	30	30	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349
Cogen1e	30	30	30	30	30	30	30	0	0	0	0	0	0	0	0
Cogen2w	180	180	180	180	180	180	180	0	0	0	0	0	0	0	0
Small Hydro 3 West	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56
Cogen2e	180	180	180	180	180	180	180	180	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Cogen3w	360	360	360	360	360	360	360	360	360	0	0	0	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Cogen3e	360	360	360	360	360	360	360	360	360	220	0	0	0	0	0
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4w	1400	1500	1500	1500	1500	1500	1500	1500	1500	1500	880	720	720	720	720
Coal3 (E. Oregon)	375	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4e	0	80	450	670	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	1352	1607	1831	1831	2643	3907	4714	4980	5279	5822
Subtotal	5441	5809	6179	6399	6729	8081	8336	8320	8140	8452	8876	9523	9789	10088	10631
Total Firm Resources	14826	15242	15663	16101	16529	16533	16466	16121	15875	15971	15972	15975	16186	16397	16478
Load/Resource Balance	69	63	60	67	68	69	0	-346	-595	-500	-500	-500	-290	-80	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	3888	4002	4120	4235	4355	4473	4591	4709	4826	4944	5058	5173	5286	5400	5514
Observed Rate		2.95%	2.94%	2.78%	2.84%	2.71%	2.63%	2.56%	2.50%	2.43%	2.32%	2.26%	2.20%	2.15%	2.10%
DSI Firm Load	2261	2268	2278	2288	2298	2308	2319	2329	2339	2350	2360	2371	2381	2392	2403
Existing Resources	8379	8546	8382	8219	8213	8208	8255	8302	8310	8319	8417	8515	8521	8527	8408
BPA Requirements	-1952	-2132	-2308	-2322	-2491	-2654	-2803	-2953	-3123	-3295	-3425	-3556	-3706	-3857	-3984
CONSERVATION PROGRAMS:															
SF Res MCS	0	5	11	16	22	27	33	40	46	53	60	67	75	82	89
MF Res MCS	0	1	1	2	2	3	4	4	5	6	6	7	8	8	9
New Manuf Housing	0	1	2	3	5	6	8	11	13	15	18	20	22	25	27
Water Heat	0	0	0	0	4	13	22	31	40	50	60	71	81	92	103
Refrigerators	0	0	0	0	1	4	6	8	11	13	16	19	22	25	28
Freezers	0	0	0	0	0	1	2	2	3	4	4	5	6	7	8
Irrigation	0	0	1	1	2	4	5	6	8	9	11	12	13	14	14
Industrial	0	2	8	17	27	38	49	60	71	82	92	103	114	125	136
New Commercial	0	7	19	31	42	53	63	74	86	98	109	119	130	141	153
Comm Lost Opps Exist	0	2	6	9	11	13	17	20	24	27	31	35	38	42	45
MF Res Weath	0	0	1	2	2	3	3	4	4	5	6	6	7	8	8
SF Res Weath	0	2	6	12	17	20	22	25	30	35	41	46	52	58	62
Comm Discret Ex	0	2	8	16	22	24	25	29	36	44	52	59	67	75	83
Subtotal	0	22	63	109	157	209	259	314	377	441	506	569	635	702	765
GENERATING RESOURCES:															
Coal1 (E. Mont)	0	0	0	0	0	0	0	188	375	375	375	375	375	375	375
Coal2 (E. Wash)	0	0	0	0	0	0	0	188	188	188	188	188	188	188	188
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	188	188	188	188	188	188	188
Coal4 (Nevada)	0	0	0	0	0	0	0	0	188	188	188	188	188	188	188
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	188	188	188	188	188	188
Hydro Eff Imp	0	0	20	40	60	80	100	100	100	100	100	100	100	100	100
Trans Eff Imp	0	0	11	22	23	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 West	0	0	0	10	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	0	0	0	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	0	0	0	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	0	0	0	11	14	14	14	14	14	14	14	14	14	14	14
Cogen1w	0	0	10	10	10	10	10	10	10	10	10	10	10	10	10
Combined Cycle Mix	0	0	0	0	349	349	349	349	349	349	349	349	349	349	349
Combined Cycle BPA	0	0	0	0	349	349	349	349	349	349	349	349	349	697	697
Cogen1e	0	0	10	10	10	10	10	10	10	10	10	10	10	10	10
Cogen2w	0	0	60	60	60	60	60	60	60	60	60	60	60	60	60
Small Hydro 3 West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
WNP 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNP 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 East	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2e	0	0	60	60	60	60	60	60	60	60	60	60	60	60	60
Cogen3w	0	0	0	0	0	0	0	30	30	30	30	30	120	120	120
Geothermal2	0	0	0	0	0	0	0	0	0	0	0	0	45	45	45
Small Hydro 4 West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 East	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	171	248	970	1001	1021	1427	1990	2178	2178	2178	2313	2661	2672
Total Firm Resources	6428	6435	6308	6254	6850	6763	6731	7090	7554	7643	7675	7706	7762	8033	7860
Load/Resource Balance	278	165	-91	-270	197	-20	-180	50	384	345	253	161	93	238	-57

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	5642	5771	5898	6026	6153	6158	6164	6169	6173	6178	6182	6185	6189	6192	6195
Observed Rate	2.34%	2.27%	2.22%	2.16%	2.11%	0.09%	0.09%	0.08%	0.07%	0.07%	0.07%	0.06%	0.06%	0.05%	0.05%
DSI Firm Load	2413	2424	2435	2446	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	8289	8394	8500	8431	8362	8291	8220	8150	8079	8009	7920	7650	7579	7449	6727
BPA Requirements	-4138	-4313	-4487	-4661	-4849	-5000	-4992	-4985	-4979	-4973	-4967	-4962	-4957	-4952	-4948
CONSERVATION PROGRAMS:															
SF Res MCS	96	103	111	118	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	10	10	11	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	29	32	34	36	39	39	39	39	39	39	39	39	39	39	39
Water Heat	113	124	136	148	159	159	159	159	159	159	159	159	159	159	159
Refrigerators	31	34	37	41	45	45	45	45	45	45	45	45	45	45	45
Freezers	8	9	10	11	12	12	12	12	12	12	12	12	12	12	12
Irrigation	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Industrial	146	157	168	179	188	188	188	188	188	188	188	188	188	188	188
New Commercial	164	176	189	201	214	214	214	214	214	214	214	214	214	214	214
Comm Lost Opps Exist	49	53	56	60	63	63	63	63	63	63	63	63	63	63	63
MF Res Weath	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
SF Res Weath	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
Comm Discret Ex	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal	817	869	923	977	1029	1029	1029	1029	1029	1029	1029	1029	1029	1029	1029
GENERATING RESOURCES:															
Coal1 (E. Mont)	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375
Coal2 (E. Wash)	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
Coal3 (E. Oregon)	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
Coal4 (Nevada)	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
Coal5 (W. Wa/Or)	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
Hydro Eff Imp	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Trans Eff Imp	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 West	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Cogen1w	10	10	10	10	10	10	10	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349
Combined Cycle BPA	697	697	697	697	697	697	697	697	697	697	697	697	697	697	697
Cogen1e	10	10	10	10	10	10	10	0	0	0	0	0	0	0	0
Cogen2w	60	60	60	60	60	60	60	0	0	0	0	0	0	0	0
Small Hydro 3 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
WNP 3	0	0	0	0	806	806	806	806	806	806	806	806	806	806	806
Small Hydro 3 East	0	0	0	11	11	11	11	11	11	11	11	11	11	11	11
Cogen2e	60	60	60	60	60	60	60	0	0	0	0	0	0	0	0
Cogen3w	120	120	120	120	120	120	120	120	120	120	120	120	90	90	90
Geothermal2	90	135	180	225	225	225	225	225	225	225	225	225	225	225	225
Small Hydro 4 West	0	0	0	7	7	7	7	7	7	7	7	7	7	7	7
Small Hydro 4 East	0	0	0	11	11	11	11	11	11	11	11	11	11	11	11
Cogen3e	0	0	0	80	80	80	80	80	80	80	80	80	80	80	80
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	126	335	714	1435
Subtotal	3530	3575	3620	3774	4580	4580	4580	4440	4440	4440	4440	4566	4745	5124	5845
Total Firm Resources	8498	8525	8555	8521	9122	8900	8837	8633	8569	8505	8422	8283	8396	8650	8653
Load/Resource Balance	442	329	219	47	512	284	216	7	-61	-130	-217	-360	-250	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	6199	6202	6205	6208	6211	6214	6216	6218	6220	6222	6224	6226	6229	6231	6234
Observed Rate	0.05%	0.05%	0.05%	0.05%	0.04%	0.04%	0.04%	0.04%	0.03%	0.03%	0.03%	0.03%	0.04%	0.04%	0.04%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727
BPA Requirements	-4944	-4942	-4940	-4937	-4935	-4933	-4931	-4930	-4928	-4926	-4925	-4924	-4925	-4926	-4927
CONSERVATION PROGRAMS:															
SF Res MCS	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Water Heat	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159
Refrigerators	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Freezers	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Irrigation	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Industrial	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
New Commercial	214	214	214	214	214	214	214	214	214	214	214	214	214	214	214
Comm Lost Opps Exist	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63
MF Res Weath	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
SF Res Weath	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
Comm Discret Ex	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal	1029	1029	1029	1029	1029	1029	1029	1029	1029	1029	1029	1029	1029	1029	1029
GENERATING RESOURCES:															
Coal1 (E. Mont)	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375
Coal2 (E. Wash)	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
Coal3 (E. Oregon)	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
Coal4 (Nevada)	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
Coal5 (W. Wa/Or)	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
Hydro Eff Imp	100	100	80	60	40	20	0	0	0	0	0	0	0	0	0
Trans Eff Imp	34	34	23	12	11	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 West	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle BPA	697	697	697	697	349	349	349	349	349	349	349	349	349	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
Small Hydro 3 East	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	90	90	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	225	225	225	225	225	225	225	225	225	225	225	225	180	180	180
Small Hydro 4 West	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Small Hydro 4 East	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Cogen3e	80	80	80	80	80	80	80	80	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	1435	1436	1557	1589	2308	2339	2360	2360	2441	2441	2442	2443	2492	2844	2847
Subtotal	5845	5846	5846	5847	5848	5848	5849	5849	5850	5850	5851	5852	5856	5859	5862
Total Firm Resources	8657	8660	8662	8666	8669	8671	8674	8675	8678	8680	8682	8684	8687	8689	8691
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	6236	6239	6241	6243	6245	6247	6248	6250	6252	6253	6255	6256	6257	6257	6258
Observed Rate	0.04%	0.04%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.02%	0.02%	0.01%	0.01%	0.01%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727
BPA Requirements	-4928	-4929	-4929	-4930	-4931	-4931	-4932	-4933	-4933	-4934	-4934	-4935	-4935	-4934	-4934
CONSERVATION PROGRAMS:															
SF Res MCS	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	39	38	37	36	34	32	31	28	26	24	21	19	17	14	12
Water Heat	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159
Refrigerators	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Freezers	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Irrigation	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Industrial	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
New Commercial	214	214	214	214	214	214	214	214	214	214	214	214	214	214	214
Comm Lost Opps Exist	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63
MF Res Weath	9	9	9	9	9	9	9	8	7	7	7	6	5	5	4
SF Res Weath	62	62	62	62	62	62	60	56	50	46	43	40	37	33	27
Comm Discret Ex	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal	1029	1028	1027	1026	1024	1022	1019	1011	1002	996	990	984	978	971	962
GENERATING RESOURCES:															
Coal1 (E. Mont)	375	375	188	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	188	188	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	188	188	188	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	188	188	188	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	188	188	188	188	0	0	0	0	0	0	0	0	0	0	0
Hydro Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trans Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 West	10	10	10	10	10	10	10	10	0	0	0	0	0	0	0
Small Hydro 1 East	14	14	14	14	14	14	14	14	0	0	0	0	0	0	0
Small Hydro 2 West	11	11	11	11	11	11	11	11	0	0	0	0	0	0	0
Small Hydro 2 East	14	14	14	14	14	14	14	14	4	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle BPA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
WNP 1	813	813	813	813	813	813	813	813	813	813	0	0	0	0	0
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	0
Small Hydro 3 East	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	135	90	45	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Small Hydro 4 East	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	2895	2944	3368	3980	4172	4176	4182	4192	4248	4262	5082	5089	5095	5103	5918
Subtotal	5865	5869	5873	5876	5880	5884	5890	5900	5911	5921	5928	5935	5941	5949	5958
Total Firm Resources	8693	8695	8698	8699	8700	8702	8704	8705	8707	8710	8711	8711	8711	8713	8713
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	9551	9881	10214	10558	10916	11253	11590	11927	12264	12600	12946	13291	13638	13984	14331
Observed Rate		3.45%	3.37%	3.37%	3.39%	3.09%	3.00%	2.91%	2.82%	2.74%	2.74%	2.67%	2.60%	2.54%	2.48%
Existing Resources	9685	9681	9795	9910	9353	8791	8795	8798	8710	8621	8652	8683	8448	8214	8306
BPA Requirements	47	77	127	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	0	3	6	10	14	17	21	25	30	34	39	44	50	55	60
MF Res MCS	0	1	2	4	5	6	7	9	10	11	13	14	16	17	18
New Manuf Housing	0	1	2	4	5	7	9	12	14	17	20	22	25	28	31
Refrigerators	0	0	0	0	2	5	8	12	15	19	23	27	32	36	41
Freezers	0	0	0	0	1	1	2	3	4	5	6	8	9	10	11
Water Heat	0	0	0	0	5	16	28	39	51	63	76	90	104	117	131
Irrigation	0	0	1	2	3	5	7	10	12	14	16	18	20	21	22
Industrial	0	2	8	19	31	43	55	68	80	92	104	116	129	141	153
New Commercial	0	11	32	52	72	89	108	127	146	166	185	203	222	241	260
Comm Lost Opps Exist	0	2	6	10	14	18	21	25	29	33	37	41	45	49	53
MF Res Weath	0	1	3	5	7	9	11	13	15	17	19	21	23	25	27
SF Res Weath	0	1	4	8	11	15	18	22	26	29	33	36	39	40	40
Comm Discret Ex	0	2	7	14	21	28	35	42	49	56	63	71	76	76	76
Subtotal	0	24	71	128	191	259	330	407	481	556	634	711	790	856	923
GENERATING RESOURCES:															
Small Hydro 1 West	0	0	0	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	0	0	0	34	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	0	0	0	25	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	0	0	0	25	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	0	0	30	30	30	30	30	30	30	30	30	30	30	30	30
Combined Cycle Mix	0	0	0	0	349	349	349	349	349	349	349	349	349	349	349
Cogen1e	0	0	30	30	30	30	30	30	30	30	30	30	30	30	30
Cogen2w	0	0	180	180	180	180	180	180	180	180	180	180	180	180	180
Small Hydro 3 West	0	0	0	0	0	0	26	37	37	37	37	37	37	37	37
Small Hydro 3 East	0	0	0	0	0	0	26	52	52	52	52	52	56	56	56
Cogen2e	0	0	0	180	180	180	180	180	180	180	180	180	180	180	180
Coal1 (E. Mont)	0	0	0	0	0	0	0	188	375	563	750	938	1125	1313	1313
Cogen3w	0	0	0	0	360	360	360	360	360	360	360	360	360	360	360
Small Hydro 4 West	0	0	0	0	0	0	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	0	0	0	0	0	0	25	32	32	32	32	32	32	32	32
Cogen3e	0	0	0	0	140	360	360	360	360	360	360	360	360	360	360
Coal2 (E. Wash)	0	0	0	0	0	0	0	188	375	563	563	563	563	563	563
Cogen4w	0	0	0	0	0	620	780	780	780	780	780	780	1000	1330	1330
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	188
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	240	533	1420	2260	2522	2942	3316	3692	3879	4067	4478	4996	5184
Total Firm Resources	9732	9782	10233	10571	10964	11310	11647	12147	12507	12869	13165	13461	13716	14066	14413
Load/Resource Balance	181	-98	21	11	47	58	59	218	243	271	221	171	77	81	79

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
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Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	14754	15178	15604	16030	16458	16460	16462	16464	16466	16468	16470	16471	16473	16474	16475
Observed Rate	2.95%	2.87%	2.80%	2.73%	2.67%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
Existing Resources	8398	8383	8368	8513	8542	7194	6872	6543	6477	6261	5838	5194	5139	5051	4589
BPA Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	66	71	77	83	89	89	89	89	89	89	89	89	89	89	89
MF Res MCS	20	21	22	24	25	25	25	25	25	25	25	25	25	25	25
New Manuf Housing	33	36	38	41	44	44	44	44	44	44	44	44	44	44	44
Refrigerators	45	49	53	59	65	65	65	65	65	65	65	65	65	65	65
Freezers	12	13	14	16	18	18	18	18	18	18	18	18	18	18	18
Water Heat	144	158	173	188	203	203	203	203	203	203	203	203	203	203	203
Irrigation	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Industrial	165	177	189	202	212	212	212	212	212	212	212	212	212	212	212
New Commercial	280	300	321	343	365	365	365	365	365	365	365	365	365	365	365
Comm Lost Opps Exist	57	60	64	68	72	72	72	72	72	72	72	72	72	72	72
MF Res Weath	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
SF Res Weath	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Comm Discret Ex	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Subtotal	987	1050	1116	1189	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258
GENERATING RESOURCES:															
Small Hydro 1 West	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	30	30	30	30	30	30	30	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349
Cogen1e	30	30	30	30	30	30	30	0	0	0	0	0	0	0	0
Cogen2w	180	180	180	180	180	180	180	0	0	0	0	0	0	0	0
Small Hydro 3 West	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56
Cogen2e	180	180	180	180	180	180	180	180	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Cogen3w	360	360	360	360	360	360	360	360	360	0	0	0	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Cogen3e	360	360	360	360	360	360	360	360	360	220	0	0	0	0	0
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4w	1400	1500	1500	1500	1500	1500	1500	1500	1500	1500	880	720	720	720	720
Coal3 (E. Oregon)	375	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4e	0	80	450	670	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	1352	1607	1831	1831	2643	3907	4714	4980	5279	5822
Subtotal	5441	5809	6179	6399	6729	8081	8336	8320	8140	8452	8876	9523	9789	10088	10631
Total Firm Resources	14826	15242	15663	16101	16529	16533	16466	16121	15875	15971	15972	15975	16186	16397	16478
Load/Resource Balance	69	63	60	67	68	69	0	-346	-595	-500	-500	-500	-290	-80	0

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Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	16475	16474	16474	16473	16472	16472	16471	16471	16470	16470	16469	16468	16464	16461	16457
Observed Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.01%	-0.02%	-0.02%	-0.02%
Existing Resources	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143
BPA Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89
MF Res MCS	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
New Manuf Housing	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44
Refrigerators	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
Freezers	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Water Heat	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203
Irrigation	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Industrial	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212
New Commercial	365	365	365	365	365	365	365	365	365	365	365	365	365	365	365
Comm Lost Opps Exist	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72
MF Res Weath	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
SF Res Weath	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Comm Discret Ex	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Subtotal	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258
GENERATING RESOURCES:															
Small Hydro 1 West	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4w	720	720	500	170	170	100	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4e	1000	1000	1000	1000	1000	1000	920	550	330	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	6268	6268	6486	6816	7164	7233	7413	7782	8002	8331	8331	8331	8331	8331	8331
Subtotal	11077	11077	11075	11075	11074	11073	11073	11072	11072	11071	11071	11071	11071	11071	11071
Total Firm Resources	16478	16478	16476	16476	16475	16474	16474	16473	16473	16472	16472	16472	16472	16472	16472
Load/Resource Balance	0	1	0	0	0	0	0	0	0	0	0	2	5	9	12

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
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Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	16454	16451	16448	16446	16443	16441	16438	16436	16434	16431	16429	16428	16427	16427	16427
Observed Rate	-0.02%	-0.02%	-0.02%	-0.02%	-0.02%	-0.02%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	0.00%	0.00%
Existing Resources	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143
BPA Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89
MF Res MCS	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
New Manuf Housing	44	43	42	40	38	37	34	32	29	27	24	21	19	16	13
Refrigerators	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
Freezers	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Water Heat	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203
Irrigation	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Industrial	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212
New Commercial	365	365	365	365	365	365	365	365	365	365	365	365	365	365	365
Comm Lost Opps Exist	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72
MF Res Weath	27	27	27	27	27	27	26	24	22	20	18	16	14	12	10
SF Res Weath	40	40	40	40	40	40	39	36	32	29	25	21	18	14	11
Comm Discret Ex	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Subtotal	1258	1257	1256	1254	1252	1251	1246	1239	1230	1223	1214	1205	1198	1189	1181
GENERATING RESOURCES:															
Small Hydro 1 West	29	29	29	29	29	29	29	29	0	0	0	0	0	0	0
Small Hydro 1 East	43	43	43	43	43	43	43	43	10	0	0	0	0	0	0
Small Hydro 2 West	32	32	32	32	32	32	32	32	7	0	0	0	0	0	0
Small Hydro 2 East	47	47	47	47	47	47	47	47	22	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	37	37	37	37	37	37	37	37	37	37	37	11	0	0	0
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	30	4	4	4
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1125	938	750	563	375	188	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	0	0	0	0
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	7	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	563	563	375	188	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	375	188	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	8331	8331	8687	9061	9435	9622	9811	10004	10310	10542	10736	11032	11083	11092	11100
Subtotal	11071	11071	11051	11051	11049	11049	11050	11056	11062	11067	11074	11080	11087	11096	11104
Total Firm Resources	16472	16471	16450	16448	16444	16443	16439	16438	16435	16433	16431	16428	16428	16428	16428
Load/Resource Balance	15	17	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: COAL ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	4284	4434	4588	4758	4922	5085	5249	5414	5579	5744	5895	6045	6196	6346	6496
Observed Rate		3.49%	3.48%	3.70%	3.44%	3.32%	3.23%	3.13%	3.05%	2.97%	2.62%	2.55%	2.49%	2.42%	2.37%
Existing Resources	2380	2378	2407	2436	2431	2431	2446	2461	2455	2449	2469	2490	2489	2489	2512
BPA Requirements	1905	2055	2181	2322	2491	2654	2803	2953	3123	3295	3425	3556	3706	3857	3984
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	4284	4434	4588	4758	4922	5085	5249	5414	5579	5744	5895	6045	6196	6346	6496
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Study ID : 9-OCT-91 20:08:29
Study Title: COAL ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	6672	6847	7022	7195	7368	7361	7353	7346	7340	7333	7328	7322	7317	7313	7308
Observed Rate	2.71%	2.63%	2.55%	2.47%	2.40%	-0.11%	-0.10%	-0.09%	-0.09%	-0.08%	-0.08%	-0.07%	-0.07%	-0.06%	-0.06%
Existing Resources	2534	2534	2534	2534	2520	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4138	4313	4487	4661	4849	5000	4992	4985	4979	4973	4967	4962	4957	4952	4948
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	6672	6847	7022	7195	7368	7361	7353	7346	7340	7334	7328	7322	7317	7313	7308
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	7305	7303	7300	7298	7296	7294	7292	7290	7289	7287	7286	7285	7286	7287	7288
Observed Rate	-0.04%	-0.04%	-0.03%	-0.03%	-0.03%	-0.03%	-0.03%	-0.02%	-0.02%	-0.02%	-0.02%	-0.01%	0.01%	0.01%	0.01%
Existing Resources	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4944	4942	4940	4937	4935	4933	4931	4930	4928	4926	4925	4924	4925	4926	4927
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	7305	7303	7300	7298	7296	7294	7292	7290	7289	7287	7286	7285	7286	7287	7288
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	7288	7289	7290	7291	7291	7292	7293	7293	7294	7294	7295	7295	7295	7295	7295
Observed Rate	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.00%	-0.01%	-0.01%
Existing Resources	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4928	4929	4929	4930	4931	4931	4932	4933	4933	4934	4934	4935	4935	4934	4934
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	7288	7289	7290	7291	7291	7292	7293	7293	7294	7294	7295	7295	7295	7295	7295
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: COAL ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	17723	18317	18922	19551	20193	20811	21431	22050	22669	23288	23899	24509	25120	25730	26341
Observed Rate		3.35%	3.30%	3.32%	3.28%	3.07%	2.97%	2.89%	2.81%	2.73%	2.62%	2.56%	2.49%	2.43%	2.37%
DSI Firm Load	2261	2268	2278	2288	2298	2308	2319	2329	2339	2350	2360	2371	2381	2392	2403
Existing Resources	20443	20605	20585	20564	19997	19429	19495	19560	19475	19389	19538	19687	19458	19229	19225
CONSERVATION PROGRAMS:															
SF Res MCS	0	8	17	26	36	44	54	65	76	87	99	111	125	137	149
MF Res MCS	0	2	3	6	7	9	11	13	15	17	19	21	24	25	27
Water Heat	0	0	0	0	9	29	50	70	91	113	136	161	185	209	234
Refrigerators	0	0	0	0	3	9	14	20	26	32	39	46	54	61	69
Freezers	0	0	0	0	1	2	4	5	7	9	10	13	15	17	19
New Manuf Housing	0	2	4	7	10	13	17	23	27	32	38	42	47	53	58
Irrigation	0	0	2	3	5	9	12	16	20	23	27	30	33	35	36
Industrial	0	4	16	36	58	81	104	128	151	174	196	219	243	266	289
New Commercial	0	18	51	83	114	142	171	201	232	264	294	322	352	382	413
Comm Discret Ex	0	4	15	30	43	52	60	71	85	100	115	130	143	151	159
Comm Lost Opps Exist	0	4	12	19	25	31	38	45	53	60	68	76	83	91	98
SF Res Weath	0	3	10	20	28	35	40	47	56	64	74	82	91	98	102
MF Res Weath	0	1	4	7	9	12	14	17	19	22	25	27	30	33	35
Subtotal	0	46	134	237	348	468	589	721	858	997	1140	1280	1425	1558	1688
GENERATING RESOURCES:															
Hydro Eff Imp	0	0	20	40	60	80	100	100	100	100	100	100	100	100	100
Trans Eff Imp	0	0	11	22	23	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 East	0	0	0	48	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	0	0	0	36	61	61	61	61	61	61	61	61	61	61	61
Small Hydro 3 East	0	0	0	0	0	0	26	52	52	52	52	52	56	56	56
Small Hydro 4 East	0	0	0	0	0	0	25	32	32	32	32	32	32	32	32
Small Hydro 1 West	0	0	0	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	0	0	0	36	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	0	0	0	0	0	0	26	37	37	37	37	37	37	37	48
Small Hydro 4 West	0	0	0	0	0	0	25	25	25	25	25	25	25	25	25
Combined Cycle BPA	0	0	0	0	349	349	349	349	349	349	349	349	349	697	697
Combined Cycle Mix	0	0	0	0	698	698	698	698	698	698	698	698	698	698	698
Cogen1e	0	0	40	40	40	40	40	40	40	40	40	40	40	40	40
Cogen2e	0	0	60	240	240	240	240	240	240	240	240	240	240	240	240
Cogen3e	0	0	0	0	140	360	360	360	360	360	360	360	360	360	360
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1w	0	0	40	40	40	40	40	40	40	40	40	40	40	40	40
Cogen2w	0	0	240	240	240	240	240	240	240	240	240	240	240	240	240
Cogen3w	0	0	0	0	360	360	360	390	390	390	390	390	480	480	480
Cogen4w	0	0	0	0	0	620	780	780	780	780	780	780	1000	1330	1330
Coal1 (E. Mont)	0	0	0	0	0	0	0	376	750	938	1125	1313	1500	1688	1688
Coal2 (E. Wash)	0	0	0	0	0	0	0	376	563	751	751	751	751	751	751
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	188	188	188	188	188	188	376
Coal4 (Nevada)	0	0	0	0	0	0	0	0	188	188	188	188	188	188	188
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	188	188	188	188	188	188
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNP 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNP 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	0	0	0	0	0	0	0	0	0	0	0	0	45	45	45
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	411	781	2390	3261	3543	4369	5306	5870	6057	6245	6791	7657	7856
Total Firm Resources	20443	20652	21129	21580	22735	23158	23628	24646	25635	26254	26733	27212	27671	28442	28765
Load/Resource Balance	459	67	-70	-258	245	38	-121	268	627	616	474	332	169	319	22

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Study Title: COAL ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	27069	27796	28524	29251	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979
Observed Rate	2.76%	2.69%	2.62%	2.55%	2.49%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DSI Firm Load	2413	2424	2435	2446	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	19221	19312	19402	19478	19423	17845	17453	17054	16917	16631	16119	15204	15079	14861	13677
CONSERVATION PROGRAMS:															
SF Res MCS	162	174	188	201	215	215	215	215	215	215	215	215	215	215	215
MF Res MCS	30	31	33	36	37	37	37	37	37	37	37	37	37	37	37
Water Heat	257	282	309	336	362	362	362	362	362	362	362	362	362	362	362
Refrigerators	76	83	90	100	110	110	110	110	110	110	110	110	110	110	110
Freezers	20	22	24	27	30	30	30	30	30	30	30	30	30	30	30
New Manuf Housing	62	68	72	77	83	83	83	83	83	83	83	83	83	83	83
Irrigation	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Industrial	311	334	357	381	400	400	400	400	400	400	400	400	400	400	400
New Commercial	444	476	510	544	579	579	579	579	579	579	579	579	579	579	579
Comm Discret Ex	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
Comm Lost Opps Exist	106	113	120	128	135	135	135	135	135	135	135	135	135	135	135
SF Res Weath	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102
MF Res Weath	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Subtotal	1804	1919	2039	2166	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287
GENERATING RESOURCES:															
Hydro Eff Imp	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Trans Eff Imp	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 East	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61
Small Hydro 3 East	56	56	56	67	67	67	67	67	67	67	67	67	67	67	67
Small Hydro 4 East	32	32	32	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 1 West	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
Small Hydro 4 West	25	25	25	32	32	32	32	32	32	32	32	32	32	32	32
Combined Cycle BPA	697	697	697	697	697	697	697	697	697	697	697	697	697	697	697
Combined Cycle Mix	698	698	698	698	698	698	698	698	698	698	698	698	698	698	698
Cogen1e	40	40	40	40	40	40	40	0	0	0	0	0	0	0	0
Cogen2e	240	240	240	240	240	240	240	180	0	0	0	0	0	0	0
Cogen3e	360	360	360	440	440	440	440	440	440	300	80	80	80	80	80
Cogen4e	0	80	450	670	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Cogen1w	40	40	40	40	40	40	40	0	0	0	0	0	0	0	0
Cogen2w	240	240	240	240	240	240	240	0	0	0	0	0	0	0	0
Cogen3w	480	480	480	480	480	480	480	480	480	120	120	120	90	90	90
Cogen4w	1400	1500	1500	1500	1500	1500	1500	1500	1500	1500	880	720	720	720	720
Coal1 (E. Mont)	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688
Coal2 (E. Wash)	751	751	751	751	751	751	751	751	751	751	751	751	751	751	751
Coal3 (E. Oregon)	563	751	751	751	751	751	751	751	751	751	751	751	751	751	751
Coal4 (Nevada)	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
Coal5 (W. Wa/Or)	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	1352	1607	1831	1831	2643	3907	4840	5315	5993	7257
WNP 3	0	0	0	0	806	806	806	806	806	806	806	806	806	806	806
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	90	135	180	225	225	225	225	225	225	225	225	225	225	225	225
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	8971	9384	9799	10173	11309	12661	12916	12760	12580	12892	13316	14089	14534	15212	16476
Total Firm Resources	29993	30613	31238	31811	33016	32789	32652	32097	31780	31806	31718	31576	31896	32356	32436
Load/Resource Balance	511	392	279	114	580	354	216	-339	-656	-630	-718	-860	-540	-80	0

Study ID : 9-OCT-91 20:08:29
Study Title: COAL ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979
Observed Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231
CONSERVATION PROGRAMS:															
SF Res MCS	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215
MF Res MCS	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Water Heat	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362
Refrigerators	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
Freezers	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
New Manuf Housing	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83
Irrigation	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Industrial	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
New Commercial	579	579	579	579	579	579	579	579	579	579	579	579	579	579	579
Comm Discret Ex	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
Comm Lost Opps Exist	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135
SF Res Weath	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102
MF Res Weath	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Subtotal	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287
GENERATING RESOURCES:															
Hydro Eff Imp	100	100	80	60	40	20	0	0	0	0	0	0	0	0	0
Trans Eff Imp	34	34	23	12	11	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 East	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61
Small Hydro 3 East	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67
Small Hydro 4 East	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 1 West	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
Small Hydro 4 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Combined Cycle BPA	697	697	697	697	349	349	349	349	349	349	349	349	349	0	0
Combined Cycle Mix	698	698	698	698	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	80	80	80	80	80	80	80	80	0	0	0	0	0	0	0
Cogen4e	1000	1000	1000	1000	1000	1000	920	550	330	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	90	90	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	720	720	500	170	170	100	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688
Coal2 (E. Wash)	751	751	751	751	751	751	751	751	751	751	751	751	751	751	751
Coal3 (E. Oregon)	751	751	751	751	751	751	751	751	751	751	751	751	751	751	751
Coal4 (Nevada)	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
Coal5 (W. Wa/Or)	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	7703	7704	8043	8405	9472	9572	9773	10142	10443	10772	10773	10774	10823	11175	11178
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	225	225	225	225	225	225	225	225	225	225	225	225	180	180	180
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	16922	16923	16921	16922	16922	16921	16922	16921	16922	16921	16922	16923	16927	16930	16933
Total Firm Resources	32436	32437	32435	32436	32436	32435	32436	32435	32436	32435	32436	32437	32441	32445	32448
Load/Resource Balance	0	1	-1	0	0	-1	0	-1	0	-1	0	1	5	9	12

Study ID : 9-OCT-91 20:08:29
Study Title: COAL ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979
Observed Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231
CONSERVATION PROGRAMS:															
SF Res MCS	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215
MF Res MCS	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Water Heat	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362
Refrigerators	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
Freezers	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
New Manuf Housing	83	81	79	76	72	69	65	60	55	51	45	40	36	30	25
Irrigation	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Industrial	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
New Commercial	579	579	579	579	579	579	579	579	579	579	579	579	579	579	579
Comm Discret Ex	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
Comm Lost Opps Exist	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135
SF Res Weath	102	102	102	102	102	102	99	92	82	75	68	61	55	47	38
MF Res Weath	36	36	36	36	36	36	35	32	29	27	25	22	19	17	14
Subtotal	2287	2285	2283	2280	2276	2273	2265	2250	2232	2219	2204	2189	2176	2160	2143
GENERATING RESOURCES:															
Hydro Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trans Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 East	57	57	57	57	57	57	57	57	10	0	0	0	0	0	0
Small Hydro 2 East	61	61	61	61	61	61	61	61	26	0	0	0	0	0	0
Small Hydro 3 East	67	67	67	67	67	67	67	67	67	67	67	41	15	15	15
Small Hydro 4 East	43	43	43	43	43	43	43	43	43	43	43	18	11	11	11
Small Hydro 1 West	39	39	39	39	39	39	39	39	0	0	0	0	0	0	0
Small Hydro 2 West	43	43	43	43	43	43	43	43	7	0	0	0	0	0	0
Small Hydro 3 West	48	48	48	48	48	48	48	48	48	48	48	22	11	11	11
Small Hydro 4 West	32	32	32	32	32	32	32	32	32	32	32	7	7	7	7
Combined Cycle BPA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1688	1688	1313	938	750	563	375	188	0	0	0	0	0	0	0
Coal2 (E. Wash)	751	751	375	188	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	751	751	751	563	563	563	563	563	563	375	188	0	0	0	0
Coal4 (Nevada)	188	188	188	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	188	188	188	188	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	11226	11275	12055	13041	13607	13798	13993	14196	14558	14804	15818	16121	16178	16195	17018
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	0
WNP 1	813	813	813	813	813	813	813	813	813	813	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	135	90	45	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	16936	16940	16924	16927	16929	16933	16940	16956	16973	16988	17002	17015	17028	17045	17062
Total Firm Resources	32451	32453	32436	32436	32436	32437	32436	32436	32436	32436	32437	32437	32435	32436	32436
Load/Resource Balance	15	17	0	0	1	1	0	0	0	1	1	1	-1	0	0

Study ID : 15-JUL-91 07:05:23
Study Title: HIGH COAL ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	16475	16474	16474	16473	16472	16472	16471	16471	16470	16470	16469	16468	16464	16461	16457
Observed Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.01%	-0.02%	-0.02%	-0.02%
Existing Resources	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143
BPA Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89
MF Res MCS	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
New Manuf Housing	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44
Refrigerators	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
Freezers	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Water Heat	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203
Irrigation	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Industrial	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212
New Commercial	365	365	365	365	365	365	365	365	365	365	365	365	365	365	365
Comm Lost Opps Exist	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72
MF Res Weath	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
SF Res Weath	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Comm Discret Ex	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Subtotal	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258
GENERATING RESOURCES:															
Small Hydro 1 West	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4w	720	720	500	170	170	100	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4e	1000	1000	1000	1000	1000	1000	920	550	330	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	6268	6268	6486	6816	7164	7233	7413	7782	8002	8331	8331	8331	8331	8331	8331
Subtotal	11077	11077	11075	11075	11074	11073	11073	11072	11072	11071	11071	11071	11071	11071	11071
Total Firm Resources	16478	16478	16476	16476	16475	16474	16474	16473	16473	16472	16472	16472	16472	16472	16472
Load/Resource Balance	0	1	0	0	0	0	0	0	0	0	0	2	5	9	12

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Study Title: HIGH COAL ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	16454	16451	16448	16446	16443	16441	16438	16436	16434	16431	16429	16428	16427	16427	16427
Observed Rate	-0.02%	-0.02%	-0.02%	-0.02%	-0.02%	-0.02%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	0.00%	0.00%
Existing Resources	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143
BPA Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89
MF Res MCS	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
New Manuf Housing	44	43	42	40	38	37	34	32	29	27	24	21	19	16	13
Refrigerators	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
Freezers	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Water Heat	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203
Irrigation	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Industrial	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212
New Commercial	365	365	365	365	365	365	365	365	365	365	365	365	365	365	365
Comm Lost Opps Exist	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72
MF Res Weath	27	27	27	27	27	27	26	24	22	20	18	16	14	12	10
SF Res Weath	40	40	40	40	40	40	39	36	32	29	25	21	18	14	11
Comm Discret Ex	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Subtotal	1258	1257	1256	1254	1252	1251	1246	1239	1230	1223	1214	1205	1198	1189	1181
GENERATING RESOURCES:															
Small Hydro 1 West	29	29	29	29	29	29	29	29	0	0	0	0	0	0	0
Small Hydro 1 East	43	43	43	43	43	43	43	43	10	0	0	0	0	0	0
Small Hydro 2 West	32	32	32	32	32	32	32	32	7	0	0	0	0	0	0
Small Hydro 2 East	47	47	47	47	47	47	47	47	22	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	37	37	37	37	37	37	37	37	37	37	37	11	0	0	0
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	30	4	4	4
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1125	938	750	563	375	188	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	0	0	0	0
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	7	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	563	563	375	188	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	375	188	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	8331	8331	8687	9061	9435	9622	9811	10004	10310	10542	10736	11032	11083	11092	11100
Subtotal	11071	11071	11051	11051	11049	11049	11050	11056	11062	11067	11074	11080	11087	11096	11104
Total Firm Resources	16472	16471	16450	16448	16444	16443	16439	16438	16435	16433	16431	16428	16428	16428	16428
Load/Resource Balance	15	17	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: HIGH COAL ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	4284	4434	4588	4758	4922	5085	5249	5414	5579	5744	5895	6045	6196	6346	6496
Observed Rate		3.49%	3.48%	3.70%	3.44%	3.32%	3.23%	3.13%	3.05%	2.97%	2.62%	2.55%	2.49%	2.42%	2.37%
Existing Resources	2380	2378	2407	2436	2431	2431	2446	2461	2455	2449	2469	2490	2489	2489	2512
BPA Requirements	1905	2055	2181	2322	2491	2654	2803	2953	3123	3295	3425	3556	3706	3857	3984
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	4284	4434	4588	4758	4922	5085	5249	5414	5579	5744	5895	6045	6196	6346	6496
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Study ID : 15-JUL-91 07:05:23
Study Title: HIGH COAL ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	6672	6847	7022	7195	7368	7361	7353	7346	7340	7333	7328	7322	7317	7313	7308
Observed Rate	2.71%	2.63%	2.55%	2.47%	2.40%	-0.11%	-0.10%	-0.09%	-0.09%	-0.08%	-0.08%	-0.07%	-0.07%	-0.06%	-0.06%
Existing Resources	2534	2534	2534	2534	2520	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4138	4313	4487	4661	4849	5000	4992	4985	4979	4973	4967	4962	4957	4952	4948
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	6672	6847	7022	7195	7368	7361	7353	7346	7340	7334	7328	7322	7317	7313	7308
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: HIGH COAL ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	7305	7303	7300	7298	7296	7294	7292	7290	7289	7287	7286	7285	7286	7287	7288
Observed Rate	-0.04%	-0.04%	-0.03%	-0.03%	-0.03%	-0.03%	-0.03%	-0.02%	-0.02%	-0.02%	-0.02%	-0.01%	0.01%	0.01%	0.01%
Existing Resources	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4944	4942	4940	4937	4935	4933	4931	4930	4928	4926	4925	4924	4925	4926	4927
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	7305	7303	7300	7298	7296	7294	7292	7290	7289	7287	7286	7285	7286	7287	7288
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: HIGH COAL ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	7288	7289	7290	7291	7291	7292	7293	7293	7294	7294	7295	7295	7295	7295	7295
Observed Rate	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.00%	-0.01%	-0.01%
Existing Resources	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4928	4929	4929	4930	4931	4931	4932	4933	4933	4934	4934	4935	4935	4934	4934
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	7288	7289	7290	7291	7291	7292	7293	7293	7294	7294	7295	7295	7295	7295	7295
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: HIGH COAL ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	17723	18317	18922	19551	20193	20811	21431	22050	22669	23288	23899	24509	25120	25730	26341
Observed Rate		3.35%	3.30%	3.32%	3.28%	3.07%	2.97%	2.89%	2.81%	2.73%	2.62%	2.56%	2.49%	2.43%	2.37%
DSI Firm Load	2261	2268	2278	2288	2298	2308	2319	2329	2339	2350	2360	2371	2381	2392	2403
Existing Resources	20443	20605	20585	20564	19997	19429	19495	19560	19475	19389	19538	19687	19458	19229	19225
CONSERVATION PROGRAMS:															
SF Res MCS	0	8	17	26	36	44	54	65	76	87	99	111	125	137	149
MF Res MCS	0	2	3	6	7	9	11	13	15	17	19	21	24	25	27
Water Heat	0	0	0	0	9	29	50	70	91	113	136	161	185	209	234
Refrigerators	0	0	0	0	3	9	14	20	26	32	39	46	54	61	69
Freezers	0	0	0	0	1	2	4	5	7	9	10	13	15	17	19
New Manuf Housing	0	2	4	7	10	13	17	23	27	32	38	42	47	53	58
Irrigation	0	0	2	3	5	9	12	16	20	23	27	30	33	35	36
Industrial	0	4	16	36	58	81	104	128	151	174	196	219	243	266	289
New Commercial	0	18	51	83	114	142	171	201	232	264	294	322	352	382	413
Comm Discret Ex	0	4	15	30	45	58	67	75	86	100	115	130	143	151	159
Comm Lost Opps Exist	0	4	12	19	27	34	41	48	56	64	71	79	86	94	102
SF Res Weath	0	3	10	20	29	37	44	53	62	71	81	89	98	102	102
MF Res Weath	0	1	4	7	9	12	14	17	19	22	25	27	30	33	35
Subtotal	0	46	134	237	353	479	603	734	868	1008	1150	1290	1435	1565	1692
GENERATING RESOURCES:															
Hydro Eff Imp	0	0	20	40	60	80	100	100	100	100	100	100	100	100	100
Trans Eff Imp	0	0	11	22	23	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 East	0	0	0	48	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	0	0	0	36	61	61	61	61	61	61	61	61	61	61	61
Small Hydro 3 East	0	0	0	0	0	0	26	52	52	52	52	52	56	56	56
Small Hydro 4 East	0	0	0	0	0	0	25	32	32	32	32	32	32	32	32
Small Hydro 1 West	0	0	0	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	0	0	0	36	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	0	0	0	0	0	0	26	37	37	48	48	48	48	48	48
Small Hydro 4 West	0	0	0	0	0	0	25	25	25	25	25	25	25	25	25
Combined Cycle BPA	0	0	0	0	349	349	349	349	349	349	349	349	349	349	697
Combined Cycle Mix	0	0	0	0	698	698	698	698	698	698	698	698	698	698	698
Cogen1e	0	0	40	40	40	40	40	40	40	40	40	40	40	40	40
Cogen2e	0	0	0	240	240	240	240	240	240	240	240	240	240	240	240
Cogen3e	0	0	0	0	140	360	360	360	360	360	360	360	360	360	360
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1w	0	0	40	40	40	40	40	40	40	40	40	40	40	40	40
Cogen2w	0	0	240	240	240	240	240	240	240	240	240	240	240	240	240
Cogen3w	0	0	0	0	360	360	360	360	360	360	360	360	360	480	480
Cogen4w	0	0	0	0	0	620	780	780	780	780	780	780	1000	1330	1330
Coal1 (E. Mont)	0	0	0	0	0	0	0	188	375	563	750	938	1125	1313	1313
Coal2 (E. Wash)	0	0	0	0	0	0	0	188	375	563	563	563	563	563	563
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	188
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	162	162	162	162	162	162	162	162
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	162	162	162	162	162	162	162	162
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	162	162	162	162	162	162	162
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	160	160	160	160	160	160	160
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	160	160	160	160	160	160
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	160	160	160	160	160
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	160	160	160	160
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	160	160	160
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNP 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNP 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	351	781	2390	3261	3543	4287	4983	5530	5877	6225	6796	7434	7970
Total Firm Resources	20443	20652	21069	21580	22740	23170	23642	24578	25324	25925	26564	27203	27687	28227	28883
Load/Resource Balance	459	67	-130	-258	249	50	-107	199	316	287	305	323	185	104	140

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Study Title: HIGH COAL ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	27069	27796	28524	29251	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979
Observed Rate	2.76%	2.69%	2.62%	2.55%	2.49%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DSI Firm Load	2413	2424	2435	2446	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	19221	19312	19402	19478	19423	17845	17453	17054	16917	16631	16119	15204	15079	14861	13677
CONSERVATION PROGRAMS:															
SF Res MCS	162	174	188	201	215	215	215	215	215	215	215	215	215	215	215
MF Res MCS	30	31	33	36	37	37	37	37	37	37	37	37	37	37	37
Water Heat	257	282	309	336	362	362	362	362	362	362	362	362	362	362	362
Refrigerators	76	83	90	100	110	110	110	110	110	110	110	110	110	110	110
Freezers	20	22	24	27	30	30	30	30	30	30	30	30	30	30	30
New Manuf Housing	62	68	72	77	83	83	83	83	83	83	83	83	83	83	83
Irrigation	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Industrial	311	334	357	381	400	400	400	400	400	400	400	400	400	400	400
New Commercial	444	476	510	544	579	579	579	579	579	579	579	579	579	579	579
Comm Discret Ex	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
Comm Lost Opps Exist	109	116	123	131	139	139	139	139	139	139	139	139	139	139	139
SF Res Weath	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102
MF Res Weath	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Subtotal	1807	1922	2042	2169	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291
GENERATING RESOURCES:															
Hydro Eff Imp	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Trans Eff Imp	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 East	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61
Small Hydro 3 East	56	56	56	67	67	67	67	67	67	67	67	67	67	67	67
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 1 West	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
Small Hydro 4 West	25	25	25	32	32	32	32	32	32	32	32	32	32	32	32
Combined Cycle BPA	697	697	697	697	697	697	697	697	697	697	697	697	697	697	697
Combined Cycle Mix	698	698	698	698	698	698	698	698	698	698	698	698	698	698	698
Cogen1e	40	40	40	40	40	40	40	0	0	0	0	0	0	0	0
Cogen2e	240	240	240	240	240	240	240	240	0	0	0	0	0	0	0
Cogen3e	360	360	360	380	380	380	380	380	380	240	20	20	20	20	20
Cogen4e	0	80	450	670	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Cogen1w	40	40	40	40	40	40	40	0	0	0	0	0	0	0	0
Cogen2w	240	240	240	240	240	240	240	0	0	0	0	0	0	0	0
Cogen3w	480	480	480	480	480	480	480	480	480	120	120	120	120	120	120
Cogen4w	1400	1500	1500	1500	1500	1500	1500	1500	1500	1500	880	720	720	720	720
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal3 (E. Oregon)	375	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
FBCoal2 (E. Wa)	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
FBCoal3 (E. Ore)	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
GCoal2 (EWash)	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
GCoal3 (EOre)	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
GCoal4 (Nev)	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
GCoal5 (WWaOr)	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Replacement	0	0	0	0	0	1352	1607	1831	1831	2643	3907	4828	5273	5961	7225
WNP 3	0	0	0	0	806	806	806	806	806	806	806	806	806	806	806
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	45	45	90	135	135	135	135	135	135	135	135	135	135	135	135
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	9085	9453	9868	10171	11307	12659	12914	12818	12578	12890	13314	14075	14520	15208	16472
Total Firm Resources	30111	30686	31311	31813	33018	32792	32654	32159	31782	31808	31720	31566	31886	32356	32436
Load/Resource Balance	629	465	352	116	582	356	218	-277	-654	-628	-716	-870	-550	-79	0

Study ID : 15-JUL-91 07:05:23
Study Title: HIGH COAL ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979
Observed Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231
CONSERVATION PROGRAMS:															
SF Res MCS	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215
MF Res MCS	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Water Heat	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362
Refrigerators	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
Freezers	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
New Manuf Housing	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83
Irrigation	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Industrial	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
New Commercial	579	579	579	579	579	579	579	579	579	579	579	579	579	579	579
Comm Discret Ex	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
Comm Lost Opps Exist	139	139	139	139	139	139	139	139	139	139	139	139	139	139	139
SF Res Weath	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102
MF Res Weath	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Subtotal	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291	2291
GENERATING RESOURCES:															
Hydro Eff Imp	100	100	80	60	40	20	0	0	0	0	0	0	0	0	0
Trans Eff Imp	34	34	23	12	11	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 East	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61
Small Hydro 3 East	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 1 West	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
Small Hydro 4 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Combined Cycle BPA	697	697	697	697	349	349	349	349	349	349	349	349	349	349	0
Combined Cycle Mix	698	698	698	698	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	20	20	20	20	20	20	20	20	0	0	0	0	0	0	0
Cogen4e	1000	1000	1000	1000	1000	1000	920	550	330	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	120	120	120	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	720	720	500	170	170	100	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	162	162	162	162	162	162	162	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	162	162	162	162	162	162	162	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	162	162	162	162	162	162	162	162	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	160	160	160	160	160	160	160	160	0	0	0	0	0	0	0
GCoal2 (EWash)	160	160	160	160	160	160	160	160	160	0	0	0	0	0	0
GCoal3 (EOre)	160	160	160	160	160	160	160	160	160	160	0	0	0	0	0
GCoal4 (Nev)	160	160	160	160	160	160	160	160	160	160	160	0	0	0	0
GCoal5 (WWaOr)	160	160	160	160	160	160	160	160	160	160	160	160	0	0	0
Replacement	7671	7672	7921	8403	9470	9570	9771	10463	11025	11515	11675	11837	12001	12004	12356
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	16918	16919	16917	16918	16918	16917	16918	16916	16916	16916	16916	16918	16922	16925	16928
Total Firm Resources	32436	32437	32435	32436	32436	32435	32436	32435	32436	32436	32436	32438	32442	32445	32448
Load/Resource Balance	0	1	-1	0	1	0	1	-1	0	0	0	2	6	9	12

Study ID : 15-JUL-91 07:05:23
Study Title: HIGH COAL ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979
Observed Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231
CONSERVATION PROGRAMS:															
SF Res MCS	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215
MF Res MCS	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Water Heat	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362
Refrigerators	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
Freezers	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
New Manuf Housing	83	81	79	76	72	69	65	60	55	51	45	40	36	30	25
Irrigation	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Industrial	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
New Commercial	579	579	579	579	579	579	579	579	579	579	579	579	579	579	579
Comm Discret Ex	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
Comm Lost Opps Exist	139	139	139	139	139	139	139	139	139	139	139	139	139	139	139
SF Res Weath	102	102	102	102	102	102	99	92	82	74	65	57	49	40	31
MF Res Weath	36	36	36	36	36	36	35	32	29	27	24	22	19	17	14
Subtotal	2291	2289	2287	2284	2280	2277	2269	2254	2236	2222	2204	2189	2174	2157	2140
GENERATING RESOURCES:															
Hydro Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trans Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 East	57	57	57	57	57	57	57	57	10	0	0	0	0	0	0
Small Hydro 2 East	61	61	61	61	61	61	61	61	26	0	0	0	0	0	0
Small Hydro 3 East	67	67	67	67	67	67	67	67	67	67	67	41	15	15	15
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	7	0	0	0
Small Hydro 1 West	39	39	39	39	39	39	39	39	0	0	0	0	0	0	0
Small Hydro 2 West	43	43	43	43	43	43	43	43	7	0	0	0	0	0	0
Small Hydro 3 West	48	48	48	48	48	48	48	48	48	48	48	22	11	11	0
Small Hydro 4 West	32	32	32	32	32	32	32	32	32	32	32	7	7	7	7
Combined Cycle BPA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1125	938	750	563	375	188	0	0	0	0	0	0	0
Coal2 (E. Wash)	563	563	375	188	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	375	188	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	12404	12408	12813	13236	13614	13805	14001	14203	14566	14812	15828	16133	16192	16210	17044
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	0
WNP 1	813	813	813	813	813	813	813	813	813	813	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	90	90	45	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	16931	16935	16919	16923	16925	16929	16937	16952	16970	16985	17001	17016	17031	17049	17066
Total Firm Resources	32451	32453	32436	32436	32436	32436	32436	32436	32436	32436	32436	32437	32435	32436	32436
Load/Resource Balance	15	18	0	0	0	0	0	0	0	0	0	1	-1	0	0

Study ID : 15-JUL-91 07:53:20
Study Title: IMPORT ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	3888	4002	4120	4235	4355	4473	4591	4709	4826	4944	5058	5173	5286	5400	5514
Observed Rate		2.95%	2.94%	2.78%	2.84%	2.71%	2.63%	2.56%	2.50%	2.43%	2.32%	2.26%	2.20%	2.15%	2.10%
DSI Firm Load	2261	2268	2278	2288	2298	2308	2319	2329	2339	2350	2360	2371	2381	2392	2403
Existing Resources	8379	8546	8382	8219	8213	8208	8255	8302	8310	8319	8417	8515	8521	8527	8408
BPA Requirements	-1952	-2132	-2308	-2322	-2491	-2654	-2803	-2953	-3123	-3295	-3425	-3556	-3706	-3857	-3984
CONSERVATION PROGRAMS:															
SF Res MCS	0	5	11	16	22	27	33	40	46	53	60	67	75	82	89
MF Res MCS	0	1	1	2	2	3	4	4	5	6	6	7	8	8	9
New Manuf Housing	0	1	2	3	5	6	8	11	13	15	18	20	22	25	27
Water Heat	0	0	0	0	4	13	22	31	40	50	60	71	81	92	103
Refrigerators	0	0	0	0	1	4	6	8	11	13	16	19	22	25	28
Freezers	0	0	0	0	0	1	2	2	3	4	4	5	6	7	8
Irrigation	0	0	0	0	0	0	1	1	2	4	5	6	8	9	11
Industrial	0	0	0	0	0	1	6	15	25	36	47	58	68	79	90
New Commercial	0	0	0	0	0	0	0	0	2	10	22	32	43	54	65
Comm Lost Opps Exist	0	0	0	0	0	0	0	0	0	2	6	9	13	16	20
MF Res Weath	0	0	0	0	0	0	0	0	0	0	1	2	2	3	4
SF Res Weath	0	0	0	0	0	0	0	0	0	2	6	12	18	23	29
Comm Discret Ex	0	0	0	0	0	0	0	0	0	2	8	16	24	32	40
Subtotal	0	7	14	21	34	55	82	112	147	197	259	324	390	455	523
GENERATING RESOURCES:															
California Imports	0	0	250	500	750	1000	1000	1250	1500	1500	1500	1500	1500	1500	1500
Canada Imports	0	0	0	0	0	250	250	250	250	500	500	750	1000	1250	1500
Hydro Eff Imp	0	0	20	40	40	40	60	60	80	100	100	100	100	100	100
Trans Eff Imp	0	0	0	11	11	11	22	22	33	33	34	34	34	34	34
Small Hydro 1 West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 East	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 2 West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 2 East	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Cogen1w	0	0	0	0	0	0	0	0	0	0	10	10	10	10	10
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle BPA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNP 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNP 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 East	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 East	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	270	551	801	1301	1332	1582	1863	2133	2144	2394	2644	2894	3148
Total Firm Resources	6428	6420	6358	6469	6558	6909	6865	7043	7197	7354	7394	7677	7848	8019	8094
Load/Resource Balance	278	150	-40	-53	-95	128	-45	4	31	60	-25	133	180	228	177

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	5642	5771	5898	6026	6153	6158	6164	6169	6173	6178	6182	6185	6189	6192	6195
Observed Rate	2.34%	2.27%	2.22%	2.16%	2.11%	0.09%	0.09%	0.08%	0.07%	0.07%	0.07%	0.06%	0.06%	0.05%	0.05%
DSI Firm Load	2413	2424	2435	2446	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	8289	8394	8500	8431	8362	8291	8220	8150	8079	8009	7920	7650	7579	7449	6727
BPA Requirements	-4138	-4313	-4487	-4661	-4849	-5000	-4992	-4985	-4979	-4973	-4967	-4962	-4957	-4952	-4948
CONSERVATION PROGRAMS:															
SF Res MCS	96	103	111	118	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	10	10	11	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	29	32	34	36	39	39	39	39	39	39	39	39	39	39	39
Water Heat	113	124	136	148	159	159	159	159	159	159	159	159	159	159	159
Refrigerators	31	34	37	41	45	45	45	45	45	45	45	45	45	45	45
Freezers	8	9	10	11	12	12	12	12	12	12	12	12	12	12	12
Irrigation	12	13	14	14	14	14	14	14	14	14	14	14	14	14	14
Industrial	101	112	122	133	144	144	144	144	144	144	144	144	144	144	144
New Commercial	77	89	101	114	126	126	126	126	126	126	126	126	126	126	126
Comm Lost Opps Exist	23	27	31	34	38	38	38	38	38	38	38	38	38	38	38
MF Res Weath	4	5	6	6	7	7	7	7	7	7	7	7	7	7	7
SF Res Weath	34	40	46	51	57	57	57	57	57	57	57	57	57	57	57
Comm Discret Ex	48	56	64	72	79	79	79	79	79	79	79	79	79	79	79
Subtotal	586	654	723	790	858	858	858	858	858	858	858	858	858	858	858
GENERATING RESOURCES:															
California Imports	1500	1500	1500	1500	1500	1500	1500	1250	1000	750	500	500	250	0	0
Canada Imports	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1250	1250	1250	1250	1000
Hydro Eff Imp	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Trans Eff Imp	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 West	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Cogen1w	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Combined Cycle Mix	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349
Combined Cycle BPA	0	0	0	349	697	697	697	697	697	697	697	697	697	697	697
Cogen1e	0	0	10	10	10	10	10	10	10	10	10	10	10	10	10
Cogen2w	0	0	60	60	60	60	60	60	60	60	60	60	60	60	60
Small Hydro 3 West	0	0	11	11	11	11	11	11	11	11	11	11	11	11	11
WNP 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNP 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 East	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2e	0	0	40	40	40	40	40	40	40	40	40	40	40	40	40
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 East	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	174	174	297	297	528	1116	1384	1743	2402	3653
Subtotal	3542	3542	3663	4012	4360	4534	4534	4407	4157	4138	4226	4494	4603	5012	6013
Total Firm Resources	8279	8277	8398	8572	8731	8683	8620	8429	8115	8032	8037	8040	8083	8367	8650
Load/Resource Balance	225	83	63	100	124	70	2	-194	-513	-600	-600	-600	-560	-280	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	6199	6202	6205	6208	6211	6214	6216	6218	6220	6222	6224	6226	6229	6231	6234
Observed Rate	0.05%	0.05%	0.05%	0.05%	0.04%	0.04%	0.04%	0.04%	0.03%	0.03%	0.03%	0.03%	0.04%	0.04%	0.04%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727
BPA Requirements	-4944	-4942	-4940	-4937	-4935	-4933	-4931	-4930	-4928	-4926	-4925	-4924	-4925	-4926	-4927
CONSERVATION PROGRAMS:															
SF Res MCS	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Water Heat	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159
Refrigerators	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Freezers	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Irrigation	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Industrial	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144
New Commercial	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126
Comm Lost Opps Exist	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38
MF Res Weath	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
SF Res Weath	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
Comm Discret Ex	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79
Subtotal	858	858	858	858	858	858	858	858	858	858	858	858	858	858	858
GENERATING RESOURCES:															
California Imports	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Canada Imports	1000	750	500	250	0	0	0	0	0	0	0	0	0	0	0
Hydro Eff Imp	100	100	80	60	60	60	40	40	20	0	0	0	0	0	0
Trans Eff Imp	34	34	34	23	23	23	12	12	1	1	0	0	0	0	0
Small Hydro 1 West	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349
Combined Cycle BPA	697	697	697	697	697	697	697	697	697	697	697	697	697	697	697
Cogen1e	10	10	10	10	10	10	10	0	0	0	0	0	0	0	0
Cogen2w	60	60	60	60	60	60	60	0	0	0	0	0	0	0	0
Small Hydro 3 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
WNP 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNP 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 East	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2e	40	40	40	40	40	40	40	0	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 East	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	3663	3914	4185	4466	4717	4717	4749	4859	4891	4911	4913	4914	4918	4921	4925
Subtotal	6013	6014	6015	6015	6016	6016	6017	6017	6018	6018	6019	6020	6024	6027	6031
Total Firm Resources	8654	8657	8660	8663	8666	8668	8671	8672	8675	8677	8679	8681	8684	8686	8689
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	6236	6239	6241	6243	6245	6247	6248	6250	6252	6253	6255	6256	6257	6257	6258
Observed Rate	0.04%	0.04%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.02%	0.02%	0.01%	0.01%	0.01%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727
BPA Requirements	-4928	-4929	-4929	-4930	-4931	-4931	-4932	-4933	-4933	-4934	-4934	-4935	-4935	-4934	-4934
CONSERVATION PROGRAMS:															
SF Res MCS	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	39	38	37	36	34	32	31	28	26	24	21	19	17	14	12
Water Heat	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159
Refrigerators	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Freezers	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Irrigation	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Industrial	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144
New Commercial	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126
Comm Lost Opps Exist	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38
MF Res Weath	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
SF Res Weath	57	57	57	57	57	57	57	57	57	57	57	57	57	57	55
Comm Discret Ex	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79
Subtotal	858	857	856	855	853	851	850	847	845	843	840	838	836	833	829
GENERATING RESOURCES:															
California Imports	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Canada Imports	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydro Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trans Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 West	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle BPA	697	697	697	349	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
WNP 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNP 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 East	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 East	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	5276	5280	5284	5637	5990	5994	5998	6003	6007	6012	6016	6020	6024	6026	6031
Subtotal	6033	6037	6041	6046	6050	6054	6058	6063	6067	6072	6076	6080	6084	6086	6091
Total Firm Resources	8690	8692	8695	8698	8699	8701	8703	8704	8706	8708	8709	8710	8712	8712	8713
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	9551	9881	10214	10558	10916	11253	11590	11927	12264	12600	12946	13291	13638	13984	14331
Observed Rate		3.45%	3.37%	3.37%	3.39%	3.09%	3.00%	2.91%	2.82%	2.74%	2.74%	2.67%	2.60%	2.54%	2.48%
Existing Resources	9685	9681	9795	9910	9353	8791	8795	8798	8710	8621	8652	8683	8448	8214	8306
BPA Requirements	47	77	127	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	0	3	6	10	14	17	21	25	30	34	39	44	50	55	60
MF Res MCS	0	1	2	4	5	6	7	9	10	11	13	14	16	17	18
New Manuf Housing	0	1	2	4	5	7	9	12	14	17	20	22	25	28	31
Refrigerators	0	0	0	0	2	5	8	12	15	19	23	27	32	36	41
Freezers	0	0	0	0	1	1	2	3	4	5	6	8	9	10	11
Water Heat	0	0	0	0	5	16	28	39	51	63	76	90	104	117	131
Irrigation	0	0	1	2	3	5	7	10	12	14	16	18	20	21	22
Industrial	0	2	8	19	31	43	55	68	80	92	104	116	129	141	153
New Commercial	0	11	32	52	72	89	108	127	146	166	185	203	222	241	260
Comm Lost Opps Exist	0	2	6	10	14	18	21	25	29	33	37	41	45	49	53
MF Res Weath	0	1	3	5	7	9	11	13	15	17	19	21	23	25	27
SF Res Weath	0	1	4	8	11	15	18	22	26	29	33	36	39	40	40
Comm Discret Ex	0	2	7	14	21	28	35	42	49	56	63	71	76	76	76
Subtotal	0	24	71	128	191	259	330	407	481	556	634	711	790	856	923
GENERATING RESOURCES:															
Small Hydro 1 West	0	0	0	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	0	0	0	34	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	0	0	0	25	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	0	0	0	25	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	0	0	30	30	30	30	30	30	30	30	30	30	30	30	30
Combined Cycle Mix	0	0	0	0	349	349	349	349	349	349	349	349	349	349	349
Cogen1e	0	0	30	30	30	30	30	30	30	30	30	30	30	30	30
Cogen2w	0	0	180	180	180	180	180	180	180	180	180	180	180	180	180
Small Hydro 3 West	0	0	0	0	0	0	26	37	37	37	37	37	37	37	37
Small Hydro 3 East	0	0	0	0	0	0	26	52	52	52	52	52	56	56	56
Cogen2e	0	0	0	180	180	180	180	180	180	180	180	180	180	180	180
Coal1 (E. Mont)	0	0	0	0	0	0	0	188	375	563	750	938	1125	1313	1313
Cogen3w	0	0	0	0	360	360	360	360	360	360	360	360	360	360	360
Small Hydro 4 West	0	0	0	0	0	0	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	0	0	0	0	0	0	25	32	32	32	32	32	32	32	32
Cogen3e	0	0	0	0	140	360	360	360	360	360	360	360	360	360	360
Coal2 (E. Wash)	0	0	0	0	0	0	0	188	375	563	563	563	563	563	563
Cogen4w	0	0	0	0	0	620	780	780	780	780	780	780	1000	1330	1330
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	188
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	240	533	1420	2260	2522	2942	3316	3692	3879	4067	4478	4996	5184
Total Firm Resources	9732	9782	10233	10571	10964	11310	11647	12147	12507	12869	13165	13461	13716	14066	14413
Load/Resource Balance	181	-98	21	11	47	58	59	218	243	271	221	171	77	81	79

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	14754	15178	15604	16030	16458	16460	16462	16464	16466	16468	16470	16471	16473	16474	16475
Observed Rate	2.95%	2.87%	2.80%	2.73%	2.67%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
Existing Resources	8398	8383	8368	8513	8542	7194	6872	6543	6477	6261	5838	5194	5139	5051	4589
BPA Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	66	71	77	83	89	89	89	89	89	89	89	89	89	89	89
MF Res MCS	20	21	22	24	25	25	25	25	25	25	25	25	25	25	25
New Manuf Housing	33	36	38	41	44	44	44	44	44	44	44	44	44	44	44
Refrigerators	45	49	53	59	65	65	65	65	65	65	65	65	65	65	65
Freezers	12	13	14	16	18	18	18	18	18	18	18	18	18	18	18
Water Heat	144	158	173	188	203	203	203	203	203	203	203	203	203	203	203
Irrigation	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Industrial	165	177	189	202	212	212	212	212	212	212	212	212	212	212	212
New Commercial	280	300	321	343	365	365	365	365	365	365	365	365	365	365	365
Comm Lost Opps Exist	57	60	64	68	72	72	72	72	72	72	72	72	72	72	72
MF Res Weath	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
SF Res Weath	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Comm Discret Ex	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Subtotal	987	1050	1116	1189	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258
GENERATING RESOURCES:															
Small Hydro 1 West	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	30	30	30	30	30	30	30	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349
Cogen1e	30	30	30	30	30	30	30	0	0	0	0	0	0	0	0
Cogen2w	180	180	180	180	180	180	180	0	0	0	0	0	0	0	0
Small Hydro 3 West	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56
Cogen2e	180	180	180	180	180	180	180	180	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Cogen3w	360	360	360	360	360	360	360	360	360	0	0	0	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Cogen3e	360	360	360	360	360	360	360	360	360	220	0	0	0	0	0
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4w	1400	1500	1500	1500	1500	1500	1500	1500	1500	1500	880	720	720	720	720
Coal3 (E. Oregon)	375	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4e	0	80	450	670	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	1352	1607	1831	1831	2643	3907	4714	4980	5279	5822
Subtotal	5441	5809	6179	6399	6729	8081	8336	8320	8140	8452	8876	9523	9789	10088	10631
Total Firm Resources	14826	15242	15663	16101	16529	16533	16466	16121	15875	15971	15972	15975	16186	16397	16478
Load/Resource Balance	69	63	60	67	68	69	0	-346	-595	-500	-500	-500	-290	-80	0

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Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	16475	16474	16474	16473	16472	16472	16471	16471	16470	16470	16469	16468	16464	16461	16457
Observed Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.01%	-0.02%	-0.02%	-0.02%
Existing Resources	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143
BPA Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89
MF Res MCS	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
New Manuf Housing	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44
Refrigerators	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
Freezers	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Water Heat	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203
Irrigation	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Industrial	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212
New Commercial	365	365	365	365	365	365	365	365	365	365	365	365	365	365	365
Comm Lost Opps Exist	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72
MF Res Weath	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
SF Res Weath	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Comm Discret Ex	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Subtotal	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258
GENERATING RESOURCES:															
Small Hydro 1 West	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4w	720	720	500	170	170	100	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4e	1000	1000	1000	1000	1000	1000	920	550	330	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	6268	6268	6486	6816	7164	7233	7413	7782	8002	8331	8331	8331	8331	8331	8331
Subtotal	11077	11077	11075	11075	11074	11073	11073	11072	11072	11071	11071	11071	11071	11071	11071
Total Firm Resources	16478	16478	16476	16476	16475	16474	16474	16473	16473	16472	16472	16472	16472	16472	16472
Load/Resource Balance	0	1	0	0	0	0	0	0	0	0	0	2	5	9	12

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Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	16454	16451	16448	16446	16443	16441	16438	16436	16434	16431	16429	16428	16427	16427	16427
Observed Rate	-0.02%	-0.02%	-0.02%	-0.02%	-0.02%	-0.02%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	0.00%	0.00%
Existing Resources	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143
BPA Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89
MF Res MCS	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
New Manuf Housing	44	43	42	40	38	37	34	32	29	27	24	21	19	16	13
Refrigerators	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
Freezers	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Water Heat	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203
Irrigation	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Industrial	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212
New Commercial	365	365	365	365	365	365	365	365	365	365	365	365	365	365	365
Comm Lost Opps Exist	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72
MF Res Weath	27	27	27	27	27	27	26	24	22	20	18	16	14	12	10
SF Res Weath	40	40	40	40	40	40	39	36	32	29	25	21	18	14	11
Comm Discret Ex	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Subtotal	1258	1257	1256	1254	1252	1251	1246	1239	1230	1223	1214	1205	1198	1189	1181
GENERATING RESOURCES:															
Small Hydro 1 West	29	29	29	29	29	29	29	29	0	0	0	0	0	0	0
Small Hydro 1 East	43	43	43	43	43	43	43	43	10	0	0	0	0	0	0
Small Hydro 2 West	32	32	32	32	32	32	32	32	7	0	0	0	0	0	0
Small Hydro 2 East	47	47	47	47	47	47	47	47	22	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	37	37	37	37	37	37	37	37	37	37	37	11	0	0	0
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	30	4	4	4
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1125	938	750	563	375	188	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	0	0	0	0
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	7	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	563	563	375	188	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	375	188	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	8331	8331	8687	9061	9435	9622	9811	10004	10310	10542	10736	11032	11083	11092	11100
Subtotal	11071	11071	11051	11051	11049	11049	11050	11056	11062	11067	11074	11080	11087	11096	11104
Total Firm Resources	16472	16471	16450	16448	16444	16443	16439	16438	16435	16433	16431	16428	16428	16428	16428
Load/Resource Balance	15	17	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: IMPORT ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	4284	4434	4588	4758	4922	5085	5249	5414	5579	5744	5895	6045	6196	6346	6496
Observed Rate		3.49%	3.48%	3.70%	3.44%	3.32%	3.23%	3.13%	3.05%	2.97%	2.62%	2.55%	2.49%	2.42%	2.37%
Existing Resources	2380	2378	2407	2436	2431	2431	2446	2461	2455	2449	2469	2490	2489	2489	2512
BPA Requirements	1905	2055	2181	2322	2491	2654	2803	2953	3123	3295	3425	3556	3706	3857	3984
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	4284	4434	4588	4758	4922	5085	5249	5414	5579	5744	5895	6045	6196	6346	6496
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Study ID : 15-JUL-91 07:53:20
Study Title: IMPORT ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	6672	6847	7022	7195	7368	7361	7353	7346	7340	7333	7328	7322	7317	7313	7308
Observed Rate	2.71%	2.63%	2.55%	2.47%	2.40%	-0.11%	-0.10%	-0.09%	-0.09%	-0.08%	-0.08%	-0.07%	-0.07%	-0.06%	-0.06%
Existing Resources	2534	2534	2534	2534	2520	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4138	4313	4487	4661	4849	5000	4992	4985	4979	4973	4967	4962	4957	4952	4948
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	6672	6847	7022	7195	7368	7361	7353	7346	7340	7334	7328	7322	7317	7313	7308
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Study ID : 15-JUL-91 07:53:20
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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	7305	7303	7300	7298	7296	7294	7292	7290	7289	7287	7286	7285	7286	7287	7288
Observed Rate	-0.04%	-0.04%	-0.03%	-0.03%	-0.03%	-0.03%	-0.03%	-0.02%	-0.02%	-0.02%	-0.02%	-0.01%	0.01%	0.01%	0.01%
Existing Resources	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4944	4942	4940	4937	4935	4933	4931	4930	4928	4926	4925	4924	4925	4926	4927
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	7305	7303	7300	7298	7296	7294	7292	7290	7289	7287	7286	7285	7286	7287	7288
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	7288	7289	7290	7291	7291	7292	7293	7293	7294	7294	7295	7295	7295	7295	7295
Observed Rate	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.00%	-0.01%	-0.01%
Existing Resources	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4928	4929	4929	4930	4931	4931	4932	4933	4933	4934	4934	4935	4935	4934	4934
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	7288	7289	7290	7291	7291	7292	7293	7293	7294	7294	7295	7295	7295	7295	7295
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: IMPORT ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	17723	18317	18922	19551	20193	20811	21431	22050	22669	23288	23899	24509	25120	25730	26341
Observed Rate		3.35%	3.30%	3.32%	3.28%	3.07%	2.97%	2.89%	2.81%	2.73%	2.62%	2.56%	2.49%	2.43%	2.37%
DSI Firm Load	2261	2268	2278	2288	2298	2308	2319	2329	2339	2350	2360	2371	2381	2392	2403
Existing Resources	20443	20605	20585	20564	19997	19429	19495	19560	19475	19389	19538	19687	19458	19229	19225
CONSERVATION PROGRAMS:															
SF Res MCS	0	8	17	26	36	44	54	65	76	87	99	111	125	137	149
MF Res MCS	0	2	3	6	7	9	11	13	15	17	19	21	24	25	27
Water Heat	0	0	0	0	9	29	50	70	91	113	136	161	185	209	234
Refrigerators	0	0	0	0	3	9	14	20	26	32	39	46	54	61	69
Freezers	0	0	0	0	1	2	4	5	7	9	10	13	15	17	19
New Manuf Housing	0	2	4	7	10	13	17	23	27	32	38	42	47	53	58
Irrigation	0	0	1	2	3	5	8	11	14	18	21	24	28	30	33
Industrial	0	2	8	19	31	44	61	83	105	128	151	174	197	220	243
New Commercial	0	11	32	52	72	89	108	127	148	176	207	235	265	295	325
Comm Discret Ex	0	2	7	14	21	28	35	42	49	58	71	87	100	108	116
Comm Lost Opps Exist	0	2	6	10	14	18	21	25	29	35	43	50	58	65	73
SF Res Weath	0	1	4	8	11	15	18	22	26	31	39	48	57	63	69
MF Res Weath	0	1	3	5	7	9	11	13	15	17	20	23	25	28	31
Subtotal	0	31	85	149	225	314	412	519	628	753	893	1035	1180	1311	1446
GENERATING RESOURCES:															
Hydro Eff Imp	0	0	20	40	40	40	60	60	80	100	100	100	100	100	100
Trans Eff Imp	0	0	0	11	11	11	22	22	33	33	34	34	34	34	34
Small Hydro 1 East	0	0	0	34	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 East	0	0	0	25	47	47	47	47	47	47	47	47	47	47	51
Small Hydro 3 East	0	0	0	0	0	0	26	52	52	52	52	52	56	56	56
Small Hydro 4 East	0	0	0	0	0	0	25	32	32	32	32	32	32	32	32
Small Hydro 1 West	0	0	0	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 2 West	0	0	0	25	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 3 West	0	0	0	0	0	0	26	37	37	37	37	37	37	37	37
Small Hydro 4 West	0	0	0	0	0	0	25	25	25	25	25	25	25	25	25
Combined Cycle BPA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	0	0	0	0	349	349	349	349	349	349	349	349	349	349	349
Cogen1e	0	0	30	30	30	30	30	30	30	30	30	30	30	30	30
Cogen2e	0	0	0	180	180	180	180	180	180	180	180	180	180	180	180
Cogen3e	0	0	0	0	140	360	360	360	360	360	360	360	360	360	360
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1w	0	0	30	30	30	30	30	30	30	30	40	40	40	40	40
Cogen2w	0	0	180	180	180	180	180	180	180	180	180	180	180	180	180
Cogen3w	0	0	0	0	360	360	360	360	360	360	360	360	360	360	360
Cogen4w	0	0	0	0	0	620	780	780	780	780	780	780	1000	1330	1330
Coal1 (E. Mont)	0	0	0	0	0	0	0	188	375	563	750	938	1125	1313	1313
Coal2 (E. Wash)	0	0	0	0	0	0	0	188	375	563	563	563	563	563	563
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	188
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNP 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNP 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
California Imports	0	0	250	500	750	1000	1000	1250	1500	1500	1500	1500	1500	1500	1500
Canada Imports	0	0	0	0	0	250	250	250	250	500	500	750	1000	1250	1500
Subtotal	0	0	510	1084	2221	3561	3854	4524	5179	5825	6023	6461	7122	7890	8332
Total Firm Resources	20443	20637	21181	21797	22443	23307	23763	24601	25282	25968	26455	27184	27758	28431	28999
Load/Resource Balance	459	52	-19	-42	-47	187	14	222	274	330	196	304	256	308	255

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	27069	27796	28524	29251	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979
Observed Rate	2.76%	2.69%	2.62%	2.55%	2.49%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DSI Firm Load	2413	2424	2435	2446	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	19221	19312	19402	19478	19423	17845	17453	17054	16917	16631	16119	15204	15079	14861	13677
CONSERVATION PROGRAMS:															
SF Res MCS	162	174	188	201	215	215	215	215	215	215	215	215	215	215	215
MF Res MCS	30	31	33	36	37	37	37	37	37	37	37	37	37	37	37
Water Heat	257	282	309	336	362	362	362	362	362	362	362	362	362	362	362
Refrigerators	76	83	90	100	110	110	110	110	110	110	110	110	110	110	110
Freezers	20	22	24	27	30	30	30	30	30	30	30	30	30	30	30
New Manuf Housing	62	68	72	77	83	83	83	83	83	83	83	83	83	83	83
Irrigation	34	35	36	36	36	36	36	36	36	36	36	36	36	36	36
Industrial	266	289	311	335	356	356	356	356	356	356	356	356	356	356	356
New Commercial	357	389	422	457	491	491	491	491	491	491	491	491	491	491	491
Comm Discret Ex	124	132	140	148	155	155	155	155	155	155	155	155	155	155	155
Comm Lost Opps Exist	80	87	95	102	110	110	110	110	110	110	110	110	110	110	110
SF Res Weath	74	80	86	91	97	97	97	97	97	97	97	97	97	97	97
MF Res Weath	31	32	33	33	34	34	34	34	34	34	34	34	34	34	34
Subtotal	1573	1704	1839	1979	2116	2116	2116	2116	2116	2116	2116	2116	2116	2116	2116
GENERATING RESOURCES:															
Hydro Eff Imp	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Trans Eff Imp	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 East	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 1 West	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	37	37	48	48	48	48	48	48	48	48	48	48	48	48	48
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Combined Cycle BPA	0	0	0	349	697	697	697	697	697	697	697	697	697	697	697
Combined Cycle Mix	698	698	698	698	698	698	698	698	698	698	698	698	698	698	698
Cogen1e	30	30	40	40	40	40	40	10	10	10	10	10	10	10	10
Cogen2e	180	180	220	220	220	220	220	220	40	40	40	40	40	40	40
Cogen3e	360	360	360	360	360	360	360	360	360	220	0	0	0	0	0
Cogen4e	0	80	450	670	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Cogen1w	40	40	40	40	40	40	40	10	10	10	10	10	10	10	10
Cogen2w	180	180	240	240	240	240	240	60	60	60	60	60	60	60	60
Cogen3w	360	360	360	360	360	360	360	360	360	0	0	0	0	0	0
Cogen4w	1400	1500	1500	1500	1500	1500	1500	1500	1500	1500	880	720	720	720	720
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal3 (E. Oregon)	375	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	1526	1781	2128	2128	3171	5023	6098	6723	7681	9475
WNP 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNP 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
California Imports	1500	1500	1500	1500	1500	1500	1500	1250	1000	750	500	500	250	0	0
Canada Imports	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1250	1250	1250	1250	1000
Subtotal	8983	9351	9842	10411	11089	12615	12870	12727	12297	12590	13102	14017	14392	15100	16644
Total Firm Resources	29776	30366	31082	31864	32627	32575	32438	31896	31329	31336	31336	31336	31586	32076	32436
Load/Resource Balance	294	146	123	167	191	139	2	-540	-1107	-1100	-1100	-1100	-850	-360	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979
Observed Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231
CONSERVATION PROGRAMS:															
SF Res MCS	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215
MF Res MCS	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Water Heat	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362
Refrigerators	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
Freezers	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
New Manuf Housing	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83
Irrigation	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Industrial	356	356	356	356	356	356	356	356	356	356	356	356	356	356	356
New Commercial	491	491	491	491	491	491	491	491	491	491	491	491	491	491	491
Comm Discret Ex	155	155	155	155	155	155	155	155	155	155	155	155	155	155	155
Comm Lost Opps Exist	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
SF Res Weath	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97
MF Res Weath	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Subtotal	2116	2116	2116	2116	2116	2116	2116	2116	2116	2116	2116	2116	2116	2116	2116
GENERATING RESOURCES:															
Hydro Eff Imp	100	100	80	60	60	60	40	40	20	0	0	0	0	0	0
Trans Eff Imp	34	34	34	23	23	23	12	12	1	1	0	0	0	0	0
Small Hydro 1 East	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 1 West	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Combined Cycle BPA	697	697	697	697	697	697	697	697	697	697	697	697	697	697	697
Combined Cycle Mix	698	698	698	698	349	349	349	349	349	349	349	349	349	349	349
Cogen1e	10	10	10	10	10	10	10	0	0	0	0	0	0	0	0
Cogen2e	40	40	40	40	40	40	40	0	0	0	0	0	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	1000	1000	1000	1000	1000	1000	920	550	330	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	60	60	60	60	60	60	60	0	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	720	720	500	170	170	100	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	9931	10182	10671	11282	11881	11950	12162	12641	12893	13242	13244	13245	13249	13252	13256
WNP 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNP 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
California Imports	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Canada Imports	1000	750	500	250	0	0	0	0	0	0	0	0	0	0	0
Subtotal	17090	17091	17090	17090	17090	17089	17090	17089	17090	17089	17090	17091	17095	17098	17102
Total Firm Resources	32436	32437	32436	32436	32436	32435	32436	32435	32436	32435	32436	32437	32441	32444	32448
Load/Resource Balance	0	1	0	0	0	-1	0	-1	0	-1	0	1	5	8	12

Study ID : 15-JUL-91 07:53:20
Study Title: IMPORT ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979
Observed Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231
CONSERVATION PROGRAMS:															
SF Res MCS	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215
MF Res MCS	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Water Heat	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362
Refrigerators	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
Freezers	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
New Manuf Housing	83	81	79	76	72	69	65	60	55	51	45	40	36	30	25
Irrigation	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Industrial	356	356	356	356	356	356	356	356	356	356	356	356	356	356	356
New Commercial	491	491	491	491	491	491	491	491	491	491	491	491	491	491	491
Comm Discret Ex	155	155	155	155	155	155	155	155	155	155	155	155	155	155	155
Comm Lost Opps Exist	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
SF Res Weath	97	97	97	97	97	97	96	93	89	86	82	78	75	71	66
MF Res Weath	34	34	34	34	34	34	33	31	29	27	25	23	21	19	17
Subtotal	2116	2114	2112	2109	2105	2102	2096	2086	2075	2066	2054	2043	2034	2022	2010
GENERATING RESOURCES:															
Hydro Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trans Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 East	57	57	57	57	57	57	57	57	24	14	14	14	14	14	14
Small Hydro 2 East	61	61	61	61	61	61	61	61	36	14	14	14	14	14	14
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	30	4	4	4
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	7	0	0	0
Small Hydro 1 West	39	39	39	39	39	39	39	39	10	10	10	10	10	10	10
Small Hydro 2 West	43	43	43	43	43	43	43	43	18	11	11	11	11	11	11
Small Hydro 3 West	48	48	48	48	48	48	48	48	48	48	48	22	11	11	11
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	0	0	0	0
Combined Cycle BPA	697	697	697	349	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1125	938	750	563	375	188	0	0	0	0	0	0	0
Coal2 (E. Wash)	563	563	375	188	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	375	188	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	13607	13611	13971	14698	15425	15616	15809	16007	16317	16554	16752	17052	17107	17118	17131
WNP 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNP 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
California Imports	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Canada Imports	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	17104	17108	17092	17097	17099	17103	17108	17119	17129	17139	17150	17160	17171	17182	17195
Total Firm Resources	32451	32453	32436	32436	32436	32436	32436	32437	32436	32436	32436	32436	32436	32436	32436
Load/Resource Balance	15	17	0	0	0	0	0	1	0	0	0	0	0	0	0

Study ID : 17-JUL-91 05:31:57
Study Title: FUEL SWITCHING ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	3888	4002	4120	4235	4355	4473	4591	4709	4826	4944	5058	5173	5286	5400	5514
Observed Rate		2.95%	2.94%	2.78%	2.84%	2.71%	2.63%	2.56%	2.50%	2.43%	2.32%	2.26%	2.20%	2.15%	2.10%
DSI Firm Load	2261	2268	2278	2288	2298	2308	2319	2329	2339	2350	2360	2371	2381	2392	2403
Existing Resources	8379	8546	8382	8219	8213	8208	8255	8302	8310	8319	8417	8515	8521	8527	8408
BPA Requirements	-1952	-2132	-2308	-2322	-2491	-2654	-2803	-2953	-3123	-3295	-3425	-3556	-3706	-3857	-3984
CONSERVATION PROGRAMS:															
SF Res MCS	0	5	11	16	22	27	33	40	46	53	60	67	75	82	89
MF Res MCS	0	1	1	2	2	3	4	4	5	6	6	7	8	8	9
New Manuf Housing	0	1	2	3	5	6	8	11	13	15	18	20	22	25	27
Water Heat	0	0	0	0	4	13	22	31	40	50	60	71	81	92	103
Refrigerators	0	0	0	0	1	4	6	8	11	13	16	19	22	25	28
Freezers	0	0	0	0	0	1	2	2	3	4	4	5	6	7	8
FSW4: EX SF CFA AND	0	4	10	18	25	32	38	46	53	60	67	74	81	88	94
FSW1: NEW SH AND WH	0	0	0	0	0	6	19	32	44	57	69	82	94	107	120
FSW2: EXISTING SF W	0	3	10	17	24	31	37	44	51	58	65	71	78	85	92
FSW3: EX SF NC AND	0	4	12	19	27	35	43	51	58	66	74	82	90	97	105
Irrigation	0	0	1	1	2	4	5	6	8	9	11	12	13	14	14
Industrial	0	2	8	17	27	38	49	60	71	82	92	103	114	125	136
New Commercial	0	7	19	31	42	53	63	74	86	98	109	119	130	141	153
Comm Lost Opps Exist	0	2	6	9	13	16	20	23	27	31	34	38	41	45	49
MF Res Weath	0	0	1	2	2	3	4	4	5	6	6	7	8	8	9
SF Res Weath	0	2	6	12	18	23	29	34	40	46	51	57	62	62	62
Comm Discret Ex	0	2	8	16	24	32	40	48	56	64	72	79	85	86	86
Subtotal	0	33	95	163	238	327	422	518	617	718	814	913	1010	1097	1184
GENERATING RESOURCES:															
Hydro Eff Imp	0	0	20	40	60	80	100	100	100	100	100	100	100	100	100
Trans Eff Imp	0	0	11	22	23	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 West	0	0	0	10	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	0	0	0	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	0	0	0	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	0	0	0	11	14	14	14	14	14	14	14	14	14	14	14
Cogen1w	0	0	10	10	10	10	10	10	10	10	10	10	10	10	10
Combined Cycle Mix	0	0	0	0	349	349	349	349	349	349	349	349	349	349	349
Combined Cycle BPA	0	0	0	0	349	349	349	349	697	697	697	697	697	697	697
Cogen1e	0	0	10	10	10	10	10	10	10	10	10	10	10	10	10
Cogen2w	0	0	60	60	60	60	60	60	60	60	60	60	60	60	60
Small Hydro 3 West	0	0	0	0	0	0	11	11	11	11	11	11	11	11	11
WNP 1	0	0	0	0	0	0	0	0	0	0	0	0	813	813	813
WNP 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 East	0	0	0	0	0	0	0	0	0	0	11	19	19	19	19
Cogen2e	0	0	0	60	60	60	60	60	60	60	60	60	60	60	60
Cogen3w	0	0	0	0	0	0	80	80	80	120	120	120	120	120	120
Geothermal2	0	0	0	0	0	0	0	0	0	45	90	90	90	135	157
Small Hydro 4 West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 East	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	111	248	970	1001	1112	1112	1460	1545	1601	1609	2422	2467	2489
Total Firm Resources	6428	6446	6280	6308	6931	6881	6985	6979	7264	7287	7406	7481	8246	8234	8096
Load/Resource Balance	278	176	-119	-216	277	98	75	-59	97	-10	-12	-62	578	442	179

Study ID : 17-JUL-91 05:31:57
Study Title: FUEL SWITCHING ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	5642	5771	5898	6026	6153	6158	6164	6169	6173	6178	6182	6185	6189	6192	6195
Observed Rate	2.34%	2.27%	2.22%	2.16%	2.11%	0.09%	0.09%	0.08%	0.07%	0.07%	0.07%	0.06%	0.06%	0.05%	0.05%
DSI Firm Load	2413	2424	2435	2446	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	8289	8394	8500	8431	8362	8291	8220	8150	8079	8009	7920	7650	7579	7449	6727
BPA Requirements	-4138	-4313	-4487	-4661	-4849	-5000	-4992	-4985	-4979	-4973	-4967	-4962	-4957	-4952	-4948
CONSERVATION PROGRAMS:															
SF Res MCS	96	103	111	118	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	10	10	11	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	29	32	34	36	39	39	39	39	39	39	39	39	39	39	39
Water Heat	113	124	136	148	159	159	159	159	159	159	159	159	159	159	159
Refrigerators	31	34	37	41	45	45	45	45	45	45	45	45	45	45	45
Freezers	8	9	10	11	12	12	12	12	12	12	12	12	12	12	12
FSW4: EX SF CFA AND	101	108	115	121	122	122	122	122	122	122	122	122	122	122	122
FSW1: NEW SH AND WH	132	145	157	170	176	176	176	176	176	176	176	176	176	176	176
FSW2: EXISTING SF W	99	105	112	119	124	124	124	124	124	124	124	124	124	124	124
FSW3: EX SF NC AND	113	121	129	134	134	134	134	134	134	134	134	134	134	134	134
Irrigation	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Industrial	146	157	168	179	188	188	188	188	188	188	188	188	188	188	188
New Commercial	164	176	189	201	214	214	214	214	214	214	214	214	214	214	214
Comm Lost Opps Exist	52	56	59	63	67	67	67	67	67	67	67	67	67	67	67
MF Res Weath	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
SF Res Weath	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
Comm Discret Ex	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal	1265	1351	1439	1524	1589	1589	1589	1589	1589	1589	1589	1589	1589	1589	1589
GENERATING RESOURCES:															
Hydro Eff Imp	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Trans Eff Imp	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 West	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Cogen1w	10	10	10	10	10	10	10	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349
Combined Cycle BPA	697	697	697	697	697	697	697	697	697	697	697	697	697	697	697
Cogen1e	10	10	10	10	10	10	10	0	0	0	0	0	0	0	0
Cogen2w	60	60	60	60	60	60	60	0	0	0	0	0	0	0	0
Small Hydro 3 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
WNP 3	0	806	806	806	806	806	806	806	806	806	806	806	806	806	806
Small Hydro 3 East	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Cogen2e	60	60	60	60	60	60	60	60	0	0	0	0	0	0	0
Cogen3w	120	120	120	120	120	120	120	120	120	120	120	40	40	40	0
Geothermal2	202	202	202	225	270	270	270	270	270	270	270	270	270	270	270
Small Hydro 4 West	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Small Hydro 4 East	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Cogen3e	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
Cogen4w	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Coal1 (E. Mont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	205	207	356	365	365	401	749	818	947	1948
Subtotal	2722	3528	3528	3551	3596	3801	3803	3872	3821	3821	3857	4125	4194	4323	5284
Total Firm Resources	8138	8960	8979	8845	8698	8681	8620	8625	8510	8446	8399	8402	8405	8409	8652
Load/Resource Balance	85	767	646	372	89	66	0	0	-120	-188	-240	-240	-240	-240	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	6199	6202	6205	6208	6211	6214	6216	6218	6220	6222	6224	6226	6229	6231	6234
Observed Rate	0.05%	0.05%	0.05%	0.05%	0.04%	0.04%	0.04%	0.04%	0.03%	0.03%	0.03%	0.03%	0.04%	0.04%	0.04%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727
BPA Requirements	-4944	-4942	-4940	-4937	-4935	-4933	-4931	-4930	-4928	-4926	-4925	-4924	-4925	-4926	-4927
CONSERVATION PROGRAMS:															
SF Res MCS	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Water Heat	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159
Refrigerators	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Freezers	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
FSW4: EX SF CFA AND	122	122	122	122	122	122	122	122	122	122	122	122	122	122	122
FSW1: NEW SH AND WH	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176
FSW2: EXISTING SF W	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124
FSW3: EX SF NC AND	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134
Irrigation	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Industrial	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
New Commercial	214	214	214	214	214	214	214	214	214	214	214	214	214	214	214
Comm Lost Opps Exist	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67
MF Res Weath	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
SF Res Weath	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
Comm Discret Ex	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal	1589	1589	1589	1589	1589	1589	1589	1589	1589	1589	1589	1589	1589	1589	1589
GENERATING RESOURCES:															
Hydro Eff Imp	100	100	80	60	40	20	0	0	0	0	0	0	0	0	0
Trans Eff Imp	34	34	23	12	11	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 West	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Small Hydro 1 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Small Hydro 2 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Small Hydro 2 East	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle BPA	697	697	697	697	349	349	349	349	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
Small Hydro 3 East	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	270	270	270	270	270	270	270	270	270	225	180	180	180	135	113
Small Hydro 4 West	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Small Hydro 4 East	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Cogen3e	120	120	120	120	120	0	0	0	0	0	0	0	0	0	0
Cogen4w	50	50	50	50	50	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	1948	1949	1981	2012	2731	2933	2953	2954	3303	3348	3394	3395	3399	3447	3473
Subtotal	5284	5285	5286	5286	5287	5288	5288	5289	5289	5289	5290	5291	5295	5298	5302
Total Firm Resources	8656	8659	8662	8665	8668	8671	8673	8675	8677	8679	8681	8683	8686	8688	8691
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = BPA
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	6236	6239	6241	6243	6245	6247	6248	6250	6252	6253	6255	6256	6257	6257	6258
Observed Rate	0.04%	0.04%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.02%	0.02%	0.01%	0.01%	0.01%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727	6727
BPA Requirements	-4928	-4929	-4929	-4930	-4931	-4931	-4932	-4933	-4933	-4934	-4934	-4935	-4935	-4934	-4934
CONSERVATION PROGRAMS:															
SF Res MCS	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126
MF Res MCS	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
New Manuf Housing	39	38	37	36	34	32	31	28	26	24	21	19	17	14	12
Water Heat	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159
Refrigerators	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Freezers	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
FSW4: EX SF CFA AND	122	122	122	122	122	122	118	111	104	97	90	83	76	69	63
FSW1: NEW SH AND WH	176	176	176	176	176	176	176	176	176	176	170	157	145	132	119
FSW2: EXISTING SF W	124	124	124	124	124	124	121	114	107	100	93	87	80	73	66
FSW3: EX SF NC AND	134	134	134	134	134	134	130	122	114	107	99	91	83	75	68
Irrigation	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Industrial	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
New Commercial	214	214	214	214	214	214	214	214	214	214	214	214	214	214	214
Comm Lost Opps Exist	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67
MF Res Weath	9	9	9	9	9	9	9	8	7	7	6	5	5	4	3
SF Res Weath	62	62	62	62	62	62	60	56	50	45	39	33	28	22	17
Comm Discret Ex	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal	1589	1588	1587	1586	1584	1582	1568	1538	1507	1479	1441	1398	1357	1312	1271
GENERATING RESOURCES:															
Hydro Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trans Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 West	10	10	10	10	10	10	10	10	0	0	0	0	0	0	0
Small Hydro 1 East	14	14	14	14	14	14	14	14	0	0	0	0	0	0	0
Small Hydro 2 West	11	11	11	11	11	11	11	11	0	0	0	0	0	0	0
Small Hydro 2 East	14	14	14	14	14	14	14	14	4	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle BPA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	11	11	11	11	11	11	11	11	11	11	11	0	0	0	0
WNP 1	813	813	813	813	813	813	813	0	0	0	0	0	0	0	0
WNP 3	806	806	806	806	806	806	806	806	806	806	806	0	0	0	0
Small Hydro 3 East	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	67	67	67	45	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Small Hydro 4 East	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	3521	3525	3529	3556	3605	3609	3626	4470	4548	4584	4622	5484	5528	5571	5614
Subtotal	5304	5308	5312	5317	5321	5325	5342	5373	5406	5438	5476	5521	5565	5608	5651
Total Firm Resources	8692	8694	8697	8700	8701	8703	8705	8705	8707	8710	8710	8711	8714	8713	8715
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	9551	9881	10214	10558	10916	11253	11590	11927	12264	12600	12946	13291	13638	13984	14331
Observed Rate		3.45%	3.37%	3.37%	3.39%	3.09%	3.00%	2.91%	2.82%	2.74%	2.74%	2.67%	2.60%	2.54%	2.48%
Existing Resources	9685	9681	9795	9910	9353	8791	8795	8798	8710	8621	8652	8683	8448	8214	8306
BPA Requirements	47	77	127	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	0	3	6	10	14	17	21	25	30	34	39	44	50	55	60
MF Res MCS	0	1	2	4	5	6	7	9	10	11	13	14	16	17	18
New Manuf Housing	0	1	2	4	5	7	9	12	14	17	20	22	25	28	31
Refrigerators	0	0	0	0	2	5	8	12	15	19	23	27	32	36	41
Freezers	0	0	0	0	1	1	2	3	4	5	6	8	9	10	11
Water Heat	0	0	0	0	5	16	28	39	51	63	76	90	104	117	131
Irrigation	0	0	1	2	3	5	7	10	12	14	16	18	20	21	22
Industrial	0	2	8	19	31	43	55	68	80	92	104	116	129	141	153
New Commercial	0	11	32	52	72	89	108	127	146	166	185	203	222	241	260
Comm Lost Opps Exist	0	2	6	10	14	18	21	25	29	33	37	41	45	49	53
MF Res Weath	0	1	3	5	7	9	11	13	15	17	19	21	23	25	27
SF Res Weath	0	1	4	8	11	15	18	22	26	29	33	36	39	40	40
Comm Discret Ex	0	2	7	14	21	28	35	42	49	56	63	71	76	76	76
Subtotal	0	24	71	128	191	259	330	407	481	556	634	711	790	856	923
GENERATING RESOURCES:															
Small Hydro 1 West	0	0	0	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	0	0	0	34	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	0	0	0	25	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	0	0	0	25	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	0	0	30	30	30	30	30	30	30	30	30	30	30	30	30
Combined Cycle Mix	0	0	0	0	349	349	349	349	349	349	349	349	349	349	349
Cogen1e	0	0	30	30	30	30	30	30	30	30	30	30	30	30	30
Cogen2w	0	0	180	180	180	180	180	180	180	180	180	180	180	180	180
Small Hydro 3 West	0	0	0	0	0	0	26	37	37	37	37	37	37	37	37
Small Hydro 3 East	0	0	0	0	0	0	26	52	52	52	52	52	56	56	56
Cogen2e	0	0	0	180	180	180	180	180	180	180	180	180	180	180	180
Coal1 (E. Mont)	0	0	0	0	0	0	0	188	375	563	750	938	1125	1313	1313
Cogen3w	0	0	0	0	360	360	360	360	360	360	360	360	360	360	360
Small Hydro 4 West	0	0	0	0	0	0	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	0	0	0	0	0	0	25	32	32	32	32	32	32	32	32
Cogen3e	0	0	0	0	140	360	360	360	360	360	360	360	360	360	360
Coal2 (E. Wash)	0	0	0	0	0	0	0	188	375	563	563	563	563	563	563
Cogen4w	0	0	0	0	0	620	780	780	780	780	780	780	1000	1330	1330
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	188
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	240	533	1420	2260	2522	2942	3316	3692	3879	4067	4478	4996	5184
Total Firm Resources	9732	9782	10233	10571	10964	11310	11647	12147	12507	12869	13165	13461	13716	14066	14413
Load/Resource Balance	181	-98	21	11	47	58	59	218	243	271	221	171	77	81	79

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	14754	15178	15604	16030	16458	16460	16462	16464	16466	16468	16470	16471	16473	16474	16475
Observed Rate	2.95%	2.87%	2.80%	2.73%	2.67%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
Existing Resources	8398	8383	8368	8513	8542	7194	6872	6543	6477	6261	5838	5194	5139	5051	4589
BPA Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	66	71	77	83	89	89	89	89	89	89	89	89	89	89	89
MF Res MCS	20	21	22	24	25	25	25	25	25	25	25	25	25	25	25
New Manuf Housing	33	36	38	41	44	44	44	44	44	44	44	44	44	44	44
Refrigerators	45	49	53	59	65	65	65	65	65	65	65	65	65	65	65
Freezers	12	13	14	16	18	18	18	18	18	18	18	18	18	18	18
Water Heat	144	158	173	188	203	203	203	203	203	203	203	203	203	203	203
Irrigation	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Industrial	165	177	189	202	212	212	212	212	212	212	212	212	212	212	212
New Commercial	280	300	321	343	365	365	365	365	365	365	365	365	365	365	365
Comm Lost Opps Exist	57	60	64	68	72	72	72	72	72	72	72	72	72	72	72
MF Res Weath	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
SF Res Weath	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Comm Discret Ex	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Subtotal	987	1050	1116	1189	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258
GENERATING RESOURCES:															
Small Hydro 1 West	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	30	30	30	30	30	30	30	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349
Cogen1e	30	30	30	30	30	30	30	0	0	0	0	0	0	0	0
Cogen2w	180	180	180	180	180	180	180	0	0	0	0	0	0	0	0
Small Hydro 3 West	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56
Cogen2e	180	180	180	180	180	180	180	180	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Cogen3w	360	360	360	360	360	360	360	360	360	0	0	0	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Cogen3e	360	360	360	360	360	360	360	360	360	220	0	0	0	0	0
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4w	1400	1500	1500	1500	1500	1500	1500	1500	1500	1500	880	720	720	720	720
Coal3 (E. Oregon)	375	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4e	0	80	450	670	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	1352	1607	1831	1831	2643	3907	4714	4980	5279	5822
Subtotal	5441	5809	6179	6399	6729	8081	8336	8320	8140	8452	8876	9523	9789	10088	10631
Total Firm Resources	14826	15242	15663	16101	16529	16533	16466	16121	15875	15971	15972	15975	16186	16397	16478
Load/Resource Balance	69	63	60	67	68	69	0	-346	-595	-500	-500	-500	-290	-80	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	16475	16474	16474	16473	16472	16472	16471	16471	16470	16470	16469	16468	16464	16461	16457
Observed Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.01%	-0.02%	-0.02%	-0.02%
Existing Resources	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143
BPA Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89
MF Res MCS	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
New Manuf Housing	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44
Refrigerators	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
Freezers	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Water Heat	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203
Irrigation	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Industrial	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212
New Commercial	365	365	365	365	365	365	365	365	365	365	365	365	365	365	365
Comm Lost Opps Exist	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72
MF Res Weath	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
SF Res Weath	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Comm Discret Ex	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Subtotal	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258	1258
GENERATING RESOURCES:															
Small Hydro 1 West	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Small Hydro 1 East	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 2 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 2 East	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	349	349	349	349	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4w	720	720	500	170	170	100	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Cogen4e	1000	1000	1000	1000	1000	1000	920	550	330	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	6268	6268	6486	6816	7164	7233	7413	7782	8002	8331	8331	8331	8331	8331	8331
Subtotal	11077	11077	11075	11075	11074	11073	11073	11072	11072	11071	11071	11071	11071	11071	11071
Total Firm Resources	16478	16478	16476	16476	16475	16474	16474	16473	16473	16472	16472	16472	16472	16472	16472
Load/Resource Balance	0	1	0	0	0	0	0	0	0	0	0	2	5	9	12

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = IOUs
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	16454	16451	16448	16446	16443	16441	16438	16436	16434	16431	16429	16428	16427	16427	16427
Observed Rate	-0.02%	-0.02%	-0.02%	-0.02%	-0.02%	-0.02%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	-0.01%	0.00%	0.00%
Existing Resources	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143	4143
BPA Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:															
SF Res MCS	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89
MF Res MCS	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
New Manuf Housing	44	43	42	40	38	37	34	32	29	27	24	21	19	16	13
Refrigerators	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
Freezers	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Water Heat	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203
Irrigation	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Industrial	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212
New Commercial	365	365	365	365	365	365	365	365	365	365	365	365	365	365	365
Comm Lost Opps Exist	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72
MF Res Weath	27	27	27	27	27	27	26	24	22	20	18	16	14	12	10
SF Res Weath	40	40	40	40	40	40	39	36	32	29	25	21	18	14	11
Comm Discret Ex	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Subtotal	1258	1257	1256	1254	1252	1251	1246	1239	1230	1223	1214	1205	1198	1189	1181
GENERATING RESOURCES:															
Small Hydro 1 West	29	29	29	29	29	29	29	29	0	0	0	0	0	0	0
Small Hydro 1 East	43	43	43	43	43	43	43	43	10	0	0	0	0	0	0
Small Hydro 2 West	32	32	32	32	32	32	32	32	7	0	0	0	0	0	0
Small Hydro 2 East	47	47	47	47	47	47	47	47	22	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 3 West	37	37	37	37	37	37	37	37	37	37	37	11	0	0	0
Small Hydro 3 East	56	56	56	56	56	56	56	56	56	56	56	30	4	4	4
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1125	938	750	563	375	188	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 4 West	25	25	25	25	25	25	25	25	25	25	25	0	0	0	0
Small Hydro 4 East	32	32	32	32	32	32	32	32	32	32	32	7	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal2 (E. Wash)	563	563	375	188	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	375	188	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	8331	8331	8687	9061	9435	9622	9811	10004	10310	10542	10736	11032	11083	11092	11100
Subtotal	11071	11071	11051	11051	11049	11049	11050	11056	11062	11067	11074	11080	11087	11096	11104
Total Firm Resources	16472	16471	16450	16448	16444	16443	16439	16438	16435	16433	16431	16428	16428	16428	16428
Load/Resource Balance	15	17	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	4284	4434	4588	4758	4922	5085	5249	5414	5579	5744	5895	6045	6196	6346	6496
Observed Rate		3.49%	3.48%	3.70%	3.44%	3.32%	3.23%	3.13%	3.05%	2.97%	2.62%	2.55%	2.49%	2.42%	2.37%
Existing Resources	2380	2378	2407	2436	2431	2431	2446	2461	2455	2449	2469	2490	2489	2489	2512
BPA Requirements	1905	2055	2181	2322	2491	2654	2803	2953	3123	3295	3425	3556	3706	3857	3984
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	4284	4434	4588	4758	4922	5085	5249	5414	5579	5744	5895	6045	6196	6346	6496
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Study ID : 17-JUL-91 05:31:57
Study Title: FUEL SWITCHING ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	6672	6847	7022	7195	7368	7361	7353	7346	7340	7333	7328	7322	7317	7313	7308
Observed Rate	2.71%	2.63%	2.55%	2.47%	2.40%	-0.11%	-0.10%	-0.09%	-0.09%	-0.08%	-0.08%	-0.07%	-0.07%	-0.06%	-0.06%
Existing Resources	2534	2534	2534	2534	2520	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4138	4313	4487	4661	4849	5000	4992	4985	4979	4973	4967	4962	4957	4952	4948
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	6672	6847	7022	7195	7368	7361	7353	7346	7340	7334	7328	7322	7317	7313	7308
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	7305	7303	7300	7298	7296	7294	7292	7290	7289	7287	7286	7285	7286	7287	7288
Observed Rate	-0.04%	-0.04%	-0.03%	-0.03%	-0.03%	-0.03%	-0.03%	-0.02%	-0.02%	-0.02%	-0.02%	-0.01%	0.01%	0.01%	0.01%
Existing Resources	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4944	4942	4940	4937	4935	4933	4931	4930	4928	4926	4925	4924	4925	4926	4927
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	7305	7303	7300	7298	7296	7294	7292	7290	7289	7287	7286	7285	7286	7287	7288
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: FUEL SWITCHING ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = Generating Publics
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	7288	7289	7290	7291	7291	7292	7293	7293	7294	7294	7295	7295	7295	7295	7295
Observed Rate	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.00%	-0.01%	-0.01%
Existing Resources	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361	2361
BPA Requirements	4928	4929	4929	4930	4931	4931	4932	4933	4933	4934	4934	4935	4935	4934	4934
CONSERVATION PROGRAMS:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:															
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Firm Resources	7288	7289	7290	7291	7291	7292	7293	7293	7294	7294	7295	7295	7295	7295	7295
Load/Resource Balance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Study Title: FUEL SWITCHING ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Observed Load	17723	18317	18922	19551	20193	20811	21431	22050	22669	23288	23899	24509	25120	25730	26341
Observed Rate		3.35%	3.30%	3.32%	3.28%	3.07%	2.97%	2.89%	2.81%	2.73%	2.62%	2.56%	2.49%	2.43%	2.37%
DSI Firm Load	2261	2268	2278	2288	2298	2308	2319	2329	2339	2350	2360	2371	2381	2392	2403
Existing Resources	20443	20605	20585	20564	19997	19429	19495	19560	19475	19389	19538	19687	19458	19229	19225
CONSERVATION PROGRAMS:															
SF Res MCS	0	8	17	26	36	44	54	65	76	87	99	111	125	137	149
MF Res MCS	0	2	3	6	7	9	11	13	15	17	19	21	24	25	27
Water Heat	0	0	0	0	9	29	50	70	91	113	136	161	185	209	234
Refrigerators	0	0	0	0	3	9	14	20	26	32	39	46	54	61	69
Freezers	0	0	0	0	1	2	4	5	7	9	10	13	15	17	19
New Manuf Housing	0	2	4	7	10	13	17	23	27	32	38	42	47	53	58
Irrigation	0	0	2	3	5	9	12	16	20	23	27	30	33	35	36
Industrial	0	4	16	36	58	81	104	128	151	174	196	219	243	266	289
New Commercial	0	18	51	83	114	142	171	201	232	264	294	322	352	382	413
Comm Discret Ex	0	4	15	30	45	60	75	90	105	120	135	150	161	162	162
Comm Lost Opps Exist	0	4	12	19	27	34	41	48	56	64	71	79	86	94	102
SF Res Weath	0	3	10	20	29	38	47	56	66	75	84	93	101	102	102
MF Res Weath	0	1	4	7	9	12	15	17	20	23	25	28	31	33	36
FSW1: NEW SH AND WH	0	0	0	0	0	6	19	32	44	57	69	82	94	107	120
FSW2: EXISTING SF W	0	3	10	17	24	31	37	44	51	58	65	71	78	85	92
FSW3: EX SF NC AND	0	4	12	19	27	35	43	51	58	66	74	82	90	97	105
FSW4: EX SF CFA AND	0	4	10	18	25	32	38	46	53	60	67	74	81	88	94
Subtotal	0	57	166	291	429	586	752	925	1098	1274	1448	1624	1800	1953	2107
GENERATING RESOURCES:															
Hydro Eff Imp	0	0	20	40	60	80	100	100	100	100	100	100	100	100	100
Trans Eff Imp	0	0	11	22	23	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 East	0	0	0	48	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	0	0	0	36	61	61	61	61	61	61	61	61	61	61	61
Small Hydro 3 East	0	0	0	0	0	0	26	52	52	52	63	71	75	75	75
Small Hydro 4 East	0	0	0	0	0	0	25	32	32	32	32	32	32	32	32
Small Hydro 1 West	0	0	0	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	0	0	0	36	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	0	0	0	0	0	0	37	48	48	48	48	48	48	48	48
Small Hydro 4 West	0	0	0	0	0	0	25	25	25	25	25	25	25	25	25
Combined Cycle BPA	0	0	0	0	349	349	349	349	697	697	697	697	697	697	697
Combined Cycle Mix	0	0	0	0	698	698	698	698	698	698	698	698	698	698	698
Cogen1e	0	0	40	40	40	40	40	40	40	40	40	40	40	40	40
Cogen2e	0	0	0	240	240	240	240	240	240	240	240	240	240	240	240
Cogen3e	0	0	0	0	140	360	360	360	360	360	360	360	360	360	360
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1w	0	0	40	40	40	40	40	40	40	40	40	40	40	40	40
Cogen2w	0	0	240	240	240	240	240	240	240	240	240	240	240	240	240
Cogen3w	0	0	0	0	360	360	440	440	440	480	480	480	480	480	480
Cogen4w	0	0	0	0	0	620	780	780	780	780	780	780	1000	1330	1330
Coal1 (E. Mont)	0	0	0	0	0	0	0	188	375	563	750	938	1125	1313	1313
Coal2 (E. Wash)	0	0	0	0	0	0	0	188	375	563	563	563	563	563	563
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	188
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNP 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNP 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	813	813	813
Geothermal2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	45	90	90	90	135	157
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	351	781	2390	3261	3634	4054	4776	5237	5480	5676	6900	7463	7673
Total Firm Resources	20443	20662	21102	21634	22815	23276	23882	24537	25348	25898	26467	26989	28156	28645	29002
Load/Resource Balance	459	78	-98	-204	325	157	133	158	340	261	209	109	655	523	258

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Observed Load	27069	27796	28524	29251	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979
Observed Rate	2.76%	2.69%	2.62%	2.55%	2.49%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DSI Firm Load	2413	2424	2435	2446	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	19221	19312	19402	19478	19423	17845	17453	17054	16917	16631	16119	15204	15079	14861	13677
CONSERVATION PROGRAMS:															
SF Res MCS	162	174	188	201	215	215	215	215	215	215	215	215	215	215	215
MF Res MCS	30	31	33	36	37	37	37	37	37	37	37	37	37	37	37
Water Heat	257	282	309	336	362	362	362	362	362	362	362	362	362	362	362
Refrigerators	76	83	90	100	110	110	110	110	110	110	110	110	110	110	110
Freezers	20	22	24	27	30	30	30	30	30	30	30	30	30	30	30
New Manuf Housing	62	68	72	77	83	83	83	83	83	83	83	83	83	83	83
Irrigation	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Industrial	311	334	357	381	400	400	400	400	400	400	400	400	400	400	400
New Commercial	444	476	510	544	579	579	579	579	579	579	579	579	579	579	579
Comm Discret Ex	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
Comm Lost Opps Exist	109	116	123	131	139	139	139	139	139	139	139	139	139	139	139
SF Res Weath	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102
MF Res Weath	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
FSW1: NEW SH AND WH	132	145	157	170	176	176	176	176	176	176	176	176	176	176	176
FSW2: EXISTING SF W	99	105	112	119	124	124	124	124	124	124	124	124	124	124	124
FSW3: EX SF NC AND	113	121	129	134	134	134	134	134	134	134	134	134	134	134	134
FSW4: EX SF CFA AND	101	108	115	121	122	122	122	122	122	122	122	122	122	122	122
Subtotal	2252	2401	2555	2713	2847	2847	2847	2847	2847	2847	2847	2847	2847	2847	2847
GENERATING RESOURCES:															
Hydro Eff Imp	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Trans Eff Imp	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 East	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61
Small Hydro 3 East	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
Small Hydro 4 East	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 1 West	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
Small Hydro 4 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Combined Cycle BPA	697	697	697	697	697	697	697	697	697	697	697	697	697	697	697
Combined Cycle Mix	698	698	698	698	698	698	698	698	698	698	698	698	698	698	698
Cogen1e	40	40	40	40	40	40	40	0	0	0	0	0	0	0	0
Cogen2e	240	240	240	240	240	240	240	240	0	0	0	0	0	0	0
Cogen3e	480	480	480	480	480	480	480	480	480	340	120	120	120	120	120
Cogen4e	0	80	450	670	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Cogen1w	40	40	40	40	40	40	40	0	0	0	0	0	0	0	0
Cogen2w	240	240	240	240	240	240	240	0	0	0	0	0	0	0	0
Cogen3w	480	480	480	480	480	480	480	480	480	120	120	40	40	40	0
Cogen4w	1450	1550	1550	1550	1550	1550	1550	1550	1550	1550	930	770	770	770	770
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal3 (E. Oregon)	375	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	1557	1814	2187	2196	3008	4308	5463	5798	6226	7770
WNP 3	0	806	806	806	806	806	806	806	806	806	806	806	806	806	806
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	202	202	202	225	270	270	270	270	270	270	270	270	270	270	270
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	8163	9337	9707	9950	10325	11882	12139	12192	11961	12273	12733	13648	13983	14411	15915
Total Firm Resources	29636	31051	31665	32137	32592	32571	32436	32090	31722	31748	31696	31696	31906	32116	32436
Load/Resource Balance	154	830	706	439	156	135	0	-346	-714	-688	-740	-740	-530	-320	0

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SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35
Observed Load	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979
Observed Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231
CONSERVATION PROGRAMS:															
SF Res MCS	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215
MF Res MCS	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Water Heat	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362
Refrigerators	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
Freezers	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
New Manuf Housing	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83
Irrigation	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Industrial	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
New Commercial	579	579	579	579	579	579	579	579	579	579	579	579	579	579	579
Comm Discret Ex	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
Comm Lost Opps Exist	139	139	139	139	139	139	139	139	139	139	139	139	139	139	139
SF Res Weath	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102
MF Res Weath	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
FSW1: NEW SH AND WH	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176
FSW2: EXISTING SF W	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124
FSW3: EX SF NC AND	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134
FSW4: EX SF CFA AND	122	122	122	122	122	122	122	122	122	122	122	122	122	122	122
Subtotal	2847	2847	2847	2847	2847	2847	2847	2847	2847	2847	2847	2847	2847	2847	2847
GENERATING RESOURCES:															
Hydro Eff Imp	100	100	80	60	40	20	0	0	0	0	0	0	0	0	0
Trans Eff Imp	34	34	23	12	11	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 East	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61
Small Hydro 3 East	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
Small Hydro 4 East	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 1 West	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
Small Hydro 4 West	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Combined Cycle BPA	697	697	697	697	349	349	349	349	0	0	0	0	0	0	0
Combined Cycle Mix	698	698	698	698	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	120	120	120	120	120	0	0	0	0	0	0	0	0	0	0
Cogen4e	1000	1000	1000	1000	1000	1000	920	550	330	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	770	770	550	220	220	100	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313	1313
Coal2 (E. Wash)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	563	563	563	563	563	563
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	8216	8217	8467	8828	9895	10166	10366	10736	11305	11679	11725	11726	11730	11778	11804
WNP 3	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
WNP 1	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	270	270	270	270	270	270	270	270	270	225	180	180	180	135	113
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	16361	16362	16361	16361	16361	16361	16361	16361	16361	16360	16361	16362	16366	16369	16373
Total Firm Resources	32436	32437	32436	32436	32436	32436	32436	32436	32437	32436	32437	32438	32442	32445	32448
Load/Resource Balance	0	1	0	0	0	0	0	0	1	0	1	2	6	9	12

Study ID : 17-JUL-91 05:31:57
Study Title: FUEL SWITCHING ALTERNATIVE

SYSTEM SUMMARY: Mean Loads and Resources (Avg MW), PARTY = REGION
0100 Games

Operating Year	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50
Observed Load	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979	29979
Observed Rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DSI Firm Load	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457	2457
Existing Resources	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231	13231
CONSERVATION PROGRAMS:															
SF Res MCS	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215
MF Res MCS	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Water Heat	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362
Refrigerators	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
Freezers	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
New Manuf Housing	83	81	79	76	72	69	65	60	55	51	45	40	36	30	25
Irrigation	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Industrial	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
New Commercial	579	579	579	579	579	579	579	579	579	579	579	579	579	579	579
Comm Discret Ex	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
Comm Lost Opps Exist	139	139	139	139	139	139	139	139	139	139	139	139	139	139	139
SF Res Weath	102	102	102	102	102	102	99	92	82	74	64	54	46	36	28
MF Res Weath	36	36	36	36	36	36	35	32	29	27	24	21	19	16	13
FSW1: NEW SH AND WH	176	176	176	176	176	176	176	176	176	176	170	157	145	132	119
FSW2: EXISTING SF W	124	124	124	124	124	124	121	114	107	100	93	87	80	73	66
FSW3: EX SF NC AND	134	134	134	134	134	134	130	122	114	107	99	91	83	75	68
FSW4: EX SF CFA AND	122	122	122	122	122	122	118	111	104	97	90	83	76	69	63
Subtotal	2847	2845	2843	2840	2836	2833	2814	2777	2737	2702	2655	2603	2555	2501	2452
GENERATING RESOURCES:															
Hydro Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trans Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 1 East	57	57	57	57	57	57	57	57	10	0	0	0	0	0	0
Small Hydro 2 East	61	61	61	61	61	61	61	61	26	0	0	0	0	0	0
Small Hydro 3 East	75	75	75	75	75	75	75	75	75	75	75	49	23	23	23
Small Hydro 4 East	43	43	43	43	43	43	43	43	43	43	43	18	11	11	11
Small Hydro 1 West	39	39	39	39	39	39	39	39	0	0	0	0	0	0	0
Small Hydro 2 West	43	43	43	43	43	43	43	43	7	0	0	0	0	0	0
Small Hydro 3 West	48	48	48	48	48	48	48	48	48	48	48	11	0	0	0
Small Hydro 4 West	32	32	32	32	32	32	32	32	32	32	32	7	7	7	7
Combined Cycle BPA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Combined Cycle Mix	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen1w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen2w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen3w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogen4w	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	1125	938	750	563	375	188	0	0	0	0	0	0	0
Coal2 (E. Wash)	563	563	375	188	0	0	0	0	0	0	0	0	0	0	0
Coal3 (E. Oregon)	563	563	563	563	563	563	563	563	563	375	188	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	11852	11856	12216	12617	13040	13231	13437	14474	14858	15126	15358	16516	16611	16663	16714
WNP 3	806	806	806	806	806	806	806	806	806	806	806	0	0	0	0
WNP 1	813	813	813	813	813	813	813	0	0	0	0	0	0	0	0
Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	67	67	67	45	0	0	0	0	0	0	0	0	0	0	0
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	16375	16379	16363	16368	16370	16374	16392	16429	16468	16505	16550	16601	16652	16704	16755
Total Firm Resources	32451	32453	32436	32436	32436	32436	32436	32436	32436	32436	32436	32436	32435	32436	32436
Load/Resource Balance	15	17	0	0	0	0	0	0	0	0	0	0	-1	0	0

APPENDIX C

APPENDIX C

Supplementary Information for BPA Conservation Programs

A Tool For Estimating the Mix of Energy Conservation Measures Given Competing Acquisition Scenarios

To support the analysis work of the Bonneville Power Administration's (BPA's) Resource Programs Environmental Impact Statement, analysts needed the ability to quickly and easily evaluate the effect of the energy conservation measure (ECM) mix and the amount of equipment/technology that could be replaced if it were adopted, given an alternative regional forecast of electricity savings potential. A tool called ECMMIX was developed in response to this need. A base-case forecast was provided by BPA to serve as a point of departure for the alternative forecasts, and a base-case ECM mix was estimated from the base-case forecast of regional megawatt savings. In addition, equipment and technology that could be replaced by the adoption of the ECM mix can be calculated. When alternative forecasts of regional savings are under consideration, ECMMIX is capable of calculating a new set of estimates for the associated ECM mix and the equipment replaced.

Chlorofluorocarbon Environmental Issues Related to Conservation Acquisition in Commercial Buildings

Recent scientific evidence strongly suggests that the release of large quantities of chlorofluorocarbon (CFC) gases into the atmosphere will result in environmentally harmful long-term effects. Because of those effects, a massive worldwide effort is currently under way to ban their use.

At the request of BPA, the Pacific Northwest Laboratory conducted a literature search to identify the issues surrounding the CFC phaseout. The search was focused on how these issues impact the commercial building sector. Information was obtained that describes:

- how the release of CFCs into the atmosphere may affect the global environment
- legislative and regulatory programs initiated to restrict CFCs
- potential impacts the reduced CFC supply will have on commercial buildings
- the most promising CFC substitute technologies
- the potential costs of CFC restriction

CFCs pose a twofold environmental threat. First, in sufficient concentrations, CFCs could significantly deplete ozone in the stratosphere, allowing increasing amounts of ultraviolet (UV) rays to reach the earth's surface. Second, CFCs are known "greenhouse gases," and, thus, will contribute to the expected man-induced global warming phenomena.

Concern over these environmental effects has led to international treaties, such as the Montreal Protocol, calling for the complete phaseout of CFCs. National and local legislative activity has also flourished, resulting in uncertainty about what the eventual regulations regarding CFCs and other ozone-depleting halocarbons will be and what alternative fluids will be allowed.

The primary uses for CFCs in commercial buildings include air conditioning, retail food refrigeration, and rigid foam insulation. Replacement of CFCs in these applications is expected to have both energy and cost ramifications. However, assuming a technologically conservative scenario for the phaseout, the overall energy impact on the commercial building sector appears to be small, with energy penalties on the order of only 5 trillion Btu by 2000 and 42 trillion Btu by 2010 over predicted levels if no CFC ban occurs. Costs are more uncertain, being highly dependent on when non-CFC substitute fluids and equipment become commercially available, and at what price.

Capital obsolescence of existing equipment is an economic danger that will be magnified by more stringent phaseout timetables. However, a well-organized and executed refrigerant reclaimation and recycling program, along with improved practices designed to minimize leakage and service losses, should help extend CFC supplies to meet the decreasing demands over the coming years.

Polychlorinated Biphenyls in Commercial Buildings

BPA is planning to implement a conservation acquisition program in new and existing commercial buildings. In anticipation of the program, BPA is examining the potential environmental effects of conservation measures in such buildings. An important conservation measure is the installation of new energy-efficient lighting fixtures. Some of the old lighting fixtures these new lights will be replacing were manufactured before 1978, when polychlorinated biphenyls (PCBs) were still used in the capacitors of the lighting ballasts.

A key concern is whether changing normal fluorescent lamps to energy-efficient lamps causes ballast failure, which, in turn, can cause leaking and the release of PCBs into the atmosphere and onto surfaces. Exposure to PCBs has been found to cause skin rashes, vomiting, abdominal pain, and temporary blindness. It also is suspected of causing birth defects and cancer. Pacific Northwest Laboratory (PNL) has prepared a summary of information about PCBs in fluorescent light fixtures in commercial buildings to aid BPA in its assessment of potential environmental effects of its commercial acquisition program.

PCBs are regulated primarily through the Toxic Substances Control Act (TSCA), enacted by Congress in 1976. This Act gave the U.S. Environmental Protection Agency (EPA) authority to control the production and use of chemicals in the United States. The rules issued by EPA pursuant to the TSCA (40 CFR 761) remain the primary means of regulating the manufacture, distribution, use, storage, and disposal of PCBs. PCBs from nonleaking lighting ballasts are excluded from the manufacturing and disposal regulations insofar as a lighting ballast contains only "small capacitors." However, the EPA interprets that provision to apply only to individual households, not to commercial establishments. Also, Washington State has enacted Dangerous Waste Regulations (173-303-WAC), which also regulate the transport, storage, and disposal of PCBs.

Fluorescent lamps, commonly used in commercial buildings, represent a good opportunity for energy savings through either delamping (simply removing some of the bulbs) or relamping (replacing old lamps with energy efficient ones). However, some reports have asserted that both of these actions cause overheating of the fluorescent ballast, which, in turn, may lead to ballast failure and PCB leaks. The EPA has adopted a policy of discouraging fluorescent lamp change-outs. Nevertheless, an unpublished analysis by the City of Richland, Washington, and observations from other organizations suggest that relamping and delamping do not increase ballast failure. Because ballasts manufactured before 1978 contain PCBs, and many may still be in service, the potential for contamination poses a real problem. However, reports of relamping and delamping contributing to ballast failure remain controversial and inconclusive.

The National Institute for Occupational Safety and Health (NIOSH) has data showing that incidents of fluorescent light ballast burnout can release PCBs into indoor air, resulting in concentrations above comparable background levels. According to that data, these concentrations often exceed NIOSH-recommended occupational levels (1 microgram per cubic meter total PCBs for up to a 10-hour workday, 40-hour week). The NIOSH also found in a study of Seattle classrooms that ballast burnout resulted in surface contamination, with concentrations at levels approximately twice those found in noncontaminated classrooms. The EPA has recommended a cleanup criterion of 0.001 microgram per cubic meter for surfaces where skin contact is likely.

Requirements for mitigating effects from PCB leaks or spills are given in 40 CFR 761. However, because lighting ballasts (as "small capacitors") are exempted from the requirements of the TSCA, the standards stated in that Act are also not required for cleaning up spills from lighting ballasts. Rather, EPA has published guidelines in the form of a fact sheet to be followed in the event of a leak. The fact sheet describes procedures for ventilating a room, as well as for cleaning both absorbent and nonabsorbent surfaces. These guidelines specify equipment, detergents, and solvents to be used, as well as the necessary protective clothing to be worn.

Options for disposal of PCB-laden lighting ballasts are also described in the EPA fact sheet. In general, licensed haulers disposing of PCB-contaminated lighting ballasts treat them as "PCB waste" in accordance with 40 CFR 761. The waste is either buried in a "permitted" landfill (i.e., one approved for accepting chemical waste) or is incinerated in one of the eight EPA-permitted incinerators. Incineration is encouraged by the EPA, and there is some indication that customers are moving toward that option to avoid future liability problems. However, our small telephone survey indicated that PCB-laden lighting ballasts are usually packed in drums approved by either the EPA or the Department of Transportation (DOT) and transported to a permitted chemical waste landfill (usually Arlington, Oregon) for burial.

Information on the costs of disposing of PCB-laden lighting ballasts was gathered from three sources: haulers of toxic waste; one of the large regional utilities; and a lighting vendor contracted to retrofit commercial buildings. The range of quoted prices is wide. Also, it is difficult to compare prices because they are often given in different units (e.g., weight versus number of barrels; dollars per loaded mile versus dollars per driver hour). Based on these diverse figures, approximate disposal costs per ballast for landfill and incineration were estimated. These costs range from about $1.40 to $15 per ballast, with incineration significantly more costly than landfill burial.

Indoor Air Quality Issues Related to the Acquisition of Conservation in Commercial Buildings

The quality of indoor air in commercial buildings is dependent on the complex interaction between sources of indoor pollutants, environmental factors within buildings such as temperature and humidity, the removal of air pollutants by air-cleaning devices, and the removal and dilution of pollutants from outside air. To the extent that energy conservation measures (ECMs) may affect a number of these factors, the relationship between ECMs and indoor air quality is difficult to predict. For example, depending on the location of pollutant sources (indoor or outdoor), indoor pollutant concentrations may be either increased or decreased by a reduction in ventilation. For instance, additional caulking and weatherstripping will reduce the infiltration/exfiltration rate. The reduction in ventilation may increase indoor pollutant levels originating from an indoor source because of a reduction in fresh air dilution and removal. On the other hand, the same ECM will decrease the levels for a pollutant with an outdoor source location by reducing the transport of that pollutant to the indoor environment.

ECMs may affect pollutant levels in other ways. Conservation measures, such as caulking and insulation, may introduce sources of indoor pollutants. Measures that reduce mechanical ventilation may allow pollutants to build up inside structures. Finally, heating, ventilating, and air-conditioning (HVAC) systems may provide surface areas for the growth of biogenic agents, or may encourage the dissemination of pollutants throughout a building.

Conservation measures that involve carefully maintaining and operating mechanical equipment may improve the quality of indoor air. In some instances, proper operation and design will increase ventilation quality and effectiveness and thus improve pollutant removal mechanisms. In addition, inspections and proper installations will make the buildup of biogenic colonies less likely in HVAC systems.

Health Effects Associated with Energy Conservation Measures in Commercial Buildings

Indoor air quality can be impacted by hundreds of different chemicals. More than 900 different organic compounds alone have been identified in indoor air. Health effects that could arise from exposure to individual pollutants or mixtures of pollutants cover the full range of acute and chronic effects, including largely reversible responses, such as rashes and irritations, to the irreversible toxic and carcinogenic effects. These indoor contaminants are emitted from a large variety of material and substances that are widespread components of everyday life.

Pacific Northwest Laboratories conducted a search of the peer-reviewed literature on health effects associated with indoor air contaminants for BPA.

Results are reported in two volumes. Volume 1 summarizes the results of the search of the peer-reviewed literature on health effects associated with a selected list of indoor air contaminants. In addition, the report discusses potential health effects of PCBs and CFCs. All references to the literature reviewed are found in Volume 2. Volume 2 provides detailed information from the literature reviewed, summarizes potential health effects, reports health hazard ratings, and discusses quantitative estimates of carcinogenic risk in humans and animals.

The health effects information available for each contaminant varies widely. A vast amount of health-effects-related information is available on some of the contaminants, such as PCBs and formaldehyde. However, very little or no information is available on others, such as a-pinene and octene. Although for some contaminants the information provided in this report may be limited, it reflects what is available at this time.

Contaminants discussed are those that:

- have been measured in the indoor air of a public building or;
- have been measured (significant concentrations) in test situations simulating indoor air quality (as presented in the referenced literature); and
- have significant hazard rating.

This report reflects information currently available on the health effects associated with each of the selected contaminants. This information was obtained by conducting a comprehensive literature search on each of the selected contaminants. In addition, three active, professionally maintained and peer-reviewed on-line chemical databases were used to locate the latest health effects information on each contaminant. The on-line databases used were the U.S. Environmental Protection Agency's Integrated Risk Information System (IRIS), the National Library of Medicine's Hazardous Substance Data Bank (HSDB), and the National Institute for Occupational Safety and Health's Registry of Toxic Effects of Chemicals (RTECS).

It is recognized that the chemicals addressed in this report likely represent only a small number of the host of potential hazardous contaminants that may be found inside public buildings.

Exhibit C-1
List of Candidate Energy Conservation Measures
Commercial Conservation Program

LIGHTING SYSTEMS

- Remove lamps and fixtures; disconnect ballasts and leave in place
- Install efficient fixtures, including heat recovery fixtures, T8, and parabolic reflectors (remove old fixtures)
- Install efficient ballasts, including electromagnetic ballasts, and high-frequency electronic ballasts
- Install efficient lamps - replace incandescent or low-efficiency mercury vapor lamps with high-pressure sodium, low-pressure sodium, metal halide, T8, or fluorescent or low-watt fluorescent lamps
- Install energy-efficient exterior lighting
- Use only necessary illumination levels through microprocessor control
- Use natural light and daylighting, including perimeter dimming systems
- Install automatic dimming control systems
- Install photocells or timeclocks to control exterior lighting
- Install switching for selective control illumination
- Install occupancy sensors
- Install corridor light timers
- Install self-powered exit lights
- Install low-voltage (tungsten) lighting

POWER SYSTEMS

- Disconnect lightly loaded transformers, leave in place
- Replace transformers (economic replacement criteria)
- Convert primary distribution system to higher voltages
- Replace (resize) oversized motors
- Use high-efficiency motors and transformers (replacement)
- Use variable speed motors and drives for pumps
- Use variable speed motors and drives for fans
- Install solid-state motor drives on elevators
- Install demand-type elevator controls
- Install energy management system (EMS)

BUILDING ENVELOPE[a]

- Install wall insulation
- Install roof insulation
- Install ceiling insulation
- Install floor insulation
- Install foundation (crawl space) insulation

- ☐ Install slab perimeter insulation
- ☐ Reduce space load from outside air infiltration (caulk, weatherstrip)
- ☐ Install window and skylight insulation (curtains)
- ☐ Install storm windows
- ☐ Install sash-mounted storm windows
- ☐ Install low-E glass
- ☐ Install multiple-glazed windows
- ☐ Reduce solar heat gain with solar film, window tints, overhangs, awnings, louvers, or other screening/shading devices
- ☐ Install storm doors
- ☐ Install double-pane sliding doors
- ☐ Install screen doors
- ☐ Replace existing doors with insulated doors
- ☐ Enclose loading docks with shelters and seals
- ☐ Install vestibules to reduce infiltration/exfiltration
- ☐ Seal vertical shafts (elevators, stairwells) to reduce infiltration/exfiltration
- ☐ Install air curtains

a = Assume that new buildings would be designed to provide the prescribed ventilation rate.

HVAC SYSTEMS

Heating/Air Conditioning

- ☐ Install automatic condenser cleaning
- ☐ Increase evaporator and/or decrease condenser water temperatures and modify controls
- ☐ Replace air-cooled condenser with cooling tower
- ☐ Install spot cooling
- ☐ Install earth cooling tubes
- ☐ Install roof spray system
- ☐ Install high-efficiency air conditioning unit
- ☐ Install chiller economizer (water-side)
- ☐ Install economizer (air-side)
- ☐ Install air-side heat recovery system (ventilation air tempering), including packaged systems)
- ☐ Isolate off-line chillers and cooling towers
- ☐ Prevent simultaneous use of heating/cooling via automatic controls
- ☐ Reset hot deck temperature via automatic controls
- ☐ Reset cold deck temperature via automatic controls
- ☐ Zone optimize reheat systems
- ☐ Use duty cycling for fan control
- ☐ Install dead-band thermostats
- ☐ Install warm-up cycle controls/optimum start
- ☐ Install automatic night setback/set up
- ☐ Reduce pump energy by reducing resistance and flow rates

- ☐ Insulate ducts
- ☐ Insulate piping
- ☐ Replace forced air heating system with (spot) radiant heaters
- ☐ Replace resistance heating with heat pump
- ☐ Install air/ground/water source heat pumps
- ☐ Install pool heat recovery
- ☐ Install high-efficiency air handler
- ☐ Convert existing constant volume air distribution system to a variable air volume (VAV) system
- ☐ Install energy management system to control HVAC

Ventilation

- ☐ Install CO_2-controlled ventilation
- ☐ Install CO-controlled covered parking ventilation
- ☐ Automatically reduce ventilation during unoccupied periods
- ☐ Reduce minimum outside air
- ☐ Recirculate exhaust air using activated carbon filters
- ☐ Install vortex hoods for restaurants
- ☐ Use separate make-up air for exhaust hoods
- ☐ Employ evaporative cooling of outdoor air
- ☐ Employ desiccant dehumidification
- ☐ Reduce energy consumption for fans by reducing air flow rates and resistance to air flow
- ☐ Install high-efficiency fans with larger ductwork
- ☐ Install dual speed fans
- ☐ Install attic ventilation
- ☐ Install low leakage dampers
- ☐ Install an air destratification system (ceiling fans)
- ☐ Install outside air reset controls
- ☐ Automatically reduce or minimize outside air intake by control modifications

Refrigeration

- ☐ Reset chilled water temperature
- ☐ Chiller optimization
- ☐ Optimize defrosting control through new controls
- ☐ Optimize capacity control via new controls
- ☐ Increase condensing unit efficiency
- ☐ Optimize cooling tower control (i.e., coolant/air flow modulation) via new controls
- ☐ Install variable-speed chiller motor
- ☐ Install high-efficiency chiller
- ☐ Install timeclocks on circulating pumps
- ☐ Install efficient compressors
- ☐ Reduce heat gains to refrigerated space

- ☐ Install efficiency-of-use improvements (strip curtains, etc.)
- ☐ Employ heat recovery from exhaust air
- ☐ Install thermal storage (ice, chilled water, hot water)
- ☐ Install variable-speed drive (VSD) on pumps
- ☐ Install floating condenser head pressure control

DOMESTIC HOT WATER SYSTEMS

- ☐ Insulate hot water storage tank with wraps, bottom boards, convection loops
- ☐ Insulate hot water piping
- ☐ Install flow restrictors to limit water use
- ☐ Install chemical dishwashing system
- ☐ Use heat recovery systems, including packaged systems, to heat water
- ☐ Replace central system with local, tankless, point-of-use heating units to eliminate storage and/or separate summer dehumidification
- ☐ Use a heat pump water heater system
- ☐ Install a timer on electric systems
- ☐ Turn off domestic hot water pumps during off hours
- ☐ Install a timeclock to turn off water heater during unoccupied periods
- ☐ Install circulating pump control
- ☐ Use solar water heating systems

Exhibit C-2
List of Candidate Energy Conservation Measures
Residential Conservation Program

- ☐ Solar Access
- ☐ New SGC (beyond current MCS) Appliances
- ☐ Water Heating
- ☐ Lighting
- ☐ Manufactured Housing
- ☐ Existing Mobile Homes
- ☐ Ventilation Systems
- ☐ Refrigerators (incentive for early retirement)
- ☐ Low-Flow Showers
- ☐ Front-loading Clothes Washers ("horizontal access" uses less water)
- ☐ Dishwashers
- ☐ Microwave Clothes Dryers
- ☐ Wood Fueled Heating
- ☐ Pellet Fueled Heating
- ☐ Back-up Heat Sources (Dual Fuel Heating Systems)
- ☐ Load Control Devices
- ☐ Remote Control Appliance and Heat Switches ("smart house")
- ☐ Thermal Storage Device
- ☐ Heat Recovery Systems (heat exhaust, hot water)
- ☐ Integrated Hot Water/Heat Systems
- ☐ Down-sizing Heat Systems
- ☐ Passive Solar
- ☐ Photovoltaics
- ☐ Battery Storage

Exhibit C-3
List of Candidate Energy Conservation Measures
Industrial Conservation Program

CONTROLS

- Adjustable Speed Drives
- Arc Furnace Controls
- Energy Management Systems
- Power Factor Controllers
- Computer Controlled Machining
- Robotics

MOTORS, PUMPS, AND CONVEYORS

- High-Efficiency Conveyors
- Pumps
- Pneumatic Conveyors

PROCESS HEATING AND DRYING TECHNOLOGIES

- Convection
- Induction Heating
- Radiant Technologies
- Infrared (IR) Radiation
- Microwave Radiation
- Radio Frequency (RF) Radiation
- Ultraviolet (UV) Radiation

DEHUMIDIFIERS

- Desiccant Dehumidification
- Heat Pump Dehumidification

REFRIGERATION TECHNOLOGIES

- Cooling Towers and Chillers
- Thermal Storage
- Refrigeration Upgrades

HEAT RECOVERY TECHNOLOGIES

- Heat Recovery
- Heat Pumps
- Pinch Technology

Exhibit C-3, continued
List of Candidate Energy Conservation Measures
Industrial Conservation Program

FABRICATION AND FINISHING TECHNOLOGIES

- Electrochemical Machining
- Induction Heating (Hardening, Welding)
- Lasers (Cutting, Hardening, Welding)
- Waterjet Cutting

SEPARATION AND CONCENTRATION TECHNOLOGIES

- Electrolytic Separation
- Freeze Concentration
- Membranes

ENERGY SYSTEMS

- Insulation
- Compressed Air Systems
- Lighting Upgrades
- Renewables
- Wastewater

Table C-1
SIC Codes and Descriptions

Major SIC Group Number	Industry Type
10	Metal mining
20	Food and Kindred products
24	Lumber and wood products, except furniture
26	Paper and allied products
28	Chemical and allied products
29	Petroleum refining and related industries
32	Stone, clay, glass, and concrete products
33	Primary metal industries
34	Fabricated metal products, except machinery and transportation equipment
36	Electronic and other electrical equipment and components, except computer equipment
37	Transportation equipment
38	Measuring, analyzing, and controlling instruments, photographic, medical and optical goods, watches and clocks

Source: Office of Management and Budget, (1987). Standard Industrial Classification Manual. National Technical Information Service, Order No. PB 87-100012, Springfield, Virginia.

Table C-2
The 100 Largest Industrial Electricity Users
Served by Public Utilities
by 2-Digit SIC Code

Number	SIC 2-Digit	Use - aMw	Number	SIC 2-Digit	Use - aMw
1	26	225.0	51	26	4.8
2	26	88.0	52	24	4.6
3	26	76.0	53	36	3.9
4	26	74.0	54	20	3.7
5	26	71.0	55	32	3.6
6	28	62.0	56	24	3.5
7	26	60.0	57	24	3.5
8	26	58.0	58	24	3.5
9	26	49.8	59	29	3.4
10	37	49.7	60	24	2.9
11	28	38.0	61	20	3.4
12	32	35.0	62	24	2.5
13	26	32.0	63	24	2.5
14	24	32.0	64	24	2.1
15	28	30.0	65	24	2.0
16	26	30.0	66	24	2.0
17	26	30.0	67	20	1.5
18	33	30.0	68	24	1.7
19	37	29.5	69	24	1.5
20	26	28.0	70	24	2.0
21	10	25.0	71	24	1.7
22	10	23.0	72	24	2.0
23	33	20.4	73	24	1.7
24	26	20.0	74	38	1.7
25	33	20.0	75	24	0.7
26	29	16.8	76	24	0.9
27	26	16.0	77	24	1.1
28	28	14.0	78	24	0.9
29	33	13.7	79	24	0.5
30	26	13.0	80	24	0.5
31	26	13.0	81	24	1.0
32	24	11.7	82	24	0.7
33	33	9.5	83	24	0.5
34	29	9.5	84	24	1.4
35	28	9.0	85	24	1.0
36	26	8.0	86	24	1.0
37	32	7.5	87	24	1.0
38	10	7.0	88	20	1.4
39	10	7.0	89	24	1.2
40	20	7.0	90	24	1.3
41	26	7.0	91	24	1.4
42	28	7.0	92	24	1.1

Table C-2, continued
The 100 Largest Industrial Electricity Users
Served by Public Utilities
by 2-Digit SIC Code

Number	SIC 2-Digit	Use - aMw	Number	SIC 2-Digit	Use - aMw
43	34	6.6	93	24	1.4
44	24	6.0	94	20	0.7
45	24	6.0	95	20	0.7
46	24	5.8	96	20	0.7
47	20	5.3	97	24	0.5
48	20	5.0	98	24	1.3
49	20	4.8	99	24	0.5
50	20	4.8	100	24	1.1
			101	24	0.9

Source: Bonneville Power Administration, Distribution of Large Industrial Plant Loads, 1989.

APPENDIX D

APPENDIX D

SECTION 1: **Modeling Programs Used in Analyzing the Alternatives**
Integrated System for Analysis of Acquisitions (ISAAC)
System Analysis Model (SAM)

SECTION 2: **Development of Resource Stacks**

SECTION 3: **Generating Resource Supply and Cost**

SECTION 4: **Conservation Resource Supply and Costs**

SECTION 5: **Fuel Switching Supply and Costs**

SECTION 6: **Short-Term Imports Contracts, Supply and Cost**

SECTION 7: **Environmental Cost Estimates/Economic Analysis**

SECTION 1

Integrated System for Analysis of Acquisitions (ISAAC)

Relative Strengths of Model

ISAAC's strength lies in its relatively detailed simulation of acquisition planning over a wide range of uncertainty. In each game, ISAAC options and acquires generating and conservation resources to meet a planning forecast and then dispatches the power system to meet "actual" load growth. Simulating this difference between the planning forecast and "actual" load growth over a large number of games covering a wide range of load growth, water conditions, and other uncertainties allows ISAAC to account for the value of many different resource characteristics. Such resource characteristics include option and construction lead times, unit size, and dispatchability. In addition, ISAAC measures the costs of being "wrong": the costs of overbuilding when loads are lower than expected or underbuilding when loads are greater than expected.

ISAAC is a relatively large model requiring a large amount of data input. Once set up, however, ISAAC runs relatively quickly compared to models such as SAM or PMDAM. ISAAC is well-suited for doing studies where large numbers of runs are required, such as in comparing numerous resource acquisition strategies and in doing extensive sensitivity analysis.

Relative Weaknesses of Model

To reduce run-time and complexity, ISAAC sacrifices detail on the operation of the power system compared to models such as SAM. ISAAC uses a more simplified hydro system representation, cruder thermal plant dispatch, and simpler simulation of the southwest market and intertie policies. ISAAC also uses a seasonal rather than a monthly dispatch as SAM does. ISAAC is therefore less well suited for analyzing detailed issues involving the operation of the power system or involving marketing.

Another weakness of ISAAC is that it looks only at energy needs. ISAAC completely ignores capacity values and needs in scheduling resource acquisitions. ISAAC is also not an optimizer: it simply schedules resource acquisitions to meet energy deficits and does not consider the value resources may have in marketing, etc.

Lastly, ISAAC does not do detailed end-use modeling as do models such as CPAM. ISAAC schedules conservation programs and ramps them up and down as needed, but does not address end-use behavior such as fuel switching, take-back effects, etc. ISAAC also does not have the ability to arrange new power sales contracts between parties, as PMDAM does.

Typical Model Usage

ISAAC is typically used for analyzing conservation and generating resource acquisition strategies for the Resource Program as well as for evaluating specific projects and policies such as WNP-1 and WNP-3, and the value of maintaining DSI loads. ISAAC is also used for forecasting resource acquisitions for use in the development of marginal costs.

Relationship to Other Models

SAM (see page D-6) and HYDRO6 contribute input to ISAAC. SAM provides Southwest market information and HYDRO6 provides hydro system data. Output from ISAAC can feed SAM by providing a schedule of resource acquisitions to meet load growth.

Modeling Environmental Costs

The ISAAC postprocessor is similar to a counter. It first totals the operation of each resource in each year in each game and multiplies that total by the environmental cost specific to that resource. This yields an annual environmental cost by resource for each game. The annual costs are then escalated by the forecast rate of annual population growth, approximately 1 percent. This serves as a reasonable proxy for the real increase in environmental damage expected to occur over time. Costs for all resources are summed and discounted in the usual way to produce a present value of environmental costs for each game. Finally, the environmental costs for all games are averaged to produce an expected present value of environmental costs for each strategy.

What Is and Is Not Included

BPA's estimates of environmental externality costs focus on the operations phase of power production. The effects on human health risks, visibility, crops and forests, and materials caused by exposure to nitrous oxides, sulfur oxides, and particulates are monetized and included in BPA's estimates. The perceived risks from certain technologies and pollutants are quantified and reflected in BPA's cost estimates. BPA also includes an estimate of the effects on land and water caused by power production.

Environmental effects caused by the up-stream phase of the fuel cycle (e.g., mining, drilling, and transportation), the down-stream phase of the fuel cycle (e.g., waste transport, storage, and disposal), and the transmission of electric power are not included in BPA's environmental externality estimates. BPA's estimates do not address the economic effects of damage to cultural, spiritual, or historical sites.

BPA's environmental externality estimates are for generic resource types and are not plant- or site-specific.

ISAAC Modeling

As previously noted, the ISAAC model was used to determine resource additions to the existing regional system and the economic effects of those additions. The following describes the assumptions that underlie the ISAAC analysis.

Data

Loads in ISAAC were based on BPA's 1989 high load forecast. The existing resources and load forecast in ISAAC were calibrated to the 1989 Pacific Northwest Loads and Resources Study (1989 White Book) high forecast. That is, under the high forecast, the existing system data in ISAAC was adjusted to match that in the 1989 White Book until the load/resource balance in ISAAC approximated the 1989 White Book's load/resource balance.

The resource supply estimates used in the RPEIS are taken from the Draft 1990 Conservation Resources Supply Document and the Draft 1990 Generation Resources Supply Document. Several changes to the generating resource supply assumptions were made and are listed in Section 3. Estimated resource supplies and costs are summarized in Table D-1. Under the high conservation subalternative, supply estimates for five conservation resources were increased to reflect increased supply estimates from the Northwest Conservation Act Coalition (NCAC). This is discussed in detail below. The development of the fuel switching supply estimates are not included in the supply document, but are discussed below.

The environmental costs used in the development of the Base Case resource stack and in the economic analysis of the alternatives are given in Table D-2 and documented in Section 7.

Study Assumptions

As previously discussed, ISAAC is designed to account for uncertainty in planning. However, several of these features were not used in the RPEIS analysis. All alternatives were run against deterministic high loads from BPA's 1989 load forecast. That is, loads did not vary by game but were set at the level of the high forecast. Water conditions, however, were random in the RPEIS analysis.

The study period for all alternatives was September 1990 through August 2050. It was necessary to conduct the study through 2050 in order to incorporate end effects of resource acquisitions.

For planning purposes, it was assumed that BPA and the Investor-Owned Utilities (IOUs) plan separately and that none of the IOU load growth would be placed on BPA. However, in the analysis, all load growth of the Generating Publics (GPUBs) is placed upon BPA.

Another significant assumption concerns treatment of BPA's obligations beyond 2001. The year 2001 is important because all of BPA's current requirements contracts with utilities and DSIs expire in that year. For purposes of the analysis, it is assumed that these existing contracts are renewed in kind in 2001.

System Analysis Model (SAM)

Description

The System Analysis Model (SAM) was used to generate data for the Resource Programs EIS. SAM simulates the Pacific Northwest's power system. It models the operation of existing and planned resources to meet load, season-by-season and month-by-month over a planning period of up to 20 years. The model simulates both planning policies and operational policies on a monthly basis. It provides information regarding the reliability of the system, the expected operation of individual thermal resources, and the expected operation of the hydro system, including reservoir elevations, flows, and spill.

The following major components of the region's power system are accounted for in SAM:

- policies of regional planning and operation;
- uncertainties of loads and resources;
- physics of hydro and thermal resources;
- nonpower constraints on the hydro system;
- transactions outside the region;
- net regional revenue requirements.

The model makes assumptions about the region and the load to be served, such that the region defined for this model conforms to that mandated in the Pacific Northwest Power Act. The defined region, however, is assumed to be a single-owner system.

SAM models the region's energy resources: hydro, thermal (including nuclear plants, combustion turbines, and coal projects), and miscellaneous (such as renewables, cogeneration units, existing steam plants, and small diesel generators). Conservation is also considered a resource.

SAM accounts for uncertainty in the hydro system. Conditions are selected from a detailed 50-year historical record of individual project inflows. This uncertainty is consistent across all scenarios analyzed using the SAM model. That is, each scenario used the same selection of water conditions.

Given the loads, resources, and the established policies for the region, SAM operates the hydro system in conjunction with the non-hydro resources to meet loads in the most economic manner possible. Included in these policies are the following economic considerations.

- All available regional resources are used to meet firm regional load.

- A portion of the direct service industrial customer load is not firm and can be restricted and interrupted, but is met, provided that reasonable priced resources are available.

- If the power outlook and streamflow forecast permit, the region sells energy to California.

SAM models three major decision points in operating a hydro system:

- the annual planning process, which determines how to shift and shape water over a 2-year planning process;

- the period planning process, which looks at such items as firm surplus, runoff forecasts, and refill, to determine the use of hydro over the following 4 months; and

- the period operating process, which dispatches Pacific Northwest resources to meet loads in the most economic manner possible. If there is sufficient energy, economy energy sales are made to California, taking into account the Intertie Access Policy, available secondary energy from Canada, and the California market.

Included in SAM is a model of BC Hydro's resources and loads. BC Hydro's resources are run to meet its own loads; any additional energy is available for sale to the U.S. BC Hydro may use this energy to directly serve any unserved PNW load (firm or nonfirm), to displace higher-cost PNW resources, or to sell to California markets.

Scenario Assumptions

SAM was used to analyze a variety of scenarios designed to examine changes in hydro system operations. The major assumptions used in these scenarios are as follows:

Existing System:

All scenarios were analyzed by comparing the resulting operation to an "existing system" operation.

Data for the existing system loads and resources were based on BPA's 1989 Pacific Northwest Loads and Resources Study. The PNW region was in load/resource balance in the existing system scenario.

Non-Treaty storage was assumed to be available to the PNW and BC Hydro.

Fisheries constraints were based on those that were in effect at the time studies were undertaken. As a result, recent developments due to ESA and Salmon Summit proceedings were not modeled.

Additions of Loads and Resources:

Studies assumed 1,000 MW or 5,000 MW of load and resource additions.

Load additions were shaped according to the shape of the existing load, i.e., more load was placed in the winter, less load was placed in the summer.

All resources were shaped as specified in each scenario: flat; with a maintenance outage; or shaped into the September through April period.

Displaceability/Operating Cost:

Non-displaceable resources were modeled as must-run; variable cost was not an issue.

Medium-cost displaceable resources were priced based on the variable cost (fuel and O&M) of a generic coal plant, i.e., higher cost than nuclear, but lower cost than most existing regional coal plants. These resources could then be displaced by any dispatchable resource with a lower variable operating cost.

High-cost displaceable resources were priced based on the variable cost (fuel and O&M) of a generic combustion turbine, i.e., higher cost than existing coal plants, but lower cost than existing combustion turbines.

Resource Shape:

Flat resource additions were assumed to be available in uniform amounts in all months of the year.

Resource additions with a maintenance outage were assumed to be unavailable from April 1 through May 31 of each year. This period is similar to the maintenance schedule for many existing resources. Availability in other months was assumed to be uniform.

Shaped additions assumed an availability of September 1 through April 30, in uniform monthly amounts. these additions were not available May through August. This shape was based on the shape of potential imports from California.

Surplus:

All scenarios with a regional surplus assumed a constant resource addition, but a lower than expected load requirement. That is, loads increased by 500 MW or 4,500 MW while resource additions were 1,000 MW or 5,000 MW, respectively.

SECTION 2

Development of Resource Stacks

The conservation and generating resources (and in one alternative, fuel switching) available to the region for meeting load growth make up the resource "stack." The stack is an ordering of resources based on cost-effectiveness. The most cost-effective resources are at the top of the stack and are acquired first by ISAAC. ISAAC is not an optimizer. That is, it will not determine the optimal ordering of resources to acquire. The resource stack is an input to the model. Therefore, developing a resource stack is a necessary precursor to analysis with ISAAC.

The resource stack for the Status Quo Alternative was the first to be developed. The resources to be included in the resource stack were first ordered by levelized cost. Levelized cost represents the cost of a resource operating on a stand-alone basis, i.e., without considering how the resource might operate in the context of the larger power system. However, many resources have system cost advantages that are not captured by the calculation of stand-alone levelized cost. These system advantages are important and must be taken into account in ordering the resource stack. This was done by starting with a resource stack ordered by levelized cost and changing the resource order until system costs were minimized.

The Status Quo resource stack was developed based upon system costs in ISAAC, i.e., direct costs incurred by BPA and other parties. Environmental externalities, or environmental costs, were not considered in the ordering of the resources. The Status Quo resource stack is given in Table D-3.

BPA's Base Case stack was developed by taking the Status Quo stack and reordering the resources based upon the environmental costs associated with each resource. The main results of inclusion of environmental costs in the ordering of resources were that WNP-1 and WNP-3 moved above combustion turbines, and coal plants dropped significantly in terms of cost-effectiveness. At the time the Base Case stack was determined, BPA's estimates of environmental costs were preliminary. Updated costs were used for the analysis of economic impacts of the alternatives. Again, these environmental costs are listed in Table D-2. The Base Case resource stack is given in Table D-3.

BPA's resource stacks for the remaining alternatives are variations of the Base Case stack. For instance, in the Emphasize Coal Alternative, the coal resources are taken out of their place in the Base Case stack and moved to the top of the stack (after nondiscretionary conservation resources). The Base Case stack does not include clean coal, imports and fuel switching resources. Therefore, for the Emphasize Clean Coal Alternative, the conventional coal resources are removed from BPA's resource stack and the clean coal resources are placed at the top of the stack. For the Emphasize Imports and Emphasize Fuel Switching Alternatives, imports and fuel switching resources, respectively, are added to the top of the Base Case stack.

It is important to note that this procedure applies to BPA's resource stack only. The resource stack for the IOUs is based upon direct costs only (no environmental costs are considered) and is held constant throughout the alternatives. The IOU resource stack is given in Table D-4.

Several alternatives required additional data or analysis, which is described below.

Emphasize High Conservation Sub-alternative

The conservation supply curves for five conservation resources (refrigerators, freezers, other appliances, new commercial and industrial) in the High Conservation Sub-alternative are based upon supply estimates from NCAC. Documentation of the development of the High Conservation Sub-alternative supply curves is in Section 4.

Emphasize High Tech Coal Sub-alternative

Clean coal technologies (fluidized bed and gasified coal resources) are not included in the Base Case resource stack for BPA or in the IOU resource stack. Under the High Tech Coal Sub-alternative, conventional coal resources are removed from BPA's Base Case stack and clean coal resources are added after nondiscretionary conservation. Conventional coal resources remain in the IOU resource stack. Documentation of the development of the Clean Coal Sub-alternative supply curves is in Section 3.

Emphasize Energy Imports Alternative

Two long-term, 20-year energy import resources are available to BPA in the Emphasize Imports Alternative: Pacific Southwest imports, and Canadian imports. Pacific Southwest imports total 1,500 aMW and are available from September through April at a cost of 30 mills per kWh (1988$) escalating at 2.3 percent per year. The Canadian imports also total 1,500 aMW but are available year-round at 34 mills per kWh (1988$) escalating at 2.3 percent per year. Both import resources are modeled as displaceable resources, i.e., BPA takes the energy only if needed. As with high tech coal, these imports are available to BPA only and are not included in the IOU resource stack. In addition to these long-term resources, an additional 500 aMW of spot market power is available to all regional parties at 25 mills per kWh in this alternative.

Emphasize Fuel Switching Alternative

In the Emphasize Fuel Switching Alternative, 560 aMW of fuel switching from electric to natural gas space and water heating is available to BPA. Section 5 documents fuel switching supply and costs.

Natural Gas Sensitivity

A sensitivity study of the Emphasize Combustion Turbines Alternative was conducted using low gas prices from the Northwest Power Planning Council's Draft 1991 Northwest Conservation and Electric Power Plan (Draft Plan). Gas prices in this sensitivity are 24.1 mills per kWh and escalate at 1.6 percent in 1988, -10.9 percent in 1989, -11.3 percent in 1990, and 0 percent from 1991 through the end of the study period. This price applies to new and existing gas resources in the Pacific Northwest. Gas prices to the Pacific Southwest were also changed to those in the Draft Plan low gas price scenario. Results of this sensitivity are discussed in the Economic Impacts section.

Modeling of the Alternatives

Once these assumptions and data were in place, ISAAC was used to analyze the alternatives. ISAAC simulates the effects of the different alternatives by acquiring resources in the order specified and operating the resulting power system. ISAAC then calculates costs, ensuing rates, and BPA's revenue requirements and net cash-flows resulting from these acquisition decisions.

All alternatives were modeled against high loads with water uncertainty. In the early years of the study for all alternatives, large resource deficits occur due to high loads and long lead times for most resources. ISAAC does not have the capability to model the development of new energy or exchange contracts with Canada or the Pacific Southwest. Thus, instead of purchasing firm power from these entities, ISAAC must curtail regional load. BPA believes that curtailment is unlikely to occur under these circumstances. Therefore, import contracts were created to bring early-year resource deficits to a more reasonable level. Section 6 details these contracts.

ISAAC Resource Acquisitions

BPA resource acquisitions in ISAAC under the various alternatives differ greatly from year to year. However, by 2010, acquisitions are similar for some resources. Under all the alternatives except Fuel Switching, High Conservation, and Imports, approximately 1,000 aMW of conservation is acquired by BPA by 2010. The Fuel Switching and High Conservation Alternatives acquire more conservation, 1,600 and 1,900 aMW, respectively (fuel switching is modeled as a conservation resource). Conservation acquisitions under the Imports Alternative are only 800 aMW, due to the large quantity of import resources at the top of the resource stack.

Generating resource acquisitions are also similar for some resources. All 134 aMW of transmission and distribution efficiency improvements are acquired by 2010 under all alternatives. All hydro resources (97 aMW) are on-line by 2010 for all alternatives except Coal, High Tech Coal, and Imports (because the supplies of these resources are so large). Similarly, BPA builds three combustion turbines (1,046 aMW) under all alternatives with the exception of Clean Coal, Cogeneration, and Imports. WNP-1 and WNP-3 are completed under all alternatives except the Imports Alternative, where only WNP-1 is brought on-line. For the remaining generating resources, BPA acquisitions greatly differ among alternatives. Appendix B contains yearly resource acquisitions for BPA, the IOUs, and the GPUBs for all alternatives.

Table D-1
Resource Supply and Costs

RESOURCE	SUPPLY (aMW)	DIRECT (INTERNAL) COSTS (ML/kWh)	ENVMTL. (EXTERNAL) COSTS* (ML/kWh)	TOTAL COSTS (ML/kWh)
Base Case Resources:				
SF MCS	215	23	0	23
MF MCS	37	28	0	28
New Manuf. Housing	83	23	0	23
Water Heat	362	19	0	19
Refrigerators	110	13	0	13
Freezers	30	16	0	16
Hydro Eff.	100	3	0	3
Trans. Eff.	34	12	0	12
Irrigation	36	14	0	14
Industrial	400	16	0	16
New Commercial	579	19	0	19
Com LO Exist.	139	28	0	28
MF Res Wes	36	29	0	29
SF Res Wes	102	30	0	30
Com Dis Exist	162	30	0	30
Hydro 1W	36	20	1	21
Hydro 1E	55	21	1	22
Hydro 2W	41	25	1	26
Hydro 2E	62	27	1	28
Cogen 1W	40	30	2	32
Cogen 1E	40	32	2	34
Cogen 2W	240	35	2	37
Hydro 3W	50	35	2	37
WNP1	813	35	2	37
WNP3	806	35	2	37
CTs	1394	26-34	4	30-38
Hydro 3E	76	36	2	38
Cogen 2E	240	37	2	39
Cogen 3W	480	40	2	42
Hydro 4W	36	42	2	44
Hydro 4E	43	42	2	44
Geothermal 2	390	42	0	42
Cogen 3E	480	42	2	44
Cogen 4W	2,000	45	2	47
Cogen 4E	2,000	47	2	49
Wind 1	261	53	0	53
Coal 1 (E. Mont)	1,800	37	10	47
Wind 2	1,241	53	0	53

Table D-1 (continued)
Resource Supply and Costs

RESOURCE	SUPPLY (aMW)	DIRECT (INTERNAL) COSTS (ML/kWh)	ENVMTL. (EXTERNAL) COSTS* (ML/kWh)	TOTAL COSTS (ML/kWh)
Coal 2 (E. Wash)	750	44	10	54
Coal 3 (E. Ore)	750	46	10	56
Coal 4 (Nev)	750	48	10	58
Coal 5 (W. Wash/Or)	750	49	10	59
Geothermal 1	27	74	0	74
Solar 3	42	78	0	78
Solar 1	22	109	0	109
Solar 2	22	111	0	111
Additional resources not in the Base Case:				
Fluidized Bed Coal	810	43-51	9	52-60
Gasified Coal	1,120	41-51	7	48-58
PSW Imports	1,500	30	4.4	34.4
Canadian Imports	1,500	34	3.8	37.8
Fuel Switching 1	127	15	2.1	17.1
Fuel Switching 2	176	16	2.8	18.8
Fuel Switching 3	124	19	2.1	21.1
Fuel Switching 4	141	9	2.1	11.1

* The environmental costs listed in this table were those used to develop BPA's Base Case resource stack. They have since been revised. Updated environmental costs were used in the analysis of economic impacts. Table D-2 contains the revised estimates.

Table D-2
Environmental Costs*

The following estimates were used in the RPEIS modeling analysis:

RESOURCE	ESTIMATE*
Conservation	0
Hydro 1 and 2	1.0
Hydro 3 and 4	2.0
Cogeneration	1.2
Conventional Coal	5.1
Fluidized Bed Coal	3.0
Gasified Coal	2.5
Nuclear	2.0
Combustion Turbines	1.3
Geothermal	1.0
Solar	1.0
Wind	1.0
Fuel Switching 1	0.5
Fuel Switching 2	2.1
Fuel Switching 3	2.1
Fuel Switching 4	2.1
Pacific Southwest Imports	1.7
Canadian Imports	1.6
Southwest Sales	(1.6)
Replacement Resource	1.6

*See Section 7 for details on how these estimates were computed.

Table D-3
Base Case and Status Quo Resource Stacks

STATUS QUO RESOURCE STACK	BASE CASE RESOURCE STACK
Resources with priority 0 (must acquire regardless of cost):	
SF MCS	SF MCS
MF MCS	MF MCS
New Manuf. Housing	New Manuf. Housing
Water Heat	Water Heat
Refrigerators	Refrigerators
Freezers	Freezers
Remaining Discretionary Resources:	
Hydro Eff. Improvements	Hydro Eff. Improvements
Trans. Eff. Improvements	Trans. Eff. Improvements
Irrigation	Irrigation
Industrial	Industrial
New Commercial	New Commercial
Hydro 1W	Comm. Lost Ops Existing
Hydro 1E	MF Res Weatherization
Hydro 2W	SF Res Weatherization
Hydro 2E	Comm. Discrete. Existing
Comm. Lost Ops Existing	Hydro 1W
MF Res Weatherization	Hydro 1E
SF Res Weatherization	Hydro 2W
Comm. Discrete. Existing	Hydro 2E
Cogen 1W	Cogen 1W
CTs	Cogen 1E
Cogen 1E	Cogen 2W
Cogen 2W	Hydro 3W
Hydro 3W	WNP1
WNP1	WNP3
WNP3	CTs
Hydro 3E	Hydro 3E
Cogen 2E	Cogen 2E
Coal 1 (E. Mont)	Cogen 3W
Cogen 3W	Hydro 4W
Hydro 4W	Hydro 4E
Hydro 4E	Geothermal 2
Cogen 3E	Cogen 3E
Geothermal 2	Cogen 4W
Coal 2 (E. Wash)	Cogen 4E
Cogen 4W	Wind 1
Coal 3 (E. Ore)	Coal 1 (E. Mont)
Cogen 4E	Wind 2
Coal 4 (Nev)	Coal 2 (E. Wash)
Coal 5 (W. Wash/Ore)	Coal 3 (E. Ore)
Wind 1	Coal 4 (Nev)
Wind 2	Coal 5 (W. Wash/Or)
Geothermal 1	Geothermal 1
Solar 3 (Trough-CT)	Solar 3 (Trough-CT)
Solar 1 (Trough)	Solar 1 (Trough)
Solar 2 (Trough w/HTR)	Solar 2 (Trough w/HTR)

Table D-4
IOU Resource Stack

RESOURCE
Single Family MCS
Multi-Family MCS
New Manufactured Housing
Water Heat
Refrigerators
Freezers
Irrigation
Industrial Conservation
New Commercial Conservation
Hydro 1W
Hydro 1E
Hydro 2W
Hydro 2E
Commercial Lost Ops - Existing
Multi-Family Residential Weatherization
Single-Family Residential Weatherization
Existing Commercial Discretionary Conservation
Cogeneration 1W
Combined-Cycle CTs
Cogeneration 1E
Cogeneration 2W
Hydro 3W
Hydro 3E
Cogeneration 2E
Coal 1 (Eastern Montana)
Cogeneration 3W
Hydro 4E
Cogeneration 3E
Coal 2 (Eastern Washington)
Cogen 4W
Coal 3 (Eastern Oregon)
Cogen 4E
Coal 4 (Nevada)
Coal 5 (Western Washington/Oregon)
Wind 1
Wind 2

SECTION 3

Generating Resource Supply

Changes in Assumptions

The following changes have been made to generating resource data in the Draft 1990 Generation Supply Document:

1. If resource supply is split between BPA and the IOUs, ISAAC requires that the build rate per year be at least two. Therefore, for resources with build rate limits of one per year, this parameter has been changed to two per year for use in ISAAC.

2. Hydro and Transmission Efficiency Improvements: Seasonal distribution was flat and has been changed to:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
15.3	12.1	8.8	7.3	7.2	6.2	3.3	2.7	4.0	6.7	10.5	15.7

3. Geothermal 1: Unit size changed to 10 MW and supply increased to 30 MW to reflect BPA's geothermal pilot project.

4. Geothermal 1 and 2: Regional supply available to BPA changed to 100%.

5. Small Hydro: Maximum build rate per year increased to 10. Lead times for small hydro 1 and 2 have been changed to 1 year for siting and licensing and 2 years for construction.

6. Solar: Regional supply available to BPA changed to 100%. Also, units of supply listed in table assumed to be MW, not aMW.

7. WNP-1 and -3: Resources in ISAAC must have non-zero lead time. Therefore, siting and licensing lead times for WNP-1 and -3 have been changed to one year.

8. Combined-Cycle CTs: Two CCCT resources are used. One is 100% available to BPA and has a supply of 840 MW (to reflect BPA's Contingency Plan). The other has a 50% BPA/50% IOU availability and a supply of 840 MW.

9. Lead times for Cogen 1 and 2 have been changed to 1 year for siting and licensing and 1 year for construction.

10. Supply of the following resources has been changed to:

    a. Cogen1e and Cogen1w: from 63 aMW to 40 aMW
    b. Cogen2e and Cogen2w: from 250 aMW to 240 aMW
    c. Cogen3e and Cogen3w: from 500 aMW to 480 aMW
    d. Small Hydro4e: from 53 aMW to 43 aMW

Table D-5
High Tech Coal Supply to BPA

RESOURCE	SUPPLY (MW)*	ON-LINE DATE
Fluidized Bed 1	197	1998
Fluidized Bed 2	197	1998
Fluidized Bed 3	197	1999
Fluidized Bed 4	0	N/A
Fluidized Bed 5	0	N/A
Gasified Coal 1	200	1999
Gasified Coal 2	200	2000
Gasified Coal 3	200	2001
Gasified Coal 4	200	2002
Gasified Coal 5	200	2003

* Supplies of fluidized bed and gasified coal resources were adjusted from those in the Draft 1990 Generation Resources Supply Document to approximate the supply of conventional coal.

RESOURCE DATA SHEET

COAL-BASE

RESOURCE IDENTIFIER		COAL-1	COAL-2	COAL-3	COAL-4	COAL-5
PLANT CHARACTERISTICS						
Site		Colstrip	Creston	Boardman	Thous Spg	West WA/OR
Fuel Source		Colstrip E.	Kootenay E.	Kootenay	Uinta	E. Kootenay
Operating life (yrs)		40	40	40	40	40
Unit Size-Net (MW)		250	250	250	250	250
Equivalent Availability (%)		75%	75%	75%	75%	75%
Anticipated Capacity Factor (%)		75%	75%	75%	75%	75%
Heat Rate (Btu/kWh)		10856	10856	10856	10856	10856
Energy by Month (% of total)						
	Jan	8.3%	8.3%	8.3%	8.3%	8.3%
	Feb	8.3%	8.3%	8.3%	8.3%	8.3%
	Mar	8.3%	8.3%	8.3%	8.3%	8.3%
	Apr	8.3%	8.3%	8.3%	8.3%	8.3%
	May	8.3%	8.3%	8.3%	8.3%	8.3%
	Jun	8.3%	8.3%	8.3%	8.3%	8.3%
	Jul	8.3%	8.3%	8.3%	8.3%	8.3%
	Aug	8.3%	8.3%	8.3%	8.3%	8.3%
	Sep	8.3%	8.3%	8.3%	8.3%	8.3%
	Oct	8.3%	8.3%	8.3%	8.3%	8.3%
	Nov	8.3%	8.3%	8.3%	8.3%	8.3%
	Dec	8.3%	8.3%	8.3%	8.3%	8.3%
COSTS (1988 $)						
Financial Life (yrs)		30	30	30	30	30
Siting & Licensing ($/kW)		28	7	28	7	28
Construction ($/kW)		1561	1657	1658	1660	1663
Transmission Adjustment ($/kW)		406	112	103	375	67
Total Capital Cost ($/kW)		1995	1776	1789	2042	1758
Siting & Licensing Hold Cost ($/kW/yr)		0.85	0.85	0.85	0.85	0.85
Fixed O&M ($/kW/yr)		28.58	29.32	30.29	31.31	31.48
Variable O&M (mills/kWh)		3.5	3.8	3.8	3.8	3.8
Fixed Fuel ($/kW/yr)		0	0	0	0	0
Variable Fuel ($/million Btu)		0.48	1.24	1.39	1.29	1.61
Variable Fuel (mills per kWh)		5.2	13.5	15.1	14.0	17.5
CONSTRUCTION CASH FLOW (% of Capital)						
	1	3.9%	3.9%	3.9%	3.9%	3.9%
	2	11.1%	11.1%	11.1%	11.1%	11.1%
	3	16.6%	16.6%	16.6%	16.6%	16.6%
	4	26.7%	26.7%	26.7%	26.7%	26.7%
	5	28.2%	28.2%	28.2%	28.2%	28.2%
	6	12.1%	12.1%	12.1%	12.1%	12.1%
	7	1.4%	1.4%	1.4%	1.4%	1.4%

COAL-BASE

LEAD TIMES					
Siting & Licensing (yrs)	2	2	2	2	2
Probability of S&L Success (%)	70%	70%	70%	70%	70%
Probability of Hold Success (%)	75%	75%	75%	75%	75%
Construction Lead Time (yrs)	5	5	5	5	5
Total Lead Time (yrs)	7	7	7	7	7
Maximum Option Shelf Life (yrs)	10	10	10	10	10

% of Regional Supply Available to BPA: 25%

RESOURCE IDENTIFIER	COAL-1	COAL-2	COAL-3	COAL-4	COAL-5
REGIONAL SUPPLY (cumulative aMW by year)					
1990	0	0	0	0	0
1991	0	0	0	0	0
1992	0	0	0	0	0
1993	0	0	0	0	0
1994	0	0	0	0	0
1995	0	0	0	0	0
1996	0	0	0	0	0
1997	300	0	0	250	0
1998	600	0	0	500	0
1999	900	0	0	750	0
2000	1200	250	250	750	250
2001	1500	500	500	750	500
2002	1800	750	750	750	750
2003	1800	750	750	750	750
2004	1800	750	750	750	750
2005	1800	750	750	750	750
2006	1800	750	750	750	750
2007	1800	750	750	750	750
2008	1800	750	750	750	750
2009	1800	750	750	750	750
SUPPLY AVAILABLE TO BPA (cumulative aMW by year)					
1990	0	0	0	0	0
1991	0	0	0	0	0
1992	0	0	0	0	0
1993	0	0	0	0	0
1994	0	0	0	0	0
1995	0	0	0	0	0
1996	0	0	0	0	0
1997	75	0	0	63	0
1998	150	0	0	125	0
1999	225	0	0	188	0
2000	300	63	63	188	63
2001	375	125	125	188	125
2002	450	188	188	188	188
2003	450	188	188	188	188
2004	450	188	188	188	188

2005	450	188	188	188	188
2006	450	188	188	188	188
2007	450	188	188	188	188
2008	450	188	188	188	188
2009	450	188	188	188	188

NOTES:

(1) OTHER RELATED WORKSHEETS:
DTCLCS.WK1, Rev. None
DTCOALH.WK1, Rev. None
DTCOALL.WK1, Rev. None
DTFIN.WK1, Rev. None

(2) THE BASE CASE IS A COMPOSITE OF THE HIGH AND LOW COAL CASES. PLANT CHARACTERISTICS ARE BASED ON THE SMALL 250 MW SIZE PLANT (REF: DTCOALH.WK1). COSTS ARE THE AVERAGE OF THE LARGE (REF: DTCOALL.WK1) AND THE SMALL (REF: DTCOALH.WK1) PLANTS.

(3) COAL-1 (COLSTRIP) AND COAL-4 (THOUSAND SPRINGS) ARE ASSUMED TO INCUR AN ADDITIONAL 3.5% TRANSMISSION LOSS. WHEN CALCULATING LEVELIZED COST, THE ENERGY AVAILABLE IS REDUCED. FUEL COST AND O&M COST REMAIN THE SAME.

(4) REVISION "A" CORRECTS HEAT RATE TO 10,856 BTUs/kWh.

RESOURCE DATA SHEET

COAL-AFBC

RESOURCE IDENTIFIER		AFBC-1	AFBC-2	AFBC-3	AFBC-4	AFBC-5
PLANT CHARACTERISTICS						
Site		Colstrip	Creston	Boardman	Thous Spg	West WA/OR
Fuel Source		Colstrip	E. Kootenay	E. Kootenay	Uinta	E. Kootenay
Operating life (yrs)		30	30	30	30	30
Unit Size-Net (MW)		197	197	197	197	197
Equivalent Availability (%)		82%	82%	82%	82%	82%
Anticipated Capacity Factor (%)		82%	82%	82%	82%	82%
Heat Rate (Btu/kWh)		9885	9885	9885	9885	9885
Energy by Month (% of total)						
	Jan	8.3%	8.3%	8.3%	8.3%	8.3%
	Feb	8.3%	8.3%	8.3%	8.3%	8.3%
	Mar	8.3%	8.3%	8.3%	8.3%	8.3%
	Apr	8.3%	8.3%	8.3%	8.3%	8.3%
	May	8.3%	8.3%	8.3%	8.3%	8.3%
	Jun	8.3%	8.3%	8.3%	8.3%	8.3%
	Jul	8.3%	8.3%	8.3%	8.3%	8.3%
	Aug	8.3%	8.3%	8.3%	8.3%	8.3%
	Sep	8.3%	8.3%	8.3%	8.3%	8.3%
	Oct	8.3%	8.3%	8.3%	8.3%	8.3%
	Nov	8.3%	8.3%	8.3%	8.3%	8.3%
	Dec	8.3%	8.3%	8.3%	8.3%	8.3%
COSTS (1988 $)						
Financial Life (yrs)		30	30	30	30	30
Siting & Licensing ($/kW)		41	25	41	16	41
Construction ($/kW)		1755	1771	1755	1771	1755
Transmission Adjustment ($/kW)		406	112	103	375	67
Total Capital Cost ($/kW)		2202	1908	1899	2162	1863
Siting & Licensing Hold Cost ($/kW/yr)		1.40	1.40	1.40	1.40	1.40
Fixed O&M ($/kW/yr)		37.10	37.10	37.10	37.10	37.10
Variable O&M (mills/kWh)		4.8	4.8	4.8	4.8	4.8
Fixed Fuel ($/kW/yr)		0	0	0	0	0
Variable Fuel ($/million Btu)		0.48	1.24	1.39	1.29	1.61
Variable Fuel (mills per kWh)		4.7	12.3	13.7	12.8	15.9
CONSTRUCTION CASH FLOW (% of Capital)						
	1	4.0%	4.0%	4.0%	4.0%	4.0%
	2	11.0%	11.0%	11.0%	11.0%	11.0%
	3	17.0%	17.0%	17.0%	17.0%	17.0%
	4	27.0%	27.0%	27.0%	27.0%	27.0%
	5	28.0%	28.0%	28.0%	28.0%	28.0%
	6	12.0%	12.0%	12.0%	12.0%	12.0%
	7	1.0%	1.0%	1.0%	1.0%	1.0%

COAL-AFBC

LEAD TIMES					
Siting & Licensing (yrs)	2	2	2	2	2
Probability of S&L Success (%)	70%	70%	70%	70%	70%
Probability of Hold Success (%)	75%	75%	75%	75%	75%
Construction Lead Time (yrs)	5	5	5	5	5
Total Lead Time (yrs)	7	7	7	7	7
Maximum Option Shelf Life (yrs)	5	5	5	5	5

% of Regional Supply Available to BPA: 25%

RESOURCE IDENTIFIER		AFBC-1	AFBC-2	AFBC-3	AFBC-4	AFBC-5
REGIONAL SUPPLY (cumulative aMW by year)						
	1990	0	0	0	0	0
	1991	0	0	0	0	0
	1992	0	0	0	0	0
	1993	0	0	0	0	0
	1994	0	0	0	0	0
	1995	0	0	0	0	0
	1996	0	0	0	0	0
	1997	300	0	0	250	0
	1998	600	0	0	500	0
	1999	900	0	0	750	0
	2000	1200	250	250	750	250
	2001	1500	500	500	750	500
	2002	1800	750	750	750	750
	2003	1800	750	750	750	750
	2004	1800	750	750	750	750
	2005	1800	750	750	750	750
	2006	1800	750	750	750	750
	2007	1800	750	750	750	750
	2008	1800	750	750	750	750
	2009	1800	750	750	750	750
SUPPLY AVAILABLE TO BPA (cumulative aMW by year)						
	1990	0	0	0	0	0
	1991	0	0	0	0	0
	1992	0	0	0	0	0
	1993	0	0	0	0	0
	1994	0	0	0	0	0
	1995	0	0	0	0	0
	1996	0	0	0	0	0
	1997	75	0	0	63	0
	1998	150	0	0	125	0
	1999	225	0	0	188	0
	2000	300	63	63	188	63
	2001	375	125	125	188	125
	2002	450	188	188	188	188
	2003	450	188	188	188	188
	2004	450	188	188	188	188

2005	450	188	188	188	188
2006	450	188	188	188	188
2007	450	188	188	188	188
2008	450	188	188	188	188
2009	450	188	188	188	188

NOTES:

(1) OTHER RELATED WORKSHEETS:
DTCLCS.WK1, Rev. None FOR FUEL BREAKDOWN
DTCOALB.WK1, Rev. None
DTFIN.WK1, Rev. None

(2) COST DATA DERIVED FROM NOV 18, 1988 MEMO, HORNER TO BERGER, GENERATING RESOURCE INFORMATION.

(3) AFBC-1 (COLSTRIP) AND COAL-4 (THOUSAND SPRINGS) ARE ASSUMED TO INCUR AN ADDITIONAL 3.5% TRANSMISSION LOSS. WHEN CALCULATING LEVELIZED COST, THE ENERGY AVAILABLE IS REDUCED. FUEL COST AND O&M COST REMAIN THE SAME.

RESOURCE DATA SHEET

COAL-GCC

RESOURCE IDENTIFIER		CGCC-1	CGCC-2	CGCC-3	CGCC-4	CGCC-5
PLANT CHARACTERISTICS						
Site		Colstrip	Creston	Boardman	Thous Spg	West WA/OR
Fuel Source		Colstrip E.	Kootenay E.	Kootenay	Uinta E.	Kootenay
Operating life (yrs)		30	30	30	30	30
Unit Size-Net (MW)		420	420	420	420	420
Equivalent Availability (%)		80%	80%	80%	80%	80%
Anticipated Capacity Factor (%)		80%	80%	80%	80%	80%
Heat Rate (Btu/kWh)		9270	9270	9270	9270	9270
Energy by Month (% of total)						
	Jan	8.3%	8.3%	8.3%	8.3%	8.3%
	Feb	8.3%	8.3%	8.3%	8.3%	8.3%
	Mar	8.3%	8.3%	8.3%	8.3%	8.3%
	Apr	8.3%	8.3%	8.3%	8.3%	8.3%
	May	8.3%	8.3%	8.3%	8.3%	8.3%
	Jun	8.3%	8.3%	8.3%	8.3%	8.3%
	Jul	8.3%	8.3%	8.3%	8.3%	8.3%
	Aug	8.3%	8.3%	8.3%	8.3%	8.3%
	Sep	8.3%	8.3%	8.3%	8.3%	8.3%
	Oct	8.3%	8.3%	8.3%	8.3%	8.3%
	Nov	8.3%	8.3%	8.3%	8.3%	8.3%
	Dec	8.3%	8.3%	8.3%	8.3%	8.3%
COSTS (1988 $)						
Financial Life (yrs)		30	30	30	30	30
Siting & Licensing ($/kW)		72	72	72	72	72
Construction ($/kW)		2092	2092	2092	2092	2092
Transmission Adjustment ($/kW)		406	112	103	375	67
Total Capital Cost ($/kW)		2570	2276	2267	2539	2231
Siting & Licensing Hold Cost ($/kW/yr)		NA	NA	NA	NA	NA
Fixed O&M ($/kW/yr)		52.32	52.32	52.32	52.32	52.32
Variable O&M (mills/kWh)		0.8	0.8	0.8	0.8	0.8
Fixed Fuel ($/kW/yr)		0	0	0	0	0
Variable Fuel ($/million Btu)		0.48	1.24	1.39	1.29	1.61
Variable Fuel (mills per kWh)		4.4	11.5	12.9	12.0	14.9
CONSTRUCTION CASH FLOW (% of Capital)						
	1	8.0%	8.0%	8.0%	8.0%	8.0%
	2	12.0%	12.0%	12.0%	12.0%	12.0%
	3	20.0%	20.0%	20.0%	20.0%	20.0%
	4	20.0%	20.0%	20.0%	20.0%	20.0%
	5	20.0%	20.0%	20.0%	20.0%	20.0%
	6	10.0%	10.0%	10.0%	10.0%	10.0%
	7	10.0%	10.0%	10.0%	10.0%	10.0%

COAL-GCC

LEAD TIMES					
Siting & Licensing (yrs)	2	2	2	2	2
Probability of S&L Success (%)	70%	70%	70%	70%	70%
Probability of Hold Success (%)	75%	75%	75%	75%	75%
Construction Lead Time (yrs)	5	5	5	5	5
Total Lead Time (yrs)	7	7	7	7	7
Maximum Option Shelf Life (yrs)	5	5	5	5	5

% of Regional Supply Available to BPA: 25%

RESOURCE IDENTIFIER		CGCC-1	CGCC-2	CGCC-3	CGCC-4	CGCC-5
REGIONAL SUPPLY (cumulative aMW by year)						
	1990	0	0	0	0	0
	1991	0	0	0	0	0
	1992	0	0	0	0	0
	1993	0	0	0	0	0
	1994	0	0	0	0	0
	1995	0	0	0	0	0
	1996	0	0	0	0	0
	1997	300	0	0	250	0
	1998	600	0	0	500	0
	1999	900	0	0	750	0
	2000	1200	250	250	750	250
	2001	1500	500	500	750	500
	2002	1800	750	750	750	750
	2003	1800	750	750	750	750
	2004	1800	750	750	750	750
	2005	1800	750	750	750	750
	2006	1800	750	750	750	750
	2007	1800	750	750	750	750
	2008	1800	750	750	750	750
	2009	1800	750	750	750	750
SUPPLY AVAILABLE TO BPA (cumulative aMW by year)						
	1990	0	0	0	0	0
	1991	0	0	0	0	0
	1992	0	0	0	0	0
	1993	0	0	0	0	0
	1994	0	0	0	0	0
	1995	0	0	0	0	0
	1996	0	0	0	0	0
	1997	75	0	0	63	0
	1998	150	0	0	125	0
	1999	225	0	0	188	0
	2000	300	63	63	188	63
	2001	375	125	125	188	125
	2002	450	188	188	188	188
	2003	450	188	188	188	188
	2004	450	188	188	188	188

2005	450	188	188	188	188
2006	450	188	188	188	188
2007	450	188	188	188	188
2008	450	188	188	188	188
2009	450	188	188	188	188

NOTES:

(1) OTHER RELATED WORKSHEETS:
DTCOALB.WK1, Rev. None
DTFIN.WK1, Rev. None

(2) THIS DATA SHEET USES THE GASIFICATION READY CT DATA FROM DTGCC.WK1 AND THE FUEL PRICE DATA FROM DT
A GASIFIED COAL FIRED SCENARIO FOR COAL DEVELOPMENT. THE SAME SUPPLY IS ASSUMED AS FOR DTCOALB.

(3) CGCC-1 (COLSTRIP) AND CGCC-4 (THOUSAND SPRINGS) ARE ASSUMED TO INCUR AN ADDITIONAL 3.5% TRANSMISSI
CALCULATING LEVELIZED COST, THE ENERGY AVAILABLE IS REDUCED. FUEL COST AND O&M COST REMAIN THE

RESOURCE DATA SHEET

COGEN WEST

RESOURCE IDENTIFIER		COGEN-1W	COGEN-2W	COGEN-3W	COGEN-4W
PLANT CHARACTERISTICS					
Site		NA	NA	NA	NA
Fuel Source		NA	NA	NA	NA
Operating life (yrs)		20	20	20	20
Unit Size-Net (MW)		10	10	10	10
Equivalent Availability (%)		100%	100%	100%	100%
Anticipated Capacity Factor (%)		100%	100%	100%	100%
Heat Rate (Btu/kWh)		NA	NA	NA	NA
Energy by Month (% of total)					
	Jan	8.3%	8.3%	8.3%	8.3%
	Feb	8.3%	8.3%	8.3%	8.3%
	Mar	8.3%	8.3%	8.3%	8.3%
	Apr	8.3%	8.3%	8.3%	8.3%
	May	8.3%	8.3%	8.3%	8.3%
	Jun	8.3%	8.3%	8.3%	8.3%
	Jul	8.3%	8.3%	8.3%	8.3%
	Aug	8.3%	8.3%	8.3%	8.3%
	Sep	8.3%	8.3%	8.3%	8.3%
	Oct	8.3%	8.3%	8.3%	8.3%
	Nov	8.3%	8.3%	8.3%	8.3%
	Dec	8.3%	8.3%	8.3%	8.3%
PRICE (1988 $)					
Price (Levelized Real mills/kWh)		30	35	40	45
Transmission Increment (mills/kWh)		0	0	0	0
Total Price (mills/kWh)		30	35	40	45
CONSTRUCTION CASH FLOW (% of Capital)					
	1	NA	NA	NA	NA
	2	NA	NA	NA	NA
	3	NA	NA	NA	NA
	4	NA	NA	NA	NA
	5	NA	NA	NA	NA
	6	NA	NA	NA	NA
	7	NA	NA	NA	NA
LEAD TIMES					
Siting & Licensing (yrs)		2	2	2	2
Probability of S&L Success (%)		80%	80%	80%	80%
Probability of Hold Success (%)		90%	90%	90%	90%
Construction Lead Time (yrs)		2	2	2	2
Total Lead Time (yrs)		4	4	4	4
Maximum Option Shelf Life (yrs)		10	10	10	10

COGEN WEST

% of Regional Supply Available to BPA: 25%

RESOURCE IDENTIFIER		COGEN-1W	COGEN-2W	COGEN-3W	COGEN-4W
REGIONAL SUPPLY (cumulative aMW by year)					
	1990	0	0	0	0
	1991	0	0	0	0
	1992	63	250	500	2000
	1993	63	250	500	2000
	1994	63	250	500	2000
	1995	63	250	500	2000
	1996	63	250	500	2000
	1997	63	250	500	2000
	1998	63	250	500	2000
	1999	63	250	500	2000
	2000	63	250	500	2000
	2001	63	250	500	2000
	2002	63	250	500	2000
	2003	63	250	500	2000
	2004	63	250	500	2000
	2005	63	250	500	2000
	2006	63	250	500	2000
	2007	63	250	500	2000
	2008	63	250	500	2000
	2009	63	250	500	2000
SUPPLY AVAILABLE TO BPA (cumulative aMW by year)					
	1990	0	0	0	0
	1991	0	0	0	0
	1992	16	63	125	500
	1993	16	63	125	500
	1994	16	63	125	500
	1995	16	63	125	500
	1996	16	63	125	500
	1997	16	63	125	500
	1998	16	63	125	500
	1999	16	63	125	500
	2000	16	63	125	500
	2001	16	63	125	500
	2002	16	63	125	500
	2003	16	63	125	500
	2004	16	63	125	500
	2005	16	63	125	500
	2006	16	63	125	500
	2007	16	63	125	500
	2008	16	63	125	500
	2009	16	63	125	500

NOTES:

(1) OTHER RELATED WORKSHEETS:
DTFIN.WK1, Rev. None
DTCOGE.WK1, Rev. None
(2) EAST/WEST SPLIT OF ENERGY EQUALS 50/50 BASED ON COMMUNICATION WITH M. LAMBIE.

RESOURCE DATA SHEET

COGEN EAST

RESOURCE IDENTIFIER		COGEN-1E	COGEN-2E	COGEN-3E	COGEN-4E
PLANT CHARACTERISTICS					
Site		NA	NA	NA	NA
Fuel Source		NA	NA	NA	NA
Operating life (yrs)		20	20	20	20
Unit Size-Net (MW)		10	10	10	10
Equivalent Availability (%)		100%	100%	100%	100%
Anticipated Capacity Factor (%)		100%	100%	100%	100%
Heat Rate (Btu/kWh)		NA	NA	NA	NA
Energy by Month (% of total)					
	Jan	8.3%	8.3%	8.3%	8.3%
	Feb	8.3%	8.3%	8.3%	8.3%
	Mar	8.3%	8.3%	8.3%	8.3%
	Apr	8.3%	8.3%	8.3%	8.3%
	May	8.3%	8.3%	8.3%	8.3%
	Jun	8.3%	8.3%	8.3%	8.3%
	Jul	8.3%	8.3%	8.3%	8.3%
	Aug	8.3%	8.3%	8.3%	8.3%
	Sep	8.3%	8.3%	8.3%	8.3%
	Oct	8.3%	8.3%	8.3%	8.3%
	Nov	8.3%	8.3%	8.3%	8.3%
	Dec	8.3%	8.3%	8.3%	8.3%
PRICE (1988 $)					
Price (Levelized Real mills/kWh)		30	35	40	45
Transmission Increment (mills/kWh)		2	2	2	2
Total Price (mills/kWh)		32	37	42	47
CONSTRUCTION CASH FLOW (% of Capital)					
	1	NA	NA	NA	NA
	2	NA	NA	NA	NA
	3	NA	NA	NA	NA
	4	NA	NA	NA	NA
	5	NA	NA	NA	NA
	6	NA	NA	NA	NA
	7	NA	NA	NA	NA
LEAD TIMES					
Siting & Licensing (yrs)		2	2	2	2
Probability of S&L Success (%)		80%	80%	80%	80%
Probability of Hold Success (%)		90%	90%	90%	90%
Construction Lead Time (yrs)		2	2	2	2
Total Lead Time (yrs)		4	4	4	4
Maximum Option Shelf Life (yrs)		10	10	10	10

COGEN EAST

% of Regional Supply Available to BPA: 25%

RESOURCE IDENTIFIER	COGEN-1E	COGEN-2E	COGEN-3E	COGEN-4E
REGIONAL SUPPLY (cumulative aMW by year)				
1990	0	0	0	0
1991	0	0	0	0
1992	63	250	500	2000
1993	63	250	500	2000
1994	63	250	500	2000
1995	63	250	500	2000
1996	63	250	500	2000
1997	63	250	500	2000
1998	63	250	500	2000
1999	63	250	500	2000
2000	63	250	500	2000
2001	63	250	500	2000
2002	63	250	500	2000
2003	63	250	500	2000
2004	63	250	500	2000
2005	63	250	500	2000
2006	63	250	500	2000
2007	63	250	500	2000
2008	63	250	500	2000
2009	63	250	500	2000
SUPPLY AVAILABLE TO BPA (cumulative aMW by year)				
1990	0	0	0	0
1991	0	0	0	0
1992	16	63	125	500
1993	16	63	125	500
1994	16	63	125	500
1995	16	63	125	500
1996	16	63	125	500
1997	16	63	125	500
1998	16	63	125	500
1999	16	63	125	500
2000	16	63	125	500
2001	16	63	125	500
2002	16	63	125	500
2003	16	63	125	500
2004	16	63	125	500
2005	16	63	125	500
2006	16	63	125	500
2007	16	63	125	500
2008	16	63	125	500
2009	16	63	125	500

COGEN EAST

NOTES:

(1) OTHER RELATED WORKSHEETS:
DTFIN.WK1, Rev. None
DTCOGW.WK1, Rev. None

(2) EAST/WEST SPLIT OF ENERGY EQUALS 50/50 BASED ON COMMUNICATION WITH M. LAMBIE.

(3) 2 MILLS/kWh WAS ADDED FOR THE TRANSMISSION ADJUSTMENT. THIS WAS CALCULATED ASSUMING $120 PER kW.

RESOURCE DATA SHEET

CONV CT

RESOURCE IDENTIFIER		SCCT	CCCT
PLANT CHARACTERISTICS			
Site		NA	NA
Fuel Source		NA	NA
Operating life (yrs)		30	30
Unit Size-Net (MW)		139	420
Equivalent Availability (%)		85%	83%
Anticipated Capacity Factor (%)		NA	NA
Heat Rate (Btu/kWh)		11480	7620
Energy by Month (% of total)			
	Jan	8.3%	8.3%
	Feb	8.3%	8.3%
	Mar	8.3%	8.3%
	Apr	8.3%	8.3%
	May	8.3%	8.3%
	Jun	8.3%	8.3%
	Jul	8.3%	8.3%
	Aug	8.3%	8.3%
	Sep	8.3%	8.3%
	Oct	8.3%	8.3%
	Nov	8.3%	8.3%
	Dec	8.3%	8.3%
COSTS (1988 $)			
Financial Life (yrs)		30	30
Siting & Licensing ($/kW)		5	6
Construction ($/kW)		535	621
Transmission Adjustment ($/kW)		120	120
Total Capital Cost ($/kW)		660	747
Siting & Licensing Hold Cost ($/kW/yr)		0.47	0.40
Fixed O&M ($/kW/yr)		3.06	7.51
Variable O&M (mills/kWh)		0.01	0.10
Fixed Fuel ($/kW/yr)		0	0
Variable Fuel ($/million Btu)		3.16	3.16
Variable Fuel (mills per kWh)		36	24
CONSTRUCTION CASH FLOW (% of Capital)			
	1	0.0%	0.0%
	2	0.0%	0.0%
	3	50.0%	50.0%
	4	50.0%	50.0%
	5	0.0%	0.0%
	6	0.0%	0.0%
	7	0.0%	0.0%

CONV CT

LEAD TIMES		
Siting & Licensing (yrs)	2	2
Probability of S&L Success (%)	0.9	0.9
Probability of Hold Success (%)	0.9	0.9
Construction Lead Time (yrs)	2	2
Total Lead Time (yrs)	4	4
Maximum Option Shelf Life (yrs)	5	5

% of Regional Supply Available to BPA: 100%

RESOURCE IDENTIFIER	SCCT	CCCT
REGIONAL SUPPLY (cumulative aMW by year)		
1990	0	0
1991	0	0
1992	0	0
1993	0	0
1994	0	0
1995	0	840
1996	0	840
1997	0	840
1998	0	840
1999	0	840
2000	0	840
2001	0	840
2002	0	840
2003	0	840
2004	0	840
2005	0	840
2006	0	840
2007	0	840
2008	0	840
2009	0	840
SUPPLY AVAILABLE TO BPA (cumulative aMW by year)		
1990	0	0
1991	0	0
1992	0	0
1993	0	0
1994	0	0
1995	0	840
1996	0	840
1997	0	840
1998	0	840
1999	0	840
2000	0	840
2001	0	840
2002	0	840
2003	0	840
2004	0	840

CONV CT

2005	0	840
2006	0	840
2007	0	840
2008	0	840
2009	0	840

NOTES:

(1) OTHER RELATED WORKSHEETS:
DTFIN.WK1, Rev. None
(2) DATA FROM "DRAFT 1990 GENERATION RESOURCES SUPPLY DOCUMENT," JAN 1990.
(3) SINCE CTs WOULD NORMALLY BE RUN TO DISPLACE HIGHER COST RESOURCES, CAPACITY FACTOR IS NOT AN ACCURATE MEASURE OF THEIR PERFORMANCE. IF CTs WERE RUN IN A BASELOAD MODE THEIR CAPACITY FACTOR WOULD EQUAL APPROXIMATELY 80 PERCENT.
(4) SCCTs WOULD NORMALLY BE USED AS A PEAKING RESOURCE. SUPPLY IS NOT CONSIDERED TO BE LIMITED.
(5) CCCTs ARE CONSIDERED TO BE DISPLACEABLE RESOURCES. THE 840 aMW SUPPLY ESTIMATE CONFORMS TO BPA's RESOURCE CONTINGENCY PLAN. SUPPLY IS NOT CONSIDERED TO BE LIMITED TECHNOLOGICALLY, HOWEVER, CONSTRAINTS ARE EXPECTED DUE TO SITING AND FUEL SUPPLY CONSIDERATIONS.

RESOURCE DATA SHEET

GEOTHERMAL

RESOURCE IDENTIFIER		GEO-1 Pilot	GEO-2 B&R Comm.	**GEO-3** Casc. Comm
PLANT CHARACTERISTICS				
Site		Cascades	Basin & Range	Cascades
Fuel Source		NA	NA	NA
Operating life (yrs)		10	30	30
Unit Size-Net (MW)		10	25	50
Equivalent Availability (%)		90%	90%	90%
Anticipated Capacity Factor (%)		90%	90%	90%
Heat Rate (Btu/kWh)		NA	NA	NA
Energy by Month (% of total)				
	Jan	8.3%	8.3%	8.3%
	Feb	8.3%	8.3%	8.3%
	Mar	8.3%	8.3%	8.3%
	Apr	8.3%	8.3%	8.3%
	May	8.3%	8.3%	8.3%
	Jun	8.3%	8.3%	8.3%
	Jul	8.3%	8.3%	8.3%
	Aug	8.3%	8.3%	8.3%
	Sep	8.3%	8.3%	8.3%
	Oct	8.3%	8.3%	8.3%
	Nov	8.3%	8.3%	8.3%
	Dec	8.3%	8.3%	8.3%
COSTS (1988 $)				
Financial Life (yrs)		10	30	30
Siting & Licensing ($/kW)		65	60	60
Construction ($/kW)		2600	2739	2490
Transmission Adjustment ($/kW)		120	120	120
Total Capital Cost ($/kW)		2785	2919	2670
Siting & Licensing Hold Cost ($/kW/yr)		0.00	13.00	13.00
Fixed O&M ($/kW/yr)		102.00	95.00	86.00
Variable O&M (mills/kWh)		2.7	1.4	1.3
Fixed Fuel ($/kW/yr)		0	0	0
Variable Fuel ($/million Btu)		0	0	0
Variable Fuel (mills per kWh)		0.0	0.0	0.0
CONSTRUCTION CASH FLOW (% of Capital)				
	1	0.0%	0.0%	0.0%
	2	50.0%	50.0%	0.0%
	3	50.0%	50.0%	25.0%
	4	0.0%	0.0%	50.0%
	5	0.0%	0.0%	25.0%
	6	0.0%	0.0%	0.0%
	7	0.0%	0.0%	0.0%

GEOTHERMAL

LEAD TIMES			
Siting & Licensing (yrs)	1	2	2
Probability of S&L Success (%)	75%	75%	75%
Probability of Hold Success (%)	90%	90%	90%
Construction Lead Time (yrs)	2	2	3
Total Lead Time (yrs)	3	4	5
Maximum Option Shelf Life (yrs)	0	5	5

% of Regional Supply Available to BPA: 100%

RESOURCE IDENTIFIER	GEO-1	GEO-2	**GEO-3**
REGIONAL SUPPLY (cumulative aMW by year)			
1990	0	0	0
1991	0	0	0
1992	0	0	0
1993	0	0	0
1994	0	24	0
1995	0	73	0
1996	30	171	0
1997	30	268	0
1998	30	366	51
1999	30	390	152
2000	30	390	354
2001	30	390	556
2002	30	390	758
2003	30	390	960
2004	30	390	1111
2005	30	390	1111
2006	30	390	1111
2007	30	390	1111
2008	30	390	1111
2009	30	390	1111
SUPPLY AVAILABLE TO BPA (cumulative aMW by year)			
1990	0	0	0
1991	0	0	0
1992	0	0	0
1993	0	0	0
1994	0	24	0
1995	0	73	0
1996	30	171	0
1997	30	268	0
1998	30	366	51
1999	30	390	152
2000	30	390	354
2001	30	390	556
2002	30	390	758
2003	30	390	960
2004	30	390	1111

GEOTHERMAL

2005	30	390	1111
2006	30	390	1111
2007	30	390	1111
2008	30	390	1111
2009	30	390	1111

NOTES:

(1) OTHER RELATED WORKSHEETS:
DTFIN.WK1, Rev. None

(2) REVISION "A" CONFORMS TO THE NWPPC GEOTHERMAL ASSUMPTIONS (2 AUG 90) FOR THE 1990 DRAFT POWER PLAN.

(3) **GEO-3** IS SHOWN FOR REFERENCE ONLY. IT IS NOT CONSIDERED TO BE AN AVAILABLE RESOURCE.

(4) REVISION "B" CHANGES THE UNIT SIZE OF GEO-1 TO 10 MW AND INCREASES BPA ACQUISITION TO 100 PERCENT.

RESOURCE DATA SHEET

EFF IMP

RESOURCE IDENTIFIER		HYDRO	TRANS
PLANT CHARACTERISTICS			
Site		NA	NA
Fuel Source		NA	NA
Operating life (yrs)		30	30
Unit Size-Net (MW)		1	1
Equivalent Availability (%)		100%	100%
Anticipated Capacity Factor (%)		60%	100%
Heat Rate (Btu/kWh)		NA	NA
Energy by Month (% of total)			
	Jan	15.3%	15.3%
	Feb	12.1%	12.1%
	Mar	8.8%	8.8%
	Apr	7.3%	7.3%
	May	7.2%	7.2%
	Jun	6.2%	6.2%
	Jul	3.3%	3.3%
	Aug	2.7%	2.7%
	Sep	4.0%	4.0%
	Oct	6.7%	6.7%
	Nov	10.5%	10.5%
	Dec	15.7%	15.7%
COSTS (1988 $)			
Financial Life (yrs)		30	30
Siting & Licensing ($/kW)		0	0
Construction ($/kW)		97	1500
Transmission Adjustment ($/kW)		120	0
Total Capital Cost ($/kW)		217	1500
Siting & Licensing Hold Cost ($/kW/yr)		0.00	0.00
Fixed O&M ($/kW/yr)		0.00	0.00
Variable O&M (mills/kWh)		0.00	0.00
Fixed Fuel ($/kW/yr)		0	0
Variable Fuel ($/million Btu)		NA	NA
Variable Fuel (mills per kWh)		NA	NA
CONSTRUCTION CASH FLOW (% of Capital)			
	1	0.0%	0.0%
	2	100.0%	100.0%
	3	0.0%	0.0%
	4	0.0%	0.0%
	5	0.0%	0.0%
	6	0.0%	0.0%
	7	0.0%	0.0%

EFF IMP

LEAD TIMES		
Siting & Licensing (yrs)	1	1
Probability of S&L Success (%)	0.9	0.9
Probability of Hold Success (%)	0.9	0.9
Construction Lead Time (yrs)	1	1
Total Lead Time (yrs)	2	2
Maximum Option Shelf Life (yrs)	10	10

% of Regional Supply Available to BPA: 100%

RESOURCE IDENTIFIER	HYDRO	TRANS
REGIONAL SUPPLY (cumulative aMW by year)		
1990	0	0
1991	20	10
1992	40	20
1993	60	34
1994	80	34
1995	100	34
1996	100	34
1997	100	34
1998	100	34
1999	100	34
2000	100	34
2001	100	34
2002	100	34
2003	100	34
2004	100	34
2005	100	34
2006	100	34
2007	100	34
2008	100	34
2009	100	34
SUPPLY AVAILABLE TO BPA (cumulative aMW by year)		
1990	0	0
1991	20	10
1992	40	20
1993	60	34
1994	80	34
1995	100	34
1996	100	34
1997	100	34
1998	100	34
1999	100	34
2000	100	34
2001	100	34
2002	100	34
2003	100	34
2004	100	34

EFF IMP

2005	100	34
2006	100	34
2007	100	34
2008	100	34
2009	100	34

NOTES:

(1) OTHER RELATED WORKSHEETS:
DTFIN.WK1, Rev. None
(2) DATA FROM "DRAFT 1990 GENERATION RESOURCES SUPPLY DOCUMENT," JAN 1990.
(3) FOR T&D EFFICIENCY IMPROVEMENTS CAPITAL COST WERE ASSUMED IN TO EQUAL THE MIDPOINT OF THE RANGE REPORTED IN THE SOURCE DOCUMENT (NOTE 2).
(4) REVISION "A" CHANGES THE ENERGY DISTRIBUTION FROM FLAT.

RESOURCE DATA SHEET

HYDRO EAST

RESOURCE IDENTIFIER		HYDRO-1E	HYDRO-2E	HYDRO-3E	HYDRO-4E
PLANT CHARACTERISTICS					
Site		NA	NA	NA	NA
Fuel Source		NA	NA	NA	NA
Operating life (yrs)		50	50	50	50
Unit Size-Net (MW)		10	10	10	10
Equivalent Availability (%)		-	-	-	-
Anticipated Capacity Factor (%)		48%	36%	37%	36%
Heat Rate (Btu/kWh)		NA	NA	NA	NA
Energy by Month (% of total)					
	Jan	6.0%	6.0%	6.0%	6.0%
	Feb	7.0%	7.0%	7.0%	7.0%
	Mar	8.0%	8.0%	8.0%	8.0%
	Apr	12.0%	12.0%	12.0%	12.0%
	May	12.0%	12.0%	12.0%	12.0%
	Jun	12.0%	12.0%	12.0%	12.0%
	Jul	13.0%	13.0%	13.0%	13.0%
	Aug	7.0%	7.0%	7.0%	7.0%
	Sep	6.0%	6.0%	6.0%	6.0%
	Oct	5.0%	5.0%	5.0%	5.0%
	Nov	6.0%	6.0%	6.0%	6.0%
	Dec	6.0%	6.0%	6.0%	6.0%
COSTS (1988 $)					
Financial Life (yrs)		30	30	30	30
Siting & Licensing ($/kW)		74	93	128	155
Construction ($/kW)		985	1235	1703	2061
Transmission Adjustment ($/kW)		120	120	120	120
Total Capital Cost ($/kW)		1179	1448	1951	2336
Siting & Licensing Hold Cost ($/kW/yr)		3.00	3.00	4.00	5.00
Fixed O&M ($/kW/yr)		21.00	27.00	37.00	44.00
Variable O&M (mills/kWh)		0	0	0	0
Fixed Fuel ($/kW/yr)		NA	NA	NA	NA
Variable Fuel ($/million Btu)		NA	NA	NA	NA
Variable Fuel (mills per kWh)		NA	NA	NA	NA
CONSTRUCTION CASH FLOW (% of Capital)					
	1	25.0%	25.0%	25.0%	25.0%
	2	50.0%	50.0%	50.0%	50.0%
	3	25.0%	25.0%	25.0%	25.0%
	4	0.0%	0.0%	0.0%	0.0%
	5	0.0%	0.0%	0.0%	0.0%
	6	0.0%	0.0%	0.0%	0.0%
	7	0.0%	0.0%	0.0%	0.0%

HYDRO EAST

LEAD TIMES				
Siting & Licensing (yrs)	3	3	3	3
Probability of S&L Success (%)	80%	80%	80%	80%
Probability of Hold Success (%)	90%	90%	90%	90%
Construction Lead Time (yrs)	3	3	3	3
Total Lead Time (yrs)	6	6	6	6
Maximum Option Shelf Life (yrs)	4	4	4	4

% of Regional Supply Available to BPA: 25%

RESOURCE IDENTIFIER	HYDRO-1E	HYDRO-2E	HYDRO-3E	HYDRO-4E
REGIONAL SUPPLY (cumulative aMW by year)				
1990	0	0	0	0
1991	0	0	0	0
1992	0	0	0	0
1993	11	12	15	11
1994	22	25	30	21
1995	33	37	45	32
1996	44	49	60	43
1997	55	62	76	53
1998	55	62	76	53
1999	55	62	76	53
2000	55	62	76	53
2001	55	62	76	53
2002	55	62	76	53
2003	55	62	76	53
2004	55	62	76	53
2005	55	62	76	53
2006	55	62	76	53
2007	55	62	76	53
2008	55	62	76	53
2009	55	62	76	53
SUPPLY AVAILABLE TO BPA (cumulative aMW by year)				
1990	0	0	0	0
1991	0	0	0	0
1992	0	0	0	0
1993	3	3	4	3
1994	5	6	8	5
1995	8	9	11	8
1996	11	12	15	11
1997	14	15	19	13
1998	14	15	19	13
1999	14	15	19	13
2000	14	15	19	13
2001	14	15	19	13
2002	14	15	19	13
2003	14	15	19	13
2004	14	15	19	13

HYDRO EAST

2005	14	15	19	13
2006	14	15	19	13
2007	14	15	19	13
2008	14	15	19	13
2009	14	15	19	13

NOTES:

(1) OTHER RELATED WORKSHEETS:
DTFIN.WK1, Rev. None

(2) EAST/WEST SPLIT OF ENERGY EQUALS 60/40 BASED ON AUG 29, 1990 MEMO, HOLEMAN TO BERGER.

RESOURCE DATA SHEET

HYDRO WEST

RESOURCE IDENTIFIER		HYDRO-1W	HYDRO-2W	HYDRO-3W	HYDRO-4W
PLANT CHARACTERISTICS					
Site		NA	NA	NA	NA
Fuel Source		NA	NA	NA	NA
Operating life (yrs)		50	50	50	50
Unit Size-Net (MW)		10	10	10	10
Equivalent Availability (%)		-	-	-	-
Anticipated Capacity Factor (%)		48%	36%	37%	36%
Heat Rate (Btu/kWh)		NA	NA	NA	NA
Energy by Month (% of total)					
	Jan	6.0%	6.0%	6.0%	6.0%
	Feb	7.0%	7.0%	7.0%	7.0%
	Mar	8.0%	8.0%	8.0%	8.0%
	Apr	12.0%	12.0%	12.0%	12.0%
	May	12.0%	12.0%	12.0%	12.0%
	Jun	12.0%	12.0%	12.0%	12.0%
	Jul	13.0%	13.0%	13.0%	13.0%
	Aug	7.0%	7.0%	7.0%	7.0%
	Sep	6.0%	6.0%	6.0%	6.0%
	Oct	5.0%	5.0%	5.0%	5.0%
	Nov	6.0%	6.0%	6.0%	6.0%
	Dec	6.0%	6.0%	6.0%	6.0%
COSTS (1988 $)					
Financial Life (yrs)		30	30	30	30
Siting & Licensing ($/kW)		74	93	128	155
Construction ($/kW)		985	1235	1703	2061
Transmission Adjustment ($/kW)		0	0	0	0
Total Capital Cost ($/kW)		1059	1328	1831	2216
Siting & Licensing Hold Cost ($/kW/yr)		3.00	3.00	4.00	5.00
Fixed O&M ($/kW/yr)		21.00	27.00	37.00	44.00
Variable O&M (mills/kWh)		0	0	0	0
Fixed Fuel ($/kW/yr)		NA	NA	NA	NA
Variable Fuel ($/million Btu)		NA	NA	NA	NA
Variable Fuel (mills per kWh)		NA	NA	NA	NA
CONSTRUCTION CASH FLOW (% of Capital)					
	1	25.0%	25.0%	25.0%	25.0%
	2	50.0%	50.0%	50.0%	50.0%
	3	25.0%	25.0%	25.0%	25.0%
	4	0.0%	0.0%	0.0%	0.0%
	5	0.0%	0.0%	0.0%	0.0%
	6	0.0%	0.0%	0.0%	0.0%
	7	0.0%	0.0%	0.0%	0.0%

HYDRO WEST

LEAD TIMES				
Siting & Licensing (yrs)	3	3	3	3
Probability of S&L Success (%)	80%	80%	80%	80%
Probability of Hold Success (%)	90%	90%	90%	90%
Construction Lead Time (yrs)	3	3	3	3
Total Lead Time (yrs)	6	6	6	6
Maximum Option Shelf Life (yrs)	4	4	4	4

% of Regional Supply Available to BPA: 25%

RESOURCE IDENTIFIER	HYDRO-1W	HYDRO-2W	HYDRO-3W	HYDRO-4W
REGIONAL SUPPLY (cumulative aMW by year)				
1990	0	0	0	0
1991	0	0	0	0
1992	0	0	0	0
1993	7	8	10	7
1994	15	16	20	14
1995	22	25	30	21
1996	29	33	40	28
1997	36	41	50	36
1998	36	41	50	36
1999	36	41	50	36
2000	36	41	50	36
2001	36	41	50	36
2002	36	41	50	36
2003	36	41	50	36
2004	36	41	50	36
2005	36	41	50	36
2006	36	41	50	36
2007	36	41	50	36
2008	36	41	50	36
2009	36	41	50	36
SUPPLY AVAILABLE TO BPA (cumulative aMW by year)				
1990	0	0	0	0
1991	0	0	0	0
1992	0	0	0	0
1993	2	2	3	2
1994	4	4	5	4
1995	5	6	8	5
1996	7	8	10	7
1997	9	10	13	9
1998	9	10	13	9
1999	9	10	13	9
2000	9	10	13	9
2001	9	10	13	9
2002	9	10	13	9
2003	9	10	13	9
2004	9	10	13	9

HYDRO WEST

2005	9	10	13	9
2006	9	10	13	9
2007	9	10	13	9
2008	9	10	13	9
2009	9	10	13	9

NOTES:

(1) OTHER RELATED WORKSHEETS:
DTFIN.WK1, Rev. None
(2) EAST/WEST SPLIT OF ENERGY EQUALS 60/40 BASED ON AUG 29, 1990 MEMO, HOLEMAN TO BERGER.

RESOURCE DATA SHEET

SOLAR

RESOURCE IDENTIFIER		TROUGH	TROUGH W/HTR	TROUGH-CT
PLANT CHARACTERISTICS				
Site		EAST	EAST	EAST
Fuel Source		NA	NA	NA
Operating life (yrs)		30	30	30
Unit Size-Net (MW)		80	80	150
Equivalent Availability (%)		28%	28%	28%
Anticipated Capacity Factor (%)		28%	28%	28%
Heat Rate (Btu/kWh)		NA	NA	8600
Energy by Month (% of total)				
	Jan	4.4%	4.4%	4.4%
	Feb	4.8%	4.8%	4.8%
	Mar	6.8%	6.8%	6.8%
	Apr	9.0%	9.0%	9.0%
	May	9.6%	9.6%	9.6%
	Jun	11.9%	11.9%	11.9%
	Jul	13.4%	13.4%	13.4%
	Aug	13.2%	13.2%	13.2%
	Sep	10.8%	10.8%	10.8%
	Oct	7.4%	7.4%	7.4%
	Nov	4.5%	4.5%	4.5%
	Dec	4.1%	4.1%	4.1%
COSTS (1988 $)				
Financial Life (yrs)		30	30	30
Siting & Licensing ($/kW)		14	15	12
Construction ($/kW)		2875	2964	2353
Transmission Adjustment ($/kW)		120	120	120
Total Capital Cost ($/kW)		3009	3099	2485
Siting & Licensing Hold Cost ($/kW/yr)		3.00	3.00	3.00
Fixed O&M ($/kW/yr)		44.00	44.00	6.00
Variable O&M (mills/kWh)		0.8	0.8	3.1
Fixed Fuel ($/kW/yr)		0	0	0
Variable Fuel ($/million Btu)		0	0	0
Variable Fuel (mills per kWh)		0.0	0.0	0
CONSTRUCTION CASH FLOW (% of Capital)				
	1	0.0%	0.0%	0.0%
	2	0.0%	0.0%	0.0%
	3	100.0%	100.0%	100.0%
	4	0.0%	0.0%	0.0%
	5	0.0%	0.0%	0.0%
	6	0.0%	0.0%	0.0%
	7	0.0%	0.0%	0.0%

SOLAR

LEAD TIMES			
Siting & Licensing (yrs)	2	2	2
Probability of S&L Success (%)	80%	60%	60%
Probability of Hold Success (%)	90%	90%	90%
Construction Lead Time (yrs)	1	1	1
Total Lead Time (yrs)	3	3	3
Maximum Option Shelf Life (yrs)	5	5	5

% of Regional Supply Available to BPA: 100%

RESOURCE IDENTIFIER		TROUGH	TROUGH W/HTR	TROUGH-CT
REGIONAL SUPPLY (cumulative aMW by year)				
	1990	0	0	0
	1991	0	0	0
	1992	0	0	0
	1993	0	0	0
	1994	22	22	0
	1995	22	22	0
	1996	22	22	42
	1997	22	22	42
	1998	22	22	42
	1999	22	22	42
	2000	22	22	42
	2001	22	22	42
	2002	22	22	42
	2003	22	22	42
	2004	22	22	42
	2005	22	22	42
	2006	22	22	42
	2007	22	22	42
	2008	22	22	42
	2009	22	22	42
SUPPLY AVAILABLE TO BPA (cumulative aMW by year)				
	1990	0	0	0
	1991	0	0	0
	1992	0	0	0
	1993	0	0	0
	1994	22	22	0
	1995	22	22	0
	1996	22	22	42
	1997	22	22	42
	1998	22	22	42
	1999	22	22	42
	2000	22	22	42
	2001	22	22	42
	2002	22	22	42
	2003	22	22	42
	2004	22	22	42

SOLAR

2005	22	22	42
2006	22	22	42
2007	22	22	42
2008	22	22	42
2009	22	22	42

NOTES:

(1) OTHER RELATED WORKSHEETS:
DTFIN.WK1, Rev. None

(2) REVISION "A" CONFORMS TO THE NWPPC SOLAR ASSUMPTIONS (2 AUG 1990) FOR THE 1990 DRAFT POWER PLAN.

(3) REVISION "B" CORRECTS SUPPLY TO aMW AND CHANGES BPA SUPPLY TO 100%.

RESOURCE DATA SHEET

WIND

RESOURCE IDENTIFIER		WIND-1	WIND-2	**WIND-3**
PLANT CHARACTERISTICS				
Site		Oregon	Washington	Montana
Fuel Source		NA	NA	NA
Operating life (yrs)		40	40	40
Unit Size-Net (MW)		22	30	30
Equivalent Availability (%)		25%	27%	30%
Anticipated Capacity Factor (%)		25%	27%	30%
Heat Rate (Btu/kWh)		NA	NA	NA
Energy by Month (% of total)				
	Jan	6.0%	14.3%	14.3%
	Feb	6.0%	9.2%	9.2%
	Mar	6.0%	9.9%	9.9%
	Apr	9.0%	8.7%	8.7%
	May	7.0%	4.2%	4.2%
	Jun	11.0%	5.8%	5.8%
	Jul	12.0%	5.6%	5.6%
	Aug	12.0%	4.3%	4.3%
	Sep	11.0%	5.8%	5.8%
	Oct	8.0%	7.1%	7.1%
	Nov	6.0%	12.3%	12.3%
	Dec	6.0%	12.8%	12.8%
COSTS (1988 $)				
Financial Life (yrs)		30	30	30
Siting & Licensing ($/kW)		15	16	16
Construction ($/kW)		1023	1114	1178
Transmission Adjustment ($/kW)		120	120	408
Total Capital Cost ($/kW)		1158	1250	1602
Siting & Licensing Hold Cost ($/kW/yr)		4.00	4.00	4.00
Fixed O&M ($/kW/yr)		15.00	16.00	16.00
Variable O&M (mills/kWh)		11.0	11.5	11.6
Fixed Fuel ($/kW/yr)		0	0	0
Variable Fuel ($/million Btu)		0	0	0
Variable Fuel (mills per kWh)		0.0	0.0	0.0
CONSTRUCTION CASH FLOW (% of Capital)				
	1	0.0%	0.0%	0.0%
	2	40.0%	40.0%	40.0%
	3	60.0%	60.0%	60.0%
	4	0.0%	0.0%	0.0%
	5	0.0%	0.0%	0.0%
	6	0.0%	0.0%	0.0%
	7	0.0%	0.0%	0.0%

WIND

LEAD TIMES			
Siting & Licensing (yrs)	1	1	1
Probability of S&L Success (%)	90%	90%	90%
Probability of Hold Success (%)	90%	90%	90%
Construction Lead Time (yrs)	2	2	2
Total Lead Time (yrs)	3	3	3
Maximum Option Shelf Life (yrs)	5	5	5

% of Regional Supply Available to BPA: 25%

RESOURCE IDENTIFIER	WIND-1	WIND-2	**WIND-3**
REGIONAL SUPPLY (cumulative aMW by year)			
1990	0	0	0
1991	0	0	0
1992	0	0	0
1993	0	0	0
1994	0	0	0
1995	22	0	0
1996	65	30	0
1997	152	30	0
1998	239	30	0
1999	261	91	61
2000	261	212	182
2001	261	333	424
2002	261	454	727
2003	261	575	1090
2004	261	696	1453
2005	261	817	1816
2006	261	938	2179
2007	261	1059	2542
2008	261	1180	2905
2009	261	1241	3268
SUPPLY AVAILABLE TO BPA (cumulative aMW by year)			
1990	0	0	0
1991	0	0	0
1992	0	0	0
1993	0	0	0
1994	0	0	0
1995	6	0	0
1996	16	8	0
1997	38	8	0
1998	60	8	0
1999	65	23	15
2000	65	53	46
2001	65	83	106
2002	65	114	182
2003	65	144	273
2004	65	174	363

WIND

2005	65	204	454
2006	65	235	545
2007	65	265	636
2008	65	295	726
2009	65	310	817

NOTES:

(1) OTHER RELATED WORKSHEETS:
DTFIN.WK1, Rev. None

(2) REVISION "A" CONFORMS TO THE NWPPC WIND ASSUMPTIONS (2 AUG 1990 FOR THE 1990 DRAFT POWER PLAN.

(3) **WIND-4** IS INCLUDED FOR REFERENCE ONLY. iT IS NOT CONSIDERED TO BE AN AVAILABLE RESOURCE.

RESOURCE DATA SHEET

WNP-1 & -3

RESOURCE IDENTIFIER		WNP-1	WNP-3
PLANT CHARACTERISTICS			
Site		Hanford	Satsop
Fuel Source		NA	NA
Operating life (yrs)		40	40
Unit Size-Net (MW)		1250	1240
Equivalent Availability (%)		65%	65%
Anticipated Capacity Factor (%)		65%	65%
Heat Rate (Btu/kWh)		NA	NA
Energy by Month (% of total)			
	Jan	10.0%	10.0%
	Feb	10.0%	10.0%
	Mar	10.0%	10.0%
	Apr	10.0%	10.0%
	May	10.0%	10.0%
	Jun	0.0%	0.0%
	Jul	0.0%	0.0%
	Aug	10.0%	10.0%
	Sep	10.0%	10.0%
	Oct	10.0%	10.0%
	Nov	10.0%	10.0%
	Dec	10.0%	10.0%
COSTS (1988 $)			
Financial Life (yrs)		30	30
Siting & Licensing ($/kW)		0	0
Construction ($/kW)		1205	1064
Transmission Adjustment ($/kW)		120	0
Total Capital Cost ($/kW)		1325	1064
Siting & Licensing Hold Cost ($/kW/yr)		4.00	4.40
Fixed O&M ($/kW/yr)		78.85	84.15
Variable O&M (mills/kWh)		6.75	6.75
Fixed Fuel ($/kW/yr)		0	0
Variable Fuel ($/million Btu)		NA	NA
Variable Fuel (mills per kWh)		NA	NA
CONSTRUCTION CASH FLOW (% of Capital)			
	1	11.0%	4.0%
	2	23.0%	24.0%
	3	29.0%	33.0%
	4	24.0%	29.0%
	5	13.0%	10.0%
	6	0.0%	0.0%
	7	0.0%	0.0%

WNP-1 & -3

LEAD TIMES		
Siting & Licensing (yrs)	0	0
Probability of S&L Success (%)	100%	100%
Probability of Hold Success (%)	90%	90%
Construction Lead Time (yrs)	5	5
Total Lead Time (yrs)	5	5
Maximum Option Shelf Life (yrs)	10	10

% of Regional Supply Available to BPA: 100%

RESOURCE IDENTIFIER		WNP-1	WNP-3
REGIONAL SUPPLY (cumulative aMW by year)			
	1990	0	0
	1991	0	0
	1992	0	0
	1993	0	0
	1994	0	0
	1995	0	0
	1996	0	0
	1997	0	0
	1998	813	806
	1999	813	806
	2000	813	806
	2001	813	806
	2002	813	806
	2003	813	806
	2004	813	806
	2005	813	806
	2006	813	806
	2007	813	806
	2008	813	806
	2009	813	806
SUPPLY AVAILABLE TO BPA (cumulative aMW by year)			
	1990	0	0
	1991	0	0
	1992	0	0
	1993	0	0
	1994	0	0
	1995	0	0
	1996	0	0
	1997	0	0
	1998	813	806
	1999	813	806
	2000	813	806
	2001	813	806
	2002	813	806
	2003	813	806
	2004	813	806

2005	813	806
2006	813	806
2007	813	806
2008	813	806
2009	813	806

NOTES:

(1) OTHER RELATED WORKSHEETS:
DTFIN.WK1, Rev. None

SECTION 4

Development of Conservation Resource Estimates

The conservation resource data used by the Integrated System for Analysis of Acquisitions (ISAAC) model to analyze all alternatives for the Draft Resource Program Environmental Impact Statement (RPEIS), (except the Emphasize Conservation Sub-alternative), were based solely on the conservation resource estimates developed for the Draft 1990 Conservation Resources Supply Document (Conservation Supply Document). The Conservation Supply document contains BPA's most recent published conservation resource estimates prior to the development of the Draft RPEIS.

The Conservation Supply Document estimates also accounted for most of the available conservation resource assumed for the Emphasize Conservation Sub-alternative. However, for this alternative, additional conservation resource potential was assumed for the following five consumer sectors represented within ISAAC: residential refrigeration, residential freezers, other residential appliances, new commercial buildings, and industrial facilities (excluding aluminum smelters operated by direct service industrial customers of BPA).

Because the RPEIS analysis is predicated on the 1989 high load forecast, data presented in this appendix exclusively represent conservation potential under high loads. Additional detail on BPA's conservation resource estimates under the low, medium, and high load scenarios, as well as a more indepth presentation of BPA's methodologies for estimating the conservation resource, can be found in the Conservation Supply Document and its accompanying volume, the Draft 1990 Conservation Resources Supply Document: Technical Documentation.

Overview of Assumptions and Methodology

Derivation of Technical Potential

The first step in quantifying the conservation resource is the development of technical conservation resource potential estimates. Technical potential is conservation that would be possible, from an engineering standpoint, assuming that all available cost-effective conservation measures are installed at each point of electrical consumption (e.g., residence, industrial facility, or commercial building). The cost-effectiveness threshold is based on the levelized cost (i.e., lifecycle cost per kWh) of some alternative resource, such as a thermal generating plant.

The quantification of technical potential for each sector relies on two primary data sources. The first data source, the load forecast, provides projections of the number of new and currently existing units, (e.g., number of residences) available for installation of conservation measures, as well as estimates of consumer energy usage and electricity fuel shares. Conservation

prototype data comprise the second source of information for estimating technical potential. For each consumer sector, a number of prototypes (such as typical residences or commercial buildings) have been developed to represent consuming entities in that sector. Each prototype identifies a set of typical available conservation measures, as well as estimates of costs, energy savings, and lifetimes associated with those measures.

The regional technical conservation potential was then derived by multiplying energy savings associated with cost-effective measures for the conservation prototypes times the number of available units projected in the load forecast.

Derivation of Achievable Potential

A series of adjustments is then made to the technical potential to arrive at estimates of achievable conservation potential. Achievable potential is the amount of cost-effective conservation savings that can realistically be acquired during the forecast period, given market constraints.

The first adjustment to technical potential is the application of a transmission line loss credit. Conservation measures yield savings to delivered energy at the point of consumption, rather than energy at the point of generation. Therefore, the avoidance of transmission line losses when conservation is acquired in lieu of generating resources represents an additional savings to the power system. Based on prior BPA analyses of transmission line losses associated with generating resources, BPA applies a 7.5 percent line loss credit to the energy savings associated with all conservation measures.

A second adjustment is made for maximum attainable market saturation associated with conservation acquisition efforts. The market saturation adjustment, a downward adjustment to technical potential, is made in recognition of market constraints. Not all consumers will participate in conservation programs, regardless of program incentive levels or delivery mechanisms. Additionally, some consumers who do participate are willing to install only a portion of the cost-effective conservation measures available to them. Other factors limiting market saturation include reduced effectiveness of some measures due to changes in building use or equipment changes, and less than 100-percent compliance with efficiency standards (i.e., energy codes).

A final adjustment is made, where appropriate, to account for historical and budgeted savings. In some cases, particularly in existing buildings, efficiency improvements associated with historical or budgeted savings are not fully reflected in the load forecast. Appropriate reductions for these savings are made to estimates of conservation potential to arrive at the final quantification of regional achievable conservation potential.

Conservation Data for All RPEIS Alternatives (Except the Emphasize Conservation Sub-Alternative)

The conservation supply data prepared for the ISAAC analysis of most of the RPEIS alternatives, except the Emphasize Conservation Sub-alternative, are summarized by program or sector in Table D-7. More detail on the ISAAC conservation supply data for these alternatives can be found in Appendix A of the Conservation Supply Document. The total regional achievable conservation potential reflected in Table D-7 is 2,274 average megawatts (aMW).

Some items of clarification should be noted regarding the conservation supply data presented in this appendix. First, for some consumer sectors (e.g., commercial), the resource lifetimes were extended and capital costs per unit increased to accommodate a longer planning horizon modeled in ISAAC. The adjusted capital costs, however, still reflect the same lifetime levelized cost per kWh for each sector or subsector.

Second, the capital costs per average megawatt shown (or implied) in Table D-7 and Table D-8 for each sector do not necessarily correspond to costs and planned acquisitions developed for each consumer sector for the 1990 Resource Program. This is due to factors such as allocated overhead costs, varying program incentive levels, and planned research and development investments embedded in the 1990 Resource Program.

Third, Tables D-7 and D-8 identify conservation resources for individual consumer sectors as either "discretionary" or "lost opportunity" resources. This is an important distinction for both modeling and planning purposes. Discretionary resources are those whose acquisition can be deferred without affecting the cost or availability of those resources. An example of a discretionary resource is existing residential weatherization, where the real cost and effectiveness of weatherization measures in existing homes will be similar today or several years from now. Lost opportunity resources are those resources which, because of physical or institutional characteristics, lose their cost-effectiveness or become unavailable unless action is taken to acquire them during a brief period of opportunity. An example of a lost opportunity conservation resource is the savings potential represented by more strict manufacturing standards in appliances. Once a manufacturer has constructed an appliance and placed it on the market, the potential savings associated with the opportunity for making that appliance more efficient are lost.

Table D-6
High Conservation Sub-Alternative

The following are supply estimates for conservation programs based on BPA conservation supply curves and NCAC conservation supply curves:

Program	BPA Supply Curves (aMW)	High Conservation Supply Curves (aMW)
Single-Family Residential MCS	215	215
Multi-Family Residential MCS	37	37
New Manufactured Housing	83	83
Water Heat	362	362
Refrigerators	110	319
Freezers	30	98
Other Appliances	0	700
Irrigation	36	36
Industrial	407	488
New Commercial	601	1760
Commercial Lost Ops Existing	139	139
Multi-Family Res Weatherization	36	36
Single-Family Res Weatherization	102	102
Commercial Disc. Existing	162	162
Total Conservation	2,320	4,537

Conservation Data for the Emphasize Conservation Sub-Alternative

The conservation supply data prepared for the ISAAC analysis of the Emphasize Conservation Sub-alternative are shown in Table D-6. For this alternative, additional regional achievable potential was assumed for the following consumer end-use sectors: residential refrigerators, residential freezers, other residential appliances, new commercial buildings, and industrial facilities. The development of estimates assumed additional achievable potential for these end-use sectors was based, in large part, on an analysis of regional technical potential by the National Resources Defense Council (NRDC) in 1990. The total regional conservation potential, as shown by consumer sector for this alternative in Table D-6, is 4,537 aMW.

A discussion of assumptions used in developing the higher estimates of achievable potential for the affected consumer sectors follows.

Residential Refrigerators

NRDC estimated 245 aMW of regional technical potential beyond that estimated under the high load scenario by the Northwest Power Planning Council (Council). The Regional Council's technical potential estimate was 130 aMW. Therefore, this implies a total of 375 aMW of regional technical potential (245 aMW plus 130 aMW). The regional achievable

potential for the Emphasize Conservation Sub-alternative of 343 aMW was derived by multiplying the assumed technical potential of 375 aMW times an 85 percent assumed maximum market saturation rate and a 1.075 transmission line loss savings factor. The estimate of 570 kWh savings per unit (refrigerator) was derived by multiplying the Council's estimate of 198 kWh per unit by a factor of 2.88 (375 aMW/130 aMW). The Council's estimate of capital cost per unit of $108 (in 1988 constant dollars) was also increased by a factor of 2.88, to $311, and then increased to $373 to incorporate a 20 percent administrative cost factor.

Residential Freezers

The Council's estimate of high load case technical potential for residential freezers was 45 aMW. NRDC estimated an additional 70 aMW of technical potential, for a total of 115 aMW or 256 percent of the Council's high case estimate. The Council's estimate of savings potential per freezer of 210 kWh per year was multiplied by 2.56 to arrive at an assumed 538 kWh of savings per unit per year for the Emphasize Conservation Sub-alternative. The Council's capital cost estimate of $30 per refrigerator (in 1988 constant dollars) was also multiplied by 2.56 to $77. In addition, a 20 percent administrative cost factor was included to yield a final capital cost per unit (in 1988 constant dollars) of $92.

Regional achievable potential for residential freezers under the Emphasize Conservation Sub-alternative was assumed to be 105 aMW. This estimate was derived based on a technical potential of 115 aMW, on 85 percent maximum market saturation rate, and a 7.5 percent transmission line loss credit.

Other Residential Appliances

The estimate of achievable potential developed for other appliances for the High Conservation Sub-Alternative are based on NRDC's technical potential associated with residential lighting, cooking, clothes dryers, televisions, energy-efficient windows, and heat pumps. For these appliances, NRDC estimated an aggregate regional technical potential of 933 aMW. From this estimate, an achievable potential of 700 aMW was derived based on an assumed 70 percent maximum market saturation rate and a transmission line loss credit of 7.5 percent.

A capital cost per average kilowatt of $2,615 for other appliances was developed based on a lifecycle levelized cost of 25 mills per kWh (1988 dollars) and a 15 year resource lifetime. Finally, a total cost per kWh of $3,138 (in 1988 dollars) was derived by incorporating a 20 percent administrative cost factor.

New Commercial

For the commercial sector, NRDC estimated an additional technical potential of 1932 aMW beyond the Council estimates. Based on information available to BPA at the time when conservation data were being developed for ISAAC, it was assumed that all of this potential was attributed to new buildings. Given that BPA's estimate of technical potential for new commercial buildings was 135 aMW higher than the Council's estimate at that time (945 aMW versus 810 aMW), NRDC's projection represented 1,797 aMW of additional potential beyond BPA's estimate. An increment of 1,159 aMW of achievable potential for new commercial buildings was derived by adjusting the 1,797 aMW of added technical potential for a 60 percent assumed maximum market saturation rate and a line loss credit of 7.5 percent. Finally, the 1,159 aMW of incremental achievable potential was added to the 601 aMW used for new commercial the other RPEIS alternatives to arrive at an estimate of 1,760 aMW of achievable potential assumed for the High Conservation Sub-alternative.

The total capital cost figure used for the other alternatives in ISAAC for savings in new commercial, $1,876 per average kilowatt (in 1988 dollars), was assumed for the Emphasize Conservation Sub-alternative. This cost estimate includes a 30 percent administrative cost assumption.

Industrial Sector

The regional achievable potential estimated for the high load scenario in the Conservation Supply Document was 407 aMW. This estimate, used for all other RPEIS alternatives, was simply assumed to be 20 percent higher, or 509 aMW, for the Emphasize Conservation Sub-alternative. As in the other alternatives, a total capital cost of $1,927 per average kilowatt (in 1988 constant dollars) was assumed for the Emphasize Conservation Sub-alternative.

SOURCES

Bonneville Power Administration, Draft 1990 Conservation Resource Supply Document, January 1990.

Bonneville Power Administration, Draft 1990 Conservation Resources Supply Document: Technical Documentation, January 1990.

Natural Resources Defense Council, "Supplementary Comments of the Natural Resources Defense Council on the Northwest Power Planning Council's Technical Appendix to the 1990 Supply Curves," June 1990.

Northwest Power Planning Council, "Conservation Supply for the 1990 Power Plan," Issue Paper 89-47, November 1989.

Northwest Power Planning Council, "Technical Appendix to Conservation Supply for the 1990 Power Plan," Issue Paper 89-47A, November 1989.

Table D-7

Conservation Resource Data for All Alternatives Except
High Conservation Sub-Alternative

Program (Sector/Subsector)	A Resource Type	B Unit Type	C Available Savings per unit 1/ (kWhs)	D Cost per unit 2/ (1988 $)	E Resource Lifetime (Yrs)	F Assumed Market Saturation Rate (%)	G Regional Achievable Potential 3/ (aMW)
Residential							
Existing Single-Family Weath.	Discret.	House	3,886	$3,035	50	75	102
Existing Multi-Family Weath.	Discret.	Dwelling	2,258	$1,740	50	75	36
New Single-Family MCS	Lost Opp	House	2,476	$2,212	70	85	260
New Multi-Family MCS	Lost Opp	Dwelling	1,389	$1,130	70	85	37
Water Heaters	Lost Opp	Water Heater	828	$ 144	12	77	345
Refrigerators	Lost Opp	Refrigerator	224	$ 43	22	85	106
Freezers	Lost Opp	Freezer	146	$ 34	22	85	38
Other Appliances 4/	Lost Opp	aKW	N/A	N/A	N/A	N/A	N/A
Commercial							
New Buildings	Lost Opp	aKW	8,760	$1,876	15	60	601
Existing Buildings-Discr.	Discret.	aKW	8,760	$2,876	15	60	158
Existing Buildings-Lost Opp	Lost Opp	aKW	8,760	$2,737	15	60	149
Industrial	Discret.	aKW	8,760	$1,927	20	85	407
Irrigation	Discret.	aKW	8,760	$1,648	20	85	35

1/ Includes a 7.5 percent Transmission Line Loss Credit.
2/ Cost per unit includes administrative costs, in 1988 constant dollars, associated with acquisition of conservation resources.
3/ Achievable conservation potential under the 1989 final high load forecast.
4/ Savings for "other appliances" were included only under the Emphasize Conservation Sub-alternative.

Table D-8

Conservation Resource Data for the Emphasize Conservation Sub-Alternative

Program (Sector/Subsector)	A Resource Type	B Unit Type	C Available Savings per unit 1/ (kWhs)	D Cost per unit 2/ (1988 $)	E Resource Lifetime (Yrs)	F Assumed Market Saturation Rate (%)	G Regional Achievable Potential 3/ (aMW)
Residential							
Existing Single-Family Weath.	Discret.	House	3,886	$3,035	50	75	102
Existing Multi-Family Weath.	Discret.	Dwelling	2,258	$1,740	50	75	36
New Single-Family MCS	Lost Opp	House	2,476	$2,212	70	85	260
New Multi-Family MCS	Lost Opp	Dwelling	1,389	$1,130	70	85	37
Water Heaters	Lost Opp	Water Heater	828	$ 144	12	77	345
Refrigerators 4/	Lost Opp	Refrigerator	570	$ 373	22	85	343
Freezers 4/	Lost Opp	Freezer	538	$ 92	22	85	105
Other Appliances 4/	Lost Opp	aKW	8,760	3,138	15	70	700
Commercial							
New Buildings 4/	Lost Opp	aKW	8,760	$1,876	15	60	1,760
Existing Buildings-Discr.	Discret.	aKW	8,760	$2,876	15	60	158
Existing Buildings-Lost Opp	Lost Opp	aKW	8,760	$2,737	15	60	149
Industrial 4/	Discret.	aKW		$1,927	20	85	508
Irrigation	Discret.	aKW		$1,648	20	85	35

1/ Includes a 7.5 percent Transmission Line Loss Credit.
2/ Cost per unit includes administrative costs, in 1988 constant dollars, associated with acquisition of conservation resources.
3/ Achievable conservation potential under the 1989 final high load forecast.
4/ For the High Conservation Sub-alternative, this sector (sub-sector) includes additional achievable potential beyond that estimated for the other RPEIS alternatives.

SECTION 5

Fuel Switching in the Resource Programs Environmental Impact Statement

Background

The Resource Programs Environmental Impact Statement (RPEIS) is examining the environmental impacts of a broad range of alternatives for meeting BPA's expected future resource needs. The environmental impacts are being assessed based on meeting high load growth, so a reasonable upper bound of possible impacts will be identified. Switching consumer electric loads to natural gas (fuel switching) is one of the alternatives for meeting the growing resource need being assessed in the RPEIS.

Overview

BPA staff have developed a fuel switching scenario for the RPEIS that results in roughly 550 aMW of public utility residential space and water heating loads being converted to natural gas. Estimates of the "technical" potential for fuel switching by market segment were based on load forecast information combined with information on natural gas availability. Cost-related data is based on the fuel switching analysis for the Puget Sound Area Electric Reliability Plan (PSAERP), a cooperative effort of BPA and Puget Sound area utilities.

Program participation rates were applied to this technical potential to derive "achievable" fuel switching potential by market segment. The market segments are summed to get the 550 aMW used in the RPEIS fuel switching analysis.

Market Segments

Screening Assumptions

For analytical purposes, the total building stock is divided into groups called market segments. Within a market segment, the same amount of load per building is available for switching and the costs per building are the same. However, the load and cost per building will vary between market segments. The following assumptions were made in order to screen out market segments where cost or institutional barriers make fuel switching prohibitive:

- Industrial and commercial sectors were not included in the analysis due to the high costs, limited potential, and institutional barriers.
- Multifamily and manufactured housing were also screened out because of cost and institutional barriers.
- Homes currently receiving gas service were screened out. Some of these homes do have electric space or water heat, but switching is expected to occur over time due to market forces alone.

- The Pacific Northwest gas and electric utilities are forecasting most new single family homes built within one-quarter mile of gas mains will choose gas from market forces alone. We assume for the RPEIS that new single family electric homes within one-quarter mile of existing gas mains have chosen electricity for reasons that would not be overcome with a fuel switching program. Therefore, the fuel switching program participation rate for new homes within one-quarter mile of a gas main is set to zero.

Segmentation Criteria

From the remaining housing stock, market segments are developed based on dividing the housing stock by housing vintage, gas availability, and type of electric equipment. Housing vintage separates households into existing units (built before 1990) and new units (built in 1990 or later). Gas availability groups households depending on the cost of connecting the household to natural gas service. The four categories of gas availability are: 1) household already receiving natural gas; 2) not receiving gas, but requiring only a service drop (also defined as within one-quarter mile of a gas main); 3) households requiring main extension and service drop; 4) more than main extension required, or significant distribution system expansion. Lastly, households are distinguished by type of electric space heating equipment (central forced air, zonal). Because the type of equipment is not yet installed in new homes, the load and costs relevant to fuel switching are a weighted average of central forced air and zonal.

The following market segments were used in the RPEIS analysis:

Table D-9
Natural Gas Availability by Market Segment

	Housing Vintage	Electric Equipment	Gas Availability
1	Existing	Central Forced Air + Water	Service Drop
2	Existing	Central Forced Air + Water	Main Extension
3	Existing	Zonal + Water	Service Drop
4	Existing	Zonal + Water	Main Extension
5	Existing	Water Heat Only	Service Drop
6	Existing	Water Heat Only	Main Extension
7	New	Space + Water Heat	Main Extension

Participation Rates

Experience with conservation programs indicates that only a portion of eligible homes will participate in a program. Program participation rates were assigned to each market segment to indicate the percentage that could be expected to participate in a year. Program participation rates are a consensus of the PSAERP Conservation and Load Management team with representatives from BPA, Seattle City Light, Tacoma Public Utilities, Snohomish County PUD, Puget Sound Power and Light, and the contracting firm of Branch Richards Anderson Company (BRACO).

Costs

The dollar amount for costs used in this analysis are based on work done for the PSAERP. All costs are expressed as 1990 dollars unless otherwise noted. The major cost categories are equipment, operating, hook-up, and administrative. These costs will vary between different market segments, but not within a given market segment.

Equipment Costs

Equipment costs include the furnace or water heater, flue, venting, piping, other installation expenses, and ductwork. The RPEIS assumes equipment will be switched when the electric equipment is close to the end of its useful life. Therefore, there is no cost related to the depreciated value of replaced, but still useful electric equipment. Equipment cost data were collected from two sources. 1/

Hook-Up Costs

Hook-up costs are the costs of connecting a house to natural gas. A cost was estimated for each of two gas availability categories. Cost for a service drop is $550. 2/ The cost for the main extension only, not including service drop, was $900 per house. 3/ Therefore, a house requiring a main extension costs $550 plus $900, equaling $1,450.

1/ A report by the Northwest Power Planning Council, Heating New Homes: A Comparison of Heating with Electric, Natural Gas and Fuel Oil Heating Systems and a survey of Puget Sound area contractors conducted by BRACO.

2/ A report by the Washington State Energy office, Analysis of Consumer and Marginal Costs for Electric and Natural Gas Space and Water Heat in Single Family Residences in Puget Sound Power And Light Company Service Territory.

3/ From the Association of Northwest Gas Utilities, Coordinated Energy Development in the Pacific Northwest.

Operating Cost

Operating costs for both gas and electric equipment are the wholesale marginal cost of fuel. For gas, this equals the city gate price. For electricity, it is the value of load reduction as calculated in the resource planning model. Retail costs were not used because they may implicitly include other costs which are already counted in this analysis as explicit cost categories, such as hook-up and administration.

Administrative Cost

Administrative costs are those costs associated with design, implementation, and oversight of fuel switching programs or policies. Program administrative costs are set equal to 20 percent of equipment costs. This is roughly equal to experience in BPA's conservation programs.

Cost Perspective

The cost of fuel switching can be viewed from several perspectives. Societal, utility and end-user are common viewpoints. The utility perspective may be that of a retail electric utility, a cooperative effort of gas and electric utilities or a regional utility (BPA). The BPA perspective was used in the RPEIS. Social costs were also calculated and are discussed at the end of this section.

A full cost scenario was used for calculating BPA costs for existing households as a conservative planning assumption in order to gauge the upper bound of costs. It was assumed that BPA would pay the full cost of replacement gas equipment and installation plus the full cost of hook-up, including the service drop and main extension if required. Administrative costs were also included, which were set equal to 20 percent of equipment costs. No operating costs were included in BPA costs.

For new households, equipment costs equal the difference between gas and electric equipment because no equipment is yet installed in new homes. All other costs are calculated the same as for existing homes: full hook-up; zero operating; administration equals 20 percent of equipment.

In general, social costs are defined as the difference between gas and electric costs. For hook-up and administration, there are zero costs for remaining electric, so the difference between gas and electric equals the full cost of gas. This is identical to BPA costs. Therefore, social and BPA costs are the same for hook-up and administration.

Social costs for equipment are the full cost of gas equipment minus the cost of electric equipment. BPA costs for equipment are the full cost of gas equipment. Social costs (gas-electric) will therefore be less than BPA costs (gas only) by the amount of the electric equipment.

Social costs also include an operating cost calculation, which is not counted in BPA costs. Social operating costs are again the difference between gas and electric. The operating cost for both fuels equals the annual energy expense. This is calculated as the product of annual energy consumption multiplied by the price. Annual energy consumption for gas equipment is

slightly higher because gas equipment is less efficient. The price used for both fuels was the wholesale marginal cost as described earlier. Currently, the price of gas is less than electricity. The price advantage of gas is forecasted to continue throughout the forecast period, although the difference is expected to narrow. For all market segments, the price advantage of gas more than offsets the efficiency disadvantage of gas equipment, yielding a lower operating cost for gas than electric.

Subtracting the electric operating cost from the gas operating cost results in a negative number because gas has a lower operating cost. Therefore, the social operating cost (gas-electric) will be negative. BPA costs do not include any operating cost calculations, so social costs will be less than BPA costs for operating costs.

As described in the previous paragraphs, BPA costs and social costs are equal for hook-up and administration, while social costs are less than BPA costs for equipment and operation. Therefore, social costs will always be less than BPA costs.

Social operating costs will be negative for roughly equivalent levels of consumption as long as the cost of gas is less than that of electricity. If the cost savings from operating costs are greater than other costs incurred in switching the equipment, hooking up to natural gas, and administration, this is interpreted as a net benefit to society. The operating cost benefit depends on the amount and value of energy consumed. This will vary between market segments and will also depend on electric and gas rates.

Preliminary analysis indicates that some, but not all of the market segments give a net benefit to society.

Results

The information used to determine the quantity of load by market segment (households, equipment type, gas availability ratios, kWh per household) are detailed in Table D-10. The data in this table are not yet separated into market segments, but do show the relevant data used to allocate households to market segments. For example, the gas availability ratios do not differ by space heat equipment type, but the kWh per household does. The ratios used to proportion households to central forced air and zonal space heat are from the PNWRES 1983 survey. Gas availability ratios are based on a BPA data request to the Association of Northwest Gas Utilities. The remaining data are from the 1990 Joint BPA/Council Long-Term Forecast.

Non-operating costs by market segment are detailed in Table D-11. The data are arranged by cost category within a market segment. The first two columns show the electric and gas costs. The third column shows BPA costs. BPA costs are equal to gas costs for existing households and equal to the difference between gas and electric for new households. Social costs are not shown here because social costs would also include incremental operating costs. Social costs for the categories shown would be the difference between gas and electric.

The product of eligible households, program participation rates and kWh per household determines the amount of load that can be switched within a market segment. These data are detailed by market segment in Table D-12. This table displays the information used in the ISAAC model to represent fuel switching for the RPEIS. The data are for public utilities in the year 2010. "Eligible Households" are taken from Table D-10. "Program Rate" is the cumulative participation rate up to 2010. "Capital Cost" includes equipment and hook-up cost per household. "Total Cost" is the capital cost multiplied by the number of households plus twenty percent for administrative cost. "Total Cost" represents BPA costs only, not social or end-user costs.

Table D-10

Existing Single Family Homes

	Percent	Households	kWh/House
Public Utilities		1,120,000	
Electric Space Heat	70	784,000	
Cent. Forced Air	21	164,640	
Service Drop	30	49,392	13,800
Main Extension	23	37,867	13,800
Zonal	79	619,360	
Service Drop	30	185,808	10,600
Main Extension	23	142,453	10,600
Electric Water Heat	86	963,200	
Gas Space	9	82,800	4,500
Non Gas Space	91	880,400	
Service Drop	30	288,960	4,500
Main Extension	23	221,536	4,500

Table D-11

Cost Detail Per Household
(1990 $/Household)

	Electric	Gas	BPA
1) Exist SF, CFA+WH, Service Drop			
Water Heat			
Replacement Unit	280	250	250
Installation	120	150	150
Flue, venting (gas only)	0	150	150
Central Forced Air			
Replacement Unit	575	900	900
Installation	0	800	800
Flue, venting (gas only)	0	400	400
Subtotal	975	2,650	2,650
Service Drop	0	550	550
TOTAL	975	3,200	3,200
2) Exist SF, CFA+WH, Main Extension			
Water Heat			
Replacement Unit	280	250	250
Installation	120	150	150
Flue, venting (gas only)	0	150	150
Central Forced Air			
Replacement Unit	575	900	900
Installation	0	800	800
Flue, venting (gas only)	0	400	400
Subtotal	975	2,650	2,650
Service Drop	0	550	550
Main Extension	0	900	900
TOTAL	975	4,100	4,100
3) Exist SF, Zone+WH, Service Drop			
Water Heat			
Replacement Unit	280	250	250
Installation	120	150	150
Flue, venting (gas only)	0	150	150
Central Forced Air			
Replacement Unit	575	900	900
Installation	0	800	800
Flue, venting (gas only)	0	400	400
Ductwork		2,500	2,500
Subtotal	975	5,150	5,150
Service Drop	0	550	550
TOTAL	975	5,700	5,700

Table D-11, continued

4) Exist SF, Zone+WH, Main Extension			
Water Heat			
Replacement Unit	280	250	250
Installation	120	150	150
Flue, venting (gas only)	0	150	150
Central Forced Air			
Replacement Unit	575	900	900
Installation	0	800	800
Flue, venting (gas only)	0	400	400
Ductwork		2,500	2,500
Subtotal	975	5,150	5,150
Service Drop	0	550	550
Main Extension	0	900	900
TOTAL	975	6,600	6,600
5) Exist SF, WH Only, Service Drop			
Water Heat			
Replacement Unit	280	250	250
Installation	120	150	150
Flue, venting (gas only)	0	150	150
Subtotal	400	550	550
Service Drop	0	550	550
TOTAL	400	1,100	1,100
6) Exist SF, WH Only, Main Extension			
Water Heat			
Replacement Unit	280	250	250
Installation	120	150	150
Flue, venting (gas only)	0	150	150
Subtotal	400	550	550
Service Drop	0	550	550
Main Extension	0	900	900
TOTAL	400	2,000	2,000
7) New SF, SH+WH, Main Extension			
Space heat *	2,125	4,100	1,975
Envelope efficiency	800	420	(380)
Water heat	400	400	0
Subtotal	3,325	4,920	1,595
Service Drop	0	550	550
Main Extension	0	900	900
TOTAL	3,325	6,370	3,045

* Electric is weighted average of CFA and zone

Table D-12

ISAAC Input Data

Market Segment	Eligible Households	Program Rate	Capital $/HH	kWh/HH	/----- Total -----/ Total Cost incl. Admn ($M)	aMW
Exist. CFA+WH						
Serv. Drop	49,392	70%	3,200	18,300	133	72
Main Ext.	37,867	70%	4,100	18,300	130	55
Exist. Zonal+WH						
Serv. Drop	185,808	25%	5,700	15,100	318	80
Main Ext.	142,453	25%	6,600	15,100	282	61
Exist. WH Only						
Serv. Drop	183,094	75%	1,100	4,500	181	71
Main Ext.	140,372	75%	2,000	4,500	253	54
New SH +	154,000	100%	3,045	10,000	563	176
TOTAL	892,985	N/A	N/A	N/A	1,860	569

CFA = Central forced air
WH = Water heat
SH = Space heat

SECTION 6

Short-Term Import Contracts

Two contracts have been added to the existing system to help alleviate the problem of large deficits in the early years of the study. The terms of the contracts are as follows:

BPA CONTRACT
--Type: Energy
--Start Month: September
--Start Year: 1988
--Term Month: August
--Term Year: 2100
--Origin: Pacific Southwest
--Destination: BPA
--Cost: Zero

--aMW:	1989	1990	1992	1994	1996-2100
Per1:	300	700	1000	700	0
Per2:	300	700	1000	700	0
Per3:	300	700	1000	700	0
Per4:	300	700	1000	700	0

IOU CONTRACT
--All assumptions are identical to the BPA contract except aMW

--aMW:	1989	1990	1992	1994	1996-2100
Per1:	200	450	500	750	0
Per2:	200	450	500	750	0
Per3:	200	450	500	750	0
Per4:	200	450	500	750	0

Table D-13

Draft Environmental Cost Adjustments
Competitive Acquisition of Firm Energy
(1990 mills/kWh)

Resource Type	East	West
Pulverized Coal	3.8	6.3
AFBC Coal (Fluidized Bed)	2.7	3.3
IGCC Coal (Coal Gasification)	2.3	2.8
Simple Cycle Combustion Turbine	1.1	1.9
Combined Cycle Combustion Turbine	1.1	1.6
New Hydro Facility	2.0	2.0
Natural Gas-Fired Cogeneration	1.0	1.3
Additions to Existing Hydro Facility	1.0	1.0
Geothermal	1.0	1.0
Wind	0.5	0.5
Solar	1.0	1.0
Conservation	0	0
Wood-Fired Cogeneration	2.8	4.7
Municipal Solid Waste-Fired Cogeneration	6.5	9.2

- These adjustments are subject to change based on an on-going review and are in real levelized 1990 mills/kWh.
- Explanatory documentation of these adjustments can be obtained by calling BPA's document request line, toll free, 1-800-622-4520.

DRAFT ENVIRONMENTAL COST ESTIMATES

Pollutants:

NO_x= Oxides of Nitrogen--precursor of ozone (O3)
SO_x= Oxides of Sulfur--includes sulfur dioxide (SO2) and sulfates (SO4)
TSP= Total Suspended Particulates
PM_{10}= Particulates under 10 Microns
CO_2= Carbon Dioxide

Comments:

BPA's environmental costs adjustments are developed according to the Northwest Power Planning Council's 1986 Northwest Conservation and Electric Power Plan, Volume Two, Appendix II.

All generating resource additions are assumed to be baseload units because BPA's system is energy constrained, not capacity constrained.

The summit of the Cascade Mountain Range in Washington and Oregon is the dividing line between the "east" and "west" externality values.

All externality values are presented in real levelized 1990 dollars. (Nominal levelized estimates would be roughly twice the real levelized estimates).

Values from the Generic Coal Study, 1987, have been adjusted upward by the Gross National Product Implicit Price Deflator from the DRI Winter 1989-90 Long-term Review. This value is 15 percent (see attachment).

The heat rates and emission factors used for fossil fuel-fired resource externality values are based on reference plants developed specifically for BPA supply curves. BPA and the Northwest Power Planning Council use the same reference plants.

The reference fossil fuel-fired plants use control technologies indicated in the tables.

Total annual output estimates of NO_x, SO_x, and TSP are calculated from the listed grams per second values listed in the Generic Coal Study (page 2-2). (The study's calculations for tons per year are incorrect).

Based on the Generic Coal Study (page iii), the affected population of a generic large-sized city located west of the Cascades is 500,000 people and the affected population of a generic medium-sized city located east of the Cascades is 20,000.

NO_x, and TSP costs are based on the Generic Coal Study. We assume that a unit of NO_x, or TSP causes similar damage whether emitted from pulverized coal, atmospheric fluidized bed combustion coal, integrated gasification combined cycle coal, combined cycle combustion turbine, simple cycle combustion turbine or any other generating resource.

Environmental cost adjustments for nuclear, wood-fired cogeneration, and municipal solid waste-fired cogeneration are under development and will be available by April 15, 1991.

Real escalation is not embedded in the levelized externality costs, but is accounted for in population growth during system modeling.

Formula for Calculating Environmental Externality Values by Pollutant

Heat rate x emission rate x pollutant's cost* = dollars per unit of energy output (or mills/kWh)

(mmbtu/MWh) x (lbs/mmbtu) x ($/lb) =

*A pollutant's cost is the lesser of control, mitigation, or damage cost.

PULVERIZED COAL--WEST OF CASCADES

Heat rate: (10856 btu/kWh) Kaiser, NSSPS 1979 Standards, October 1987 (hereafter referenced as Kaiser Study).

NO_x emissions factor: (0.5 lbs/mmbtu) from the Kaiser Study, p. 5-16.

NO_x controls: Not determined.

NO_x damage cost: ($0.4421/lb total; $0.3535/lb human health risk; $0.0096/lb materials; $0.0071/lb crops; $0.0719/lb visibility) ECO Northwest, et al., Generic Coal Study--Quantification and Valuation of Environmental Impacts, prepared for Bonneville Power Administration, Portland, Oregon, January, 1987 (hereafter referenced as Generic Coal Study). Assumes west-side generic coal plant, large-size city, 1990$, NO_x emissions total: 22,048,000 lbs/year. Health risks total=$7,793,888/year--p.2-27; materials total=$212,142/year--p.3-12; crops=$157,156/year--p.3-23; visibility=$1,584,568/year--p.3-23 (all estimates converted to $1990's).

SO_x emissions factor: (0.2 lbs/mmbtu) Based on recommendations from U.S. Department of Energy and Portland General Electric Co.

SO_x controls: Dry scrubbing system consisting of multiple absorber vessels, additive preparation system and waste recycling system. 70 percent SO2 reduction.

SO_x cost: $0.75/lb total based on EPA reservation cost for SO_x emissions allowance.

TSP emissions factor: (0.03 lbs/mmbtu) from the Kaiser Study.

TSP controls: Multiple compartmental fabric filter baghouse.

TSP damage cost: ($.7698/lb total; $.7660/lb human health risk; $0.0038/lb materials) from the Generic Coal Study, TSP emissions total: 1,050,000 lbs/year. Health risks total= $804,263/year--p.2-27; materials total=$3,982/year--p.3-12; (all estimates converted to $1990's).

CO_2 emissions factor: (205 lb/mmbtu) See Addendum 1.

CO_2 controls: None.

Proxy for land, water and other: ($0.002/kWh) Representative value from BPA case studies, Pace report 1/, and New York Public Service Commission values.

1/ Richard Ottinger, et al., Environmental Costs of Electricity, Pace University Center for Environmental Legal Studies, New York, Oceana Publications, September 1990.

PULVERIZED COAL--EAST OF CASCADES

Heat rate: (10856 btu/kWh) from the Kaiser Study.

NO_x emissions factor: (0.5 lbs/mmbtu) from the Kaiser Study, p. 5-16.

NO_x controls: Not determined.

NO_x damage cost: ($0.0344/lb total; $0.0228/lb human health risk; $0.0010/lb materials; $0.0046/lb crops; $0.006/lb visibility) from the Generic Coal Study. Assumes east-side generic coal plant, medium-sized city, 1990$, NO_x emissions total: 22,048,000 lbs/year. Health risks total= $501,623/year--p.2-30; materials total=$21,392/year--p.3-12; crops=$100,837/year--p.3-26; visibility= $132,819/year--p.3-26(all estimates converted to $1990's).

SO_x emissions factor: (0.2 lbs/mmbtu) Based on recommendations from U.S. Department of Energy and Portland General Electric Co.

SO_x controls: Dry scrubbing system consisting of multiple absorber vessels, additive preparation system and waste recycling system. 70 percent SO2 reduction.

SO_x cost: $0.75/lb total based on EPA reservation cost for SO_x emissions allowance.

TSP emissions factor: (0.03 lbs/mmbtu) from the Kaiser Study.

TSP controls: Multiple compartmental fabric filter baghouse.

TSP damage cost: ($0.0833/lb total; $0.0829/lb human health risk; $0.0004/lb materials) from the Generic Coal Study. TSP emissions total: 1,050,000 lbs/year. Health risks total= $87,059/year--p.2-30; materials total=$468/year--p.3-12;(all estimates converted to $1990's).

CO_2 emissions factor: (205 lbs/mmbtu) See Addendum 1.

CO_2 controls: None.

Proxy for land, water and other: ($0.002/kWh) Same as for west-side pulverized coal plant.

ATMOSPHERIC FLUIDIZED BED COAL--WEST OF CASCADES

Heat rate: (9885 btu/kWh) Northwest Power Planning Council, 1989 Supplement to the 1986 Conservation and Electric Power Plan, Portland, Oregon, May 1989 (hereafter referenced as the NWPPC, 1989 Supplement).

NO_x emissions factor: (0.134 lbs/mmbtu) Electric Power Research Institute, Air Emissions and Solid Waste from Various Power Generation Technology, unpublished, page 29 (hereafter referred to as data from EPRI).

NO_x controls: Not determined.

NO_x damage cost: ($.4421/lb total; $0.3535/lb human health risk; $0.0096/lb materials; $0.0071/lb crops; $0.0719/lb visibility) From the Generic Coal Study. Same as for west-side pulverized coal.

SO_x emissions factor: (0.08 lbs/mmbtu) Data from EPRI, page 29. EPRI (p. 7) uses 2.5 percent sulfur coal. We assume 1 percent sulfur coal, so 40 percent of this number equals 0.08 lb/mmbtu.

SO_x controls: Limestone injection into bed.

SO_x cost: $0.75/lb total based on EPA reservation cost for SO_x emissions allowance.

TSP emissions factor: (0.015 lbs/mmbtu) Data from EPRI, page 29.

TSP controls: Hot cyclone collector.

TSP damage cost: ($.7698/lb total; $.7660/lb human health risk; $0.0038/lb materials) From the Generic Coal Study. TSP emissions total: 1,050,000 lbs/year. Same as for west-side pulverized coal plant.

CO_2 emissions factor: (205 lbs/mmbtu) See Addendum 1.

CO_2 controls: None.

Proxy for land, water and other: ($0.002/kWh) Representative value from BPA case studies, Pace report, and New York Public Service Commission values.

ATMOSPHERIC FLUIDIZED BED COAL--EAST OF CASCADES

Heat rate: (9885 btu/kWh) NWPPC, 1989 Supplement.

NO_x emissions factor: (0.134 lbs/mmbtu) Data from EPRI, page 29.

NO_x controls: Not determined.

NO_x damage cost: ($0.0344/lb total; $0.0228/lb human health risk; $0.0010/lb materials; $0.0046/lb crops; $0.006/lb visibility) From the Generic Coal Study. Assumes east-side generic coal plant, medium-sized city, 1990$, NO_x emissions total: 22,048,000 lbs/year. Same as for east-side pulverized coal.

SO_x emissions factor: (0.08 lbs/mmbtu) Data from EPRI, page 29. EPRI (p. 7) uses 2.5 percent sulfur coal. We assume 1 percent sulfur coal, so 40 percent of this number equals 0.08 lbs/mmbtu.

SO_x controls: Limestone injection into bed.

SO_x cost: $0.75/lb total based on EPA reservation cost for SO_x emissions allowance.

TSP emissions factor: (0.015 lbs/mmbtu) Data from EPRI, p.29.

TSP controls: Hot cyclone collector.

TSP damage cost: ($0.0833/lb total; $0.0829/lb human health risk; $0.0004/lb materials) From the Generic Coal Study. TSP emissions total: 1,050,000 lbs/year. Same as for east-side pulverized coal.

CO_2 emissions factor: (205 lbs/kWh) See Addendum 1.

CO_2 controls: None.

Proxy for land, water and other: ($0.002/kWh) Representative value from BPA case studies, Pace report, and New York Public Service Commission values.

INTEGRATED GASIFICATION COMBINED CYCLE COAL--WEST OF CASCADES

Heat rate: (9270 btu/kWh) NWPPC, 1989 Supplement.

NO_x emissions factor: (0.105 lbs/mmbtu) Data from EPRI, page 36.

NO_x controls: Not determined.

NO_x damage cost: ($.4421/lb total; $0.3535/lb human health risk; $0.0096/lb materials; $0.0071/lb crops; $0.0719/lb visibility) From the Generic Coal Study. Assumes west-side generic coal plant, large-size city, 1990$, NO_x emissions total: 22,048,000 lbs/year. Same as for west-side pulverized coal.

SO_x emissions factor: (0.04 lbs/mmbtu) Data from EPRI, page 36. EPRI (p. 7) uses 2.5 percent sulfur coal. We assume 1 percent sulfur coal, so 40 percent of this number equals 0.04 lbs/mmbtu.

SO_x controls: Two-stage acid gas bypass-type Claus unit with hot gas reheat.

SO_x cost: $0.75/lb total based on EPA reservation cost for SO_x emissions allowance.

TSP emissions factor: (0.0066 lbs/mmbtu) Data from EPRI, page 36.

TSP controls: Bag filters.

TSP damage cost: ($.7698/lb total; $.7660/lb human health risk; $0.0038/lb materials) From the Generic Coal Study. TSP emissions total: 1,050,000 lbs/year. Same as for west-side pulverized coal.

CO_2 emissions factor: (205 lbs/mmbtu) See Addendum 1.

CO_2 controls: None.

Proxy for land, water and other: ($0.002/kWh) Representative value from BPA case studies, Pace report, and New York Public Service Commission values.

INTEGRATED GASIFICATION COMBINED CYCLE--EAST OF CASCADES

Heat rate: (9270 btu/kWh) NWPPC, 1989 Supplement.

NO_x emissions factor: (0.105 lbs/mmbtu) Data from EPRI, page 36.

NO_x controls: Not determined.

NO_x damage cost: ($0.0344/lb total; $0.0228/lb human health risk; $0.0010/lb materials; $0.0046/lb crops; $0.006/lb visibility) From the Generic Coal Study. Assumes east-side generic coal plant, medium-sized city, 1990$, NO_x emissions total: 22,048,000 lbs/year. Same as for east-side pulverized coal.

SO_x emissions factor: (0.04 lbs/mmbtu) Data from EPRI, page 36. EPRI (p. 7) uses 2.5 percent sulfur coal. We assume 1 percent sulfur coal, so 40 percent of this number equals 0.04 lbs/mmbtu.

SO_x controls: Two-stage acid gas bypass-type Claus unit with hot gas reheat.

SO_x cost: $0.75/lb total based on EPA reservation cost for SO_x emissions allowance.

TSP emissions factor: (0.0066 lbs/mmbtu) Data from EPRI, page 36.

TSP controls: Bag filters.

TSP damage cost: ($0.0833/lb total; $0.0829/lb human health risk; $0.0004/lb materials) From the Generic Coal Study. TSP emissions total: 1,050,000 lbs/year. Same as for east-side pulverized coal.

CO_2 emissions factor: (205 lbs/mmbtu) See Addendum 1.

CO_2 controls: None.

Proxy for land, water and other: ($0.002/kWh) Representative value from BPA case studies, Pace report, and New York Public Service Commission values.

COMBINED CYCLE COMBUSTION TURBINE--WEST OF CASCADES

Heat rate: (7620 btu/kWh) Heat rates for both SCCT and CCCT are derived from the heat rates reported in "Comparison and Reconciliation of 'Coal Gasifications: Conversion of Medium Btu Gas to Electrical Energy, Shell Gasification: Based Phasing Study' and 'Development of Combustion Turbine Capital and Operating Costs,'" prepared by Fluor Daniel, Inc. for BPA, December 1989. Performance curves to adjust plant output and heat rates to ISO conditions are contained in "Shell Gasification-Based Phasing Study," Fluor Technology, Inc. for BPA, November 1986, Figures 3-1 to 3-4.

NO_x emissions factor: (0.174 lbs/mmbtu) Fluor Daniel, Inc., CT Technology Assessment, March 1990, p. 3-4 (hereafter referenced as Fluor 1990).

NO_x controls: Water injection at combustor.

NO_x damage cost: ($.4421/lb total; $0.3535/lb human health risk; $0.0096/lb materials; $0.0071/lb crops; $0.0719/lb visibility) From the Generic Coal Study. Assumes west-side generic coal plant, large-size city, 1990$, NO_x emissions total: 22,048,000 lbs/year. Same as for west-side pulverized coal.

SO_x emissions factor: (0.001 lbs/mmbtu) From Fluor 1990, p. 3-4.

SO_x controls: None.

SO_x cost: $0.75/lb total based on EPA reservation cost for SO_x emissions allowance.

TSP emissions factor: (0.001 lbs/mmbtu), From Fluor 1990, p. 3-4.

TSP controls: None.

TSP damage cost: ($.7698/lb total; $.7660/lb human health risk; $0.0038/lb materials) From the Generic Coal Study. TSP emissions total: 1,050,000 lbs/year. Same as for west-side pulverized coal.

CO_2 emissions factor: (117 lbs/mmbtu) Based on natural gas fuel. Hsing, C. Cheng, "Potential Reductions in US CO_2 Emissions in 1995 and 2010 by Technology Improvements in Electricity Generation and Transportation Sectors," Brookhaven National Laboratory, BNL 41201, Upton, NY, April 1988, p. 26 (hereafter referenced as Cheng, "Potential Reductions in US CO_2 Emissions").

CO_2 controls: None.

Proxy for land, water and other: ($0.001/kWh) Representative value from BPA case studies, Pace report, and New York Public Service Commission values.

COMBINED CYCLE COMBUSTION TURBINE--EAST OF CASCADES

Heat rate: (7620 btu/kWh) Heat rates for both SCCT and CCCT are derived from the heat rates reported in "Comparison and Reconciliation of 'Coal Gasifications: Conversion of Medium Btu Gas to Electrical Energy, Shell Gasification: Based Phasing Study' and 'Development of Combustion Turbine Capital and Operating Costs,'" prepared by Fluor Daniel, Inc. for BPA, December 1989. Performance curves to adjust plant output and heat rates to ISO conditions are contained in "Shell Gasification-Based Phasing Study," Fluor Technology, Inc. for BPA, November 1986, Figures 3-1 to 3-4.

NO_x emissions factor: (0.174 lbs/mmbtu) From Fluor 1990, p. 3-4.

NO_x controls: Water injection at combustor.

NO_x damage cost: ($0.0344/lb total; $0.0228/lb human health risk; $0.0010/lb materials; $0.0046/lb crops; $0.006/lb visibility) From the Generic Coal Study. Assumes east-side generic coal plant, medium-sized city, 1990$, NO_x emissions total: 22,048,000 lbs/year. Same as for east-side pulverized coal plant.

SO_x emissions factor: (0.001 lbs/mmbtu) From Fluor 1990, p. 3-4.

SO_x controls: None.

SO_x cost: $0.75/lb total based on EPA reservation cost for SO_x emissions allowance.

TSP emissions factor: (0.001 lbs/mmbtu) From Fluor 1990, p. 3-4.

TSP controls: None.

TSP damage cost: ($0.0833/lb total; $0.0829/lb human health risk; $0.0004/lb materials) From the Generic Coal Study. TSP emissions total: 1,050,000 lbs/year. Same as for east-side pulverized coal plant.

CO_2 emissions factor: (117 lb/mmbtu) Based on natural gas fuel. Cheng, "Potential Reductions in US CO_2 Emissions," p. 26.

CO_2 controls: None.

Proxy for land, water and other: (0.001/kWh) Representative value from BPA case studies, Pace report, and New York Public Service Commission values.

SINGLE CYCLE COMBUSTION TURBINE--WEST OF CASCADES

Heat rate: (11480 btu/kWh) Heat rates for both SCCT and CCCT are derived from the heat rates reported in "Comparison and Reconciliation of 'Coal Gasifications: Conversion of Medium Btu Gas to Electrical Energy, Shell Gasification: Based Phasing Study' and 'Development of Combustion Turbine Capital and Operating Costs,'" prepared by Fluor Daniel, Inc. for BPA, December 1989. Performance curves to adjust plant output and heat rates to ISO conditions are contained in "Shell Gasification-Based Phasing Study," Fluor Technology, Inc. for BPA, November 1986, Figures 3-1 to 3-4.

NO_x emissions factor: (0.175 lbs/mmbtu) From Fluor 1990, p. 3-4.

NO_x controls: Water injection at combustor.

NO_x damage cost: ($.4421/lb total; $0.3535/lb human health risk; $0.0096/lb materials; $0.0071/lb crops; $0.0719/lb visibility) From the Generic Coal Study. Assumes west-side generic coal plant, large-size city, 1990$, NO_x emissions total: 22,048,000 lbs/year. Same as for west-side pulverized coal.

SO_x emissions factor: (0.001 lbs/mmbtu) Fluor 1990, p. 3-4.

SO_x controls: None.

SO_x cost: $0.75/lb total based on EPA reservation cost for SO_x emissions allowance.

TSP emissions factor: (0.001 lbs/mmbtu) From Fluor 1990, p. 3-4.

TSP controls: None.

TSP damage cost: ($.7698/lb total; $.7660/lb human health risk; $0.0038/lb materials) From the Generic Coal Study. TSP emissions total: 1,050,000 lbs/year.

CO_2 emissions factor: (117 lb/mmbtu) Based on natural gas fuel. Cheng, "Potential Reductions in US CO_2 Emissions" p. 26.

CO_2 controls: None.

Proxy for land, water and other: (0.001/kWh) Representative value from BPA case studies, Pace report, and New York Public Service Commission values.

SINGLE CYCLE COMBUSTION TURBINE--EAST OF CASCADES

Heat rate: (11480 btu/kWh) Heat rates for both SCCT and CCCT are derived from the heat rates reported in "Comparison and Reconciliation of 'Coal Gasifications: Conversion of Medium Btu Gas to Electrical Energy, Shell Gasification: Based Phasing Study' and 'Development of Combustion Turbine Capital and Operating Costs,'" prepared by Fluor Daniel, Inc. for BPA, December 1989. Performance curves to adjust plant output and heat rates to ISO conditions are contained in "Shell Gasification-Based Phasing Study," Fluor Technology, Inc. for BPA, November 1986, Figures 3-1 to 3-4.

NO_x emissions factor: (0.175 lbs/mmbtu) From Fluor 1990, p. 3-4.

NO_x controls: Water injection at combustor.

NO_x damage cost: ($0.0344/lb total; $0.0228/lb human health risk; $0.0010/lb materials; $0.0046/lb crops; $0.006/lb visibility) From the Generic Coal Study. Assumes east-side generic coal plant, medium-sized city, 1990$, NO_x emissions total: 22,048,000 lbs/year. Same as for east-side pulverized coal.

SO_x emissions factor: (0.001 lbs/mmbtu) From Fluor 1990, p. 3-4.

SO_x controls: None.

SO_x cost: $0.75/lb total based on EPA reservation cost for SO_x emissions allowance.

TSP emissions factor: (0.001 lbs/mmbtu) From Fluor 1990, p. 3-4.

TSP controls: None.

TSP damage cost: ($0.0833/lb total; $0.0829/lb human health risk; $0.0004/lb materials) From the Generic Coal Study. TSP emissions total: 1,050,000 lbs/year. Same as for east-side pulverized coal.

CO_2 emissions factor: (117 lb/mmbtu) Based on natural gas fuel. Cheng, "Potential Reductions in US CO_2 Emissions," p. 26.

CO_2 controls: None.

Proxy for land, water and other: (0.001/kWh) Representative value from BPA case studies, Pace report, and New York Public Service Commission values.

NATURAL GAS-FIRED COGENERATION--WEST OF CASCADES

Heat rate: (5017 btu/kWh) Average effective heat rate of four types of natural gas-fired cogeneration units with combustion turbines. Heat rates range from 4800 btu/kWh to 5067 btu/kWh. The heat rates are from computer modeling done for BPA's 1990 Resource Program.

NO_x emissions factor: (0.175 lbs/mmbtu) From Fluor 1990, p. 3-4.

NO_x controls: Not determined.

NO_x damage cost: ($.4421/lb total; $0.3535/lb human health risk; $0.0096/lb materials; $0.0071/lb crops; $0.0719/lb visibility) From the Generic Coal Study. Assumes west-side generic coal plant, large-size city, 1990$, NO_x emissions total: 22,048,000 lbs/year.

SO_x emissions factor: (0.001 lbs/mmbtu), Fluor Daniel, Inc., ibid., March 1990, p. 3-4.

SO_x controls: Not determined.

SO_x cost: $0.75/lb total based on EPA reservation cost for SO_x emissions allowance.

TSP emissions factor: (0.001 lbs/mmbtu) From Fluor 1990, p. 3-4.

TSP controls: Not determined.

TSP damage cost: ($.7698/lb total; $.7660/lb human health risk; $0.0038/lb materials) From the Generic Coal Study. TSP emissions total: 1,050,000 lbs/year.

CO_2 emissions factor: (117 lb/mmbtu) Based on natural gas fuel. Cheng, "Potential Reductions in US CO_2 Emissions," p. 26.

CO_2 controls: None

Proxy for land and other: ($0/kWh) Effects would have occurred in the absence of electrical generation.

NATURAL GAS-FIRED COGENERATION--EAST OF CASCADES

Heat rate: (5017 btu/kWh) Average effective heat rate of four types of natural gas-fired cogeneration units with combustion turbines. Heat rates range from 4800 btu/kWh to 5067 btu/kWh. The heat rates are from computer modeling done for BPA's 1990 Resource Program.

NO_x emissions factor: (0.175 lbs/mmbtu) From Fluor 1990, p. 3-4.

NO_x controls: Not determined.

NO_x damage cost: ($0.0344/lb total; $0.0228/lb human health risk; $0.0010/lb materials; $0.0046/lb crops; $0.006/lb visibility) From the Generic Coal Study. Assumes east-side generic coal plant, medium-sized city, 1990$, NO_x emissions total: 22,048,000 lbs/year.

SO_x emissions factor: (0.001 lbs/mmbtu) From Fluor 1990, p. 3-4.

SO_x controls: Not determined.

SO_x cost: $0.75/lb total based on EPA reservation cost for SO_x emissions allowance.

TSP emissions factor: (0.001 lbs/mmbtu) From Fluor 1990, p. 3-4.

TSP controls: Not determined.

TSP damage cost: ($0.0833/lb total; $0.0829/lb human health risk; $0.0004/lb materials) From the Generic Coal Study. TSP emissions total: 1,050,000 lbs/year.

CO_2 emissions factor: (117 lb/mmbtu) Based on natural gas fuel. Cheng, "Potential Reductions in US CO_2 Emissions," p. 26.

CO_2 controls: None

Proxy for land and other: ($0/kWh) Effects would have occurred in the absence of electrical generation.

NEW HYDRO FACILITIES AND ADDITIONS TO EXISTING SITES

BPA has performed two studies of the environmental costs associated with new hydroelectric facilities. One was a case study of an actual facility, then called the Sultan River Project near Everett, Washington. 2/ The other was an attempt to derive generic environmental costs for all types of hydroelectric facilities. 3/ Using information from environmental analyses conducted during the permitting and licensing of the project, the case study resulted in a successful effort to estimate environmental costs for the project. The generic study produced estimates of value for several environmental goods and services likely to be affected by typical hydroelectric facilities.

BPA and other parties in the region also developed the Pacific Northwest Rivers Study and the Hydro Site Data base. Those efforts result in environmental characterization of nearly all potential hydro sites in the region. BPA uses the results of those studies to derive estimates of the supply potential of hydropower in the region. Environmental factors influence the probability of development at the different sites and, consequently, have already influenced the cost and supply of hydropower estimated by BPA.

Based on the results of the two environmental cost studies and the information from the Pacific Northwest Rivers Study, BPA determines that an appropriate environmental cost adder for new hydro sites, on a generic basis, equals two mills per kWh, in real levelized 1990 dollars. For hydroelectric additions to existing sites, BPA determines that a value of half that of a new site is appropriate. Thus, an environmental cost adder for that resource is one mill per kWh.

Higher values may be appropriate for specific sites. However, BPA has excluded resources located in Protected Areas. This means that no anadromous fish impacts are expected to result from new hydroelectric facilities. In addition, the process of deriving supply estimates of new hydropower in the region effectively eliminates hydro sites having significant environmental impacts.

Conversely, hydro sites do affect environmental conditions, potentially altering fish and wildlife habitat, riparian conditions, recreational opportunities and other environmental goods and services. Therefore, an environmental cost adder greater than zero is deemed appropriate. BPA

2/ Biosystems Analysis, Inc., Final Report--Methods for Valuation of Environmental Costs and Benefits of Hydroelectric Facilities, A Case Study of the Sultan River Project, prepared for Bonneville Power Administration, Portland, Oregon, June 1984.

3/ P. Meyer, and E. Cheslak, et al., Calculation of Environmental Costs and Benefits Associated with Hydropower Development in the Pacific Northwest, prepared for Bonneville Power Administration, Portland, Oregon, April 1986.

determines that two mills for new facilities and one mill for additions to existing facilities places new hydro in the appropriate range of values for the environmental cost adders for all resource types. BPA will continue to review the appropriateness of these environmental cost adders and welcomes comment.

GEOTHERMAL

(<1.0 mills/kWh)

Source: Eco Northwest, Ltd., Shapiro and Associates, Inc., and Seton, Johnson, and Odell, Inc., Estimating Environmental Costs and Benefits For Five Generating Resources, Final Report: Description of Generic Generating Resources, Their Likely Significant Environmental Effects, and the Economic Value of Those Effects, prepared for Bonneville Power Administration, March 1986, p. 4-8, adjusted to 1990$.

Generic Plant Assumptions:

Plant Size:	10 MW
Capacity Factor:	80%
Average Annual Output:	70,080,000 kWh
Expected Plant Life:	30 years

Main pollutants:

Hydrogen sulfides
Radon222

Because of the location of plants in isolated areas, there is minimal human health risk to hydrogen sulfides and radon222 emissions. Geothermal fluids are assumed to be re-injected. Consequently the total real levelized cost of environmental effects from geothermal plant operations is less than 1.0 mills/kWh.

WIND

(0.5 mills/kWh)

Source: Eco Northwest, Ltd., Shapiro and Associates, Inc., and Seton, Johnson, and Odell, Inc., Estimating Environmental Costs and Benefits For Five Generating Resources, Final Report: Description of Generic Generating Resources, Their Likely Significant Environmental Effects, and the Economic Value of Those Effects, prepared for Bonneville Power Administration, March 1986, p. 4-10, adjusted to 1990$.

Generic Plant Assumptions:

Plant Size:	35 MW
Capacity Factor:	20%
Average Annual Output:	61,320,000 kWh
Expected Plant Life:	15 years

Main Pollutants:

None

No economically significant environmental effects from the operations phase of the wind units were found.

CONSERVATION

(0 mills/kWh)

Source: M. E. Baechler, D. H. Fickeisen, and P. L. Hendrickson, Environmental Effects and Mitigation for Energy Resources, prepared by Pacific Northwest Laboratory for the Bonneville Power Administration, Portland, Oregon, May 1990, pp. 12-1 to 12-11.

Main Pollutants: Possible entrapment of radon gas and other toxic fumes from sealing homes.

Assumes full mitigation of air quality effects will occur via air to air heat exchanges. No other "operational" effects from conservation are known.

SOLAR

(<1.0 mills/kWh)

Source: Eco Northwest, Ltd., Shapiro and Associates, Inc., and Seton, Johnson, and Odell, Inc., Estimating Environmental Costs and Benefits For Five Generating Resources, Final Report: Description of Generic Generating Resources, Their Likely Significant Environmental Effects, and the Economic Value of Those Effects, prepared for Bonneville Power Administration, March 1986, p. 4-9, adjusted to 1990$.

Generic Plant Assumptions:

Plant Size:	100 MW
Capacity Factor:	25%
Average Annual Output:	219,000,000 kWh
Expected Plant Life:	40 years

No economically significant environmental effects from the operations phase of the solar units were found.

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Addendum 1

1. Heat content of coal= 8600 btu/lb.

Source: Thermal Resources Data Base, 1987 edition, PNUCC Resources Committee, Portland, Oregon, p. 20.

2. Therefore 116.28 lbs. of coal per mmbtu.

$$\frac{1 \text{ lb.}}{8600 \text{ btu}} = \frac{116.28 \text{ lbs.}}{1{,}000{,}000 \text{ btu}}$$

3. Assume coal is 48 percent carbon.

Source: Electric Power Research Institute Technical Assessment Guide, Volume 1, "Electricity Supply," December 1986, EPRI P-4463-SR, Palo Alto, CA, Table 2-2.

4. 116.28 x .48 = 55.81 lbs C/mmbtu

5. 1 lb C = 3.67 lbs C (by periodic table)

6. Ergo 55.81 x 3.67 = 205 lbs CO_2/mmbtu

---PGNP---

GROSS NATIONAL PRODUCT IMPLICIT PRICE DEFLATOR

PGNP INDEX 1982 = 1.000

	PGNP	% chg.
1971	0.444	NA
1972	0.465	4.8
1973	0.495	6.5
1974	0.540	8.9
1975	0.593	9.9
1976	0.631	6.3
1977	0.673	6.7
1978	0.722	7.3
1979	0.786	8.8
1980	0.857	9.1
1981	0.940	9.6
1982	1.000	6.4
1983	1.039	3.9
1984	1.077	3.7
1985	1.109	3.0
1986	1.138	2.6
1987	1.174	3.1
1988	1.213	3.3
1989	1.263	4.2
1990	1.309	3.7
1991	1.360	3.9
1992	1.419	4.3
1993	1.480	4.3
1994	1.549	4.6
1995	1.624	4.8
1996	1.703	4.9
1997	1.787	4.9
1998	1.877	5.0
1999	1.971	5.0
2000	2.071	5.1
2001	2.179	5.2
2002	2.293	5.3
2003	2.413	5.2
2004	2.537	5.1
2005	2.665	5.1
2006	2.799	5.0
2007	2.940	5.1
2008	3.093	5.2
2009	3.254	5.2
2010	3.419	5.1

SOURCE: DRI, WINTER 1989-90 LONG-TERM REVIEW

APPENDIX E

APPENDIX E

SECTION 1: Hydro System Operations
- Important Terms and Concepts
- Hydropower System Planning and Operation

SECTION 2: Transmission Requirements

SECTION 1
IMPORTANT TERMS AND CONCEPTS

Federal Columbia River Power System (FCRPS) as a Multi-Use System

The Federal Columbia River Power System serves multiple purposes in addition to power generation: flood control, navigation, recreation, irrigation, fishery benefits, and other such non-power uses. BPA markets the power from FCRPS projects pursuant to the Bonneville Project Act and other Federal legislation and orders. FCRPS projects are operated by the U. S. Army Corps of Engineers and the Bureau of Reclamation. BPA and these agencies have Memorandums of Understanding recognizing each others' responsibilities and establishing operating arrangements. Non-power uses and electric power production are brought together in the development of "operating constraints" (see following discussion of Operating Constraints).

The Pacific Northwest Coordination Agreement (Coordination Agreement)

The electric utilities of the Pacific Northwest plan and operate their systems in a coordinated manner. BPA plays a major role in this planning. This planning is carried out under the specifications of the Agreement for Coordination of Operations among Power Systems of the Pacific Northwest, also known as the Pacific Northwest Coordination Agreement. The Coordination Agreement's major provisions deal with preparation of the Annual Operating Plan, and the monthly, weekly, and daily operations of the parties' generating systems. Coordination of reservoir operations is given special attention, particularly when there is diverse ownership of generating plants downstream from a reservoir.

The Coordination Agreement does not cover two significant aspects of coordination: long-range planning of new resources, and short-term hour-by-hour coordinated operation of generating facilities.

All major generating utilities in the Pacific Northwest are parties to the Coordination Agreement, except The Idaho Power Company. Idaho Power does coordinate its Brownlee Reservoir operations in concert with the Agreement to a certain extent. Joint planning is essential because the system utilities

are interconnected electrically through shared transmission facilities, and hydraulically through the effect of released water on downstream hydroelectric projects. The advantages to the region of operating a coordinated system are:

- ability to take advantage of more efficient operation of hydro resources;
- ability to exchange power among member utilities;
- assistance gained during emergency outages of transmission lines or generators;
- ability to take advantage of diversities among systems in loads, generation, and maintenance outages; and
- reduced overall costs from coordinated use of all facilities and elimination of duplicative or multiple generation, transmission, and control facilities.

Reservoir-owning parties and parties with downstream generating plants coordinate storage and release of water and interchange power among systems to achieve more efficient use of the hydro system for the region and greater guarantees of meeting firm load.

Operating Constraints

FCRPS plants are operated to produce power within "operating constraints," some of which describe the physical operating limits of the project, and some of which prioritize the use of the project between power and non-power uses. Operating constraints may limit maximum or minimum reservoir levels, project outflows, spills, rates of change of outflows, or many other operating parameters. These limits are often different for various times of the year.

Operations planning is another important guide to FCRPS operation, and to the trade-offs between power and non-power functions of each project.

At the time each hydroelectric project is designed, numerous operating parameters are defined. These include the maximum and minimum reservoir elevations, minimum outflows, and other parameters. Operating limits sometimes include maximum rates of change of reservoir levels or outflows. Some may be the direct result of physical design parameters: for example, the minimum reservoir elevation may be determined by the vertical placement of the outlet works. Some may be to preserve existing river uses. A good example of this is the minimum project outflow. Some operating constraints may be established to obtain benefits for uses other than power, for example, minimum

outflows may be established to provide water for irrigation or for downstream navigation. Minimum reservoir elevations may be established to permit navigation or recreation on the reservoir. Flood control operation of typical Pacific Northwest reservoirs results in some of the most complex operating constraints. These usually vary both seasonally and with forecasts of runoff.

To the extent these constraints are established during the design phase, they are taken into account in the studies which determine the feasibility of the project. After a project begins operating, additional operating constraints may have to be established, possibly because some effect of operations was overlooked in the design phase or because conditions have changed. Hopefully, these constraints will not be so great as to undo the feasibility of the project.

While some constraints are very definite, for example, those based on the physical characteristics of the project, others may be simply a priority of use. Not infrequently, non-power constraints can be met without adversely impacting power production. However, when similar constraints are applied to many FCRPS projects, meeting them all may become impossible. Some constraints are more definite, while others express a desire for a certain operation if it is possible without impacting other uses.

Water Budget

The Northwest Power Act gave BPA significant new responsibilities to mitigate the effects of the development and operation of the FCRPS on fish and wildlife. These activities are conducted with the guidance of the Northwest Power Planning Council's Fish and Wildlife Program. One of the first measures taken by BPA and hydroproject operators to carry out the Council's first Program was the implementation of the first Water Budget in 1983. BPA treats the Water Budget as a firm operating constraint that allows for the Fish Passage Managers to request certain levels of flow in the Columbia and Snake Rivers between April 15 and June 15 to help juvenile salmon and steelhead achieve their downstream migration to the sea. For the Water Budget, water is reserved in the reservoirs and is released, either through the turbines or as spill, depending on the demand for energy, at times and in quantities as specified by the Fish Passage Managers within the guidelines of the Water Budget plan. The Water Budget results in an amount of Firm Energy Load Carrying Capability (FELCC - see following discussion of FELCC) to be produced in the April 15 to June 15 period which is in excess of the demand for firm energy. It results in an overall decrease in the amount of firm power which can be produced to meet the region's firm loads. This decrease is borne collectively by the Coordination Agreement parties. Affected parties, including BPA, attempt to store the excess firm energy from April 15 to June 15 outside the Columbia River Basin or market it.

Annual Spill Plans

Until mainstem Columbia and Snake River projects are properly screened to protect fish runs, the Council's Fish and Wildlife Program calls for spills of water to carry fish over dams instead of letting the fish pass through the turbines. Enough spill must be provided to protect at least 90 percent of the young fish at each project through the middle 80 percent of the runs. The Program calls for project owners and operators to develop and implement spill plans. These plans list percentages of spill for specific projects. Development and implementation of spill plans are multi-party efforts involving fishery agencies and tribes and project owners and operators.

BPA and fishery agencies and tribes have developed a 10-year spill agreement which would set forth spills at specific projects pending completion of other acceptable bypass methods.

The Critical Period

The critical period is that portion of the historical 50-year streamflow a record which, when combined with draft of all available reservoir storage, will produce the least amount of energy, with energy used according to seasonal load patterns. At present, the coordinated system's critical period is about 3-1/2 years long, encompassing the historical period from September 1928 through February 1932.

Prior to the construction of the three "Canadian Storage" reservoirs and the Libby dam, the coordinated system's critical period was about 9 months long, encompassing the historical months from September 1936 through April 1937. The data on actual water conditions that prevailed during the critical period are used with current data on loads and resources to determine FELCC.

Firm Energy Load Carrying Capability (FELCC)

FELCC is the level of energy capable of being produced by the hydrogeneration system using all of the reservoir storage in combination with critical period streamflows. FELCC is used to determine the levels to which the coordinated system's reservoirs may be drafted to produce firm energy. The Coordination Agreement's published annual operating program includes the FELCC for each month of the coming operating year for the coordinated system and for each participant.

Refill

Each year, Coordinated System Operations endeavor to refill reservoirs each summer to what is referred to in the Coordination Agreement as "normal top elevation." Operations during the year are constantly analyzed in light of best available data to check their effect on probability of refill. If refill standards are not achieved, Coordination Agreement parties must adopt the FELCC for a critical period year other than the first year. In such a case, FELCC Shift is not available. If first year FELCC is not adopted, parties may have to increase expensive thermal operations, make outside purchases, or use restriction rights.

Annual Operating Plan

Each year, an operating plan is prepared for the next July-June operating year. It combines the operating characteristics of thermal and hydroelectric plants, load forecasts, and historical streamflows to determine system capabilities. It uses monthly (sometimes half-month) time increments. It describes loads and resource capabilities in terms of two quantities -- average energy for monthly periods, and peakload or generating capability during the month. The purpose of the Annual Operating Plan is to determine how much load can be served with existing resources.

Determination of the Multi-Year Critical Period and FELCC

Preparation of the Annual Operating Plan starts in February of each year. Participants in the Coordination Agreement (BPA, various investor-owned utilities, public utilities, and hydroelectric project operators) submit loads, resources, and operating constraints for a multi-year period (that is, each year, they submit data for the next 4 years) for use in developing an Annual Operating Plan. The Northwest Power Pool Coordinating Group then uses a computerized model to produce the Actual Energy Regulation study to determine the critical period for the coordinated system and the total FELCC for the coordinated system and for each member system.

The planning model takes into account the constraints imposed on the system (flood control, navigation, irrigation, the Water Budget, and other factors).

An important concept of the Coordination Agreement is that the energy studies are made by using the total coordinated system as if it were a single-ownership system.

The Critical Rule Curve -- Levels to Meet Firm Loads

The Critical Rule Curve is a tabulation for each reservoir of the end-of-month elevation that corresponds to the reservoir's draft under critical period streamflow conditions to produce the firm energy capability. Because the critical period is longer than one year, several critical rule curves are necessary to describe each reservoir's draft regime during the first, second, third, and fourth years of the critical period. The critical rule curves for an individual system or for the coordinated system can be constructed by converting the remaining storage in each reservoir at the end of the month to units of energy, then totalling all reservoirs in the system. The critical rule curve is an important guide to operations. If the coordinated system reservoirs are below the critical rule curve level, then the reoccurrence of one or possibly more historical sequences of low streamflows could result in the inability of the system to generate its firm energy capability, even if all its reservoirs were drafted empty. Thus, operation of the coordinated system reservoirs below their critical rule curves could jeopardize the system's ability to meet its firm loads for the remainder of the critical period.

Energy Content Curve -- Levels to Protect Refill

The energy content curve for each reservoir is the higher of its critical rule curve or the lowest level from which the reservoir would have a 95 percent probability of refilling by the following July 31. Refill probabilities are based on an analysis of 50-year historical streamflows at the reservoir.

The energy content curve is an important guide to operations. In order to protect the system's ability to develop its firm energy capability in future years, systems are not permitted to generate energy in excess of their FELCC loads if their system of reservoirs is below the energy content curve as long as such energy can be stored. This means that the use of streamflows to refill a reservoir is given priority over their use for generating nonfirm energy. Thus, the energy content curve is the primary guide that system operators use to determine whether nonfirm energy is available for sale from their systems.

Pacific Northwest Hydropower System
Planning and Operation

Introduction

The Pacific Northwest depends on its hydroelectric power system for a large percentage of its electric power needs. The amount of runoff in this system is highly variable. The average annual runoff is about 134 million acre-feet (MAF), but in the past has varied from a low of about 78 MAF to a high of 193 MAF. The monthly mean streamflow (unregulated), as measured at the Dalles, Oregon, can range from 40,000 cfs in January to 1,240,000 cfs in May.

The hydro system consists of many "run-of-river" projects with limited daily or weekly storage, and a few much larger "seasonal storage" projects whose storage may be drawn upon over a year or more before emptying or refilling. Since streamflows do not occur in the same pattern as electric energy requirements, the water is used as a storage medium for potential energy. The streamflow pattern is regulated into a more usable shape by controlling project outflow to store energy when natural streamflows exceed load requirements, and to release stored energy as needed. The total storage capacity of the system is only about 42 MAF, nearly half of which is located in Canada. The Canadian portion of the storage is operated by BC Hydro, with the U.S. rights determined by the Columbia River Treaty. Because of the low storage capacity compared with runoff, the hydro system has the potential of producing about 12,000 average megawatts (aMW) of energy as "firm" during low runoff conditions. It can generate about 16,000 aMW on a long-term average basis, and about 19,000 aMW in a high runoff year. This means that in planning the coming year there is an additional unknown factor; up to 7,000 aMW of nonfirm energy that may or may not be available.

Seasonal Planning

The operational planning of Pacific Northwest hydro system is based on the Pacific Northwest Coordination Agreement (PNCA). The PNCA is a contract among the parties to that agreement that defines how planning and operation of the hydro system is carried out on a coordinated basis. The Treaty reservoir storage space in Canada is included in the PNCA planning process and is operated to rule curves and refill requirements similar to other Pacific Northwest reservoirs. Planning is based on the "critical period," which is that period using the historical streamflow data base during which the hydro system can produce the least amount of power while drafting the water in the reservoirs allocated to power from full to empty. The amount of power produced under critical water conditions is called "firm." The critical period itself is most often defined as the 42 months of low streamflow from September 1, 1928, through February 29, 1932. This represents the level of risk that the regional utilities have contractually agreed upon under the PNCA in relying on the hydro system to produce firm energy. Since flows are usually better than what occurs under critical water conditions, the amount of additional power produced is called "nonfirm." If all the runoff could be stored in any streamflow runoff year, as is the case with some other large hydro power systems in the U.S., the hydro system could always produce an average amount of power, and firm energy would be based on average runoff.

The flexibility of the hydro system to "shape" generation to meet load is limited by many constraints. Constraints modeled in the planning process include upper storage limits for flood control or recreation, project minimum and maximum outflows, tailwater restrictions, spills of water from dams to transport juvenile fish around (rather than through) the turbines, and the water set aside for increased streamflows to aid in the downstream migration of fish (the Water Budget). While meeting these and other constraints, hydro system flexibility is used wherever possible for power operations. By drafting reservoirs earlier in the year to meet higher loads, energy is shifted forward in time, or "borrowed" from the future, up to certain limits. While thermal plants are meeting base loads, the hydro system is meeting both base and peak loads. Nighttime constraints on the ability to refill plants that have storage capability further limit the system. Operational constraints limit the ability to shift firm energy within the critical period. These constraints place limits on the amount of reservoir drawdown permitted at certain times during the year.

In planning for each coming operating year, Northwest utilities prepare a critical period study in accordance with the PNCA. This study defines certain operational parameters called critical rule curves under which the system will operate. A critical rule curve for a reservoir is a schedule of the end-of-month storage contents attained by that reservoir in the critical period study. Critical rule curves are designed to protect the ability of the hydro system to serve firm load with the occurrence of flows no worse than those of the critical period. For each reservoir, there is a set of four rule curves showing storage contents, one rule curve for each year from July 1928, through June 1932. The critical period study shows how the system would operate if all the loads and resources were in place as forecasted and the historical critically low streamflows reoccur. The study also defines the amount of load the system can serve on a firm basis (the firm energy load carrying capability, or FELCC). Operationally, the system reservoirs are drafted proportionately with respect to each reservoir's critical rule curves under noncritical, but highly variable, streamflow conditions.

Operations

The critical rule curves are used along with reservoir refill requirements to develop the generation needed to meet the FELCC regardless of the amount of streamflow that actually occurs. For example, if the flows during the given month are less than the flows used in the critical period study, the system reservoirs would be drafted proportionately according to each reservoir's critical rule curves taking into consideration each project's refill probability. If the flows are higher, but the reservoirs are lower than the rule curves, then the reservoirs could be proportionately filled to the rule curve while meeting firm loads. If the system is surplus when compared with critical water conditions, then nonfirm energy would be offered to displace higher cost Northwest thermal resources, exported out of the region, stored in reservoirs, or spilled. Note, however, that the Northwest under the PNCA would not draft the reservoirs below their rule curves to serve nonfirm markets because that would jeopardize the system's ability to meet its FELCC in the remainder of the operating year. In addition, this would also impair the ability of the system to refill all reservoirs by July 31 of each year.

Ideally, the system refills each summer. By late summer, in most years, the snowpack in the region has melted, causing the streamflows to recede sharply. In order to continue meeting FELCC, reservoirs must be drafted. In some years, climatic conditions are such that the system is surplus and some nonfirm energy is available in the fall or early winter. In January, the first snowpack measurements and the first forecasts of the January through July runoff are made. Flood control curves are developed to prevent flooding in the spring and refill requirements are developed so as to insure that firm loads are met and system reservoirs are refilled by July 31. This would not be difficult if accurate forecasts of the January through July runoff were available. However, the January forecast is based on actual snowpack and projected precipitation through July. The future precipitation can vary greatly from projections and since most storage reservoirs and drainage areas are relatively remote, little accurate data are available on the amount of snowpack loss or gain between snowpack surveys. Even with January through July runoff projections updated monthly, a project may run at maximum generation one month for flood control, and then because of an unexpectedly low snowpack measurement, be run at minimum the next month in order to refill. The closer to July, the more accurate the forecast, since less of it is based on future precipitation. Unfortunately, if a reservoir is drafted too much early in the season based on a high projected runoff, it may be impossible to refill if precipitation is much below normal. Likewise, if it is not drafted enough, flood control will force water to be spilled, a loss that can run to tens of thousands of dollars per hour. With an annual runoff that varies between about 60 percent and 145 percent of normal and limited storage space, hydro operations is really a continual balancing act between maximizing revenues and the need to refill annually for recreation, fisheries, and to assure future energy needs.

Differences Between Hydro and Thermal Systems

A major difference between hydro and thermal systems is the time it takes to bring generation on line. A thermal plant can require hours, or even days, to reach maximum output, while hydro units can be brought on line in a few minutes. A coal or nuclear plant is limited in its ability to ramp up or down, while a hydro system can usually call upon a large number of units to be brought on line singly or in groups. A thermal plant's fuel supply can be controlled within certain limits while there is very limited control over the hydro system's "fuel" due to variations in the amount of the spring runoff, or the runoff from sudden rainstorms or snowmelts. Moreover, as previously discussed there are significant restrictions on the ability of the hydro resource to generate power because of the need to refill reservoirs, the requirements to maintain specific elevations for flood control, wildlife, recreation, navigation, or irrigation; and the requirement to provide flows for fish migration, recreation, and navigation.

SECTION 2
Transmission Requirements

The present evaluation of transmission system impacts potentially resulting from alternative resource developments are based on assumptions of resource size and location, and probable load centers:

- Generation size assumption: Up to 2,000 megawatts from any one location.
- Load center assumptions: Major load centers are located west of the Cascade Mountains, centered around Portland and Seattle. Greatest load growth is in the Puget Sound area.
- Coal-fired generation location assumptions: (1) Colstrip, in eastern Montana; (2) Creston, in east central Washington; (3) Boardman, in north central Oregon; (4) Thousand Springs, in northeast Nevada; (5) Southern Powder River Basin, in central Wyoming; and/or (6) Centralia, in western Washington.
- Nuclear generation location assumptions: (1) WNP-1, at Hanford, in central Washington; and (2) WNP-3, at Satsop in western Washington.
- Combustion turbine generation location assumption: Near load centers.
- Energy import assumptions: (1) from Canada west of the Cascade Mountains; (2) from Canada east of the Cascade Mountains; and (3) from California.

Developing some of these potential resources would require construction of major new transmission lines to deliver the power to load centers. Some resources would not require major new transmission construction. Generally, resources located farther from load centers, especially resources east of BPA's transmission system, would require construction of more transmission facilities than would resources closer to load centers.

For resources that would require construction of major transmission facilities, the probable routes of new transmission lines would generally be along existing transmission line corridors and would use recognized corridors across the Cascade Mountains. These probable routes are shown in Figure E-1. Other routes are possible. This evaluation provides only a general understanding of the potential impacts of integrating probable transmission requirements for each resource, as summarized in Table E-1. Detailed, site-specific analysis of transmission alternatives and impacts would proceed when specific generating resources are proposed for development.

Figure E-1

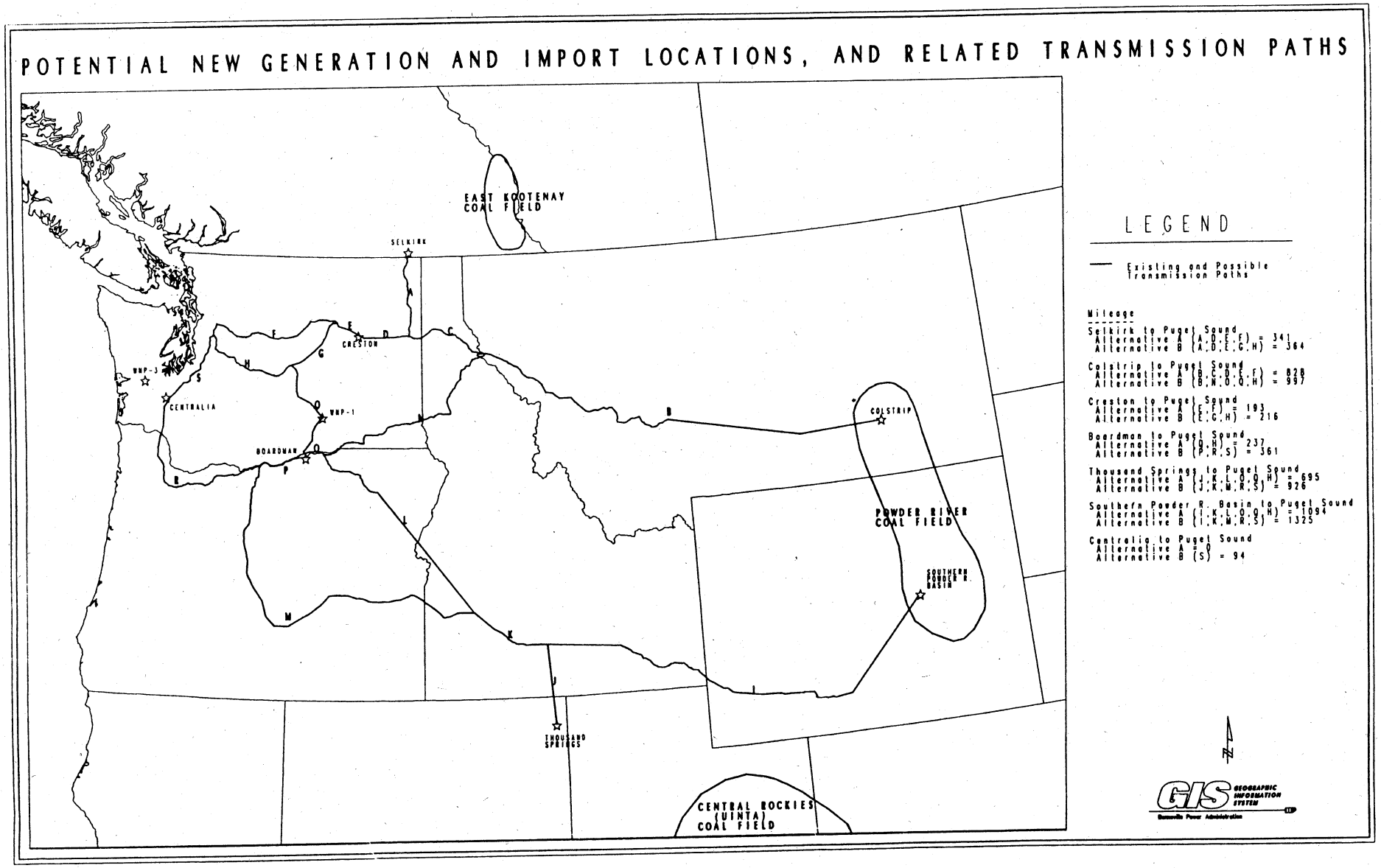
POTENTIAL NEW GENERATION AND IMPORT LOCATIONS, AND RELATED TRANSMISSION PATHS
EAST KOOTENAY COAL FIELD
SELKIRK
CRESTON
WNP-3
CENTRALIA
WNP-1
BOARDMAN
COLSTRIP
POWDER RIVER COAL FIELD
SOUTHERN POWDER R. BASIN
THOUSAND SPRINGS
CENTRAL ROCKIES (UINTA) COAL FIELD
LEGEND
Existing and Possible Transmission Paths
Mileage
Selkirk to Puget Sound
Alternative A (A,D,E,F) = 341
Alternative B (A,D,E,G,H) = 364
Colstrip to Puget Sound
Alternative A (B,C,D,E,F) = 828
Alternative B (B,N,O,Q,H) = 997
Creston to Puget Sound
Alternative A (E,F) = 193
Alternative B (E,G,H) = 216
Boardman to Puget Sound
Alternative A (Q,H) = 237
Alternative B (P,R,S) = 361
Thousand Springs to Puget Sound
Alternative A (J,K,L,O,Q,H) = 695
Alternative B (J,K,M,R,S) = 926
Southern Powder R. Basin to Puget Sound
Alternative A (I,K,L,O,Q,H) = 1094
Alternative B (I,K,M,R,S) = 1325
Centralia to Puget Sound
Alternative A = 0
Alternative B (S) = 94
N
GIS GEOGRAPHIC INFORMATION SYSTEM
Bonneville Power Administration

Table E-1
Summary of Resource Transmission Requirements

Resource	Possible Transmission Requirements
Coal	
Colstrip	Up to about 850 miles of major new transmission
Creston	Up to about 215 miles of major new transmission
Boardman	Up to about 250 miles of major new transmission
Thousand Springs	Up to about 925 miles of major new transmission
So. Powder River Basin	Up to about 1,325 miles of major new transmission
Centralia	Local transmission system improvements
Nuclear	
WNP-1	Up to about 190 miles of new transmission
WNP-3	Local transmission system improvements
Combustion Turbine	Local transmission system improvements
Energy Import	
Canada, west	Up to about 690 miles of major new transmission
Canada, east	Up to about 365 miles of major new transmission
California	Up to about 300 miles of new transmission

Resources Located West of the Cascades

Integrating new generation resources sited near the heavy loads west of the Cascades would probably require only local transmission system improvements. Potential resources in this category include combustion turbines, WNP-3 at Satsop, and additional coal-fired generation at Centralia.

Resources Located East of the Cascades

Integrating new generation resources sited east of the Cascades would probably require construction of major new transmission facilities to deliver the power west of the Cascades. Completing development of WNP-1 may require up to about 190 miles of new transmission. Developing coal-fired generation at Creston may require up to about 215 miles of new transmission. Further development of coal-fired generation at Boardman may require up to about 250 miles of new transmission.

Resources Located East of the BPA Transmission Network

Integrating new resources sited east of the BPA transmission network would require construction of major transmission interties. Developing additional coal-fired generation at Colstrip may require up to about 850 miles of new transmission. Developing coal-fired generation in the southern Powder River Basin may require up to about 1,325 miles of new transmission. Developing coal-fired generation at Thousand Springs may require up to about 925 miles of new transmission.

Import from Canada

Transmission system improvements required to accommodate future import energy from Canada are very uncertain. Transmission requirements for import with delivery west of the Cascade Mountains depend on whether and how the transmission system is improved to resolve existing problems associated with load growth in the Bellingham, Washington, area. BPA has published a Notice of Intent to Prepare an Environmental Impact Statement (EIS) for the BPA/Puget Power Northwest Washington Transmission Project; the EIS will address alternative transmission actions and their relationship to potential energy imports from Canada. It is possible that up to about 690 miles of new transmission (mostly in Canada) would be required to accommodate substantial energy imports from Canada.

Transmission requirements for import east of the Cascade Mountains depend on whether and how the transmission system will change to increase Washington Water Power's (WWP's) supply of electricity in the Spokane, Washington, area. WWP has proposed to increase north-to-south transfer capacity by adding a 230-kV double-circuit transmission line from Canada to the Spokane area. WWP has accordingly applied to the U.S. Department of Energy for a Presidential permit to interconnect with B.C. Hydro. The Department of Energy published a draft EIS on the proposed WWP/B.C. Hydro Transmission Interconnection Project

in December 1989 (DOE/EIS 0141-D). To accommodate potential additional imports east of the Cascade Mountains for BPA power supply, this project might be expanded to 500-kV single- or double-circuit construction. Alternatively, a separate 500-kV transmission line might be constructed from Canada to Spokane. With either alternative, an additional 500-kV line may be needed from Spokane to Puget Sound. For delivery west of the Cascade Mountains, up to about 364 miles of new transmission may be required.

Import from California

The south to north transfer capacity of the existing and planned transmission interties with California is adequate to accommodate potential imports from California to the Pacific Northwest. But because the northern terminals of the interties are east of the Cascade Mountains, up to about 300 miles of new transmission may be required to deliver the power to load centers.

APPENDIX F

APPENDIX F

SECTION 1

EVALUATION OF THE HEALTH EFFECTS OF OZONE FOR THE BPA RESOURCE PROGRAM

SECTION 1

EVALUATION OF THE HEALTH EFFECTS OF OZONE FOR THE BPA RESOURCE PROGRAMS EIS

INTRODUCTION

Health effects due to ozone for the Resource Programs EIS alternatives have been estimated based on air quality modeling data and health risk coefficients for ozone. High and low ambient air pollutant concentrations for the four reference sites were applied to estimated populations within 80 km of the sites to obtain cumulative exposures for ambient levels of ozone at each location. The ambient ozone levels were representative of moderate-to-poor air quality for each site, and were independent of the pollutant levels from power production facilities. Ozone concentrations in the plumes from power production facilities were evaluated for the alternatives with the highest and lowest pollutant emission levels, and cumulative exposures within the plume were calculated on the basis that the plume was blowing toward the sector containing the largest share of the 80-km population. The health risk coefficient was applied to the cumulative exposures at each site for each ambient concentration and emission level to estimate the number of acute mortalities expected from the ozone concentrations at each site and for the total resource stack.

AIR QUALITY MODELING

Air concentration data were obtained from the RPM-II model. In this analysis, plume ozone concentrations as a function of time of day (and distance from the source) were estimated for a puff release of ozone precursor pollutants. Both ambient levels of ozone and concentrations within the plume were calculated for the initial resource configuration (1991) and for scenarios in the years 2000 and 2010 having the highest and lowest pollutant emission levels. Because ozone formation models are designed to estimate short-term peak concentrations for regulatory purposes, annual average impacts for each resource alternative were not estimated as for other air quality data.

Instead, each of the four sites was evaluated at two ambient pollutant levels and for the high- and low-plume emission levels for each period, based on a mid-Summer date (July 1) and a 4-mph wind speed with constant wind direction. Maximum plume ozone concentrations were generally about 10 to 20% greater than the corresponding ambient concentration, and only a small fraction of the 80-km zone surrounding the source (less than 5%) was affected by the plume. For this analysis, plume ozone concentrations were applied to the directional sector containing the largest population to obtain a high-end estimate for ozone impacts. Because the population distribution within the maximum sector was unknown, the exposed fraction of the population within that sector was assumed to be equal to the fraction of the area affected by the plume.

HEALTH RISK ESTIMATES

The health risk estimates for ozone are based only on acute mortality because no data were available for morbidity (ECO Northwest 1987). Risk levels for acute mortality following exposure to ozone were taken from studies by Lave and Seskin (1978), Lipfert (1984), and Mendelsohn and Orcutt (1979), averaging 6E-06 per æg/m^3 ambient air concentration. Because the available health effects information was applicable to annual average ambient ozone concentration, several assumptions were made to convert the seasonal hourly ozone concentration data to a suitable quantity for use in the health effects analysis.

The ozone data for all times and distances in a given case were averaged to obtain a representative daily mean ambient ozone concentration for the entire 80-km zone and for the fraction of the sector affected by the plume. This assumes that the 18 h/day for which the ozone concentrations were calculated represented the average concentration for the full 24 hours, and that the distance from the source had a negligible effect on plume ozone concentration (or alternatively, that the concentration represented an average for all distances). Ambient ozone concentrations were independent of distance and depended only on the time of day. The validity of these assumptions is unknown in the absence of more detailed data.

Both plume and ambient ozone concentrations were applied to 25% of the days during the 3-month summer season (6.25% of the year), and ozone concentrations were assumed to be negligible for the remaining months.

An average air temperature of 15°C and 76-cm Hg atmospheric pressure were used to convert the ozone concentrations in pphm to æg/m^3.

The health risk coefficient for acute mortality is applicable at, and independent of, ozone concentrations encountered in this situation.

RESULTS

The "low ambient" and "high ambient" impacts were estimated for each location, and the results for all four sites were added to obtain an overall range of potential impacts for the ambient ozone levels. Results of the evaluation are presented in Tables 1a and 1b. The impacts for ozone in this analysis were greatest at the Centralia site because of the large surrounding population and the relatively high ambient ozone concentrations. The risk of acute mortality from background ozone levels was several times greater than for any other types of air pollutants related to power production, based on the annual average concentrations for nitrogen oxides, sulfur oxides, and particulates in the most recent evaluation (Rhoads 1991).

The impact of ozone from the power plant plumes (Tables 2a - 2f) was smaller than that of the background ozone concentrations, principally because of the smaller population affected. Annual mortality rates ranged from about 8 to 11 acute deaths per year, depending on the assumed ambient pollution levels. Pollutant emission levels from different power production alternatives had a negligible effect on the plume ozone mortality estimates, which were comparable in magnitude to those from other types of pollutants. One analysis in the EIS is based on the average of the concentration scenarios shown in Table 2a.

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TABLE 1a. Health Effects Estimate for Ambient Ozone Levels

Acute Mortality Risk from Ambient Ozone Levels (deaths/y)

Site:	Centralia	Creston	Boardman	Colstrip	Total
Ozone Level:					
Low Ambient	23.1	6.2	18.7	0.3	48.3
High Ambient	30.1	8.6	21.6	0.6	60.7

Health Risk Coefficient for Acute Mortality (Deaths/y per $\mu g/m^3$): 6.0E-06
Fraction of Year that Ambient Concentration Persists: 0.0625

Cumulative Exposure to Ambient Ozone Levels (person-$\mu g/m^3$-y)

Site:	Centralia	Creston	Boardman	Colstrip
Ozone Level:				
Low Ambient	6.15E+07	1.66E+07	5.00E+07	8.87E+05
High Ambient	8.02E+07	2.28E+07	5.75E+07	1.49E+06

Site-Specific Information for Cumulative Exposure Calculation

Site:	Centralia	Creston	Boardman	Colstrip
Population:				
80-km Total	567068	276603	402244	12756
Plume Fraction	111192	107295	31830	1732
Ambient Fraction	455876	169308	370414	11024
Ozone Level:				
Low Ambient	D. Rural	T. Rural	D. Rural	C. Rural
High Ambient	Urban 2	D. Rural	Urban 1	D. Rural

Ambient Air Concentrations ($\mu g/m^3$)

Time	Clean Rural	Typical Rural	Dirty Rural	Urban 1	Urban 2
18-hr Average	80.48	98.06	134.86	155.23	175.88

Conversion to $\mu g/m^3$: 1 pphm O_3 = 20.3 $\mu g/m^3$ O_3
(Assumes 15° C, 76 cm Hg)

Ambient Air Concentrations (pphm)

Time	Clean Rural	Typical Rural	Dirty Rural	Urban 1	Urban 2
18-hr Average	3.96	4.83	6.64	7.65	8.66

TABLE 1b. Health Effects Estimate for Ambient Ozone Levels

Time	Plume Width (mi)	Ambient Air Concentrations (pphm) Clean Rural	Typical Rural	Dirty Rural	Urban 1	Urban 2
1:00	0.68	3.98	4.00	3.91	3.84	3.67
2:00	1.26	3.98	3.99	3.91	3.84	3.67
3:00	1.81	3.98	3.99	3.90	3.83	3.66
4:00	2.35	3.98	3.99	3.90	3.84	3.67
5:00	2.87	3.97	4.00	3.93	3.89	3.75
6:00	3.39	3.98	4.10	4.18	4.21	4.10
7:00	4.05	3.98	4.31	4.65	4.84	4.70
8:00	4.82	3.96	4.59	5.30	5.89	5.66
9:00	5.82	3.93	4.79	5.93	6.46	7.02
10:00	6.84	3.91	4.96	6.58	7.94	8.55
11:00	8.14	3.91	5.14	7.31	8.86	10.10
12:00	9.57	3.93	5.32	8.07	9.80	11.60
13:00	11.50	3.94	5.46	8.74	10.60	12.80
14:00	13.42	3.96	5.57	9.31	11.30	13.80
15:00	15.29	3.98	5.65	9.71	11.80	14.40
16:00	16.90	3.99	5.68	9.95	12.10	14.80
17:00	18.33	4.00	5.70	10.10	12.30	15.00
18:00	19.32	4.00	5.71	10.20	12.30	15.00
18-hr Average:	--	3.96	4.83	6.64	7.65	8.66

TABLE 2a. Health Effects Estimate for Ozone in Power Plant Plume

Acute Mortality Risk from Plume Ozone Levels (deaths/y)

Year: 1991	Concentration Scenarios	
Ambient Ozone Level:	Low	High
Plume Emission Level:	All	All
Site:		
Centralia	4.31	5.45
Creston	N/A	N/A
Boardman	1.35	1.55
Colstrip	0.03	0.06
Total:	5.7	7.1

Year: 2000				
Ambient Ozone Level:	Low	Low	High	High
Plume Emission Level:	Low	High	Low	High
Site:				
Centralia	4.12	4.04	5.28	5.21
Creston	2.91	2.80	4.49	4.40
Boardman	1.29	1.25	1.48	1.43
Colstrip	0.03	0.03	0.06	0.06
Total:	8.3	8.1	11.3	11.1

Year: 2010				
Ambient Ozone Level:	Low	Low	High	High
Plume Emission Level:	Low	High	Low	High
Site:				
Centralia	3.92	3.92	5.10	5.10
Creston	2.78	2.65	4.38	4.27
Boardman	1.15	1.11	1.33	1.29
Colstrip	0.03	0.03	0.06	0.05
Total:	7.9	7.7	10.9	10.7

TABLE 2b. Health Effects Estimate for Ozone in Power Plant Plume

Health Risk Coefficient for Acute Mortality (Deaths/y per $\mu g/m^3$): 6.0E-06
Fraction of Year that Ambient Concentration Persists: 0.0625

Cumulative Exposure to Plume Ozone Levels (person-$\mu g/m^3$-y)

Year:		2000				2010				1991	
	Ambient Ozone Level:	Low	Low	High	High	Low	Low	High	High	Low	High
	Plume Emission Level:	Low	High	Low	High	Low	High	Low	High	All	All
Site:	Affected Population:										
Centralia	111192	1.1E+07	1.1E+07	1.4E+07	1.4E+07	1.0E+07	1.0E+07	1.4E+07	1.4E+07	1.1E+07	1.5E+07
Creston	107295	7.7E+06	7.5E+06	1.2E+07	1.2E+07	7.4E+06	7.1E+06	1.2E+07	1.1E+07	N/A	N/A
Boardman	31830	3.5E+06	3.3E+06	3.9E+06	3.8E+06	3.1E+06	3.0E+06	3.5E+06	3.4E+06	3.6E+06	4.1E+06
Colstrip	1732	7.0E+04	7.0E+04	1.6E+05	1.5E+05	7.0E+04	7.0E+04	1.5E+05	1.5E+05	7.4E+04	1.7E+05

Directional Sector Width at 50 mi from source:
20 mi

Plume Width at 50 mi from source:
11 mi

18-hour Average Plume Ozone Concentrations ($\mu g/m^3$)

Year:	2000				2010				1991	
Ambient Ozone Level:	Low	Low	High	High	Low	Low	High	High	Low	High
Plume Emission Level:	Low	High	Low	High	Low	High	Low	High	All	All
Site:										
Centralia	98.85	96.94	126.55	124.86	94.06	94.06	122.40	122.40	103.39	130.69
Creston	72.22	69.57	111.59	109.35	68.97	65.87	108.89	106.07	N/A	N/A
Boardman	108.39	104.74	124.07	119.92	96.28	93.23	111.52	108.33	113.50	130.03
Colstrip	40.55	40.27	90.02	87.52	40.31	40.32	85.86	84.65	42.61	95.69

Plume Ozone Concentrations (pphm)

Conversion to $\mu g/m^3$
1 pphm = 20.3 $\mu g/m^3$ O_3

TABLE 2c. Health Effects Estimate for Ozone in Power Plant Plume

Plume Ozone Concentrations (pphm) as a Function of Time and Distance from Source

Site: Centralia **Year:** **2000** **2010** **1991**

Time	Distance (mi)	Plume Width(mi)	Ambient: Emissions: Low Low	Low High	High Low	High High	Low All	High All	Low All	High All
18-hr Average			4.87	4.78	6.23	6.15	4.63	6.03	5.09	6.44
1:00	4	0.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2:00	8	1.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:00	12	1.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:00	16	2.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:00	20	2.87	0.10	0.09	0.11	0.10	0.09	0.10	0.12	0.13
6:00	24	3.39	0.44	0.42	0.48	0.45	0.40	0.43	0.54	0.58
7:00	28	4.05	0.96	0.91	1.02	0.97	0.87	0.92	1.16	1.22
8:00	32	4.82	1.55	1.46	1.63	1.54	1.36	1.45	1.84	1.93
9:00	36	5.82	3.10	2.95	3.38	3.21	2.73	2.99	3.57	3.85
10:00	40	6.84	4.73	4.54	5.39	5.19	4.28	4.92	5.24	5.87
11:00	44	8.14	6.28	6.08	7.49	7.31	5.79	7.04	6.76	7.96
12:00	48	9.57	7.64	7.44	9.51	9.34	7.17	9.09	8.13	9.94
13:00	52	11.50	8.86	8.66	11.40	11.30	8.37	11.00	9.32	11.80
14:00	56	13.42	9.79	9.60	12.90	12.80	9.34	12.60	10.20	13.20
15:00	60	15.29	10.50	10.30	14.00	13.90	10.10	13.70	10.70	14.20
16:00	64	16.90	11.00	10.90	14.70	14.60	10.60	14.50	11.20	14.80
17:00	68	18.33	11.30	11.20	15.00	14.90	11.10	14.80	11.40	15.10
18:00	72	19.32	11.40	11.40	15.20	15.10	11.20	15.00	11.50	15.30

TABLE 2d. Health Effects Estimate for Ozone in Power Plant Plume

Plume Ozone Concentrations (pphm) as a Function of Time and Distance from Source

Site: Creston			Year:	2000				2010				1991	
Time	Distance (mi)	Plume Width(mi)	Ambient: Emissions:	Low Low	Low High	High Low	High High	Low Low	Low High	High Low	High High	Low All	High All
18-hr Average				3.56	3.43	5.50	5.39	3.40	3.25	5.36	5.23	N/A	N/A
1:00	4	0.68		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2:00	8	1.26		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:00	12	1.81		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:00	16	2.35		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:00	20	2.87		0.43	0.24	0.48	0.26	0.22	0.14	0.24	0.16	0.00	0.00
6:00	24	3.39		1.11	0.82	1.27	0.95	0.78	0.59	0.89	0.67	0.00	0.00
7:00	28	4.05		1.72	1.44	2.09	1.72	1.38	1.13	1.67	1.37	0.00	0.00
8:00	32	4.82		2.28	1.97	2.99	2.58	1.90	1.63	2.51	2.13	0.00	0.00
9:00	36	5.82		3.54	3.22	4.89	4.48	3.16	2.85	4.39	3.95	0.00	0.00
10:00	40	6.84		4.44	4.15	6.50	6.11	4.09	3.81	6.03	5.61	0.00	0.00
11:00	44	8.14		5.19	4.90	7.91	7.59	4.84	4.58	7.52	7.11	0.00	0.00
12:00	48	9.57		5.80	5.52	9.05	8.85	5.46	5.18	8.80	8.47	0.00	0.00
13:00	52	11.50		6.23	6.02	9.87	9.82	5.97	5.70	9.80	9.58	0.00	0.00
14:00	56	13.42		6.49	6.36	10.40	10.40	6.32	6.10	10.40	10.30	0.00	0.00
15:00	60	15.29		6.60	6.56	10.60	10.80	6.54	6.38	10.80	10.80	0.00	0.00
16:00	64	16.90		6.71	6.76	10.90	11.00	6.75	6.64	11.10	11.20	0.00	0.00
17:00	68	18.33		6.75	6.85	11.00	11.20	6.86	6.80	11.20	11.30	0.00	0.00
18:00	72	19.32		6.75	6.88	11.00	11.20	6.89	6.88	11.20	11.40	0.00	0.00

TABLE 2e. Health Effects Estimate for Ozone in Power Plant Plume

Plume Ozone Concentrations (pphm) as a Function of Time and Distance from Source

Site: Boardman **Year:** **2000** **2010** **1991**

Time	Distance (mi)	Plume Width(mi)	Ambient: Emissions:	Low Low	Low High	High Low	High High	Low Low	Low High	High Low	High High	Low All	High All
18-hr Average				5.34	5.16	6.11	5.91	4.74	4.59	5.49	5.34	5.59	6.41
1:00	4	0.68		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2:00	8	1.26		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:00	12	1.81		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:00	16	2.35		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:00	20	2.87		0.21	0.14	0.22	0.14	0.09	0.09	0.10	0.09	0.78	0.77
6:00	24	3.39		0.83	0.59	0.84	0.60	0.42	0.40	0.42	0.41	1.61	1.62
7:00	28	4.05		1.61	1.25	1.63	1.27	0.90	0.86	0.92	0.88	2.52	2.54
8:00	32	4.82		2.43	1.97	2.50	2.04	1.45	1.34	1.50	1.38	3.47	3.53
9:00	36	5.82		4.30	3.74	4.69	4.12	2.90	2.67	3.21	2.94	5.31	5.70
10:00	40	6.84		5.96	5.41	6.67	6.13	4.49	4.20	5.15	4.81	6.87	7.57
11:00	44	8.14		7.45	6.93	8.46	7.96	6.01	5.70	7.02	6.68	8.15	9.17
12:00	48	9.57		8.75	8.29	10.00	9.57	7.38	7.08	8.67	8.35	9.13	10.40
13:00	52	11.50		9.77	9.45	11.20	10.90	8.59	8.28	10.10	9.81	9.80	11.40
14:00	56	13.42		10.40	10.20	12.10	11.90	9.54	9.25	11.20	10.90	10.20	12.00
15:00	60	15.29		10.80	10.80	12.60	12.50	10.30	10.00	12.00	11.80	10.50	12.40
16:00	64	16.90		11.10	11.20	12.90	12.90	10.80	10.60	12.60	12.40	10.70	12.60
17:00	68	18.33		11.20	11.40	13.10	13.10	11.20	11.00	12.90	12.70	10.80	12.80
18:00	72	19.32		11.30	11.50	13.10	13.20	11.30	11.20	13.10	12.90	10.80	12.80

TABLE 2f. Health Effects Estimate for Ozone in Power Plant Plume

Plume Ozone Concentrations (pphm) as a Function of Time and Distance from Source

Site: Colstrip			Year:	2000				2010				1991	
Time	Distance (mi)	Plume Width(mi)	Ambient: Emissions:	Low Low	Low High	High Low	High High	Low Low	Low High	High Low	High High	Low All	High All
18-hr Average				2.00	1.98	4.43	4.31	1.99	1.99	4.23	4.17	2.10	4.71
1:00	4	0.68		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2:00	8	1.26		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3:00	12	1.81		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4:00	16	2.35		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:00	20	2.87		0.09	0.09	0.09	0.10	0.10	0.11	0.10	0.11	0.09	0.09
6:00	24	3.39		0.38	0.41	0.41	0.43	0.43	0.46	0.45	0.47	0.37	0.41
7:00	28	4.05		0.76	0.80	0.84	0.86	0.85	0.89	0.90	0.94	0.76	0.89
8:00	32	4.82		1.06	1.10	1.28	1.28	1.15	1.19	1.29	1.33	1.11	1.41
9:00	36	5.82		1.72	1.71	2.47	2.36	1.73	1.75	2.30	2.29	1.86	2.84
10:00	40	6.84		2.34	2.31	3.90	3.70	2.32	2.32	3.59	3.52	2.52	4.42
11:00	44	8.14		2.87	2.84	5.40	5.17	2.84	2.83	5.01	4.90	3.05	5.95
12:00	48	9.57		3.26	3.24	6.76	6.51	3.24	3.23	6.34	6.20	3.43	7.32
13:00	52	11.50		3.55	3.53	7.98	7.73	3.53	3.53	7.56	7.42	3.70	8.53
14:00	56	13.42		3.77	3.74	8.95	8.69	3.73	3.73	8.52	8.39	3.91	9.49
15:00	60	15.29		3.92	3.88	9.74	9.48	3.87	3.87	9.30	9.16	4.08	10.20
16:00	64	16.90		4.04	3.99	10.30	10.10	3.97	3.94	9.87	9.73	4.22	10.80
17:00	68	18.33		4.10	4.04	10.80	10.50	4.01	3.98	10.40	10.20	4.32	11.20
18:00	72	19.32		4.10	4.02	10.90	10.70	3.97	3.92	10.50	10.40	4.37	11.30

APPENDIX F

SECTION 2

EVALUATION OF THE HEALTH EFFECTS OF NITROGEN OXIDES, SULFUR OXIDES, AND TOTAL SUSPENDED PARTICULATES

SECTION 2

EVALUATION OF THE HEALTH EFFECTS OF NITROGEN OXIDES, SULFUR OXIDES, AND TOTAL SUSPENDED PARTICULATES

INTRODUCTION

The effects of each of the alternative scenarios for power generation on human health and mortality were estimated for populations within 80 km (50 mi) of existing and proposed production facilities. Results from the air quality analyses were coupled with population data for the corresponding location to estimate collective exposure to the pollutants for which air quality standards have been established. These were combined with published risk estimates for acute morbidity and mortality to determine the health impact of airborne emissions from power-generating facilities in each region. Estimates of lifetime cancer risk were also developed for metals and radionuclides associated with airborne particulates. Finally, the health effects for each of the four potential power-generation sites were summed to determine the total impact of each alternative scenario in the resource program. Emissions were evaluated at the beginning of the study period (1991) and in the years 2000 and 2010.

AIR QUALITY ESTIMATES

Air concentrations for critical pollutants were obtained from the air quality task for use with the population and health risk estimates. Pollutants evaluated in this analysis were nitrogen oxides (NOX), sulfur oxides (SOX), and total suspended particulates (TSP) which are produced by fossil fuel combustion. This analysis also includes trace materials such as radionuclides and metals which are components of TSP. Health risks were only estimated out to 80 km because this is the generally accepted range of applicability of the Gaussian plume model used to determine air concentrations. Concentrations were estimated for a polar grid consisting of 16 directions and 10 distances at intervals of 1,600 m (1 mi) out to 8,000 m (5 mi) and every 16 km (10 mi) out to 80 km at each of the four sites. Air

concentrations were determined from local meteorological conditions and quantities of the various pollutants released according to the type and capacity of the power-generating facilities associated with each site for a particular scenario.

POPULATION DISTRIBUTIONS

Population grids corresponding to the air concentration data were developed for each of the four potential power-generating sites using 1980 census data (Bureau of the Census 1982a, 1982b, 1982c, and 1982d). Data prepared from the 1980 census was used in this evaluation because time did not permit evaluation of the newly received 1990 data. The populations for each sector were estimated by direction and distance from the populations of cities located within the sector and the average population density outside of cities on a county-by-county basis for the area within each individual sector. The population distributions for all four sites are listed in Table 1.

Uncertainties in the census data are discussed in the individual state summary documents (Bureau of the Census 1982a, 1982b, 1982c, and 1982d.) For purposes of this analysis, additional uncertainty is introduced by the assumption that the population located outside of the incorporated areas was uniformly distributed throughout the area of the applicable county.

HEALTH RISK ESTIMATES

Health risk estimates for acid aerosols from fossil fuel combustion were adapted from those developed for the generic coal study (ECO Northwest 1987). In addition, an attempt was made to correlate lifetime cancer risk from metals and radionuclides in coal fly ash with the air particulate concentrations. Risk estimates for acute mortality, cancer mortality, and morbidity were then applied to the collective exposure at each of the four sites to obtain a total health impact for the various resource alternatives. A summary of the risk estimates for all pollutants and health effects is found in Table 2.

Acute Mortality

Estimates of acute mortality risk for sulfur oxides and particulates were taken from the studies of Lave and Seskin (1978) and Lipfert (1984) as

applied in the Generic Coal Study. A similar study by Mendelsohn and Orcutt (1979) reported results that were specific for sulfates and sulfur dioxide; however, those estimates were not used in this analysis because information about the relative composition of sulfur oxides in coal plant emissions was not available. The acute mortality risk estimates of 50E-06 and 30E-06, respectively, from these studies were averaged to arrive at a risk from sulfur oxides of 40E-06/person-year per microgram/m^3 ambient air concentration. This average value was 40% of the risk estimated in the Mendelsohn and Orcutt study for sulfate, indicating that ambient sulfur oxides are probably a mixture of chemical forms that are less potent than sulfate alone.

Estimates of acute mortality for particulates were also taken from the above mentioned studies and averaged to obtain representative value for use in this evaluation. Risks from airborne particulates ranged from 1E-06 to 5E-06, and averaged 3E-06/person-y per $\mu g/m^3$ ambient air concentration. Comparable risk levels for acute mortality following exposure to ozone were found in the above studies, averaging 6E-06 per $\mu g/m^3$ ambient air concentration. No effect on acute mortality was found to be correlated with exposure to nitrogen oxides in the literature surveyed.

Acute Morbidity

Morbidity data related to ambient air pollution are somewhat less abundant than mortality data, and were only available for sulfates and particulates. Estimates given in the Generic Coal Study (based on Lunn et al. 1970, Ware et al. 1986, and EPA 1974) were applied using the assumption that ambient sulfur oxides were 40% as effective as sulfate, consistent with the mortality data. For purposes of this analysis, it was assumed that exposure to ambient sulfur oxides carries a risk/person-y per $\mu g/m^3$ air concentration of 400E-06 for coughs and bronchitis, 360E-06 for colds, and 200E-06 for lower respiratory disease.

Cancer Mortality

Estimates of lifetime risk for cancer mortality were developed based on the concentrations of metals and radionuclides in fly ash from coal burning. Estimates of air concentration for metals were calculated by multiplying the ambient particulate concentration times the weight fraction of metals in

respirable particulates from coal-burning plants (Davison et al. 1974, Fisher et al. 1980, and Ondov et al. 1979). Risk estimates for inhalation of the metals arsenic, beryllium, and chromium were obtained from the U.S. Environmental Protection Agency's on-line IRIS database, and a composite risk for the three metals was calculated as the sum of the risks from the individual metals based on the weighted concentration of each in airborne particulates.

A similar procedure was used to estimate risk from the radionuclides U-238, Ra-226, Po-210, Pb-210, Th-230, and Th-232, based on their activity concentrations in particulates released from coal plants (Roeck et al. 1987). The effective dose equivalent resulting from inhalation of each radionuclide was calculated based on the dose conversion factors recommended by the U.S. Department of Energy (1988) and an inhalation rate of 22,000 L/d for 70 years. The radiation dose was converted to lifetime cancer risk using the estimate of 400E-06 per person-rem recommended by EPA (1989).

Limitations and Uncertainty in Health Risk Data

Risk estimates for acute morbidity and mortality resulting from exposure to inhaled pollutants are associated with uncertainties that are comparable in magnitude to the estimates themselves (ECO-Northwest 1987). Estimates of lifetime cancer risk from inhalation of the metals may vary within a factor of 5 to 10 or greater, depending on the nature and quantity of experimental data available, and are assumed to be appropriate for the exposure levels and chemical forms encountered in the environment (EPA-IRIS). In addition, none of the lifetime cancer risks account for intake of metals or radionuclides as a result of particulate deposition and subsequent entry of the materials into food chain pathways. Ingestion pathways may be significant for those elements that accumulate in the environment or in food products consumed by humans.

Estimated health impacts of the pollutants considered in this analysis were treated as additive because no information was available to determine the effect of synergism or antagonism between various classes of pollutants. These estimates should therefore be treated as relative measures of the consequences of various program alternatives for the purpose of comparing them. Absolute estimates of their impact are associated with additional

uncertainty. An example of an analytic approach is shown in Table 3 which illustrates health risks and exposure for each pollutant type.

RESULTS

Results of the health effects impact analysis are summarized in Table 4. For all endpoints evaluated, there were relatively minor differences between the 12 resource program alternatives. Compared to the base case, impacts in the year 2000 increased by 29 to 59% for lifetime cancer risk, and by 13 to 27% for acute mortality and morbidity. Corresponding increases for the year 2010 were 56 to 94% for lifetime cancer risk and 26 to 34% for acute morbidity and mortality. Metals accounted for the majority of the lifetime cancer risk, and sulfur oxides dominated the risks for acute morbidity and mortality. Because of its larger surrounding population, impacts from the Centralia site account for the largest proportion of consequences for all scenarios. Compared to the 1991 base case, the largest increases in health risk resulted from the Conventional Coal alternative, followed by the Imports alternative. High Conservation and Cogeneration produced the smallest increases in health risk.

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TABLE 1. Population Distribution for BPA Resource Program Study Sites

Estimated number of persons living at a given location relative to source
(Based on 1980 Census)

Direction:	Distance (miles from plant) 0-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50
Centralia, WA										
N	2	7	42	16	131	1097	4387	41463	1003	2618
NNW	2	7	11	16	131	1097	4387	7311	3039	11536
NW	2	7	11	59	131	1097	3127	951	5897	2436
WNW	2	7	11	16	20	633	2397	951	4578	3287
W	2	7	11	16	20	170	678	1132	1585	4948
WSW	2	7	11	16	20	11725	678	1131	1585	2038
SW	2	7	11	16	20	170	678	1130	1579	1213
SSW	2	7	11	16	20	6270	678	1402	2352	2020
S	2	7	11	16	20	170	2978	1948	4899	44820
SSE	2	7	11	16	20	170	678	1402	2737	3519
SE	2	7	11	16	20	170	678	1130	2159	2964
ESE	2	7	11	16	20	170	678	1130	3309	2034
E	2	7	11	16	20	170	1142	3170	5588	12079
ENE	2	7	11	16	20	633	4387	9801	18206	22124
NE	2	7	11	59	131	1616	5278	10218	17208	23887
NNE	2	7	11	16	131	1097	5667	23790	5679	169563
Creston, WA										
N	0	1	1	2	3	25	247	168	235	522
NNW	0	1	1	2	3	24	101	168	235	302
NW	0	1	1	2	3	23	96	168	288	688
WNW	0	1	1	2	3	22	87	152	3403	1344
W	0	1	1	2	3	22	1209	475	1059	1247
WSW	0	1	1	2	3	22	87	145	721	1659
SW	0	1	1	2	3	22	87	145	375	1078
SSW	0	1	1	2	3	22	87	1154	203	347
S	0	310	1	2	3	22	87	145	203	434
SSE	0	1	1	2	3	22	87	145	203	2060
SE	0	1	1	2	3	22	594	145	203	5315
ESE	0	1	1	2	3	22	1646	145	6472	19922
E	0	1	1	2	3	22	87	145	13161	185322
ENE	0	1	1	2	3	22	240	529	3080	8877
NE	0	1	1	2	3	22	293	657	1200	3070
NNE	0	1	1	2	3	22	317	657	919	1182

TABLE 1. Population Distribution for BPA Resource Program Study Sites (contd)

Estimated number of persons living at a given location relative to source
(Based on 1980 Census)

Direction:	Distance (miles from plant) 0-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50
Boardman, OR										
N	0	1	1	2	2	245	980	1633	2286	2940
NNW	0	1	1	2	2	245	980	1633	7837	2814
NW	0	1	1	2	2	245	798	2624	11315	4499
WNW	0	1	1	2	2	132	616	420	1339	1855
W	0	1	1	2	2	20	165	338	588	757
WSW	0	1	1	2	2	20	79	613	129	162
SW	0	1	1	2	2	20	79	111	129	165
SSW	0	1	1	2	2	20	424	131	176	201
S	0	1	1	2	2	20	79	131	183	236
SSE	0	1	1	2	2	20	79	1936	183	236
SE	0	1	1	2	2	20	154	320	358	693
ESE	0	1	1	2	2	20	249	510	714	2548
E	0	1	1	2	2	20	306	12110	714	15439
ENE	0	1	1	2	2	720	3673	1072	1500	1251
NE	0	1	1	2	2	132	980	1633	36683	19525
NNE	0	1	1	2	2	132	2241	1633	4266	38544
Colstrip, MT										
N	0	1	1	2	2	20	79	131	183	236
NNW	0	1	1	2	2	20	79	131	2736	236
NW	1476	1	1	2	2	20	79	110	106	136
WNW	0	1	1	2	2	20	62	48	68	87
W	0	1	1	2	2	20	54	88	143	184
WSW	0	1	1	2	2	20	78	129	180	232
SW	0	1	1	2	2	20	78	129	180	232
SSW	0	1	1	2	2	20	79	129	180	232
S	0	1	1	2	2	20	79	130	182	234
SSE	0	1	1	2	2	20	79	131	183	236
SE	0	1	1	2	2	20	79	131	129	95
ESE	0	1	1	2	2	20	79	92	74	95
E	0	1	1	2	2	20	79	100	119	134
ENE	0	1	1	2	2	20	79	108	119	153
NE	0	1	1	2	2	20	79	131	140	153
NNE	0	1	1	2	2	20	79	131	183	215

TABLE 2. Health Risk Factors for Air Pollutants Associated with Fossil Fuel Combustion

	Health Risk Coefficients					
	Mortality		Morbidity (Effects/year per $\mu g/m^3$)			
Pollutant	Cancer (lifetime per $\mu g/m^3$)	Acute (risk/y per $\mu g/m^3$)	Bronchitis	Lower Respiratory Disease	Cough	Colds
Nitrogen Oxides	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Sulfur Oxides	0.0E+00	4.0E-05	4.0E-04	2.0E-04	4.0E-04	3.6E-04
Particulates	0.0E+00	3.0E-06	3.6E-04	0.0E+00	0.0E+00	0.0E+00
Metals	1.7E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Radionuclides	1.8E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

TABLE 3. Example of Approach for Analyzing Health Risks and Pollutant Type for Each Alternative

Bonneville Power Administration
Resource Program - Environmental Impact Statement
Health Effects Summary, Rev. 9/91
Scenario: 1
Year: 2000

Primary Resource Program: 1 - STATUS QUO
Total Impact of Existing and New Facilities

Cumulative Exposure (person-$\mu g/m^3$)

Pollutant	Total	Centralia	Creston	Boardman	Colstrip
NOX	753679	671503	15411	54260	12506
SO2	549199	492568	6164	36624	13843
TSP	23919	20759	925	1567	669

Health Risk Coefficients

Pollutant	Cancer Mortality Lifetime	Other Mortality (deaths/y)	Morbidity (Effects per year) Bronchitis	Lower Resp	Cough	Colds
NOX	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SO2	0.0E+00	4.0E-05	4.0E-04	2.0E-04	4.0E-04	3.6E-04
TSP	0.0E+00	3.0E-06	3.6E-04	0.0E+00	0.0E+00	0.0E+00
MET	1.7E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RAD	1.8E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Cumulative Health Risk

Pollutant	Cancer Mortality Lifetime	Other Mortality (deaths/y)	Morbidity (Effects per year) Bronchitis	Lower Resp	Cough	Colds
NOX	0.00	0.00	0.00	0.00	0.00	0.00
SO2	0.00	21.97	219.68	109.84	219.68	197.71
TSP	0.00	0.07	8.61	0.00	0.00	0.00
MET	0.42	0.00	0.00	0.00	0.00	0.00
RAD	0.04	0.00	0.00	0.00	0.00	0.00
Total	0.46	22.04	228.29	109.84	219.68	197.71

TABLE 4. Health Effects Summary for Bonneville Power Administration Resource Program - Environmental Impact Statement

Scenario:	Cumulative Health Risk					
	Mortality		Morbidity (Effects per year)			
	Cancer (lifetime)	Acute (deaths/y)	Bronchitis	Lower Respiratory Disease	Cough	Colds
Year: 1991 - Impact of Existing Facilities at Beginning of Study Period						
1 - ALL PROGRAMS	0.34	18.44	190.27	91.93	183.86	165.47
Year: 2000 - Impact of New and Existing Facilities						
1 - STATUS QUO	0.46	22.04	228.29	109.84	219.68	197.71
2 - BASE CASE 4	0.46	21.96	227.47	109.43	218.86	196.97
3 - CONSERVATION	0.46	21.96	227.43	109.42	218.84	196.96
4 - CONVENTIONAL COAL	0.54	23.24	241.62	115.78	231.56	208.40
5 - CLEAN COAL	0.48	22.30	231.24	111.14	222.29	200.06
6 - NUCLEAR	0.45	21.79	225.60	108.59	217.18	195.46
7 - COMBUSTION TURBINE	0.47	21.98	227.79	109.54	219.07	197.16
8 - RENEWABLES	0.47	22.01	228.09	109.69	219.38	197.44
9 - COGENERATION	0.45	20.79	215.54	103.58	207.15	186.44
10 - FUEL SWITCHING	0.48	22.15	229.69	110.37	220.73	198.66
11 - HIGH CONSERVATION	0.44	21.38	221.34	106.56	213.11	191.80
12 - IMPORTS	0.54	22.70	236.31	113.09	226.19	203.57
Year: 2010 - Impact of New and Existing Facilities						
1 - STATUS QUO	0.55	23.35	242.99	116.31	232.62	209.36
2 - BASE CASE 4	0.55	23.28	242.33	115.99	231.98	208.78
3 - CONSERVATION	0.55	23.28	242.33	115.99	231.98	208.78
4 - CONVENTIONAL COAL	0.62	24.46	255.12	121.80	243.59	219.23
5 - CLEAN COAL	0.53	23.50	244.07	117.08	234.16	210.75
6 - NUCLEAR	0.56	23.30	242.56	116.08	232.17	208.95
7 - COMBUSTION TURBINE	0.55	23.27	242.13	115.93	231.87	208.68
8 - RENEWABLES	0.55	23.29	242.39	116.04	232.09	208.88
9 - COGENERATION	0.54	23.24	241.65	115.77	231.55	208.39
10 - FUEL SWITCHING	0.54	23.30	242.31	116.08	232.15	208.94
11 - HIGH CONSERVATION	0.55	23.28	242.11	115.95	231.90	208.71
12 - IMPORTS	0.66	23.76	248.91	118.28	236.56	212.90

* 1991 Case has no facilities located at Creston Site.

APPENDIX F

SECTION 3

VALUATION OF SELECTED ENVIRONMENTAL IMPACTS ASSOCIATED WITH BPA RESOURCE PROGRAM ALTERNATIVES

SECTION 3

VALUATION OF SELECTED ENVIRONMENTAL IMPACTS ASSOCIATED WITH BPA RESOURCE PROGRAM ALTERNATIVES

This section documents the economic valuation of environmental impacts associated with the alternative resource scenarios discussed in the Bonneville Power Administration (BPA) Resource Program Environmental Impact Statement (RPEIS). Regional economic values are calculated for human health effects, crop losses, and visibility reductions associated with increased air pollution from power-generation sources. The impacts are converted to dollar terms using economic estimates of value from studies that have applied quantitative valuation techniques.[a] Variations in the nature of the data, the character of the economic impacts, and the usefulness of the results determine the specific methodologies selected to assess the impacts.

BACKGROUND INFORMATION

The economic analysis takes the physical effects data and combines it with price data (for market goods such as crops) or values produced by economic valuation studies (for nonmarket goods) to calculate the total costs associated with the environmental effects of each of the alternatives. The physical effects data is described in the following section. Sources of price data and economic values will be discussed as they are employed in the cost calculations.

Physical Effects Data

Separate studies--of air quality and visibility effects, human health effects, and ecological effects--were conducted to produce the original physical effects data needed to evaluate the impacts of the power-generation scenarios. These analysis are described in other sections of Appendix F of the RPEIS.

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[a] These techniques are discussed in Englin and Gygi 1991.

Each of these studies evaluated impacts at the beginning of the study period (1991) and in the years 2000 and 2010 for the 12 alternative power-generation scenarios. Effects were estimated for four generic plant locations: Western Washington, Eastern Washington, Eastern Oregon, and Eastern Montana. The effects at each site were then summed to determine the total impact of each alternative scenario in the resource program.

The air quality analysis provides information on emissions and dispersion for criteria pollutants (nitrogen oxides, sulfur oxides, and total suspended particulates), ozone, and heavy metals. The air quality analysis also estimates the amount of acidic deposition associated with each of the power-generation alternatives. For the visibility analysis, the air quality data is used to evaluate the reduction in visual range associated with air pollution.

The human health effects analysis takes the air quality data and estimates the human health risks for the population exposed to power-plant emissions. Mortality effects are evaluated for the criteria pollutants and ozone; morbidity effects of the criteria pollutants are also evaluated.

The ecological effects analysis estimates the impacts of air quality changes on crops, vegetation, and wildlife. The ecological effects analysis also estimates the impacts of changing water levels on wildlife, recreation, and irrigation. The analysis of hydro effects is primarily qualitative, consisting of narrative descriptions of the effects on wildlife habitats and human activities.

Sources of Economic Value

The economic value of health and environmental risks is measured in terms of society's willingness to pay to avoid the risks. The basic techniques used to value environmental impacts for the EIS are market prices, contingent valuation, hedonic wage, hedonic property value, and travel cost methods. Table 1 shows the specific impacts discussed in this section and the economic techniques commonly used to value them.

Market prices can be used in a straightforward manner to value goods, such as crops, that are bought and sold in organized, observed markets. The costs associated with ozone impacts on crop yields are estimated in this

analysis. Contingent valuation, a survey technique used to value nonmarket goods, bases value on how respondents react to hypothetical markets. Contingent valuation has been widely used to value recreational impacts and is used in this analysis to value human morbidity and visibility impacts.

Hedonic wage and property values are commonly used to value human health risks, air pollution, and other environmental impacts tied to jobs or property. This analysis estimates the costs associated with human mortality from air pollution using the results of hedonic wage studies. Travel cost methods are used primarily to value recreation. Their application to effects such as wildlife mortality, forest effects, and recreational fishing are discussed in this report. However, the costs associated with these impacts are not actually calculated due to insufficient data.

The economic values for specific impacts are taken from existing studies (see Englin and Gygi 1991). These values are multiplied by the magnitude of the physical effects to derive the total regional costs associated with the environmental impacts. All dollar values are adjusted to reflect 1991 dollars using the factors in Table 2.

HUMAN HEALTH IMPACTS

The specific health impacts evaluated in this analysis are the risks of cancer and other deaths and nonfatal respiratory illness among the entire population exposed to power plant emissions. Derivation of health risk estimates, selection of economic values for mortality and morbidity (nonfatal) risks, and resulting health effects costs are discussed below.

Physical Effects Data

The health effects analysis calculates cumulative mortality and morbidity risks associated with the 12 power-generation alternatives. Results from the air quality analysis were coupled with population data for each site to estimate collective exposure to critical pollutants. The exposure data were combined with published risk estimates for acute morbidity and mortality.

Mortality effects include cancer fatalities and deaths from acute illness. Estimates of lifetime cancer risk were developed for metals and radionuclides associated with airborne particulates. Lifetime cancer risks

are based on an assumed average lifetime of 70 years. Morbidity effects include bronchitis, lower respiratory disease, coughs, and colds.

Table 3 summarizes the results of the health effects analysis for pollutants other than ozone for the 12 resource program alternatives. Compared to the Base Case, impacts in the year 2000 increased by 29% to 59% for lifetime cancer risk, and from 13% to 27% for acute mortality and morbidity. Corresponding increases for the year 2010 ranged from 56% to 94% for lifetime cancer risk and 26% to 34% for acute morbidity and mortality.

Metals accounted for the majority of the lifetime cancer risk, and sulfur oxides dominated the risks for acute morbidity and mortality. Compared to the 1991 Base Case, the largest increases in health risk resulted from the Conventional Coal alternative, followed by the Imports alternative. Cogeneration and High Conservation produced the smallest increases in health risks.

Table 4 gives the health risk estimates for ozone mortality (no data were available for morbidity). The impact of ozone from power plant emissions was smaller than that of the background ozone concentrations, primarily because of the smaller population affected. Emission levels from power production facilities had a negligible effect on the ozone mortality estimates. The risk of acute mortality from background ozone levels was several times greater than for any other types of air pollutants.

Valuing Mortality Risks

The majority of efforts to value human mortality risks have been wage compensation studies, which apply hedonic wage models to calculate willingness to pay to accept increased risk associated with dangerous work. A survey of the literature by Ottinger et al. (1990) found estimates of health risk value ranging from about $1 million to $12 million for a statistical life.[a] Table 5 reports these value estimates in 1991 dollars. Based on these studies, Ottinger et al. recommend using a mid-range value of $4 million for

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(a) It is important to note that the value of a statistical life is derived by aggregating the value of small risks faced by the entire population. Although health risk values are often expressed as values per human life they really indicate a statistical life.

mortality risks in evaluating the costs associated with increased health risks.[a]

Accordingly, $4 million was inflated to 1991 dollars and used in this analysis to value the risk of fatal cancers and other deaths (acute morbidity) associated with air pollution from power generation. The adjusted value of $4.388 million was multiplied by the health risks in Tables 3 and 4 for each alternative in order to derive costs.[b] Tables 6 and 7 report the expected mortality costs for criteria pollutants and ozone for all alternatives in each study year.

Conventional Coal results in the highest mortality impacts from criteria pollutants, primarily from noncancer deaths, in 2000 and 2010. Cogeneration and High Conservation produce early savings--they have the smallest total costs in 2000--but by 2010 they have similar values to most of the other alternatives. The value of Imports is higher than all the other alternatives except Conventional Coal in 2010.

For ozone, the mortality rates were the same across all alternatives. Thus, there is a single dollar amount for all alternatives in each study year ($27.90 million in 1991, $42.65 million in 2000, and $40.72 million in 2010). The estimated ambient ozone levels are very similar in 2000 and 2010, as are the economic values of ozone mortality.

Valuing Morbidity Risks

The economic value of morbidity (nonfatal) risks was taken from a contingent valuation method (CVM) study conducted by Berger et al. (1987). This study questioned individuals on their willingness to pay for reductions in various light symptoms of illness, such as coughing and nausea. The results of this study are given in Table 8 in 1991 dollars. Since the morbidity health effects do not specify symptoms, it was not possible to value symptoms. Instead, the value specified by Berger et al. for a general sick

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(a) Thus, society is willing to pay $4 million per avoided death.

(b) The lifetime fatality estimates from the health effects analysis were divided by an expected lifetime of 70 years to derive annual mortality risks.

day ("All Symptoms Experienced") was used. This value ($95.62/day) was multiplied by the morbidity risks from Table 3 to determine the costs associated with respiratory illness (morbidity). Table 9 gives the results of these calculations for all alternatives in each study year.

VISIBILITY IMPACTS

The air quality analysis calculates the value of visibility attenuation from criteria pollutant emissions for each alternative. The physical effects data and the economic valuation of these impacts are discussed below.

Physical Effects Data

The air quality analysis estimates the visibility attenuation associated with criteria pollutant emissions for each power-generation alternative. The study used a plume dispersion model to calculate the reductions in visual range that would occur against a clear sky background at each of the four release sites for each study year. The reductions in visible range were found to be greatest where pollutant emission rates were highest. The greatest reductions in visible range occurred under the Conventional Coal alternative. Most other alternatives have slightly lower reductions in visual range.

The air quality analysis calculated the average changes in visibility for three representative sets of meteorology. Each set of meteorological conditions is assumed to represent one-third of the days in an average year at each site. These calculations are repeated for two different observer locations. This analysis takes these data points and calculates an annual average reduction in visual range for an observer at an arbitrary location for each site as follows.

The change in visibility at each site is found by averaging the lost visibility throughout the 360-degree field of each of the two observer locations. Of course, visibility losses in the direction of the plume are positive, while there is no loss in visibility when looking directly away from the plume. Because there is no information about which direction people look most of the time it is assumed that each direction is equally likely.

These estimates are used to calculate an average annual loss in visibility for the entire area downwind of the coal plant. The area-wide

annual loss is the average of the annual loss of the two observers. Therefore, the average annual loss values given in Table 10 represent the loss in visual range averaged across the year, two observer locations, and the entire field of view.

Valuing Visibility Effects

Estimates of damages related to visibility have focused on regional haze, or the loss of visibility over a distance. Several studies have estimated the willingness to pay for visual range using either the contingent valuation method or hedonic property value techniques (see Englin and Gygi 1991). Table 11 summarizes the major results relating to visibility. For the purposes of this analysis, visibility reduction was valued at $41 per mile per person on the west side of the Cascade Mountains and $7 per mile per person on the east side. These different values were chosen because of the wide difference in baseline visibility for the two regions.

In order to calculate the economic value of visibility reduction associated with power-plant emissions, the average annual loss in visibility for each coal plant is multiplied by the appropriate value of dollars per mile of visual range (i.e., $7 per mile for Centralia, $41 per mile for the other three plants). The costs for each coal plant are aggregated to regional costs for each alternative by weighting up the per-mile losses for each plant by the total population downwind of each plant. The total population-weighted losses for each plant are then aggregated by alternative to find the regional losses from diminished visibility. Table 12 gives the resulting values calculated for each alternative in all study years.

CROP EFFECTS

The ecological effects analysis evaluated the impacts of criteria pollutants and ozone on a variety of crops, including hay and wheat. The physical effects data for regional hay and wheat production and the economic valuation of this impact--which is a straightforward case of using market prices to value damages--are discussed below.

Physical Data

The ecological effects analysis calculated crop losses due to power-plant emissions for a variety of crops at each of the generic generation sites. Effects were calculated for the criteria pollutants and ozone. The results show no significant impact on crops from criteria pollutants under any of the alternatives. The crop results do show ozone effects in each of the study years. However, impacts from exposure to ozone are equal for all the alternatives, with no more than 1% crop losses at some locations. The expected crop effects are shown in Table 13.

Valuing Crop Effects

The 1989 market prices for hay and wheat in Idaho, Montana, Oregon, and Washington are shown in Table 14. These prices were averaged and inflated to 1991 dollars resulting in values of $89.26 per ton of hay and $4.45 per bushel of wheat. These values multiplied by the estimated crop losses give the results shown in Table 15. These costs apply to all alternatives in all study years.

WILDLIFE IMPACTS

The ecological effects analysis evaluated the impacts of power-plant emissions on wildlife, including avian species, rodents, deer, and elk. The physical effects data for wildlife and the economic valuation of these impacts are discussed below. However, actual costs are not estimated for these impacts due to insufficient data.

Physical Effects

Wildlife impacts from criteria pollutants, trace metals, and acid deposition were estimated for each of the alternative generation scenarios. Wildlife biologists predicted wildlife population density estimated for each of the four study sites. Mortality estimates for avian species were based on the total adult breeding birds of all species per square mile of habitat type. Waterfowl production estimates were obtained from state wildlife biologists and the U.S. Fish and Wildlife Services.

Acute mortality risk estimates were developed using those for human populations. Criteria pollutant impacts were calculated for species within 32 kilometers (20 miles) of each study site. Mortality risks are not estimated for nitrogen oxides because no information is available on the effects of chronic low exposures on mortality rates. The number of deaths resulting from exposure to sulfur dioxide and particulates is highest for birds and rodents. For example, in Western Washington, mortality estimates include 300 birds and 12,000 rodents, or about 0.02% of the local populations of these species.

The impacts of increased acidic deposition on waterfowl include increased mortality rates for some species and increased foraging which ultimately reduces the population of other species. The results showed that acidification in Western Washington may result in 2,000 additional duckling deaths per year. Although species may continue to live in the area, increased difficulty in foraging will reduce the population of species in the area.

Valuing Wildlife Effects

Although mortality data for different wildlife species are available, for most of the species in question (e.g., rodents) there has been no research on the consumption value (e.g., for hunting or observation) of an individual animal, therefore assessment of the costs of wildlife mortality is not possible. Table 16 gives consumption values that have been estimated for game species.

Even when the consumption values are known, the economic values associated with population reductions cannot be calculated without specific information about species, visits (for observers), or success rates (for hunters). For example, an increased mortality risk of 1/100,000 per deer due to air emissions would be worth about $\$1.80 \times 10^{-5}$ per hunter using the above consumptive value. Assuming that the value is the same for all consumptive and nonconsumptive users, with an average of 100,000 visits per year to hunt or view wildlife in the affected area, the reduction in value due to air pollution would be $1.80 per year. Other estimates have put values for deer as high as $6,285 each. However, these studies have been found to be over-inflated.

In any case, the ecological effects analysis shows small mortality impacts on game species. For the entire region, less than one statistical elk or deer is lost. Thus, economic values were not calculated for wildlife impacts.

HYDRO EFFECTS

The costs of impacts associated with hydroelectric power generation were not calculated in this analysis because the alternatives did not cause different hydro management regimes. As a result, the alternatives cannot be differentiated on the basis of fishing impacts. To calculate these values, data is needed on the effects of emissions or water-level fluctuations on fish populations and migration patterns as well as catch rates for impacted species and number of visits by individuals to impacted fishing sites.

A wide range of economic techniques have been applied to value recreational and commercial fisheries. Table 17 summarizes the results of the major valuation studies. These values could be used to estimate the economic value associated with the impacts of air emissions on fisheries, e.g., acidification, as well as the effects on fishing of changing water levels caused by hydroelectric projects.

FORESTRY EFFECTS

Like the other elements examined in this study, forests are affected by both market and non-market impacts. The primary market impact affecting forests is timber value. Non-market uses of a forest include its beauty, its value in stabilizing soil, and its value as a wildlife habitat, among other things. Market impacts are easily valued using timber prices. Non-market uses can be valued using one of the techniques described in Englin and Gygi 1991.

Few non-market values of forests have been quantified. One use that has been examined in the Pacific Northwest is backcountry hiking. Table 18 summarizes the results of a study that estimates hikers' willingness to pay for forests along hiking trails (Englin and Mendelsohn 1991). As discussed in Englin and Gygi 1991, travel cost techniques produce marginal willingness to

pay, which can be used to value small changes in quality, and total willingness to pay, which is used to value large changes in quality.

The negative values in Table 18 for hemlock and alpine fir indicate that hikers are not willing to pay for more miles of these tree species along hiking trails because there currently are so many of them. However, they are willing to pay rather than have all of these trees removed. In the case of hemlock, hikers would be willing to pay $2.08 to have small amounts of hemlock removed from the trail, but would pay $19.43 rather than have all the hemlock trees removed from the trail.

The values in Table 18 represent the recreational value of forests and could be used to estimate economic costs associated with ozone impacts on forests. These costs are not calculated in this analysis because of insufficient data on dose-response relationships between forests and ozone emissions.

LIMITATIONS

The analyses described above provide information about environmental costs that can be used to compare alternative scenarios. Since each alternative is evaluated using a common set of assumptions the comparative results are meaningful. There are, however, considerable uncertainties and limitations to the analysis. This section provides a discussion of several of the key limitations and omissions of the results reported in this analysis.

One set of limitations has to do with transferring economic study results from another area of the country or time period to the contemporary Pacific Northwest. A key difficulty is the plausibility of the transfer of the economic results from one area of the country to another, and from one time period to another. In general, there is no reason to believe that the valuation of environmental impacts is identical in different areas of the country. There may even, in fact, be a systematic impact if people move to an area of the country in part because of its environmental qualities.

Even holding the area of the country constant, the total amount of an environmental attribute may change from year to year. In that case the remaining amount can become even more valuable. A compelling example of this

effect is old-growth forests. Of course, improved conditions are likely to cause older estimates of value to be over-estimates of value. Finally, the changing composition of the population (for example, the aging of the "baby boom" generation) is also affecting the value of environmental attributes over time. Each of these affects the quality of the economic values used in this analysis.

A second set of difficulties has to do with the interactions among environmental attributes. To some degree, the demand for and, therefore, the willingness to pay for, any environmental good depends on the quantity of all other environmental goods available. For projects that affect only one environmental attribute these impacts may be quite small. The issue is less clear for projects, such as the alternatives in the RPEIS, that affect much of the environment over broad areas. Unfortunately, there is no way to correct for this problem within the confines of an EIS. It is, however, important to be aware of the possible inappropriateness of simply adding up the dollar value of the environmental impacts valued in this report.

Finally, considerable uncertainty remains about which impacts should be evaluated. The impacts evaluated in this study were chosen because they met three criteria: 1) The impacts have been thought important in other studies; 2) the impacts had economic values that could be transferred to the Pacific Northwest; and, 3) the impacts were physical impacts that could be differentiated between alternatives.

This set of criteria generates a list of conventional environmental impacts that have been well studied. There may remain additional impacts that have not been studied that could differentiate the environmental effects of the alternatives. For example, acid rain has not been carefully examined in this study. It may or may not be an important impact associated with some alternatives.

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TABLE 1. Type of Environmental Impact and Method of Assessment

Impact	Assessment Technique
Human Health Effects Mortality Morbidity	Hedonic Wage and Contingent Valuation Studies
Visibility	Hedonic Property Value and Contingent Valuation Studies
Crop Reductions Wheat Hay	Market Prices
Wildlife[a]	Travel Cost and Contingent Valuation Studies
Forest Recreation[a]	Travel Cost and Contingent Valuation Studies
Hydro Effects[a] Recreational fishing	Travel Cost and Contingent Valuation Studies

(a) Costs not actually calculated in this analysis for this impact.

TABLE 2. PGNP: Gross National Product Implicit Price Deflator (PGNP Index 1982 = 1.000)

YEAR	PGNP	% Change
1971	0.444	NA
1972	0.465	4.8
1973	0.495	6.5
1974	0.540	8.9
1975	0.593	9.9
1976	0.631	6.3
1977	0.673	6.7
1978	0.722	7.3
1979	0.786	8.8
1980	0.857	9.1
1981	0.940	9.6
1982	1.000	6.4
1983	1.039	3.9
1984	1.077	3.7
1985	1.109	3.0
1986	1.138	2.6
1987	1.174	3.1
1988	1.213	3.3
1989	1.263	4.2
1990	1.309	3.7
1991	1.360	3.9
1992	1.419	4.3
1993	1.480	4.3
1994	1.549	4.6
1995	1.624	4.8
1996	1.703	4.9
1997	1.787	4.9
1998	1.877	5.0
1999	1.971	5.0

TABLE 3. Criteria Pollutant Mortality and Morbidity Effects

Scenario:	Cumulative Health Risk					
	Mortality		Morbidity (Effects per year)			
	Cancer (lifetime)	Acute (deaths/year)	Bronchitis	Lower Respiratory Disease	Cough	Colds
Year: 1991 - Impact of Existing Facilities at Beginning of Study Period						
1 - ALL PROGRAMS	0.34	18.44	190.27	91.93	183.86	165.47
Year: 2000 - Impact of New and Existing Facilities						
1 - STATUS QUO	0.46	22.04	228.29	109.84	219.68	197.71
2 - BASE CASE 4	0.46	21.96	227.47	109.43	218.86	196.97
3 - CONSERVATION	0.46	21.96	227.43	109.42	218.84	196.96
4 - CONVENTIONAL COAL	0.54	23.24	241.62	115.78	231.56	208.40
5 - CLEAN COAL	0.48	22.30	231.24	111.14	222.29	200.06
6 - NUCLEAR	0.45	21.79	225.60	108.59	217.18	195.46
7 - COMBUSTION TURBINE	0.47	21.98	227.79	109.54	219.07	197.16
8 - RENEWABLES	0.47	22.01	228.09	109.69	219.38	197.44
9 - COGENERATION	0.45	20.79	215.54	103.58	207.15	186.44
10 - FUEL SWITCHING	0.48	22.15	229.69	110.37	220.73	198.66
11 - HIGH CONSERVATION	0.44	21.38	221.34	106.56	213.11	191.80
12 - IMPORTS	0.54	22.70	236.31	113.09	226.19	203.57
Year: 2010 - Impact of New and Existing Facilities						
1 - STATUS QUO	0.55	23.35	242.99	116.31	232.62	209.36
2 - BASE CASE 4	0.55	23.28	242.33	115.99	231.98	208.78
3 - CONSERVATION	0.55	23.28	242.33	115.99	231.98	208.78
4 - CONVENTIONAL COAL	0.62	24.46	255.12	121.80	243.59	219.23
5 - CLEAN COAL	0.53	23.50	244.07	117.08	234.16	210.75
6 - NUCLEAR	0.56	23.30	242.56	116.08	232.17	208.95
7 - COMBUSTION TURBINE	0.55	23.27	242.13	115.93	231.87	208.68
8 - RENEWABLES	0.55	23.29	242.39	116.04	232.09	208.88
9 - COGENERATION	0.54	23.24	241.65	115.77	231.55	208.39
10 - FUEL SWITCHING	0.54	23.30	242.31	116.08	232.15	208.94
11 - HIGH CONSERVATION	0.55	23.28	242.11	115.95	231.90	208.71
12 - IMPORTS	0.66	23.76	248.91	118.28	236.56	212.90

SOURCE: NOX, SOX, and TSP Health Effects Analysis, RPEIS, Appendix F, Section 2

TABLE 4. Summary of Mortality Risks Due to Ozone

Year	Western Washington (deaths/year)	Eastern Washington (deaths/year)	Eastern Oregon (deaths/year)	Eastern Montana (deaths/year)	Regional Average (deaths/year)
1991	4.88	0.00	1.45	0.05	1.59
2000	4.66	3.65	1.36	0.05	2.43
2010	4.51	3.52	1.22	0.04	2.32

SOURCE: Ozone Health Effects Analysis, RPEIS, Appendix F, Section 1

TABLE 5. Summary of Published Health Risk Values (dollar value per statistical life)

Study	Value Per Life (1991 dollars)
Brown (1980)	$1.4 to 2.0 million
Olson (1981)	$9.9 million
Smith (1976)	$10.3 million
Thaler and Rosen (1976)	$0.7 million
Viscusi (1979)	$3.9 to 5.3 million
Viscusi (1983)	$9.3 to 14.0 million
Moore and Viscusi (1988a)	$5.0 million
Moore and Viscusi (1988b)	$5.8 to 7.0 million
Shuman and Cavanagh (1981)	$0.4 to 4.8 million
ECO Northwest (1987)	$3.6 million

SOURCE: Ottinger et al. 1990

TABLE 6. Economic Value of Criteria Pollutant Mortality

	Cancer Costs (1991 dollars)	Acute Morbidity Costs (1991 dollars)	Total Costs (1991 dollars)
1991	$21,313	$80,914,720	$ 80,936,033
2000			
Status Quo	$28,835	$96,711,520	$ 96,740,355
Base Case 4	$28,835	$96,360,480	$ 96,389,315
Conservation	$28,835	$96,360,480	$ 96,389,315
Conventional Coal	$33,850	$101,977,120	$ 102,010,970
Clean Coal	$30,089	$97,852,400	$ 97,882,489
Nuclear	$28,209	$95,614,520	$ 95,642,729
Combustion Turbine	$29,462	$96,448,240	$ 96,477,702
Renewables	$29,462	$96,579,880	$ 96,609,342
Cogeneration	$28,209	$91,226,520	$ 91,254,729
Fuel Switching	$30,089	$97,194,200	$ 97,224,289
High Conservation	$27,582	$93,815,440	$ 93,843,022
Imports	$33,850	$99,607,600	$ 99,641,450
2010			
Status Quo	$34,477	$102,459,800	$ 102,494,277
Base Case 4	$34,477	$102,152,640	$ 102,187,117
Conservation	$34,477	$102,152,640	$ 102,187,117
Conventional Coal	$38,865	$107,330,480	$ 107,369,345
Clean Coal	$33,223	$103,118,000	$ 103,151,223
Nuclear	$35,104	$102,240,400	$ 102,275,504
Combustion Turbine	$34,477	$102,108,760	$ 102,143,237
Renewables	$34,477	$102,196,520	$ 102,230,997
Cogeneration	$33,850	$101,977,120	$ 102,010,970
Fuel Switching	$33,850	$102,240,400	$ 102,274,250
High Conservation	$34,477	$102,152,640	$ 102,187,117
Imports	$41,373	$104,258,880	$ 104,300,253

TABLE 7. Economic Value of Ozone Mortality

Year	Regional Mortality Risk[a] (deaths/year)	Annual Cost (1991 dollars)
1991	6.36	$27.9 million
2000	9.72	$42.65 million
2010	9.28	$40.72 million

(a) Regional Average from Table 4 multiplied by four.

TABLE 8. Willingness to Pay to Avoid Illness

Symptom	WTP per Day (1991 dollars)
Coughing Spells	$90.11
Stuffed-Up Sinuses	$32.40
Throat Congestion	$52.10
Itching Eyes	$57.49
Heavy Drowsiness	$168.41
Headaches	$128.93
Nausea	$56.78
All Symptoms Experienced	$95.62

SOURCE: Berger et al. 1987

TABLE 9. Economic Value of Criteria Pollutant Morbidity (1991 dollars)

Alternative	Bronchitis	Lower Respiratory Disease	Coughs	Colds	Total Costs
1991	$18,195	$8,791	$17,582	$15,823	$60,391
2000					
Status Quo	$21,831	$10,504	$21,007	$18,906	$72,248
Base Case 4	$21,752	$10,464	$20,929	$18,836	$71,981
Conservation	$21,748	$10,464	$20,927	$18,835	$71,974
Conventional Coal	$23,105	$11,072	$22,143	$19,929	$76,249
Clean Coal	$22,113	$10,628	$21,257	$19,131	$73,129
Nuclear	$21,573	$10,384	$20,768	$18,691	$71,416
Combustion Turbine	$21,783	$10,475	$20,949	$18,854	$72,061
Renewables	$21,812	$10,489	$20,979	$18,881	$72,161
Cogeneration	$20,611	$9,905	$19,809	$17,829	$68,154
Fuel Switching	$21,965	$10,554	$21,108	$18,997	$72,624
High Conservation	$21,166	$10,190	$20,379	$18,341	$70,076
Imports	$22,598	$10,814	$21,630	$19,467	$74,509
2010					
Status Quo	$23,236	$11,122	$22,245	$20,021	$76,624
Base Case 4	$23,173	$11,092	$22,184	$19,965	$76,414
Conservation	$23,173	$11,092	$22,184	$19,965	$76,414
Conventional Coal	$24,396	$11,647	$23,294	$20,964	$80,301

TABLE 9. Economic Value of Criteria Pollutant Morbidity (1991 dollars) (contd)

Alternative	Bronchitis	Lower Respiratory Disease	Coughs	Colds	Total Costs
Clean Coal	$23,340	$11,196	$22,392	$20,153	$77,081
Nuclear	$23,195	$11,100	$22,202	$19,981	$76,478
Combustion Turbine	$23,154	$11,086	$22,173	$19,955	$76,368
Renewables	$23,179	$11,097	$22,194	$19,975	$76,445
Cogeneration	$23,108	$11,071	$22,142	$19,928	$76,249
Fuel Switching	$23,171	$11,100	$22,200	$19,980	$76,451
High Conservation	$23,152	$11,088	$22,176	$19,958	$76,374
Imports	$23,803	$11,311	$22,622	$20,359	$78,095

TABLE 10. Annual Average Visibility Reduction from Criteria

Resource Alternative	Loss East of Cascades (km)	Loss West of Cascades (km)
1991	0.216129	0.3435484
2000		
STATUS QUO	0.3870968	0.4354839
BASE CASE	0.3870968	0.4451613
CONSERVATION	0.3870968	0.4354839
CONVENTIONAL COAL	0.4629032	0.4790323
CLEAN COAL	0.4032258	0.4451613
NUCLEAR	0.3822581	0.4209677
COMBUSTION TURBINE	0.3903226	0.4548387
RENEWABLES	0.3903226	0.45
COGENERATION	0.3822581	0.4209677
FUEL SWITCHING	0.3903226	0.4548387
HIGH CONSERVATION	0.3903226	0.4548387
IMPORTS	0.3951613	0.4741935
2010		
STATUS QUO	0.5919355	0.4693548
BASE CASE	0.5209677	0.4887097
CONSERVATION	0.5209677	0.4887097
CONVENTIONAL COAL	0.6274194	0.5177419
CLEAN COAL	0.5419355	0.4596774
NUCLEAR	0.5209677	0.4887097
COMBUSTION TURBINE	0.5241935	0.4790323
RENEWABLES	0.5209677	0.483871
COGENERATION	0.5306452	0.483871
FUEL SWITCHING	0.5209677	0.4741935
HIGH CONSERVATION	0.5209677	0.4645161
IMPORTS	0.5483871	0.5225806

TABLE 11. Summary of Visibility Valuation Results

Study	Estimation Procedure	Annual Average WTP for a 1-mile Change in Visual Range	WTP/Mile (1991 dollars)
California Studies			
Brookshire et al. (1979) Los Angeles (1978$)	Property value study using NO_2 and TSP Contingent valuation bidding for a change in typical conditions	$14 - $15 Obtain Improvement: $5 - $6	$19.49-19.81 $6.60-7.92
Loehman, Boldt, and Chaikin (1981) San Francisco (1980$)	Contingent valuation bidding for a change in the distribution of conditions	Obtain Improvement: $30 - $31 Prevent Deterioration: $42 - $65	$39.63-40.95 $55.48-85.86
Trijonis et al. (1984) Los Angeles (1978-79$) San Francisco	Property value study using light extinction Property value study using light extinction	$34 - $64 $29 - $32	$44.90-84.54 $38.30-42.27
Eastern Studies			
Randall et al. (1981) Chicago (1981$)	Contingent valuation bidding for a change in typical conditions	Obtain Improvement: $13 - $24	$17.17-31.70
Tolley et al. (1984) Six Cities (1982$)	Contingent valuation bidding for a change in typical conditions payment card format	Obtain Improvement: $9 - $15 Prevent Deterioration: $29	$11.88-19.81

TABLE 11. Summary of Visibility Valuation Results (contd)

Study	Estimation Procedure	Annual Average WTP for a 1-mile Change in Visual Range	WTP/Mile (1991 dollars)
Rae, Hausman, and Wickham (1983) Cincinnatti (1982$)	Contingent valuation bidding for a change in typical conditions	Obtain Improvement: $30	$39.63
	Contingent ranking for a change in typical conditions	Obtain Improvement: $71 - $108	$93.79-$142.66
	Contingent ranking for a change in distribution of conditions	Obtain Improvement: $39 - $225	$51.51-$297.22

SOURCE: Bhardwaja 1987, p. 166

TABLE 12. Economic Value of Regional Visibility Reductions

RESOURCE ALTERNATIVE	TOTAL REGIONAL COST
1991	$8,664,069
2000	
STATUS QUO	$11,336,803
BASE CASE	$11,561,801
CONSERVATION	$11,336,803
CONVENTIONAL COAL	$12,586,623
CLEAN COAL	$11,612,296
NUCLEAR	$10,984,157
COMBUSTION TURBINE	$11,796,898
RENEWABLES	$11,684,399
COGENERATION	$10,984,157
FUEL SWITCHING	$11,796,898
HIGH CONSERVATION	$11,796,898
IMPORTS	$12,262,042
2010	
STATUS QUO	$12,765,590
BASE CASE	$12,993,405
CONSERVATION	$12,993,405
CONVENTIONAL COAL	$14,001,670
CLEAN COAL	$12,384,056
NUCLEAR	$12,993,405
COMBUSTION TURBINE	$12,778,506
RENEWABLES	$12,880,906
COGENERATION	$12,911,204
FUEL SWITCHING	$12,655,908
HIGH CONSERVATION	$12,430,910
IMPORTS	$13,866,741

TABLE 13. Crop Losses due to Ozone

Crop	Loss
Wheat	13,743 bushels
Hay	163.48 tons

TABLE 14. Regional Market Prices for Hay and Wheat in 1991 Dollars

State	Wheat (per bushel)	Hay (per ton)
Idaho	$4.29	$88.79
Montana	$4.18	$78.31
Oregon	$4.68	$93.20
Washington	$4.74	$98.72
Regional Average	$4.46	$89.76

SOURCE: U.S. Department of Agriculture 1990

TABLE 15. Economic Value of Crop Losses due to Ozone

Crop	Annual Loss (1991 dollars)
Wheat	$61,394
Hay	$14,673

TABLE 16. Economic Value of Game Species

Study	SPECIES	ECONOMIC VALUE[a]
Brown and Hammack (1973)	Waterfowl	$2.40 to $4.65 per bird
Nickerson (1990)	Deer	$1.80 per animal per square mile

(a) Not adjusted to 1991 dollars.

TABLE 17. Summary of Economic Valuation Study Results for Recreational Fishing

Source	Type of Fish	State	Valuation Method Used	Value Estimated[a]
Brown, Singh, and Castle (1964)	All salmon/steelhead	Oregon	TC	$22/day (1987$)
Mathews and Brown (1970)	Ocean salmon	Washington	CV	$211/day (1987$)
	Freshwater salmon		CV	$109/day
	Ocean salmon		TC	$6/trip
Crutchfield and Schelle (1970)	Ocean salmon		CV	$34/day (1987$)
Brown, Sorhus, and Gibbs (1980)	Ocean salmon	Oregon	TC	$97/trip (1987$)
	Freshwater salmon			$32/trip
	Steelhead			$45/trip
	Ocean salmon	Washington		$94/trip
	Freshwater salmon			$79/trip
Charbonneau and Hay (1978)	Ocean fishing	United States	CV	$154/day (1987$)
	Freshwater salmon			$107/day
	Trout			$29/day

TABLE 17. Summary of Economic Valuation Study Results for Recreational Fishing (contd)

Source	Type of Fish	State	Valuation Method Used	Value Estimated[a]
Brown and Shalloof (1986)	Freshwater salmon/ steelhead Ocean salmon	Oregon	TC	$41/trip (1987$) $108/trip
Brown and Hay (1987)	Trout	United States	CV	$15/day (1987$)
Sorg et al. (1985)	Trout	Idaho	CV TC	$26/trip (1987$) $16/day $50/trip $29/day
Donnelly et al. (1985)	Steelhead	Idaho	CV TC	$36/trip (1987$) $23/day $27/trip $16/day
Vaughn and Russell (1982)	Trout	United States	TC	$25/day (1987$)
Johnson and Adams (1989)	Steelhead	OR	CV	$6.65/day (1989$)
Samples and Bishop (1985)	Salmon/trout	MI	TC	$10.25/fish (1987$)

TABLE 17. Summary of Economic Valuation Study Results for Recreational Fishing (contd)

Source	Type of Fish	State	Valuatio n Method Used	Value Estimated[a]
Loomis (1988)	Steelhead Salmon	OR	TC	$23 to $103/fish (1987$) $7.48 tp $64.61/fish (1987$)
Cameron and James (1987)	Salmon	Canada	CV	$14.47/fish (1984 Canadian$)
Olsen (1990) Existence Value	Salmon	Pacific Northwest	CV	$17.70/fish (1990$)

(a) TC = Travel Cost Method
CV = Contingent Valuation Method

(b) Not adjusted to 1991 dollars.

TABLE 18. Hikers' Valuation of Forest Existence Values[a]

Forest Type	Average Marginal WTP (($/mile)/trip)	Average Total WTP ($/trip)[b]
Douglas fir	$0.49	--[b]
Hemlock	-$2.08	$19.43
Spruce	$2.50	$12.96
Old-growth	$1.31	$35.77
Silver fir	$0.32	$7.05
Alpine fir	-$0.70	--[b]

(a) Travel time and distance valued at $0.50 per mile.
(b) Average Total WTP could not be calculated because of flat demand.

SOURCE: Englin and Mendelsohn 1991

APPENDIX F

SECTION 4

ANNUAL CHANGES IN ELECTRICITY GENERATION AND CONSERVATION

SECTION 4

ANNUAL CHANGES IN ELECTRICITY GENERATION AND CONSERVATION

Information on fossil-fuel thermal plant operation was provided by output from Bonneville's ISAAC model. Two types of ISAAC files were provided for each resource alternative. One set of files provides information on the average megawatts produced by existing and acquired coal plants, nuclear plants, and natural gas-fired combustion turbines.[a] The information includes details about potential generic plant location that was needed for environmental analyses. Samples of these files for the Base Case and Emphasize High Conservation alternatives are presented in Tables 1 and 2.

The second set of files provide information about when new plants are acquired and the average megawatts produced by all types of new energy resources, including conservation, renewables, and cogeneration. These files do not provide information about plant location or specific plant operation. Tables 3 and 4 show these files for the two example alternatives. The figures shown in Tables 1, 2, 3, and 4 have been reformatted for ease in our spreadsheet analysis.

Both sets of files were combined to determine the total mix of energy resources. This combined picture is used to calculate many of the environmental impacts discussed in this EIS, such as air quality, employment, land use, water consumption, and water effluent. The combined files are used for the Thermal Operations Section of Chapter 5 of this EIS, which describes thermal-based power plants that burn fuels such as coal and natural gas. A table from that section is presented here as Table 5. Table 5 shows thermal power plant generation for the years 1991, 2000, and 2010.

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[a] The existing and acquired natural gas-fired combustion turbines are broken down into simple-cycle combustion turbine (SCT) and combined-cycle combustion turbine (CCCT) plants.

Our analysis focuses on the years 1991, 2000, and 2010. Our analysis is based on total regional energy availability, regardless of which utilities or agencies operate the plants or programs. Energy is acquired based on its cost, with least-cost plants or programs used first.

TABLE 1a. Example of ISAAC Output Showing Specific Plant Generation (in average megawatts) for the Base Case Alternative in 1991

YEAR: 1991					Annual Totals
EXISTING - NUC					
TROJAN	877	644	0	877	2398
WNP#2	853	853	0	569	2275
Seasonal Totals:	1730	1497	0	1446	4673
ACQUIRED - NUC					
WNP 3	0	0	0	0	0
WNP 1	0	0	0	0	0
Seasonal Totals:	0	0	0	0	0
EXISTING - COAL					
VALMY1	87	53	16	37	193
VALMY2	88	53	1	42	184
BRDMAN	336	129	117	168	750
COLST1	131	110	1	112	354
COLST2	131	110	1	111	353
COLST3	415	349	82	349	1195
COLST4	415	349	76	349	1189
CENT#1	571	480	108	457	1616
CENT#2	545	421	94	391	1451
BRIG#1	156	131	4	129	420
BRIG#2	119	131	75	129	454
BRIG#3	158	98	76	126	458
BRIG#4 (E. Montana)	114	134	76	127	451
Existing Coal: subtotals by location					
E. Oregon	511	235	134	247	1127
E. Montana	1639	1412	391	1432	4874
W. Washington	1116	901	202	848	3067
Seasonal Totals:	3266	2548	727	2527	9068
ACQUIRED - COAL					
Coal2 (E. Wash)	0	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0

TABLE 1a. Example of ISAAC Output Showing Specific Plant Generation (in average megawatts) for the Base Case Alternative in 1991 (contd)

FBCoal4 (Nev)	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0
Coal1 (E. Mont)	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0
Acquired Coal: subtotals by location					
E. Washington	0	0	0	0	0
E. Oregon	0	0	0	0	0
Nevada	0	0	0	0	0
W. Wash/Oregon	0	0	0	0	0
E. Montana	0	0	0	0	0
Seasnoal Totals:	0	0	0	0	0
EXISTING - SCT					
BEAVER	0	0	0	0	0
WHITH1	0	0	0	0	0
WHITH2	0	0	0	0	0
WHITH3	0	0	0	0	0
BETHEL	0	0	0	0	0
FREDK1	0	0	0	0	0
FREDK2	0	0	0	0	0
FREDO1	0	0	0	0	0
FREDO2	0	0	0	0	0
Seasonal Totals	0	0	0	0	0
ACQUIRED - SCT					
IMPORTS					
California Imports	0	0	0	0	0
Canada Imports	0	0	0	0	0
Seasonal Totals:	0	0	0	0	0
EXISTING - CCT					
ACQUIRED - CCT					
Combined Cycle BPA	0	0	0	0	0
Combined Cycle Mix	0	0	0	0	0
Seasonal Totals:	0	0	0	0	0

TABLE 1b. Example of ISAAC Output Showing Specific Plant Generation (in average megawatts) for the Base Case Alternative in 2000

YEAR: 2000					Annual Totals
EXISTING - NUC					
TROJAN	877	644	0	877	2398
WNP#2	853	853	0	569	2275
Seasonal Totals:	1730	1497	0	1446	4673
ACQUIRED - NUC					
WNP 3	0	0	0	0	0
WNP 1	975	975	975	325	3250
Seasonal Totals:	975	975	975	325	3250
EXISTING - COAL					
VALMY1	101	101	41	77	320
VALMY2	101	101	1	74	277
BRDMAN	391	249	297	334	1271
COLST1	131	131	1	130	393
COLST2	131	131	1	130	393
COLST3	415	415	129	385	1344
COLST4	415	415	120	400	1350
CENT#1	570	545	154	490	1759
CENT#2	571	571	178	519	1839
BRIG#1	156	156	6	153	471
BRIG#2	119	156	119	154	548
BRIG#3	158	117	120	156	551
BRIG#4	114	159	121	157	551
Existing Coal: subtotals by location					
E. Oregon	593	451	339	485	1868
E. Montana	1639	1680	617	1665	5601
W. Washington	1141	1116	332	1009	3598
Seasonal Totals:	3373	3247	1288	3159	11067
ACQUIRED - COAL					
Coal2 (E. Wash)	563	563	428	450	2004
Coal3 (E. Oregon)	0	0	0	0	0
Coal4 (Nevada)	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0

TABLE 1b. Example of ISAAC Output Showing Specific Plant Generation (in average megawatts) for the Base Case Alternative in 2000 (contd)

GCoal3 (EOre)	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0
Coal1 (E. Mont)	563	563	428	560	2114
FBCoal1 (E. Mnt)	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0
Acquired Coal: subtotals by location					
E. Washington	563	563	428	450	2004
E. Oregon	0	0	0	0	0
Nevada	0	0	0	0	0
W. Wash/Oregon	0	0	0	0	0
E. Montana	563	563	428	560	2114
Seasonal Totals:	1126	1126	856	1010	4118
EXISTING - SCT					
BEAVER	0	0	0	0	0
WHITH1	0	0	0	0	0
WHITH2	0	0	0	0	0
WHITH3	0	0	0	0	0
BETHEL	0	0	0	0	0
FREDK1	0	0	0	0	0
FREDK2	0	0	0	0	0
FREDO1	0	0	0	0	0
FREDO2	0	0	0	0	0
Seasonal Totals:	0	0	0	0	0
ACQUIRED - SCT					
IMPORTS					
California Imports	0	0	0	0	0
	0	0	0	0	0
Seasonal Totals:	0	0	0	0	0
EXISTING - CCT					
ACQUIRED - CCT					
Combined Cycle BPA	379	117	0	74	570
Combined Cycle Mix	97	18	0	23	138
Seasonal Totals:	476	135	0	97	708

TABLE 1c. Example of ISAAC Output Showing Specific Plant Generation (in average megawatts) for the Base Case Alternative in 2010

YEAR: 2010					Annual Totals
EXISTING - NUC					
TROJAN	877	644	0	877	2398
WNP#2	853	853	0	569	2275
Seasonal Totals:	1730	1497	0	1446	4673
ACQUIRED - NUC					
WNP 3	967	967	967	322	3223
WNP 1	975	975	975	325	3250
Seasonal Totals:	1942	1942	1942	647	6473
EXISTING - COAL					
VALMY1	100	97	22	100	319
VALMY2	102	99	1	102	304
BRDMAN	391	242	164	391	1188
COLST1	131	131	1	131	394
COLST2	131	131	1	131	394
COLST3	415	415	129	415	1374
COLST4	415	415	120	415	1365
CENT#1	570	566	153	571	1860
CENT#2	571	571	178	571	1891
BRIG#1	156	156	6	156	474
BRIG#2	119	156	119	156	550
BRIG#3	158	117	120	158	553
BRIG#4	114	159	121	159	553
Existing Coal: subtotals by location					
E. Oregon	593	438	187	593	1811
E. Montana	1639	1680	617	1721	5657
W. Washington	1141	1137	331	1142	3751
Seasonal Totals:	3373	3255	1135	3456	11219
ACQUIRED - COAL					
Coal2 (E. Wash)	563	546	236	563	1908
Coal3 (E. Oregon)	563	546	236	563	1908
Coal4 (Nevada)	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0

TABLE 1c. Example of ISAAC Output Showing Specific Plant Generation (in average megawatts) for the Base Case Alternative in 2010 (contd)

GCoal4 (Nev)	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0
Coal1 (E. Mont)	1313	1313	999	1313	4938
FBCoal1 (E. Mnt)	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0
Acquired Coal: Subtotals by location					
E. Washington	563	546	236	563	1908
E. Oregon	563	546	236	563	1908
Nevada	0	0	0	0	0
W. Wash/Oregon	0	0	0	0	0
E. Montana	1313	1313	999	1313	4938
Seasonal Totals:	2439	2405	1471	2439	8754
EXISTING - SCT					
BEAVER	50	12	0	13	75
WHITH1	0	0	0	0	0
WHITH2	0	0	0	0	0
WHITH3	0	0	0	0	0
BETHEL	0	1	0	0	1
FREDK1	0	0	0	0	0
FREDK2	0	0	0	0	0
FREDO1	0	0	0	0	0
FREDO2	0	0	0	0	0
Seasonal Totals:	50	13	0	13	76
ACQUIRED - SCT					
IMPORTS					
California Imports	0	0	0	0	0
Canada Imports	0	0	0	0	0
Seasonal Totals:	0	0	0	0	0
EXISTING - CCT					
ACQUIRED - CCT					
Combined Cycle BPA	428	159	0	137	724
Combined Cycle Mix	378	132	0	91	601
Seasonal Totals:	806	291	0	228	1325

TABLE 2a. Example of ISAAC Output Showing Specific Plant Generation (in average megawatts) for the High Conservation Alternative in 1991

STUDY TITLE : HIGH CONSERVATION ALTERNATIVE
STUDY ID : 15-JUL-91 06:36:06

YEAR : 1991

EXISTING - NUC				
TROJAN	877	644	0	877
WNP#2	853	853	0	569
ACQUIRED - NUC				
WNP 3	0	0	0	0
WNP 1	0	0	0	0
EXISTING - HCOAL				
VALMY1	87	53	16	37
VALMY2	88	53	1	42
BRDMAN	336	129	117	168
ACQUIRED - HCOAL				
Coal2 (E. Wash)	0	0	0	0
Coal3 (E. Oregon)	0	0	0	0
Coal4 (Nevada)	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0
FBCoal4 (Nev)	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0
GCoal2 (EWash)	0	0	0	0
GCoal3 (EOre)	0	0	0	0
GCoal4 (Nev)	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0

TABLE 2a. Example of ISAAC Output Showing Specific Plant Generation (in average megawatts) for the High Conservation Alternative in 1991 (contd)

EXISTING - LCOAL				
COLST1	131	110	1	112
COLST2	131	110	1	111
COLST3	415	349	82	349
COLST4	415	349	76	349
CENT#1	571	480	108	457
CENT#2	545	421	94	391
BRIG#1	156	131	4	129
BRIG#2	119	131	75	129
BRIG#3	158	98	76	126
BRIG#4	114	134	76	127
ACQUIRED - LCOAL				
Coal1 (E. Mont)	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0
GCoal1 (EMont)	0	0	0	0
EXISTING - SCT				
BEAVER	0	0	0	0
WHITH1	0	0	0	0
WHITH2	0	0	0	0
WHITH3	0	0	0	0
BETHEL	0	0	0	0
FREDK1	0	0	0	0
FREDK2	0	0	0	0
FREDO1	0	0	0	0
FREDO2	0	0	0	0
ACQUIRED - SCT				
California Imports	0	0	0	0
Canada Imports	0	0	0	0
EXISTING - CCT				
ACQUIRED - CCT				
Combined Cycle BPA	0	0	0	0
Combined Cycle Mix	0	0	0	0

TABLE 2b. Example of ISAAC Output Showing Specific Plant Generation (in average megawatts) for the High Conservation Alternative in 2000

YEAR: 2000

EXISTING - NUC				
TROJAN	877	644	0	877
WNP#2	853	853	0	569
ACQUIRED - NUC				
WNP 3	967	967	967	322
WNP 1	975	975	975	325
EXISTING - HCOAL				
VALMY1	101	101	41	65
VALMY2	101	101	1	64
BRDMAN	391	249	297	293
ACQUIRED - HCOAL				
Coal2 (E. Wash)	563	563	428	391
Coal3 (E. Oregon)	0	0	0	0
Coal4 (Nevada)	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0
FBCoal4 (Nev)	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0
GCoal2 (EWash)	0	0	0	0
GCoal3 (EOre)	0	0	0	0
GCoal4 (Nev)	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0

TABLE 2b. Example of ISAAC Output Showing Specific Plant Generation (in average megawatts) for the High Conservation Alternative in 2000 (contd)

EXISTING - LCOAL				
COLST1	131	131	1	126
COLST2	131	131	1	127
COLST3	415	415	129	371
COLST4	415	415	120	385
CENT#1	570	534	157	453
CENT#2	571	571	178	494
BRIG#1	156	156	6	146
BRIG#2	119	156	119	149
BRIG#3	158	117	120	150
BRIG#4	114	159	121	151
ACQUIRED - LCOAL				
Coal1 (E. Mont)	563	563	428	547
FBCoal1 (E. Mnt)	0	0	0	0
GCoal1 (EMont)	0	0	0	0
EXISTING - SCT				
BEAVER	0	0	0	0
WHITH1	0	0	0	0
WHITH2	0	0	0	0
WHITH3	0	0	0	0
BETHEL	0	0	0	0
FREDK1	0	0	0	0
FREDK2	0	0	0	0
FREDO1	0	0	0	0
FREDO2	0	0	0	0
ACQUIRED - SCT				
California Imports	0	0	0	0
	0	0	0	0
EXISTING - CCT				
ACQUIRED - CCT				
Combined Cycle BPA	0	0	0	0
Combined Cycle Mix	105	22	0	20

TABLE 2c. Example of ISAAC Output Showing Specific Plant Generation (in average megawatts) for the High Conservation Alternative in 2010

YEAR : 2010

EXISTING - NUC				
TROJAN	877	644	0	877
WNP#2	853	853	0	569
ACQUIRED - NUC				
WNP 3	967	967	967	322
WNP 1	975	975	975	325
EXISTING - HCOAL				
VALMY1	100	97	23	100
VALMY2	102	99	1	102
BRDMAN	391	242	172	391
ACQUIRED - HCOAL				
Coal2 (E. Wash)	563	546	248	563
Coal3 (E. Oregon)	563	546	248	563
Coal4 (Nevada)	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0
FBCoal4 (Nev)	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0
GCoal2 (EWash)	0	0	0	0
GCoal3 (EOre)	0	0	0	0
GCoal4 (Nev)	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0

TABLE 2c. Example of ISAAC Output Showing Specific Plant Generation (in average megawatts) for the High Conservation Alternative in 2010 (contd)

EXISTING - LCOAL				
COLST1	131	131	1	131
COLST2	131	131	1	131
COLST3	415	415	129	415
COLST4	415	415	120	415
CENT#1	570	566	154	571
CENT#2	571	571	178	571
BRIG#1	156	156	6	156
BRIG#2	119	156	119	156
BRIG#3	158	117	120	158
BRIG#4	114	159	121	159
ACQUIRED - LCOAL				
Coal1 (E. Mont)	1313	1313	999	1313
FBCoal1 (E. Mnt)	0	0	0	0
GCoal1 (EMont)	0	0	0	0
EXISTING - SCT				
BEAVER	41	10	0	13
WHITH1	0	0	0	0
WHITH2	0	0	0	0
WHITH3	0	0	0	0
BETHEL	0	1	0	0
FREDK1	0	0	0	0
FREDK2	0	0	0	0
FREDO1	0	0	0	0
FREDO2	0	0	0	0
ACQUIRED - SCT				
California Imports	0	0	0	0
Canada Imports	0	0	0	0
EXISTING - CCT				
ACQUIRED - CCT				
Combined Cycle BPA	420	164	0	135
Combined Cycle Mix	377	130	0	98

TABLE 3. Example of ISAAC Output Showing Generation by Resource Type (in average megawatts) for the Base Case Alternative

1Study ID : 15-JUL-91 07:09:02
Study Title: HIGH LOAD NEW BASE CASE 4

Operating Year	90_91	91_92	92_93	93_94	94_95	95_96	96_97	97_98	98_99	99_00	00_01	01_02	02_03	03_04	04_05	05_06	06_07	07_08	08_09	09_10
CONSERVATION PROGRAMS:																				
SF Res MCS	0	8	17	26	36	44	54	65	76	87	99	111	125	137	149	162	174	188	201	215
MF Res MCS	0	2	3	6	7	9	11	13	15	17	19	21	24	25	27	30	31	33	36	37
Water Heat	0	0	0	0	9	29	50	70	91	113	136	161	185	209	234	257	282	309	336	362
Refrigerators	0	0	0	0	3	9	14	20	26	32	39	46	54	61	69	76	83	90	100	110
High Refrigerators	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Appliances	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freezers	0	0	0	0	1	2	4	5	7	9	10	13	15	17	19	20	22	24	27	30
High Freezers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Manuf Housing	0	2	4	7	10	13	17	23	27	32	38	42	47	53	58	62	68	72	77	83
Irrigation	0	0	2	3	5	9	12	16	20	23	27	30	33	35	36	36	36	36	36	36
Industrial	0	4	16	36	58	81	104	128	151	174	196	219	243	266	289	311	334	357	381	400
High Industrial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Commercial	0	18	51	83	114	142	171	201	232	264	294	322	352	382	413	444	476	510	544	579
High New Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Comm Discret Ex	0	4	15	30	45	60	75	90	105	120	135	150	161	162	162	162	162	162	162	162
Comm Lost Opps Exist	0	4	12	19	27	34	41	48	56	64	71	79	86	94	102	109	116	123	131	139
SF Res Weath	0	3	10	20	29	38	47	56	66	75	84	93	101	102	102	102	102	102	102	102
MF Res Weath	0	1	4	7	9	12	15	17	20	23	25	28	31	33	36	36	36	36	36	36
FSW1: NEW SH AND WH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FSW2: EXISTING SF W	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FSW3: EX SF NC AND	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FSW4: EX SF CFA AND	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:																				
Hydro Eff Imp	0	0	20	40	60	80	80	100	100	100	100	100	100	100	100	100	100	100	100	100
Trans Eff Imp	0	0	11	22	23	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 East	0	0	0	48	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	0	0	0	36	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61

TABLE 3. Example of ISAAC Output Showing Generation by Resource Type (in average megawatts) for the Base Case Alternative (contd)

Small Hydro 3 East	0	0	0	0	0	0	26	52	52	52	52	52	56	67	67	67	67	75	75	75
Small Hydro 4 East	0	0	0	0	0	0	25	32	32	32	32	32	32	32	32	32	32	36	43	43
Small Hydro 1 West	0	0	0	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	0	0	0	36	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	0	0	0	0	0	0	26	48	48	48	48	48	48	48	48	48	48	48	48	48
Small Hydro 4 West	0	0	0	0	0	0	25	25	25	25	25	25	25	25	25	25	25	32	32	32
Combined Cycle BPA	0	0	0	0	349	349	697	697	697	697	697	697	697	697	697	697	697	697	697	697
Combined Cycle Mix	0	0	0	0	698	698	698	698	698	698	698	698	698	698	698	698	698	698	698	698
Cogen1e	0	0	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Cogen2e	0	0	0	180	180	180	180	240	240	240	240	240	240	240	240	240	240	240	240	240
Cogen3e	0	0	0	0	140	360	360	360	360	360	360	360	360	370	370	370	370	370	480	480
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80	450	670	1000
Cogen1w	0	0	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Cogen2w	0	0	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240
Cogen3w	0	0	0	0	360	360	360	380	480	480	480	480	480	480	480	480	480	480	480	480
Cogen4w	0	0	0	0	0	620	780	780	780	780	780	780	1000	1330	1330	1400	1500	1500	1660	1960
Coal1 (E. Mont)	0	0	0	0	0	0	0	188	375	563	750	938	1125	1313	1313	1313	1313	1313	1313	1313
Coal2 (E. Wash)	0	0	0	0	0	0	0	188	375	563	563	563	563	563	563	563	563	563	563	563
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	188	375	563	563	563	563
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNP 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	806	806	806	806	806	806
WNP 1	0	0	0	0	0	0	0	0	0	813	813	813	813	813	813	813	813	813	813	813

TABLE 3. Example of ISAAC Output Showing Generation by Resource Type (in average megawatts) for the Base Case Alternative (contd)

Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	0	0	0	0	0	0	0	0	45	45	45	45	90	135	157	202	248	293	338	383
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
California Imports	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Canada Imports	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TABLE 4. Example of ISAAC Output Showing Generation by Resource Type (in average megawatts) for the High Conservation Alternative

.Study ID : 16_SEP_91 17:49:46
Study Title: HIGH CONSERVATION ALTERNATIVE

Operating Year	90_91	91_92	92_93	93_94	94_95	95_96	96_97	97_98	98_99	99_00	00_01	01_02	02_03	03_04	04_05	05_06	06_07	07_08	08_09	09_10
CONSERVATION PROGRAMS:																				
SF Res MCS	0	8	17	26	36	44	54	65	76	87	99	111	125	137	149	162	174	188	201	215
MF Res MCS	0	2	3	6	7	9	11	13	15	17	19	21	24	25	27	30	31	33	36	37
Water Heat	0	0	0	0	9	29	50	70	91	113	136	161	185	209	234	257	282	309	336	362
Refrigerators	0	0	0	0	2	5	8	12	15	19	23	27	32	36	41	45	49	53	59	65
High Refrigerators	0	0	0	0	3	9	15	21	27	33	40	48	57	64	72	79	86	94	104	115
Other Appliances	0	0	0	0	0	15	32	49	67	84	102	120	139	157	176	194	213	231	250	270
Freezers	0	0	0	0	1	1	2	3	4	5	6	8	9	10	11	12	13	14	16	18
High Freezers	0	0	0	0	1	4	6	8	11	13	16	19	22	25	28	31	34	37	41	45
New Manuf Housing	0	2	4	7	10	13	17	23	27	32	38	42	47	53	58	62	68	72	77	83
Irrigation	0	0	2	3	5	9	12	16	20	23	27	30	33	35	36	36	36	36	36	36
Industrial	0	2	8	19	31	43	55	68	80	92	104	116	129	141	153	165	177	189	202	212
High Industrial	0	2	9	21	35	49	63	78	92	106	120	134	148	162	176	190	204	219	227	227
New Commercial	0	11	32	52	72	89	108	127	146	166	185	203	222	241	260	280	300	321	343	365
High New Commercial	0	18	53	88	123	158	193	228	264	299	334	369	404	439	475	510	545	580	615	650
Comm Discret Ex	0	4	15	30	45	60	75	90	105	120	135	150	161	162	162	162	162	162	162	162
Comm Lost Opps Exist	0	4	12	19	27	34	41	48	56	64	71	79	86	94	102	109	116	123	131	139
SF Res Weath	0	3	10	20	29	38	47	56	66	75	84	93	101	102	102	102	102	102	102	102
MF Res Weath	0	1	4	7	9	12	15	17	20	23	25	28	31	33	36	36	36	36	36	36
FSW1: NEW SH AND WH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FSW2: EXISTING SF W	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FSW3: EX SF NC AND	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FSW4: EX SF CFA AND	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENERATING RESOURCES:																				
Hydro Eff Imp	0	0	20	40	60	80	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Trans Eff Imp	0	0	11	22	33	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Small Hydro 1 East	0	0	0	48	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
Small Hydro 2 East	0	0	0	36	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61

TABLE 4. Example of ISAAC Output Showing Generation by Resource Type (in average megawatts) for the High Conservation Alternative (contd)

Small Hydro 3 East	0	0	0	0	0	0	26	52	52	52	52	63	75	75	75	75	75	75	75	75
Small Hydro 4 East	0	0	0	0	0	0	25	32	32	32	32	32	32	32	32	32	32	32	32	32
Small Hydro 1 West	0	0	0	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Small Hydro 2 West	0	0	0	36	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Small Hydro 3 West	0	0	0	0	0	0	37	48	48	48	48	48	48	48	48	48	48	48	48	48
Small Hydro 4 West	0	0	0	0	0	0	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Combined Cycle BPA	0	0	0	0	0	349	349	349	697	697	697	697	697	697	697	697	697	697	697	697
Combined Cycle Mix	0	0	0	0	698	698	698	698	698	698	698	698	698	698	698	698	698	698	698	698
Cogen1e	0	0	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Cogen2e	0	0	0	230	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240
Cogen3e	0	0	0	0	140	360	360	360	360	360	360	360	480	480	480	480	480	480	480	480
Cogen4e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80	450	670	1000
Cogen1w	0	0	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Cogen2w	0	0	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240
Cogen3w	0	0	0	0	360	360	400	480	480	480	480	480	480	480	480	480	480	480	480	480
Cogen4w	0	0	0	0	0	620	780	780	780	780	780	780	1000	1330	1330	1400	1500	1520	1520	1520
Coal1 (E. Mont)	0	0	0	0	0	0	0	188	375	563	750	938	1125	1313	1313	1313	1313	1313	1313	1313
Coal2 (E. Wash)	0	0	0	0	0	0	0	188	375	563	563	563	563	563	563	563	563	563	563	563
Coal3 (E. Oregon)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	188	375	563	563	563	563
Coal4 (Nevada)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal5 (W. Wa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal1 (E. Mnt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal2 (E. Wa)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal3 (E. Ore)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FBCoal5 (WWa/Or)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal1 (EMont)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal2 (EWash)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal3 (EOre)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal4 (Nev)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GCoal5 (WWaOr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNP 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	806	806
WNP 1	0	0	0	0	0	0	0	0	0	0	0	0	0	813	813	813	813	813	813	813

TABLE 4. Example of ISAAC Output Showing Generation by Resource Type (in average megawatts) for the High Conservation Alternative (contd)

Geothermal1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal2	0	0	0	0	0	0	0	0	0	0	45	90	135	135	135	180	225	270	270	270
Solar1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
California Imports	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Canada Imports	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TABLE 5a. Regional Thermal Operations (in average megawatts) for 1991

Energy Resources:	Alternatives											
	Status Quo	Base Case	Fuel Switching	Nuclear	Imports	Cogeneration	Combustion Turbines	Pulverized Coal	Clean Coal	High Conservation	Conservation	Renewables
EXISTING NUCLEAR												
W. Oregon	726	726	726	726	726	726	726	726	726	726	726	726
E. Washington	711	711	711	711	711	711	711	711	711	711	711	711
EXISTING PULVERIZED COAL												
E. Montana	914	914	914	914	914	914	914	914	914	914	914	914
Nevada	115	115	115	115	115	115	115	115	115	115	115	115
E. Oregon	207	207	207	207	207	207	207	207	207	207	207	207
W. Washington	901	901	901	901	901	901	901	901	901	901	901	901
Wyoming	494	494	494	494	494	494	494	494	494	494	494	494

TABLE 5b. Regional Thermal Operations (in average megawatts) for 2000

Energy Resources:	Alternatives											
	Status Quo	Base Case	Fuel Switching	Nuclear	Imports	Cogeneration	Combustion Turbines	Pulverized Coal	Clean Coal	High Conservation	Conservation	Renewables
EXISTING NUCLEAR												
W. Oregon	726	726	726	726	726	726	726	726	726	726	726	726
E. Washington	711	711	711	711	711	711	711	711	711	711	711	711
ACQUIRED NUCLEAR												
W. Washington	0	0	0	806	0	0	0	0	0	0	0	0
E. Washington	813	813	0	813	0	0	813	0	0	0	813	0
EXISTING PULVERIZED COAL												
E. Montana	1015	1010	1021	1006	1021	990	1011	1019	1020	1017	1010	1015
Nevada	178	176	178	173	184	170	176	158	159	176	176	175
E. Oregon	324	322	327	319	331	309	322	296	315	325	322	320
W. Washington	1036	1032	1040	1025	1067	1007	1033	1050	1051	1037	1032	1035
Wyoming	564	564	570	560	567	554	564	569	569	570	564	569
ACQUIRED PULVERIZED COAL												
E. Montana	551	551	556	552	554	549	552	924	555	556	551	556
E. Washington	525	524	530	513	544	506	524	621	481	526	524	525
E. Oregon	0	0	0	0	0	0	0	148	0	0	0	0
Nevada	0	0	0	0	0	0	0	159	0	0	0	0
W. Washington	0	0	0	0	0	0	0	144	0	0	0	0
ACQUIRED AFB COAL												
E. Montana	0	0	0	0	0	0	0	0	160	0	0	0
E. Washington	0	0	0	0	0	0	0	0	144	0	0	0
E. Oregon	0	0	0	0	0	0	0	0	128	0	0	0
ACQUIRED IGCC COAL												
E. Montana	0	0	0	0	0	0	0	0	158	0	0	0
E. Washington	0	0	0	0	0	0	0	0	150	0	0	0
EXISTING SCT												
W. Washington	0	0	21	2	105	3	0	0	17	12	0	5
ACQUIRED CCCT												
Combined Cycle BPA	195	184	213	0	0	0	184	96	104	213	184	212
Combined Cycle MIX	82	44	172	104	121	157	45	96	171	166	44	161
ACQUIRED COGEN	2060	2180	2180	1930	1920	3300	2180	2090	2060	2000	2180	2060

TABLE 5c. Regional Thermal Operations (in average megawatts) for 2010

Energy Resources:	Alternatives											
	Status Quo	Base Case	Fuel Switching	Nuclear	Imports	Cogeneration	Combustion Turbines	Pulverized Coal	Clean Coal	High Conservation	Conservation	Renewables
EXISTING NUCLEAR												
W. Oregon	726	726	726	726	726	726	726	726	726	726	726	726
E. Washington	711	711	711	711	711	711	711	711	711	711	711	711
ACQUIRED NUCLEAR												
W. Washington	806	806	806	806	0	806	806	806	806	806	806	806
E. Washington	813	813	813	813	0	813	813	813	813	813	813	813
EXISTING PULVERIZED COAL												
E. Montana	1022	1022	1023	1022	1029	1021	1022	1029	1029	1022	1022	1022
Nevada	180	185	185	185	190	184	185	175	172	185	185	185
E. Oregon	326	322	325	323	344	322	322	326	327	322	322	323
W. Washington	1071	1072	1074	1073	1086	1071	1072	1071	1074	1072	1072	1073
Wyoming	566	566	567	566	576	564	566	576	576	566	566	566
ACQUIRED PULVERIZED COAL												
E. Montana	1666	1287	1290	1288	1313	1283	1287	1688	1313	1287	1287	1287
E. Washington	715	530	533	532	563	529	530	716	536	530	530	532
E. Oregon	535	530	533	532	563	529	530	697	502	530	530	532
Nevada	0	0	0	0	0	0	0	179	0	0	0	0
W. Washington	0	0	0	0	0	0	0	163	0	0	0	0
ACQUIRED AFB COAL												
E. Montana	0	0	0	0	0	0	0	0	162	0	0	0
E. Washington	0	0	0	0	0	0	0	0	155	0	0	0
E. Oregon	0	0	0	0	0	0	0	0	151	0	0	0
ACQUIRED IGCC COAL												
E. Montana	0	0	0	0	0	0	0	0	160	0	0	0
E. Washington	0	0	0	0	0	0	0	0	153	0	0	0
E. Oregon	0	0	0	0	0	0	0	0	153	0	0	0
Nevada	0	0	0	0	0	0	0	0	153	0	0	0
W. Washington	0	0	0	0	0	0	0	0	153	0	0	0
EXISTING SCT												
W. Washington	26	24	17	25	155	1	24	0	0	2	24	24
ACQUIRED CCCT												
Combined Cycle BPA	229	230	228	229	404	207	230	210	208	219	230	230
Combined Cycle MIX	192	193	185	193	369	81	193	80	80	132	193	192
ACQUIRED COGEN:	4030	4480	4070	4570	3760	5020	4480	3980	3920	4340	4480	4300

APPENDIX F

SECTION 5

EMPLOYMENT AND LAND-USE IMPACTS OF RESOURCE PROGRAM ELEMENTS

SECTION 5

EMPLOYMENT AND LAND-USE IMPACTS OF RESOURCE PROGRAM ELEMENTS

The following summary describes the analyses we used to estimate impacts for each of the alternatives. Our findings are based on a review and analysis of the literature to determine the extent of the impacts expected from each resource type. This review is presented in a separate report.[a] The review resulted in the multipliers presented in Tables 1 and 2. These multipliers were applied to generation estimates for each resource type under each alternative. For operation employment impacts for cogeneration, we used the factor from natural gas-fired combined-cycle combustion turbines (0.1). We found no estimate of employment needs for natural gas-fired cogeneration, which is the fuel Bonneville assumes that all cogeneration will employ for purposes of the EIS analysis.

Estimates of operations employment and land use were a simple matter of multiplying the factor for each resource by the average megawatts of generation (or load reduction) expected for each energy resource type in each alternative. In this approach we assume that the annual generation rate in average megawatts accounts for the quantity of time that operation employees would be affected by Bonneville actions. Conservation resources (rather than the Emphasize Conservation alternative) do not result in operations employment or land use impacts in our analysis. Our results are shown in Tables 3 and 4.

Construction employment and land use represent one-time events. Once a particular plant is constructed, or a conservation measure is installed, construction employment ends and additional land need not be disturbed. Therefore, estimates of construction employment and land use required that we address only new plants constructed in any given time period. To estimate new construction, we calculated the differences in generation between each year from 1991 to 2010. We assume that increased generation and conservation, over

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[a] Shankle, S. A., M. C. Baechler, D. W. Blondin, and S. E. Grover. 1991. Employment and Land-Use Impact of Resource Program Elements, (Draft), Pacific Northwest Laboratory, Richland, Washington.

and above that reported in any previous year, results from new construction. Even though we do not accurately determine when a new generation plant is built, this approach does capture the employment resulting from new construction as new capacity is used to generate average megawatts. Examples of our application of this technique to the Emphasize Coal and High Conservation alternatives are shown in Tables 5 and 6. This approach addresses the energy requirements of Bonneville. The portion of plant generation sold elsewhere is not included in this analysis.

For consistency with the analysis of other types of impacts, we sum the effects to show impacts for the three study years of 1991, 2000, and 2010. Impacts that appear to occur in 1991 represent all plant construction up to that time. Employment and land use from conservation activities occurring prior to 1991 is not estimated. We sum the impacts across the years for each of the study years. For example, study year 2000 represents the sum of 1991 and all years through 2000. Our results are shown in Tables 7 and 8.

TABLE 1. Employment Impacts Summary

Resource	Construction Employment (employee years per MW capacity)	Operations Employment (employees per MW capacity)
Pulverized coal	4.7	0.5
Atmospheric fluidized bed coal	5.1	0.7
Coal gasification	5.7	0.9
Cogeneration (overall average)	15.1	4.5
Cogeneration (wood-fired)	9.6	4.5 (a)
Cogeneration (municipal solid waste)	24.1	4.5
Combined cycle combustion turbine	1.4	0.1
Geothermal	4.1	0.3
Hydroelectric (overall average)	9.3	0.3
Hydro efficiency improvements	4.9	None
Small hydro 1	8.3	0.2
Small hydro 2	10.4	0.2
Small hydro 3	14.3	0.3
Small hydro 4	17.3	0.4
Solar	19.6	0.4
Wind	1.9	0.4
Nuclear	1.8	0.9
Conservation (overall average)	41.7	None
Conservation (res. space heat: ex. SF)	77.9	None
Conservation (res. space heat: ex. MF)	74.4	None
Conservation (res. space heat: new SF)	79.2	None
Conservation (res. space heat: new MF)	81.2	None
Conservation (res. space heat: new man.)	55.0	None
Conservation (res. appl: refrigerators)	18.7	None
Conservation (res. appl: freezers)	23.3	None
Conservation (res. appl: water heaters)	18.1	None
Conservation (com: ex. bldgs disc.)	30.2	None
Conservation (com: ex. bldgs lost opp.)	20.2	None
Conservation (com: new bldgs lost opp.)	19.6	None
Conservation (industrial)	21.9	None
Conservation (agricultural)	22.5	None

(a) Estimate is for MSW plant. No data for wood-fired cogeneration operations employment were found.

TABLE 2. Land Use Impacts Summary

Resource	Construction Land Use (acres per MW capacity)	Operations Land Use (acres per MW capacity)
Pulverized coal	1.0	0.2
Atmospheric fluidized bed coal	1.5	0.2
Coal gasification	0.6	0.2
Cogeneration (overall average)	1.7	NQ
Cogeneration (wood-fired)	2.1	NQ
Cogeneration (municipal solid waste)	1.6	NQ
Combined cycle combustion turbine	0.1	NQ
Geothermal	0.2	NQ
Hydroelectric (overall average)	NQ	NQ
Hydro efficiency improvements	None	None
Small hydro 1	NQ	NQ
Small hydro 2	NQ	NQ
Small hydro 3	NQ	NQ
Small hydro 4	NQ	NQ
Solar	3.0	None
Wind	5.9	None
Nuclear	5.0	NQ
Conservation (overall average)	None	None
Conservation (res. space heat: ex. SF)	None	None
Conservation (res. space heat: ex. MF)	None	None
Conservation (res. space heat: new SF)	None	None
Conservation (res. space heat: new MF)	None	None
Conservation (res. space heat: new man.)	None	None
Conservation (res. appl: refrigerators)	None	None
Conservation (res. appl: freezers)	None	None
Conservation (res. appl: water heaters)	None	None
Conservation (com: ex. bldgs disc.)	None	None
Conservation (com: ex. bldgs lost opp.)	None	None
Conservation (com: new bldgs lost opp.)	None	None
Conservation (industrial)	None	None
Conservation (agricultural)	None	None

NQ: Not quantified.

TABLE 3a. Operations Employment Impacts for 1991 (by number of employees per year)

Energy Resources:	Alternatives: Status Quo	Base Case	Fuel Switching	Nuclear	Imports	Cogeneration	Combustion Turbines	Pulverized Coal	Clean Coal	High Conservation	Conservation	Renewables
EXISTING NUCLEAR												
W. Oregon	654	654	654	654	654	654	654	654	654	654	654	654
E. Washington	640	640	640	640	640	640	640	640	640	640	640	640
EXISTING PULVERIZED COAL												
E. Montana	457	457	457	457	457	457	457	457	457	457	457	457
Nevada	57	57	57	57	57	57	57	57	57	57	57	57
E. Oregon	103	103	103	103	103	103	103	103	103	103	103	103
W. Washington	451	451	451	451	451	451	451	451	451	451	451	451
Wyoming	247	247	247	247	247	247	247	247	247	247	247	247

TABLE 3b. Operations Employment Impacts for 2000 (by number of employees per year)

Energy Resources:	Alternatives: Status Quo	Base Case	Fuel Switching	Nuclear	Imports	Cogeneration	Combustion Turbines	Pulverized Coal	Clean Coal	High Conservation	Conservation	Renewables
EXISTING NUCLEAR												
W. Oregon	654	654	654	654	654	654	654	654	654	654	654	654
E. Washington	640	640	640	640	640	640	640	640	640	640	640	640
ACQUIRED NUCLEAR												
E. Washington	731	731	0	1456	0	0	731	0	0	0	731	0
EXISTING PULVERIZED COAL												
E. Montana	508	505	511	503	511	495	505	510	510	508	505	507
Nevada	89	88	89	86	92	85	88	79	79	88	88	87
E. Oregon	162	161	163	160	166	155	161	148	157	163	161	160
W. Washington	518	516	520	513	534	504	516	525	525	519	516	517
Wyoming	282	282	285	280	283	277	282	284	284	285	282	285
ACQUIRED PULVERIZED COAL												
E. Montana	276	276	278	276	277	274	276	462	277	278	276	278
E. Washington	262	262	265	257	272	253	262	311	241	263	262	263
E. Oregon	0	0	0	0	0	0	0	74	0	0	0	0
Nevada	0	0	0	0	0	0	0	80	0	0	0	0
W. Washington	0	0	0	0	0	0	0	72	0	0	0	0
ACQUIRED AFB COAL												
E. Montana	0	0	0	0	0	0	0	0	112	0	0	0
E. Washington	0	0	0	0	0	0	0	0	101	0	0	0
E. Oregon	0	0	0	0	0	0	0	0	89	0	0	0
ACQUIRED IGCC COAL												
E. Montana	0	0	0	0	0	0	0	0	142	0	0	0
E. Washington	0	0	0	0	0	0	0	0	135	0	0	0
IMPORTS	0	0	0	0	59	0	0	0	0	0	0	0
EXISTING SCT												
W. Washington	0	0	2	0	10	0	0	0	2	1	0	1
ACQUIRED CCCT												
Combined Cycle BPA	20	18	21	0	0	0	18	10	10	21	18	21
Combined Cycle Mix	8	4	17	10	12	16	4	10	17	17	4	16
OTHER ACQUIRED GENERATION RESOURCES												
Hydro Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0
Trans Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro	93	93	93	89	80	90	93	90	93	93	93	106
Cogen	206	218	218	193	192	330	218	209	206	200	218	206
Geothermal	0	14	14	0	0	0	14	0	0	0	14	89
Solar	0	0	0	0	0	0	0	0	0	0	0	34
Wind	0	0	0	0	0	0	0	0	0	0	0	26

TABLE 3c. Operations Employment Impacts for 2010 (by number of employees per year)

Energy Resources:	Alternatives: Status Quo	Base Case	Fuel Switching	Nuclear	Imports	Cogeneration	Combustion Turbines	Pulverized Coal	Clean Coal	High Conservation	Conservation	Renewables
EXISTING NUCLEAR												
W. Oregon	654	654	654	654	654	654	654	654	654	654	654	654
E. Washington	640	640	640	640	640	640	640	640	640	640	640	640
ACQUIRED NUCLEAR												
E. Washington	1456	1456	1456	1456	0	1456	1456	1456	1456	1456	1456	1456
EXISTING PULVERIZED COAL												
E. Montana	511	511	511	511	514	510	511	514	514	511	511	511
Nevada	90	93	93	93	95	92	93	88	86	92	93	93
E. Oregon	163	161	162	162	172	161	161	163	164	161	161	162
W. Washington	535	536	537	536	543	535	536	535	537	536	536	536
Wyoming	283	283	283	283	288	282	283	288	288	283	283	283
ACQUIRED PULVERIZED COAL												
E. Montana	833	643	645	644	657	642	643	844	657	643	643	644
E. Washington	357	265	267	266	282	265	265	358	268	265	265	266
E. Oregon	267	265	267	266	282	265	265	348	251	265	265	266
Nevada	0	0	0	0	0	0	0	90	0	0	0	0
W. Washington	0	0	0	0	0	0	0	81	0	0	0	0
ACQUIRED AFB COAL												
E. Montana	0	0	0	0	0	0	0	0	113	0	0	0
E. Washington	0	0	0	0	0	0	0	0	109	0	0	0
E. Oregon	0	0	0	0	0	0	0	0	106	0	0	0
ACQUIRED IGCC COAL												
E. Montana	0	0	0	0	0	0	0	0	144	0	0	0
E. Washington	0	0	0	0	0	0	0	0	138	0	0	0
E. Oregon	0	0	0	0	0	0	0	0	138	0	0	0
Nevada	0	0	0	0	0	0	0	0	138	0	0	0
W. Washington	0	0	0	0	0	0	0	0	138	0	0	0
IMPORTS	0	0	0	0	110	0	0	0	0	0	0	0
EXISTING SCT												
W. Washington	3	2	2	3	16	0	2	0	0	0	2	2
ACQUIRED CCCT												
Combined Cycle BPA	23	23	23	23	40	21	23	21	21	22	23	23
Combined Cycle Mix	19	19	18	19	37	8	19	8	8	13	19	19
OTHER ACQUIRED GENERATION RESOURCES												
Hydro Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0
Trans Eff Imp	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro	107	107	107	107	94	105	107	105	100	107	107	107
Cogen	403	448	407	457	376	502	448	398	392	434	448	430
Geothermal	81	115	81	95	0	84	115	68	41	81	115	123
Solar	0	0	0	0	0	0	0	0	0	0	0	34
Wind	0	0	0	0	0	13	0	0	0	0	0	26

TABLE 4a. Operations Land Use Impacts for Coal-Fired Generation for 1991 (by number of acres)

Energy Resources:	Alternatives											
	Status Quo	Base Case	Fuel Switching	Nuclear	Imports	Cogeneration	Combustion Turbines	Pulverized Coal	Clean Coal	High Conservation	Conservation	Renewables
EXISTING PULVERIZED COAL												
E. Montana	183	183	183	183	183	183	183	183	183	183	183	183
Nevada	23	23	23	23	23	23	23	23	23	23	23	23
E. Oregon	41	41	41	41	41	41	41	41	41	41	41	41
W. Washington	180	180	180	180	180	180	180	180	180	180	180	180
Wyoming	99	99	99	99	99	99	99	99	99	99	99	99

TABLE 4b. Operations Land Use Impacts for Coal-Fired Generation for 2000 (by number of acres)

Energy Resources:	Alternatives											
	Status Quo	Base Case	Fuel Switching	Nuclear	Imports	Cogeneration	Combustion Turbines	Pulverized Coal	Clean Coal	High Conservation	Conservation	Renewables
EXISTING PULVERIZED COAL												
E. Montana	203	202	204	201	204	198	202	204	204	203	202	203
Nevada	36	35	36	35	37	34	35	32	32	35	35	35
E. Oregon	65	64	65	64	66	62	64	59	63	65	64	64
W. Washington	207	206	208	205	213	201	207	210	210	207	206	207
Wyoming	113	113	114	112	113	111	113	114	114	114	113	114
ACQUIRED PULVERIZED COAL												
E. Montana	110	110	111	110	111	110	110	185	111	111	110	111
E. Washington	105	105	106	103	109	101	105	124	96	105	105	105
E. Oregon	0	0	0	0	0	0	0	30	0	0	0	0
Nevada	0	0	0	0	0	0	0	32	0	0	0	0
W. Washington	0	0	0	0	0	0	0	29	0	0	0	0
ACQUIRED AFB COAL												
E. Montana	0	0	0	0	0	0	0	0	32	0	0	0
E. Washington	0	0	0	0	0	0	0	0	29	0	0	0
E. Oregon	0	0	0	0	0	0	0	0	26	0	0	0
ACQUIRED IGCC COAL												
E. Montana	0	0	0	0	0	0	0	0	32	0	0	0
E. Washington	0	0	0	0	0	0	0	0	30	0	0	0

TABLE 4c. Operations Land Use Impacts for Coal-Fired Generation for 2010 (by number of acres)

Energy Alternatives:	Alternatives											
	Status Quo	Base Case	Fuel Switching	Nuclear	Imports	Cogeneration	Combustion Turbines	Pulverized Coal	Clean Coal	High Conservation	Conservation	Renewables
EXISTING PULVERIZED COAL												
E. Montana	204	204	205	204	206	204	204	206	206	204	204	204
Nevada	36	37	37	37	38	37	37	35	34	37	37	37
E. Oregon	65	64	65	65	69	64	64	65	65	64	64	65
W. Washington	214	214	215	215	217	214	214	214	215	214	214	215
Wyoming	113	113	113	113	115	113	113	115	115	113	113	113
ACQUIRED PULVERIZED COAL												
E. Montana	333	257	258	258	263	257	257	338	263	257	257	257
E. Washington	143	106	107	106	113	106	106	143	107	106	106	106
E. Oregon	107	106	107	106	113	106	106	139	100	106	106	106
Nevada	0	0	0	0	0	0	0	36	0	0	0	0
W. Washington	0	0	0	0	0	0	0	33	0	0	0	0
ACQUIRED AFB COAL												
E. Montana	0	0	0	0	0	0	0	0	32	0	0	0
E. Washington	0	0	0	0	0	0	0	0	31	0	0	0
E. Oregon	0	0	0	0	0	0	0	0	30	0	0	0
ACQUIRED IGCC COAL												
E. Montana	0	0	0	0	0	0	0	0	32	0	0	0
E. Washington	0	0	0	0	0	0	0	0	31	0	0	0
E. Oregon	0	0	0	0	0	0	0	0	31	0	0	0
Nevada	0	0	0	0	0	0	0	0	31	0	0	0
W. Washington	0	0	0	0	0	0	0	0	31	0	0	0

TABLE 5a. Sample of Year-to-Year Differences for Generation and Conservation (in average megawatts) for Coal Alternative

Study ID : 15-JUL-91 06:37:44
Study Title: COAL ALTERNATIVE
30-Oct-91
Year To Year Differences
Includes P Coal and Nuclear data for 1991 from ISSAC raw files: negative values are set to zero

Operating Year	90_91	91_92	92_93	93_94	94_95	95_96	96_97	97_98	98_99	99_00	00_01	01_02	02_03	03_04	04_05	05_06	06_07	07_08	08_09	09_10
Collapsed GENERATING RESOURCES:																				
Hydro Eff Imp	0	0	20	20	20	20	20	0	0	0	0	0	0	0	0	0	0	0	0	0
Trans Eff Imp	0	0	11	11	1	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 1	0	0	0	123	34	0	51	33	0	0	0	0	4	0	0	0	0	0	22	0
Small Hydro 2	0	0	0	111	32	0	51	33	0	0	0	0	4	0	0	0	0	0	22	0
Small Hydro 3	0	0	0	75	7	0	77	44	0	0	0	0	4	0	11	0	0	0	22	0
Small Hydro 4	0	0	0	75	7	0	76	18	0	0	0	0	0	0	11	0	0	0	18	0
CCCT	0	0	0	0	1047	0	0	0	0	0	0	0	0	348	0	0	0	0	0	0
Cogen	0	0	380	180	500	840	160	30	0	0	0	0	310	330	0	70	180	370	300	330
P Coal	2527	0	0	0	0	0	0	752	937	564	187	188	187	188	188	187	188	0	0	0
FB Coal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
G Coal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nuclear	1446	0	0	0	0	0	0	0	0	0	0	0	0	0	0	813	0	0	0	806
Geothermal	0	0	0	0	0	0	0	0	0	0	0	0	45	0	0	45	45	45	45	0
Solar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Imports	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:																				
SF Res MCS	0	8	9	9	10	8	10	11	11	11	12	12	14	12	12	13	12	14	13	14
MF Res MCS	0	2	1	3	1	2	2	2	2	2	2	2	3	1	2	3	1	2	3	1
Water Heat	0	0	0	0	9	20	21	20	21	22	23	25	24	24	25	23	25	27	27	26
Refrigerators	0	0	0	0	3	6	5	6	6	6	7	7	8	7	8	7	7	7	10	10
High Refrigerators	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Appliances	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freezers	0	0	0	0	1	1	2	1	2	2	1	3	2	2	2	1	2	2	3	3
High Freezers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Manuf Housing	0	2	2	3	3	3	4	6	4	5	6	4	5	6	5	4	6	4	5	6
Irrigation	0	0	2	1	2	4	3	4	4	3	4	3	3	2	1	0	0	0	0	0
Industrial	0	4	12	20	22	23	23	24	23	23	22	23	24	23	23	22	23	23	24	19
High Industrial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Commercial	0	18	33	32	31	28	29	30	31	32	30	28	30	30	31	31	32	34	34	35
High New Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Comm Discret Ex	0	4	11	15	13	9	8	11	14	15	15	15	13	8	8	3	0	0	0	0
Comm Lost Opps Exist	0	4	8	7	6	6	7	7	8	7	8	8	7	8	7	8	7	7	8	7
SF Res Weath	0	3	7	10	8	7	5	7	9	8	10	8	9	7	4	0	0	0	0	0
MF Res Weath	0	1	3	3	2	3	2	3	2	3	3	2	3	3	2	1	0	0	0	0
FSW1: NEW SH AND W	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FSW2: EXISTING SF W	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FSW3: EX SF NC AND	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FSW4: EX SF CFA AND	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CO_2 Emissions

In 1991, we estimate the annual level of CO_2 emissions for electricity generation to be 19.25 x 10^6 tons per year. In 2000 and 2010, additional CO_2 emissions will come from the increased operation of the existing coal-fired power plants, the operation of new coal-fired power plants, and the operation of new combustion turbine and cogeneration facilities. Figure 12 presents information on the annual level of CO_2 emissions for each resource alternative in 1991, 2000, and 2010.

The Conventional and Clean Coal Alternatives produce the highest levels of CO_2 emissions in each study year. On the whole, the Coal, Imports, and Status Quo Alternatives have high CO_2 emission levels compared to other resource alternatives. The Status Quo Alternative has below-median CO_2 emissions in 2000 and above-median emissions in 2010. The Cogeneration and Combustion Turbine Alternatives have emission levels slightly above or close to median values. The Base Case, Conservation, and Nuclear Alternatives have below- median emission levels in 2000 and near-median values in 2010. The Renewable, Fuel Switching, and High Conservation Alternatives have near-median CO_2 emission levels in 2000 and below-median values in 2010; however, the Fuel Switching Alternative does not consider the increase in CO_2 emissions that would occur from homes and industry as a result of the switch to fossil fuels to meet heating requirements.

Figure 5-12
Total Carbon Dioxide Emissions

Alternatives

TABLE 5b. Sample of Year-to-Year Differences for Generation and Conservation (in average megawatts) Summed for Study Years, for Coal Alternative

Study ID : 15-JUL-91 06:37:44
Study Title: COAL ALTERNATIVE

1991			2000			2010			Multipliers		
sums	CLU	CEM	sums	CLU	CEM	sums	CLU	CEM	CLU	CEM	
0	0	0	100	0	930	0	0	0	0	9.3	Hydroelectric (overall average)
0	0	0	34	0	744.6	0	0	0	0	21.9	conservation (Industrial)
0	0	0	241	0	2000	26	0	215.8	0	8.3	Sm Hydro1
0	0	0	227	0	2361	26	0	270.4	0	10.4	Sm Hydro 2
0	0	0	203	0	2903	37	0	529.1	0	14.3	Sm Hydro 3
0	0	0	176	0	3045	29	0	501.7	0	17.3	Sm Hydro 4
0	0	0	1047	104.7	1466	348	34.8	487.2	0.1	1.4	CCCT
0	0	0	2090	209	2926	1890	189	2646	0.1	1.4	CCCT
2527	2527	11877	4780	4780	22466	3840	3840	18048	1	4.7	P Coal
0	0	0	0	0	0	0	0	0	1.5	5.1	AFB Coal
0	0	0	0	0	0	0	0	0	0.6	5.7	G Coal
0	0	0	0	0	0	0	0	0			
1446	7230	2603	1446	7230	2603	3065	15325	5517	5	1.8	Nuclear
0	0	0	0	0	0	225	45	922.5	0.2	4.1	Geothermal
0	0	0	0	0	0	0	0	0	3	19.6	Solar
0	0	0	0	0	0	0	0	0	5.9	1.9	Wind
0	0	0	0	0	0	0	0	0	0.1	1.4	CCCT
0	0	0	87	0	6890	128	0	10138	0	79.2	conservation (Res. space heat: New SF)
0	0	0	17	0	1380	20	0	1624	0	81.2	conservation (Res. space heat: New MF)
0	0	0	113	0	2045	249	0	4507	0	18.1	conservation (Res. Appl.: Water heaters)
0	0	0	32	0	598.4	78	0	1459	0	18.7	conservation (Res. Appl.: Refrigerators)
0	0	0	0	0	0	0	0	0	0	18.7	conservation (Res. Appl.: Refrigerators)
0	0	0	0	0	0	0	0	0	0	18.4	(wh + ref)/2
0	0	0	9	0	209.7	21	0	489.3	0	23.3	conservation (Res. Appl.: Freezers)
0	0	0	0	0	0	0	0	0	0	23.3	conservation (Res. Appl.: Freezers
0	0	0	32	0	2534	51	0	4039	0	79.2	conservation (Res. space heat: New SF)
0	0	0	23	0	517.5	13	0	292.5	0	22.5	conservation (Agricultural)
0	0	0	174	0	3811	226	0	4949	0	21.9	conservation (Industrial)
0	0	0	0	0	0	0	0	0	0	21.9	conservation (Industrial)
0	0	0	264	0	5174	315	0	6174	0	19.6	conservation (Com: New bldgs lost opp.)
0	0	0	0	0	0	0	0	0	0	19.6	conservation (Com: New bldgs lost opp.)
0	0	0	100	0	3020	62	0	1872	0	30.2	conservation (Com: Ex bldgs disc.)
0	0	0	60	0	1212	75	0	1515	0	20.2	conservation (Com: Ex bldgs lost opp.)
0	0	0	64	0	5069	38	0	3010	0	79.2	conservation (Res. space heat: New SF)
0	0	0	22	0	1742	14	0	1109	0	79.2	conservation (Res. space heat: New SF)
0	0	0	0	0	0	0	0	0	0	41.7	conservation (Overall average)
0	0	0	0	0	0	0	0	0	0	41.7	conservation (Overall average)
0	0	0	0	0	0	0	0	0	0	41.7	conservation (Overall average)
0	0	0	0	0	0	0	0	0	0	41.7	conservation (Overall average)

TABLE 6a. Sample of Year-to-Year Differences for Generation and Conservation (in average megawatts) for High Conservation Alternative

.Study ID : 16_SEP_91 17:49:46
Study Title: HIGH CONSERVATION ALTERNATIVE
30-Oct-91
Year To Year Differences
Includes P Coal and Nuclear data for 1991 from ISSAC raw files: negative values are set to zero

Operating Year	90_91	91_92	92_93	93_94	94_95	95_96	96_97	97_98	98_99	99_00	00_01	01_02	02_03	03_04	04_05	05_06	06_07	07_08	08_09	09_10
Collapsed GENERATING RESOURCES:																				
Hydro Eff Imp	0	0	20	20	20	20	20	0	0	0	0	0	0	0	0	0	0	0	0	0
Trans Eff Imp	0	0	11	11	11	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small Hydro 1	0	0	0	123	34	0	51	33	0	0	0	11	12	0	0	0	0	0	0	0
Small Hydro 2	0	0	0	111	32	0	51	33	0	0	0	11	12	0	0	0	0	0	0	0
Small Hydro 3	0	0	0	75	7	0	88	44	0	0	0	11	12	0	0	0	0	0	0	0
Small Hydro 4	0	0	0	75	7	0	87	18	0	0	0	0	0	0	0	0	0	0	0	0
CCCT	0	0	0	0	698	349	0	0	348	0	0	0	0	0	0	0	0	0	0	0
Cogen	0	0	320	230	510	840	200	80	0	0	0	0	340	330	0	70	180	390	220	330
P Coal	2527	0	0	0	0	0	0	376	374	376	187	188	187	188	188	187	188	0	0	0
FB Coal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
G Coal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Replacement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nuclear	1446	0	0	0	0	0	0	0	0	0	0	0	0	813	0	0	0	0	806	0
Geothermal	0	0	0	0	0	0	0	0	0	0	45	45	45	0	0	45	45	45	0	0
Solar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Imports	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSERVATION PROGRAMS:																				
SF Res MCS	0	8	9	9	10	8	10	11	11	11	12	12	14	12	12	13	12	14	13	14
MF Res MCS	0	2	1	3	1	2	2	2	2	2	2	2	3	1	2	3	1	2	3	1
Water Heat	0	0	0	0	9	20	21	20	21	22	23	25	24	24	25	23	25	27	27	26
Refrigerators	0	0	0	0	2	3	3	4	3	4	4	4	5	4	5	4	4	4	6	6
High Refrigerators	0	0	0	0	3	6	6	6	6	6	7	8	9	7	8	7	7	8	10	11
Other Appliances	0	0	0	0	0	15	17	17	18	17	18	18	19	18	19	18	19	18	19	20
Freezers	0	0	0	0	1	0	1	1	1	1	1	2	1	1	1	1	1	1	2	2
High Freezers	0	0	0	0	1	3	2	2	3	2	3	3	3	3	3	3	3	3	4	4
New Manuf Housing	0	2	2	3	3	3	4	6	4	5	6	4	5	6	5	4	6	4	5	6
Irrigation	0	0	2	1	2	4	3	4	4	3	4	3	3	2	1	0	0	0	0	0
Industrial	0	2	6	11	12	12	12	13	12	12	12	12	13	12	12	12	12	12	13	10
High Industrial	0	2	7	12	14	14	14	15	14	14	14	14	14	14	14	14	14	15	8	0
New Commercial	0	11	21	20	20	17	19	19	19	20	19	18	19	19	19	20	20	21	22	22
High New Commercial	0	18	35	35	35	35	35	35	36	35	35	35	35	35	36	35	35	35	35	35
Comm Discret Ex	0	4	11	15	15	15	15	15	15	15	15	15	11	1	0	0	0	0	0	0
Comm Lost Opps Exist	0	4	8	7	8	7	7	7	8	8	7	8	7	8	8	7	7	7	8	8
SF Res Weath	0	3	7	10	9	9	9	9	10	9	9	9	8	1	0	0	0	0	0	0
MF Res Weath	0	1	3	3	2	3	3	2	3	3	2	3	3	2	3	0	0	0	0	0
FSW1: NEW SH AND W	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FSW2: EXISTING SF W	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FSW3: EX SF NC AND	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FSW4: EX SF CFA AND	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TABLE 6b. Sample of Year-to-Year Differences for Generation and Conservation (in average megawatts) Summed for Study Years, for High Conservation Alternative

Study ID : 16_SEP_91 17:49:46
Study Title: HIGH CONSERVATION ALTERNATIVE

1991			2000			2010			Multipliers		
sums	CLU	CEM	sums	CLU	CEM	sums	CLU	CEM	CLU	CEM	
0	0	0	100	0	930	0	0	0	0	9.3	Hydroelectric (overall average)
0	0	0	34	0	744.6	0	0	0	0	21.9	conservation (Industrial)
0	0	0	241	0	2000	23	0	190.9	0	8.3	Sm Hydro1
0	0	0	227	0	2361	23	0	239.2	0	10.4	Sm Hydro 2
0	0	0	214	0	3060	23	0	328.9	0	14.3	Sm Hydro 3
0	0	0	187	0	3235	0	0	0	0	17.3	Sm Hydro 4
0	0	0	1395	139.5	1953	0	0	0	0.1	1.4	CCCT
0	0	0	2180	218	3052	1860	186	2604	0.1	1.4	CCCT
2527	2527	11877	3653	3653	17169	3840	3840	18048	1	4.7	P Coal
0	0	0	0	0	0	0	0	0	1.5	5.1	AFB Coal
0	0	0	0	0	0	0	0	0	0.6	5.7	G Coal
0	0	0	0	0	0	0	0	0			
1446	7230	2603	1446	7230	2603	3065	15325	5517	5	1.8	Nuclear
0	0	0	0	0	0	270	54	1107	0.2	4.1	Geothermal
0	0	0	0	0	0	0	0	0	3	19.6	Solar
0	0	0	0	0	0	0	0	0	5.9	1.9	Wind
0	0	0	0	0	0	0	0	0	0.1	1.4	CCCT
0	0	0	87	0	6890	128	0	10138	0	79.2	conservation (Res. space heat: New SF)
0	0	0	17	0	1380	20	0	1624	0	81.2	conservation (Res. space heat: New MF)
0	0	0	113	0	2045	249	0	4507	0	18.1	conservation (Res. Appl.: Water heaters)
0	0	0	19	0	355.3	46	0	860.2	0	18.7	conservation (Res. Appl.: Refrigerators)
0	0	0	33	0	617.1	82	0	1533	0	18.7	conservation (Res. Appl.: Refrigerators)
0	0	0	84	0	1546	186	0	3422	0	18.4	(wh+ref)/2
0	0	0	5	0	116.5	13	0	302.9	0	23.3	conservation (Res. Appl.: Freezers)
0	0	0	13	0	302.9	32	0	745.6	0	23.3	conservation (Res. Appl.: Freezers
0	0	0	32	0	2534	51	0	4039	0	79.2	conservation (Res. space heat: New SF)
0	0	0	23	0	517.5	13	0	292.5	0	22.5	conservation (Agricultural)
0	0	0	92	0	2015	120	0	2628	0	21.9	conservation (Industrial)
0	0	0	106	0	2321	121	0	2650	0	21.9	conservation (Industrial)
0	0	0	166	0	3254	199	0	3900	0	19.6	conservation (Com: New bldgs lost opp.)
0	0	0	299	0	5860	351	0	6880	0	19.6	conservation (Com: New bldgs lost opp.)
0	0	0	120	0	3624	42	0	1268	0	30.2	conservation (Com: Ex bldgs disc.)
0	0	0	64	0	1293	75	0	1515	0	20.2	conservation (Com: Ex bldgs lost opp.)
0	0	0	75	0	5940	27	0	2138	0	79.2	conservation (Res. space heat: New SF)
0	0	0	23	0	1822	13	0	1030	0	79.2	conservation (Res. space heat: New SF)
0	0	0	0	0	0	0	0	0	0	41.7	conservation (Overall average)
0	0	0	0	0	0	0	0	0	0	41.7	conservation (Overall average)
0	0	0	0	0	0	0	0	0	0	41.7	conservation (Overall average)
0	0	0	0	0	0	0	0	0	0	41.7	conservation (Overall average)

TABLE 7a. Construction Employment Impacts for 1991 (in cumulative employee years)

Energy Resources:	Alternatives											
	Status Quo	Base Case	Fuel Switching	Nuclear	Imports	Cogeneration	Combustion Turbines	Pulverized Coal	Clean Coal	High Conservation	Conservation	Renewables
GENERATION RESOURCES												
Nuclear	2603	2569	2587	2587	2587	2603	2587	2603	2587	2603	2603	2603
P Coal	11877	12361	12361	12361	12361	11877	12361	11877	12361	11877	11877	12361

TABLE 7b. Construction Employment Impacts for 2000 (in cumulative employee years)

Energy Resources:	Alternatives											
	Status Quo	Base Case	Fuel Switching	Nuclear	Imports	Cogeneration	Combustion Turbines	Pulverized Coal	Clean Coal	High Conservation	Conservation	Renewables
GENERATION RESOURCES												
Nuclear	4066	4032	2587	5501	2587	2603	4050	2603	2587	2603	4066	2603
P Coal	17169	17653	17653	17653	17653	17169	17653	22466	17653	17169	17169	17653
AFB Coal	0	0	0	0	0	0	0	0	2479	0	0	0
IGCC Coal	0	0	0	0	0	0	0	0	1824	0	0	0
Imports	0	0	0	0	2800	0	0	0	0	0	0	0
CCCT	1953	1953	1953	977	489	977	1953	1466	1466	1953	1953	1953
Hydro Eff Imp	930	930	930	744	930	930	930	930	930	930	930	930
Trans Eff Imp	745	745	745	745	723	745	745	745	745	745	745	745
Small Hydro	10656	10656	10656	10253	8966	10309	10656	10309	10656	10656	10656	11958
Cogen	2884	3052	3052	2702	2688	4620	3052	2926	2884	3052	3052	2884
Geothermal	0	185	185	0	0	0	185	0	0	0	185	1218
Solar	0	0	0	0	0	0	0	0	0	0	0	1686
Wind	0	0	0	0	0	0	0	0	0	0	0	125
DEMAND SIDE RESOURCES												
SF Res MCS	6890	6890	6890	6890	6890	6890	6890	6890	6890	6890	6890	6890
MF Res MCS	1380	1380	1380	1380	1380	1380	1380	1380	1380	1380	1380	1380
Water Heat	2045	2045	2045	2045	2045	2045	2045	2045	2045	2045	2045	2045
Refrigerators	598	598	598	598	598	598	598	598	598	355	598	598
High Refrigerators	0	0	0	0	0	0	0	0	0	617	0	0
Other Appliences	0	0	0	0	0	0	0	0	0	1546	0	0
Freezers	210	210	210	210	210	210	210	210	210	117	210	210
High Freezers	0	0	0	0	0	0	0	0	0	303	0	0
New Manuf Housing	2534	2534	2534	2534	2534	2534	2534	2534	2534	2534	2534	2534
Irrigation	518	518	518	518	405	518	518	518	518	518	518	518
Industrial	3811	3811	3811	3745	2803	3811	3811	3811	3811	2015	3811	3811
High Industrial	0	0	0	0	0	0	0	0	0	2321	0	0
New Commercial	5174	5174	5174	4939	3450	5174	5174	5174	5174	3254	5174	5174
High New Commercial	0	0	0	0	0	0	0	0	0	5860	0	0
Comm Discret Ex	3624	3624	3624	2537	1752	3382	3624	3020	3020	3624	3624	3624
Comm Lost Opps Exist	1293	1293	1293	1131	707	1212	1293	1212	1293	1293	1293	1293
SF Res Weath	5940	5940	5940	4990	2455	5465	5940	5069	5623	5940	5940	5940
MF Res Weath	1822	1822	1822	1663	1346	1742	1822	1742	1742	1822	1822	1822

TABLE 7c. Construction Employment Impacts for 2010 (in cumulative employee years)

Energy Alternatives:	Alternatives											
	Status Quo	Base Case	Fuel Switching	Nuclear	Imports	Cogeneration	Combustion Turbines	Pulverized Coal	Clean Coal	High Conservation	Conservation	Renewables
GENERATION RESOURCES												
Nuclear	4054	4019	5501	2587	2587	5517	4037	5517	5501	5517	4054	5517
P Coal	20694	18532	18532	18532	18532	18048	18532	18048	18532	18048	18048	18532
AFB Coal	0	0	0	0	0	0	0	0	0	0	0	0
IGCC Coal	0	0	0	0	0	0	0	0	2736	0	0	0
Imports	0	0	0	0	1400	0	0	0	0	0	0	0
CCCT	0	0	0	976	1464	976	0	487	487	0	0	0
Hydro Eff Imp	0	0	0	186	0	0	0	0	0	0	0	0
Trans Eff Imp	0	0	0	0	22	0	0	0	0	0	0	0
Small Hydro	1433	1433	1433	1837	1823	1580	1433	1517	616	759	1433	132
Cogen	2758	3220	2646	3696	2576	2408	3220	2646	2604	2604	3220	3136
Geothermal	1107	1386	923	1292	0	1144	1386	923	554	1107	1386	574
Solar	0	0	0	0	0	0	0	0	0	0	0	0
Wind	0	0	0	0	0	63	0	0	0	0	0	0
DEMAND SIDE RESOURCES												
SF Res MCS	10138	10138	10138	10138	10138	10138	10138	10138	10138	10138	10138	10138
MF Res MCS	1624	1624	1624	1624	1624	1624	1624	1624	1624	1624	1624	1624
Water Heat	4507	4507	4507	4507	4507	4507	4507	4507	4507	4507	4507	4507
Refrigerators	1459	1459	1459	1459	1459	1459	1459	1459	1459	860	1459	1459
High Refrigerators	0	0	0	0	0	0	0	0	0	1533	0	0
Other Appliences	0	0	0	0	0	0	0	0	0	3422	0	0
Freezers	489	489	489	489	489	489	489	489	489	303	489	489
High Freezers	0	0	0	0	0	0	0	0	0	746	0	0
New Manuf Housing	4039	4039	4039	4039	4039	4039	4039	4039	4039	4039	4039	4039
Irrigation	293	293	293	293	405	293	293	293	293	293	293	293
Industrial	4949	4949	4949	4949	4993	4949	4949	4949	4949	2628	4949	4949
High Industrial	0	0	0	0	0	0	0	0	0	2650	0	0
New Commercial	6174	6174	6174	6194	6174	6174	6174	6174	6174	3900	6174	6174
High New Commercial	0	0	0	0	0	0	0	0	0	6880	0	0
Comm Discret Ex	1268	1268	1268	2356	2929	1510	1268	1872	1872	1268	1268	1268
Comm Lost Opps Exist	1515	1515	1515	1515	1515	1515	1515	1515	1515	1515	1515	1515
SF Res Weath	2138	2138	2138	3089	5227	2614	2138	3010	2455	2138	2138	2138
MF Res Weath	1030	1030	1030	1188	1346	1109	1030	1109	1109	1030	1030	1030

TABLE 8a. Construction Land Use Impacts for 1991 (in cumulative acres)

Energy Resources:	Alternatives											
	Status Quo	Base Case	Fuel Switching	Nuclear	Imports	Cogeneration	Combustion Turbines	Pulverized Coal	Clean Coal	High Conservation	Conservation	Renewables
GENERATION RESOURCES												
Nuclear	7230	7135	7185	7185	7185	7230	7185	7230	7185	7230	7230	7230
P Coal	2527	2630	2630	2630	2630	2527	2630	2527	2630	2527	2527	2630

TABLE 8b. Construction Land Use Impacts for 2000 (in cumulative acres)

Energy Resources:	Alternatives											
	Status Quo	Base Case	Fuel Switching	Nuclear	Imports	Cogeneration	Combustion Turbines	Pulverized Coal	Clean Coal	High Conservation	Conservation	Renewables
GENERATION RESOURCES												
Nuclear	11295	11200	7185	15280	7185	7230	11250	7230	7185	7230	11295	7230
P Coal	3653	3756	3756	3756	3756	3653	3756	4780	3756	3653	3653	3756
AFB Coal	0	0	0	0	0	0	0	0	729	0	0	0
IGCC Coal	0	0	0	0	0	0	0	0	192	0	0	0
Imports	0	0	0	0	200	0	0	0	0	0	0	0
CCCT	140	140	140	70	35	70	140	105	105	140	140	140
Cogen	206	218	218	193	192	330	218	209	206	218	218	206
Geothermal	0	9	9	0	0	0	9	0	0	0	9	59
Solar	0	0	0	0	0	0	0	0	0	0	0	258
Wind	0	0	0	0	0	0	0	0	0	0	0	389

TABLE 8c. Construction Land Use Impacts for 2010 (in cumulative acres)

Energy Alternatives:	Alternatives											
	Status Quo	Base Case	Fuel Switching	Nuclear	Imports	Cogeneration	Combustion Turbines	Pulverized Coal	Clean Coal	High Conservation	Conservation	Renewables
GENERATION RESOURCES												
Nuclear	11260	11165	15280	7185	7185	15325	11215	15325	15280	15325	11260	15325
P Coal	4403	3943	3943	3943	3943	3840	3943	3840	3943	3840	3840	3943
IGCC Coal	0	0	0	0	0	0	0	0	288	0	0	0
Imports	0	0	0	0	100	0	0	0	0	0	0	0
CCCT	0	0	0	70	105	70	0	35	35	0	0	0
Cogen	197	230	189	264	184	172	230	189	186	186	230	224
Geothermal	54	68	45	63	0	56	68	45	27	54	68	28
Wind	0	0	0	0	0	195	0	0	0	0	0	0

APPENDIX F

SECTION 6

ESTIMATING WATER QUALITY AND CONSUMPTION ENVIRONMENTAL IMPACTS

SECTION 6

ESTIMATING WATER QUALITY AND CONSUMPTION ENVIRONMENTAL IMPACTS

Estimates of impacts to water quality and consumption were primarily based on generic descriptions of resources found in the literature. Our primary source was the U.S. Department of Energy (DOE) (1983). Lack of consistency between reporting and analytical methods makes it difficult to rely on more than one source. We incorporated other sources only when significantly more recent or specific information could be used for the analysis. We used sources other than DOE in two instances, for water consumption by gasified coal plants and for water consumption of natural gas-fired combined-cycle combustion turbines. Both of these technologies are currently emerging as potential electricity generators in the Pacific Northwest.

For gasified coal we adapted reference material cited in Ottinger et al. (1990 p. 285). Ottinger references Energy System Emissions and Materials Requirements (DOE 1989).

For natural gas-fired combined-cycle combustion turbines (CCT) and simple-cycle combustion turbines (SCT), we calculated water consumption requirements using engineering estimates from Fluor Daniel Inc. (1988). This source provided a consumption rate of 3.4 gallons per minute (gpm) per megawatt electric (MWe). We converted this figure to annual consumption per average megawatt using an assumed 65% resource availability (83% equivalent availability plus 6% forced outage plus 12% planned outage) (as cited in Table 1). This figure was then converted from gallons to acre-feet. The equation is as follows:

(3.4 gpm/MWe / 0.65) * 525,600 minutes/year = 2,749,292.3 g/aMW

2,749,292.3 g/aMW / 325,850.35 g/acre-feet = 8.33 acre feet/aMW

Table 1 shows water consumption for each of the resources assessed. Table 2 shows water effluent and thermal discharges for each resource

assessed. Tables 3, 4, and 5 are from the spreadsheet analyses. Table 3 shows water consumption. Tables 4 and 5 show effluent estimates by energy type for each study year. The resources shown in Table 5 were not utilized in 1991.

REFERENCES

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Ottinger, R. L., D. R. Wooley, N. A. Robinson, D. R. Hodas, and S. E. Babb. 1990. Environmental Costs of Electricity. Oceanna Publications, New York.

U.S. Department of Energy (DOE). 1983. Energy Technology Characterizations Handbook, Environmental Pollution and Control Factors. DOE/EP-0093. U.S. Department of Energy, Washington, D.C.

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TABLE 1. Factors for Calculating Annual Water Consumption

Resource	Acre-Feet Consumption/aMWa
Nuclear	22.85
Pulverized Coal	13.36
AFB Coal	17.40
ICCG Coal	16.26[b]
SCT	1.03[c,d]
CCCT	8.44[c,d]
Geothermal	59.73[e]
Central Thermal Solar	0.61

(a) Unless indicated otherwise, sources are taken from U.S. DOE 1983.
(b) Meridian Corporation 1989, as cited in Ottinger et al. 1990.
(c) Fluor Daniel, Inc. 1988.
(d) Bonneville Power Administration 1990.
(e) Figures are for a hydro thermal flashed system. A vapor-dominated system would result in about twice the water consumption.

AFB = atmospheric fluidized bed
CCCT = combined-cycle combustion turbine
ICCG = integrated combined-cycle gasification
SCT = simple-cycle combustion turbine

TABLE 2. Water Effluent and Thermal Discharges

	Nuclear	Coal	AFB Coal	ICCG Coal	Gas-Fired SCT & CCCT	Geothermal	Solar
Activated Corrosion & Fusion Products *	1.71E-04	-	-	-	-	-	-
Tritium *	4.31E-01	-	-	-	-	-	-
TSS **	1.84E+04	7.50E-02	6.32E-02	7.42E-02	1.43E+00	-	-
TDS **	4.09E+03	-	-	-	1.33E+00	-	-
Iron **	2.57E+02	2.25E-05	1.89E-05	2.22E-05	-	-	-
Chloride **	5.14E+02	7.53E-02	6.34E-02	7.44E-02	-	-	-
Chromium **	4.29E-01	-	-	-	-	-	-
Copper **	1.04E+00	2.25E-05	1.89E-05	2.22E-05	-	-	-
Zinc **	1.20E+00	-	-	-	-	-	-
Oil & Grease **	-	3.80E-02	3.20E-02	3.76E-02	-	-	-
Biological Oxygen Demand	-	-	-	-	8.14E-03	-	-
Chemical Oxygen Demand	-	-	-	-	6.86E-01	-	-
Ammonia	-	-	-	-	1.53E-04	-	-
Thermal ***	6E+10	5.25E+10	4.42E+10	5.19E+10	3.60E+10	1.75E+11	4.60E+10

* = ci

** = mg/l for nuclear (annual average varies with discharge); tons/aMW for others

*** = BTUs/aMW

TABLE 3a. Water Consumption Estimates for Each Energy Type for 1991

Water Consumption (acre feet): 1991

Energy Resources:	Alternatives											
	Status Quo	Base Case	Fuel Switching	Nuclear	Imports	Cogeneration	Combustion Turbines	Pulverized Coal	Clean Coal	High Conservation	Conservation	Renewables
EXISTING NUCLEAR												
W. Oregon	16595	16595	16595	16595	16595	16595	16595	16595	16595	16595	16595	16595
E. Washington	16244	16244	16244	16244	16244	16244	16244	16244	16244	16244	16244	16244
EXISTING PULVERIZED COAL												
E. Montana	12205	12205	12205	12205	12205	12205	12205	12205	12205	12205	12205	12205
Nevada	1534	1534	1534	1534	1534	1534	1534	1534	1534	1534	1534	1534
E. Oregon	2762	2762	2762	2762	2762	2762	2762	2762	2762	2762	2762	2762
W. Washington	12040	12040	12040	12040	12040	12040	12040	12040	12040	12040	12040	12040
Wyoming	6600	6600	6600	6600	6600	6600	6600	6600	6600	6600	6600	6600

TABLE 3b. Water Consumption Estimates for Each Energy Type for 2000

Water Consumption (acre feet): 2000

Energy Resources:	Alternatives: Status Quo	Base Case	Fuel Switching	Nuclear	Imports	Cogeneration	Combustion Turbines	Pulverized Coal	Clean Coal	High Conservation	Conservation	Renewables
EXISTING NUCLEAR												
W. Oregon	16595	16595	16595	16595	16595	16595	16595	16595	16595	16595	16595	16595
E. Washington	16244	16244	16244	16244	16244	16244	16244	16244	16244	16244	16244	16244
ACQUIRED NUCLEAR												
W. Washington	0	0	0	18411	0	0	0	0	0	0	0	0
E. Washington	18566	18566	0	18566	0	0	18566	0	0	0	18566	0
EXISTING PULVERIZED COAL												
E. Montana	13560	13496	13646	13440	13642	13224	13500	13615	13628	13583	13496	13556
Nevada	2374	2350	2376	2306	2464	2273	2351	2116	2122	2356	2350	2335
E. Oregon	4329	4296	4363	4263	4423	4132	4301	3952	4207	4346	4296	4274
W. Washington	13845	13791	13891	13696	14258	13454	13795	14031	14038	13860	13791	13823
Wyoming	7531	7533	7616	7482	7568	7395	7537	7595	7595	7616	7533	7606
ACQUIRED PULVERIZED COAL												
E. Montana	7361	7361	7434	7370	7399	7329	7368	12344	7409	7434	7361	7421
E. Washington	7007	6994	7076	6859	7262	6758	7001	8301	6428	7030	6994	7017
E. Oregon	0	0	0	0	0	0	0	1978	0	0	0	0
Nevada	0	0	0	0	0	0	0	2124	0	0	0	0
W. Washington	0	0	0	0	0	0	0	1919	0	0	0	0
ACQUIRED AFB COAL												
E. Montana	0	0	0	0	0	0	0	0	2777	0	0	0
E. Washington	0	0	0	0	0	0	0	0	2507	0	0	0
E. Oregon	0	0	0	0	0	0	0	0	2224	0	0	0
ACQUIRED IGCC COAL												
E. Montana	0	0	0	0	0	0	0	0	2562	0	0	0
E. Washington	0	0	0	0	0	0	0	0	2440	0	0	0
EXISTING SCT												
W. Washington	0	0	22	2	108	3	0	0	17	12	0	6
ACQUIRED CCCT												
Combined Cycle BPA	1646	1552	1800	0	0	0	1556	814	874	1800	1552	1789
Combined Cycle MIX	693	372	1448	876	1018	1329	376	811	1439	1399	372	1362
COGENERATION	14132	14955	14955	13240	13171	22638	14955	14337	14132	13720	14955	14132
GEOTHERMAL	0	2688	2688	0	0	0	2688	0	0	0	2688	17740
CENTRAL THERMAL SOLAR	0	0	0	0	0	0	0					

TABLE 3c. Water Consumption Estimates for Each Energy Type for 2010

Water Consumption (acre feet): 2010

Energy Resources:	Alternatives: Status Quo	Base Case	Fuel Switching	Nuclear	Imports	Cogeneration	Combustion Turbines	Pulverized Coal	Clean Coal	High Conservation	Conservation	Renewables
EXISTING NUCLEAR												
W. Oregon	16595	16595	16595	16595	16595	16595	16595	16595	16595	16595	16595	16595
E. Washington	16244	16244	16244	16244	16244	16244	16244	16244	16244	16244	16244	16244
ACQUIRED NUCLEAR												
W. Washington	18411	18411	18411	18411	0	18411	18411	18411	18411	18411	18411	18411
E. Washington	18566	18566	18566	18566	0	18566	18566	18566	18566	18566	18566	18566
EXISTING PULVERIZED COAL												
E. Montana	13657	13653	13661	13657	13741	13638	13653	13741	13741	13653	13653	13653
Nevada	2404	2473	2477	2475	2534	2452	2473	2344	2301	2468	2473	2474
E. Oregon	4352	4307	4339	4321	4591	4299	4307	4352	4370	4303	4307	4321
W. Washington	14304	14327	14343	14333	14502	14307	14327	14307	14345	14327	14327	14334
Wyoming	7567	7563	7573	7567	7691	7541	7563	7691	7691	7563	7563	7563
ACQUIRED PULVERIZED COAL												
E. Montana	22252	17192	17233	17207	17542	17146	17192	22552	17542	17193	17192	17200
E. Washington	9547	7082	7126	7101	7522	7070	7082	9561	7164	7076	7082	7101
E. Oregon	7143	7082	7126	7101	7522	7070	7082	9307	6702	7076	7082	7101
Nevada	0	0	0	0	0	0	0	2397	0	0	0	0
W. Washington	0	0	0	0	0	0	0	2172	0	0	0	0
ACQUIRED AFB COAL												
E. Montana	0	0	0	0	0	0	0	0	2819	0	0	0
E. Washington	0	0	0	0	0	0	0	0	2698	0	0	0
E. Oregon	0	0	0	0	0	0	0	0	2625	0	0	0
ACQUIRED IGCC COAL												
E. Montana	0	0	0	0	0	0	0	0	2602	0	0	0
E. Washington	0	0	0	0	0	0	0	0	2490	0	0	0
E. Oregon	0	0	0	0	0	0	0	0	2490	0	0	0
Nevada	0	0	0	0	0	0	0	0	2490	0	0	0
W. Washington	0	0	0	0	0	0	0	0	2490	0	0	0
EXISTING SCT												
W. Washington	26	25	18	26	160	1	25	0	0	2	25	25
ACQUIRED CCCT												
Combined Cycle BPA	1936	1940	1920	1933	3413	1745	1940	1768	1756	1846	1940	1942
Combined Cycle MIX	1619	1627	1561	1627	3116	681	1627	677	675	1112	1627	1620
COGENERATION	27646	30733	27920	31350	25794	34437	30733	27303	26891	29772	30733	29498
GEOTHERMAL	16127	22877	16127	18815	0	16665	22877	13439	8064	16127	22877	24489
CENTRAL THERMAL												
SOLAR	0	0	0	0	0	0	0	0	0	0	0	52

TABLE 4a. Effluent Estimates for Coal-Fired Energy Types for 1991

Energy Resources:	Alternatives											
	Status Quo	Base Case	Fuel Switching	Nuclear	Imports	Cogeneration	Combustion Turbines	Pulverized Coal	Clean Coal	High Conservation	Conservation	Renewables
Montana Coal:												
Total suspended Solids	68.5	68.5	68.5	68.5	68.5	68.5	68.5	68.5	68.5	68.5	68.5	68.5
Iron	0.0228	0.0228	0.0228	0.0228	0.0228	0.0228	0.0228	0.0228	0.0228	0.0228	0.0228	0.0228
Chloride	68.8	68.8	68.8	68.8	68.8	68.8	68.8	68.8	68.8	68.8	68.8	68.8
Copper	0.0206	0.0206	0.0206	0.0206	0.0206	0.0206	0.0206	0.0206	0.0206	0.0206	0.0206	0.0206
Oil and Grease	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7
Thermal Discharge	4.80E+13	4.80E+13	4.80E+13	4.80E+13	4.80E+13	4.80E+13	4.80E+13	4.80E+13	4.80E+13	4.80E+13	4.80E+13	4.80E+13
Nevada Coal:												
Total suspended Solids	8.61	8.61	8.61	8.61	8.61	8.61	8.61	8.61	8.61	8.61	8.61	8.61
Iron	0.00287	0.00287	0.00287	0.00287	0.00287	0.00287	0.00287	0.00287	0.00287	0.00287	0.00287	0.00287
Chloride	8.65	8.65	8.65	8.65	8.65	8.65	8.65	8.65	8.65	8.65	8.65	8.65
Copper	0.00258	0.00258	0.00258	0.00258	0.00258	0.00258	0.00258	0.00258	0.00258	0.00258	0.00258	0.00258
Oil and Grease	4.36	4.36	4.36	4.36	4.36	4.36	4.36	4.36	4.36	4.36	4.36	4.36
Thermal Discharge	6.03E+12	6.03E+12	6.03E+12	6.03E+12	6.03E+12	6.03E+12	6.03E+12	6.03E+12	6.03E+12	6.03E+12	6.03E+12	6.03E+12
E. Oregon Coal:												
Total suspended Solids	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5
Iron	0.00517	0.00517	0.00517	0.00517	0.00517	0.00517	0.00517	0.00517	0.00517	0.00517	0.00517	0.00517
Chloride	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6
Copper	0.00465	0.00465	0.00465	0.00465	0.00465	0.00465	0.00465	0.00465	0.00465	0.00465	0.00465	0.00465
Oil and Grease	7.86	7.86	7.86	7.86	7.86	7.86	7.86	7.86	7.86	7.86	7.86	7.86
Thermal Discharge	1.09E+13	1.09E+13	1.09E+13	1.09E+13	1.09E+13	1.09E+13	1.09E+13	1.09E+13	1.09E+13	1.09E+13	1.09E+13	1.09E+13
W. Washington Coal:												
Total suspended Solids	67.6	67.6	67.6	67.6	67.6	67.6	67.6	67.6	67.6	67.6	67.6	67.6
Iron	0.0225	0.0225	0.0225	0.0225	0.0225	0.0225	0.0225	0.0225	0.0225	0.0225	0.0225	0.0225
Chloride	67.9	67.9	67.9	67.9	67.9	67.9	67.9	67.9	67.9	67.9	67.9	67.9
Copper	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203
Oil and Grease	34.2	34.2	34.2	34.2	34.2	34.2	34.2	34.2	34.2	34.2	34.2	34.2
Thermal Discharge	4.73E+13	4.73E+13	4.73E+13	4.73E+13	4.73E+13	4.73E+13	4.73E+13	4.73E+13	4.73E+13	4.73E+13	4.73E+13	4.73E+13
Wyoming Coal:												
Total suspended Solids	36.7	36.7	36.7	36.7	36.7	36.7	36.7	36.7	36.7	36.7	36.7	36.7
Iron	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011
Chloride	36.8	36.8	36.8	36.8	36.8	36.8	36.8	36.8	36.8	36.8	36.8	36.8
Copper	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011
Oil and Grease	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6
Thermal Discharge	2.56E+13	2.56E+13	2.56E+13	2.56E+13	2.56E+13	2.56E+13	2.56E+13	2.56E+13	2.56E+13	2.56E+13	2.56E+13	2.56E+13

* Units are in tons; except Thermal Discharge, which is in BTUs, and all effluents for Nuclear, which are in mg/l.

TABLE 4b. Effluent Estimates for Coal-Fired Energy Types for 2000

Energy Resources:	Alternatives											
	Status Quo	Base Case	Fuel Switching	Nuclear	Imports	Cogeneration	Combustion Turbines	Pulverized Coal	Clean Coal	High Conservation	Conservation	Renewables
Montana Coal:												
Total suspended Solids	117	117	118	117	118	115	117	146	140	118	117	118
Iron	0.0392	0.039	0.0394	0.0389	0.0394	0.0385	0.0391	0.0486	0.0459	0.0393	0.039	0.0393
Chloride	118	118	119	117	119	116	118	146	140	118	118	118
Copper	0.0352	0.0351	0.0355	0.035	0.0354	0.0346	0.0351	0.0437	0.0419	0.0354	0.0351	0.0353
Oil and Grease	59.5	59.3	60	59.2	59.8	58.5	59.4	73.8	70.9	59.8	59.3	59.7
Thermal Discharge	8.22E+13	8.20E+13	8.28E+13	8.18E+13	8.27E+13	8.08E+13	8.20E+13	1.02E+14	9.79E+13	8.26E+13	8.20E+13	8.24E+13
Nevada Coal:												
Total suspended Solids	13.3	13.2	13.3	12.9	13.8	12.8	13.2	23.8	11.9	13.2	13.2	13.1
Iron	0.00444	0.0044	0.00445	0.00431	0.00461	0.00425	0.0044	0.00794	0.00397	0.00441	0.0044	0.00437
Chloride	13.4	13.2	13.4	13	13.9	12.8	13.3	23.9	12	13.3	13.2	13.2
Copper	0.004	0.00396	0.004	0.00388	0.00415	0.00383	0.00396	0.00714	0.00357	0.00397	0.00396	0.00393
Oil and Grease	6.75	6.68	6.76	6.56	7.01	6.47	6.69	12.1	6.04	6.7	6.68	6.64
Thermal Discharge	9.33E+12	9.24E+12	9.34E+12	9.06E+12	9.68E+12	8.93E+12	9.24E+12	1.67E+13	8.34E+12	9.26E+12	9.24E+12	9.17E+12
E. Oregon Coal:												
Total suspended Solids	24.3	24.1	24.5	23.9	24.8	23.2	24.1	33.3	31.7	24.4	24.1	24
Iron	0.0081	0.00804	0.00816	0.00798	0.00828	0.00773	0.00805	0.0111	0.0103	0.00813	0.00804	0.008
Chloride	24.4	24.2	24.6	24	24.9	23.3	24.2	33.4	31.8	24.5	24.2	24.1
Copper	0.00729	0.00724	0.00735	0.00718	0.00745	0.00696	0.00724	0.00999	0.0095	0.00732	0.00724	0.0072
Oil and Grease	12.3	12.2	12.4	12.1	12.6	11.8	12.2	16.9	16.1	12.4	12.2	12.2
Thermal Discharge	1.70E+13	1.69E+13	1.71E+13	1.68E+13	1.74E+13	1.62E+13	1.69E+13	2.33E+13	2.22E+13	1.71E+13	1.69E+13	1.68E+13
E. Washington Coal:												
Total suspended Solids	39.3	39.3	39.7	38.5	40.8	37.9	39.3	46.6	56.3	39.5	39.3	39.4
Iron	0.0131	0.0131	0.0132	0.0128	0.0136	0.0126	0.0131	0.0155	0.0181	0.0132	0.0131	0.0131
Chloride	39.5	39.4	39.9	38.7	40.9	38.1	39.5	46.8	56.5	39.6	39.4	39.6
Copper	0.0118	0.0118	0.0119	0.0116	0.0122	0.0114	0.0118	0.014	0.0169	0.0118	0.0118	0.0118
Oil and Grease	19.9	19.9	20.1	19.5	20.7	19.2	19.9	23.6	28.5	20	19.9	20
Thermal Discharge	2.75E+13	2.75E+13	2.78E+13	2.70E+13	2.85E+13	2.66E+13	2.75E+13	3.26E+13	3.94E+13	2.76E+13	2.75E+13	2.76E+13
W. Washington Coal:												
Total suspended Solids	77.7	77.4	78.0	76.9	80.0	75.5	77.4	89.5	78.8	77.8	77.4	77.6
Iron	0.0259	0.0258	0.026	0.0256	0.0267	0.0252	0.0258	0.0298	0.0263	0.0259	0.0258	0.0259
Chloride	78	77.7	78.3	77.2	80.4	75.8	77.8	89.9	79.1	78.1	77.7	77.9
Copper	0.0233	0.0232	0.0234	0.0231	0.024	0.0227	0.0232	0.0269	0.0236	0.0233	0.0232	0.0233
Oil and Grease	39.4	39.2	39.5	39	40.6	38.3	39.2	45.4	39.9	39.4	39.2	39.3
Thermal Discharge	5.44E+13	5.42E+13	5.46E+13	5.38E+13	5.60E+13	5.29E+13	5.42E+13	6.27E+13	5.52E+13	5.45E+13	5.42E+13	5.43E+13
Wyoming Coal:												
Total suspended Solids	41.8	41.8	42.3	41.6	42	41.1	41.9	42.2	42.2	42.3	41.8	42.2
Iron	0.0125	0.0125	0.0127	0.0124	0.0126	0.0123	0.0125	0.0126	0.0126	0.0127	0.0125	0.0126
Chloride	41.9	41.9	42.4	41.7	42.1	41.2	42	42.3	42.3	42.4	41.9	42.4
Copper	0.0125	0.0125	0.0127	0.0124	0.0126	0.0123	0.0125	0.0126	0.0126	0.0127	0.0125	0.0126
Oil and Grease	21.2	21.2	21.4	21.1	21.3	20.8	21.2	21.4	21.4	21.4	21.2	21.4
Thermal Discharge	2.93E+13	2.93E+13	2.96E+13	2.91E+13	2.94E+13	2.87E+13	2.93E+13	2.95E+13	2.95E+13	2.96E+13	2.93E+13	2.95E+13

* Units are in tons; except Thermal Discharge, which is in BTUs, and all effluents for Nuclear, which are in mg/l.

TABLE 4c. Effluent Estimates for Coal-Fired Energy Types for 2010

Energy Resources:	Alternatives											
	Status Quo	Base Case	Fuel Switching	Nuclear	Imports	Cogeneration	Combustion Turbines	Pulverized Coal	Clean Coal	High Conservation	Conservation	Renewables
Montana Coal:												
Total suspended Solids	202	173	173	173	176	173	173	204	198	173	173	173
Iron	0.0672	0.0577	0.0578	0.0578	0.0585	0.0576	0.0577	0.0679	0.0652	0.0577	0.0577	0.0577
Chloride	202	174	174	174	176	174	174	205	198	174	174	174
Copper	0.0605	0.0519	0.052	0.052	0.0527	0.0518	0.0519	0.0611	0.0593	0.0519	0.0519	0.052
Oil and Grease	102	87.7	87.9	87.8	89	87.6	87.7	103	100	87.7	87.7	87.8
Thermal Discharge	1.41E+14	1.21E+14	1.21E+14	1.21E+14	1.23E+14	1.21E+14	1.21E+14	1.43E+14	1.38E+14	1.21E+14	1.21E+14	1.21E+14
Nevada Coal:												
Total suspended Solids	13.5	13.9	13.9	13.9	14.2	13.8	13.9	26.6	24.3	13.9	13.9	13.9
Iron	0.0045	0.00463	0.00464	0.00463	0.00474	0.00459	0.00463	0.00887	0.00771	0.00462	0.00463	0.00463
Chloride	13.5	13.9	14	13.9	14.3	13.8	13.9	26.7	24.4	13.9	13.9	13.9
Copper	0.00405	0.00416	0.00417	0.00417	0.00427	0.00413	0.00416	0.00798	0.00728	0.00416	0.00416	0.00417
Oil and Grease	6.84	7.03	7.05	7.04	7.21	6.97	7.03	13.5	12.3	7.02	7.03	7.04
Thermal Discharge	9.45E+12	9.72E+12	9.73E+12	9.73E+12	9.96E+12	9.63E+12	9.72E+12	1.86E+13	1.70E+13	9.70E+12	9.72E+12	9.72E+12
E. Oregon Coal:												
Total suspended Solids	64.5	63.9	64.4	64.1	68	63.8	63.9	76.7	83.1	63.9	63.9	64.1
Iron	0.0215	0.0213	0.0215	0.0214	0.0227	0.0213	0.0213	0.0256	0.027	0.0213	0.0213	0.0214
Chloride	64.8	64.2	64.6	64.4	68.3	64.1	64.2	77	83.4	64.1	64.2	64.4
Copper	0.0194	0.0192	0.0193	0.0192	0.0204	0.0191	0.0192	0.023	0.0249	0.0192	0.0192	0.0192
Oil and Grease	32.7	32.4	32.6	32.5	34.5	32.3	32.4	38.9	42.1	32.4	32.4	32.5
Thermal Discharge	4.52E+13	4.48E+13	4.51E+13	4.49E+13	4.76E+13	4.47E+13	4.48E+13	5.37E+13	5.81E+13	4.47E+13	4.48E+13	4.49E+13
E. Washington Coal:												
Total suspended Solids	53.6	39.8	40	39.9	42.2	39.7	39.8	53.7	61.4	39.7	39.8	39.9
Iron	0.0179	0.0133	0.0133	0.0133	0.0141	0.0132	0.0133	0.0179	0.0197	0.0132	0.0133	0.0133
Chloride	53.8	39.9	40.2	40	42.4	39.8	39.9	53.9	61.6	39.9	39.9	40
Copper	0.0161	0.0119	0.012	0.012	0.0127	0.0119	0.0119	0.0161	0.0184	0.0119	0.0119	0.012
Oil and Grease	27.2	20.1	20.3	20.2	21.4	20.1	20.1	27.2	31.1	20.1	20.1	20.2
Thermal Discharge	3.75E+13	2.78E+13	2.80E+13	2.79E+13	2.96E+13	2.78E+13	2.78E+13	3.76E+13	4.30E+13	2.78E+13	2.78E+13	2.79E+13
W. Washington Coal:												
Total suspended Solids	80.3	80.4	80.5	80.5	81.4	80.3	80.4	92.5	91.9	80.4	80.4	80.5
Iron	0.0268	0.0268	0.0268	0.0268	0.0271	0.0268	0.0268	0.0308	0.0302	0.0268	0.0268	0.0268
Chloride	80.6	80.8	80.8	80.8	81.7	80.6	80.8	92.9	92.2	80.8	80.8	80.8
Copper	0.0241	0.0241	0.0242	0.0241	0.0244	0.0241	0.0241	0.0278	0.0276	0.0241	0.0241	0.0241
Oil and Grease	40.7	40.8	40.8	40.8	41.2	40.7	40.8	46.9	46.6	40.8	40.8	40.8
Thermal Discharge	5.62E+13	5.63E+13	5.64E+13	5.63E+13	5.70E+13	5.62E+13	5.63E+13	6.48E+13	6.43E+13	5.63E+13	5.63E+13	5.63E+13
Wyoming Coal:												
Total suspended Solids	42	42	42.1	42	42.7	41.9	42	42.7	42.7	42	42	42
Iron	0.0126	0.0126	0.0126	0.0126	0.0128	0.0125	0.0126	0.0128	0.0128	0.0126	0.0126	0.0126
Chloride	42.1	42.1	42.2	42.1	42.8	42	42.1	42.8	42.8	42.1	42.1	42.1
Copper	0.0126	0.0126	0.0126	0.0126	0.0128	0.0125	0.0126	0.0128	0.0128	0.0126	0.0126	0.0126
Oil and Grease	21.3	21.3	21.3	21.3	21.6	21.2	21.3	21.6	21.6	21.3	21.3	21.3
Thermal Discharge	2.94E+13	2.94E+13	2.94E+13	2.94E+13	2.99E+13	2.93E+13	2.94E+13	2.99E+13	2.99E+13	2.94E+13	2.94E+13	2.94E+13

* Units are in tons; except Thermal Discharge, which is in BTUs, and all effluents for Nuclear, which are in mg/l.

TABLE 5a. Effluent Estimates for Non-Coal-Fired Energy Types for 1991

Energy Resources:	Alternatives											
	Status Quo	Base Case	Fuel Switching	Nuclear	Imports	Cogeneration	Combustion Turbines	Pulverized Coal	Clean Coal	High Conservation	Conservation	Renewables
W. Oregon Nuclear:												
Activated Corrosion and Fusion Products	0.124	0.124	0.124	0.124	0.124	0.124	0.124	0.124	0.124	0.124	0.124	0.124
Tritium	313	313	313	313	313	313	313	313	313	313	313	313
Total Suspended Solids	0.134	0.134	0.134	0.134	0.134	0.134	0.134	0.134	0.134	0.134	0.134	0.134
Total Disolved Solids	2.97	2.97	2.97	2.97	2.97	2.97	2.97	2.97	2.97	2.97	2.97	2.97
Iron	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7
Chloride	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3
Chromium	312	312	312	312	312	312	312	312	312	312	312	312
Copper	755	755	755	755	755	755	755	755	755	755	755	755
Zinc	872	872	872	872	872	872	872	872	872	872	872	872
Thermal Discharge	4.36E+13	4.36E+13	4.36E+13	4.36E+13	4.36E+13	4.36E+13	4.36E+13	4.36E+13	4.36E+13	4.36E+13	4.36E+13	4.36E+13
E. Washington Nuclear:												
Activated Corrosion and Fusion Products	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122
Tritium	306	306	306	306	306	306	306	306	306	306	306	306
Total Suspended Solids	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131	0.131
Total Disolved Solids	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91
Iron	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3
Chloride	36.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5
Chromium	305	305	305	305	305	305	305	305	305	305	305	305
Copper	739	739	739	739	739	739	739	739	739	739	739	739
Zinc	853	853	853	853	853	853	853	853	853	853	853	853
Thermal Discharge	4.27E+13	4.27E+13	4.27E+13	4.27E+13	4.27E+13	4.27E+13	4.27E+13	4.27E+13	4.27E+13	4.27E+13	4.27E+13	4.27E+13

* Units are in tons; except Thermal Discharge, which is in BTUs, and all effluents for Nuclear, which are in mg/l.

TABLE 5a. Effluent Estimates for Gas-Fired and Renewable Energy Types for 2000

Energy Resources:	Alternatives*											
	Status Quo	Base Case	Fuel Switching	Nuclear	Imports	Cogeneration	Combustion Turbines	Pulverized Coal	Clean Coal	High Conservation	Conservation	Renewables
Solar Thermal:												
Thermal Discharge	0.00E+00	2.07E+12	2.07E+12	0.00E+00	0.00E+00	0.00E+00	2.07E+12	0.00E+00	0.00E+00	0.00E+00	2.07E+12	1.37E+13
Geothermal:												
Thermal Discharge	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.51E+13
W. Washington SCT:												
Total Suspended Solids	0.477	0	30.1	2.38	150	4.53	0	0.477	23.7	16.8	0	7.75
Total Disolved Solids	0.443	0	28	2.22	140	4.21	0	0.443	22.1	15.6	0	7.2
Biological Oxygen Dema	0.00271	0	0.172	0.0136	0.854	0.0258	0	0.00271	0.135	0.0956	0	0.0441
Chemical Oxygen Dema	0.229	0	14.5	1.14	72	2.17	0	0.229	11.4	8.06	0	3.72
Ammonia	0.000051	0	0.00323	0.000255	0.0161	0.000485	0	0.000051	0.00254	0.0018	0	0.000829
Thermal Discharge	1.20E+10	0.00E+00	7.59E+11	6.00E+10	3.78E+12	1.14E+11	0.00E+00	1.20E+10	5.97E+11	4.23E+11	0.00E+00	1.95E+11
CCCT:												
Total Suspended Solids	396	326	550	148	173	225	327	275	392	542	326	534
Total Disolved Solids	369	303	512	138	160	209	304	256	365	504	303	497
Biological Oxygen Dema	2.26	1.86	3.13	0.845	0.982	1.28	1.86	1.57	2.23	3.09	1.86	3.04
Chemical Oxygen Dema	190	156	264	71.2	82.8	108	157	132	188	260	156	256
Ammonia	0.0424	0.0349	0.0589	0.0159	0.0185	0.0241	0.035	0.0295	0.0419	0.058	0.0349	0.0571
Thermal Discharge	9.98E+12	8.21E+12	1.39E+13	3.74E+12	4.34E+12	5.67E+12	8.24E+12	6.93E+12	9.87E+12	1.36E+13	8.21E+12	1.34E+13
Gas-Fired Cogeneration:												
Total Suspended Solids	2940	3110	3110	2750	2740	4700	3110	2980	2940	2850	3110	2940
Total Disolved Solids	2730	2890	2890	2560	2540	4370	2890	2770	2730	2650	2890	2730
Biological Oxygen Dema	16.8	17.7	17.7	15.7	15.6	26.9	17.7	17	16.8	16.3	17.7	16.8
Chemical Oxygen Dema	1410	1500	1500	1320	1320	2260	1500	1430	1410	1370	1500	1410
Ammonia	0.314	0.332	0.332	0.294	0.293	0.503	0.332	0.319	0.314	0.305	0.332	0.314
Thermal Discharge	7.42E+13	7.85E+13	7.85E+13	6.95E+13	6.91E+13	1.19E+14	7.85E+13	7.52E+13	7.42E+13	7.20E+13	7.85E+13	7.42E+13

* Units are in tons; except Thermal Discharge, which is in BTUs.

TABLE 5b. Effluent Estimates for Gas-Fired and Renewable Energy Types for 2010

Energy Resources:	Alternatives*											
	Status Quo	Base Case	Fuel Switching	Nuclear	Imports	Cogeneration	Combustion Turbines	Pulverized Coal	Clean Coal	High Conservation	Conservation	Renewables
Solar Thermal:												
Thermal Discharge	1.24E+13	1.76E+13	1.24E+13	1.45E+13	0.00E+00	1.28E+13	1.76E+13	1.04E+13	6.21E+12	1.24E+13	1.76E+13	1.89E+13
Geothermal:												
Thermal Discharge	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.51E+13
W. Washington SCT:												
Total Suspended Solids	36.6	34.7	24.9	36.1	222	0.953	34.7	0	0	2.38	34.7	34.1
Total Disolved Solids	34	32.3	23.2	33.6	207	0.887	32.3	0	0	2.22	32.3	31.7
Biological Oxygen Dema	0.208	0.197	0.142	0.206	1.26	0.00543	0.197	0	0	0.0136	0.197	0.194
Chemical Oxygen Dema	17.6	16.6	11.9	17.3	107	0.457	16.6	0	0	1.14	16.6	16.3
Ammonia	0.00391	0.00371	0.00266	0.00386	0.0238	0.000102	0.00371	0	0	0.000255	0.00371	0.00365
Thermal Discharge	9.21E+11	8.73E+11	6.27E+11	9.09E+11	5.59E+12	2.40E+10	8.73E+11	0.00E+00	0.00E+00	6.00E+10	8.73E+11	8.58E+11
CCCT:												
Total Suspended Solids	602	604	590	603	1110	411	604	414	412	501	604	603
Total Disolved Solids	560	562	549	561	1030	382	562	385	383	466	562	561
Biological Oxygen Dema	3.43	3.44	3.36	3.43	6.3	2.34	3.44	2.36	2.34	2.85	3.44	3.44
Chemical Oxygen Dema	289	290	283	289	531	197	290	199	198	240	290	289
Ammonia	0.0645	0.0647	0.0631	0.0645	0.118	0.044	0.0647	0.0443	0.0441	0.0536	0.0647	0.0646
Thermal Discharge	1.52E+13	1.52E+13	1.48E+13	1.52E+13	2.78E+13	1.03E+13	1.52E+13	1.04E+13	1.04E+13	1.26E+13	1.52E+13	1.52E+13
Gas-Fired Cogeneration:												
Total Suspended Solids	5740	6380	5800	6510	5360	7150	6380	5670	5590	6180	6380	6130
Total Disolved Solids	5340	5940	5390	6060	4980	6650	5940	5270	5190	5750	5940	5700
Biological Oxygen Dema	32.8	36.5	33.1	37.2	30.6	40.9	36.5	32.4	31.9	35.3	36.5	35
Chemical Oxygen Dema	2770	3070	2790	3140	2580	3440	3070	2730	2690	2980	3070	2950
Ammonia	0.615	0.683	0.621	0.697	0.573	0.766	0.683	0.607	0.598	0.662	0.683	0.656
Thermal Discharge	1.45E+14	1.61E+14	1.47E+14	1.65E+14	1.35E+14	1.81E+14	1.61E+14	1.43E+14	1.41E+14	1.56E+14	1.61E+14	1.55E+14

* Units are in tons; except Thermal Discharge, which is in BTUs.

APPENDIX F

SECTION 7

ESTIMATES OF WILDLIFE EFFECTS FOR BONNEVILLE POWER ADMINISTRATION RESOURCE PROGRAM

SECTION 7

ESTIMATES OF WILDLIFE EFFECTS FOR BONNEVILLE POWER ADMINISTRATION RESOURCE PROGRAM

INTRODUCTION

Air quality analyses for each of 12 alternative power-generation scenarios were used to estimate the impact of production-facility emissions on the wildlife populations within 32 km (20 miles) of the facilities. Mortality estimates were made for important mammalian species at each of four potential power-generation sites by using population densities reported by local wildlife biologists. Mortality estimates for avian species were based on the total number of adult breeding birds of all species per square mile of habitat type (Udvardy 1957 and 1958). Waterfowl production estimates were obtained from state wildlife biologists and the U.S. Fish and Wildlife Service. Acute mortality risk estimates reported for human populations exposed to airborne contaminants from power production facilities were used to calculate the deaths per year for wildlife species.

Data predicting acidification of surface waters within the 400-km radius were used to evaluate the potential impact of the emissions on waterfowl production in each region. The potential impact of metal contamination from fossil fuel combustion was estimated from particulate deposition data and the reported bioaccumulation rates for metals in the edible plant biomass. A hypothetical watershed was used to evaluate the potential effects of fly ash deposition on terrestrial animals dependent on aquatic vertebrate and invertebrate food sources. Emissions were evaluated at the beginning of the study period (1991) and for the years 2000 and 2010.

Air Quality, Particulate Deposition, and Water Acidification Estimates

Air concentrations of sulfur oxides (SOX), and total suspended particulates (TSP) were obtained from the air quality task. Airborne concentrations of both pollutants were determined for each generation scenario using local meteorological data and the emission characteristics of the power

production facilities (type and capacity) at each site. Wildlife mortality risks were estimated out to 32 km from the stack (1,222 mi^2) because this is the range within which health effects are expected to occur and represents an area around the sites where human disturbance and habitat modification are low. Mortality estimates were not calculated for nitrogen oxides (NOX) because of the lack of direct mortality-effect data for chronic low-level exposure to these compounds.

Air concentrations of ozone were obtained from the RPM-II model which provides ozone concentrations for a puff release of ozone precursor compounds as a function of time and distance from the source. Because the initial effect of the power-plant emissions is to deplete the ozone from the pollutant plume, the impact of ozone on wildlife populations was estimated for the downwind plume area having O_3 concentrations exceeding ambient levels. This area varied among the sites but, in general, was located at a distance greater than 60-km from the stack. Data from the model were provided to a downwind distance of 120 km. The corresponding plume width varied between 11 and 31 km along this 60-km length. The area (km^2) potentially impacted by ozone downwind of each facility is listed in Table 1.

The available health effects data for O3 are based on annual average exposures rather than the hourly ozone values provided by the model. To convert model data to annual averages, "worst day" (summer solstice) hourly emission values for ozone were averaged for the number of hours calculated in the model that corresponded to the potentially impacted distances downwind (i.e., the distances where ozone levels exceeded ambient levels) and were assumed to represent the average concentration for a 24-hour day. Atmospheric conditions during 20 days of the year (minimum) and 90 days of the year (maximum) were assumed to be such that "worst day" average ozone concentrations were produced. The remaining days of the year were assumed to have near zero ozone production in the plume. Ambient levels for each site were those generated by the RPM-II model for a "dirty rural environment." Because the potential impact area for ozone generation in the Centralia plume is located in a rural environment, the "dirty rural" background was also used for this more urban-situated power plant.

Potential acidification of surface water was estimated from the acid precipitation predicted in the air quality task. The area within 400 km of the stack where the projected pH of the rainfall was less than or equal to 5.0 was outlined and superimposed on the surface water alkalinities of that area. Areas with total alkalinity of less than 200 μeq/L were considered sensitive to acidification (Kaplan et al. 1981, Hendrey et al. 1980).

Metal contamination was calculated using particulate deposition (mg/m^2), estimates obtained from the air quality task, and published metal composition of coal fly ash (Table 2). These values were used to estimate the potential metal deposition (mg/m^2) to soil and aquatic environments during a year. This report addresses the potential impact of only those metals with known avian or mammalian toxicity and that are above natural levels in soils (Table 2). Because metal toxicosis can be related to water acidification, the 400-km area was used.

Acute Mortality Estimates

Little is known about the toxic effects of power-production emissions on animals functioning in natural communities; therefore, the human mortality risks for sulfur oxides, ozone, and particulate emissions applied in a generic coal power study (ECO Northwest 1987) were used. The dose-response coefficients were derived from epidemiological research by Lipfert (1984) and Lave and Seskin (1978). Averaging the acute mortality risk estimates of the two original studies, the risk coefficient for sulfur oxides exposure is 4x10-05/animal-year per μg/m^3 ambient air concentration and 3x10-06/animal-year per μg/m^3 for particulates. The risk of mortality from exposure to a daily average concentration of 1 μg of ozone/m^3 for one year is 13x10-06 (Lipfert 1984). No effect on acute mortality from nitrogen oxide exposure was available from the literature surveyed.

The risk coefficient for each pollutant was applied to the cumulative exposure at each site to estimate the number of acute mortalities expected in populations of birds and mammals within 32 km of the stack. The current animal populations for each site are shown in Table 3. Summation of the mortality assessments for each pollutant provided an estimate of overall wildlife loss per year for the various alternatives at each site.

The uncertainty around the risk coefficient values is large; it is comparable in magnitude to the estimates themselves (ECO Northwest 1987). Application of these coefficients of risk to wildlife populations assumes that wild animals have about the same sensitivity to air pollutants as humans and receive, on a body weight basis, equivalent doses in the environment. However, it has been shown that the volume of air breathed per minute per unit of body weight (i.e., the weight-specific minute ventilation) varies greatly among mammals (Phalen 1984). Generally, the smaller the animal the more air per minute per gram is inhaled. Compared to humans, rabbits ventilate 3 times greater volumes of air and small rodents ventilate 8 to 13 times greater volumes of air on a per-body-weight basis (Phalen 1984). Larger animals such as deer and elk receive smaller doses than humans during inhalation exposures. Birds may be at even greater risk than represented in the human mortality risk coefficients because their respiratory rates are generally higher than mammals of comparable size. In addition, migration, seasonal physiological changes, activities (e.g. flying), breathing zones differences (e.g., near the turbulent ground surface) and greatly varying home ranges further complicate the extrapolation of the human risk coefficients to wild animals. Therefore, the mortality measures for wild animals should be viewed as relative estimates of the consequences of the various alternative power generation scenarios.

Metal Toxicosis

Long-term atmospheric deposition of fly ash particulates increases the concentrations of trace metals available for plant and aquatic organism uptake (Straughan et al. 1978; Adriano et al. 1980; Mbagwa 1983). Direct foliar absorption of deposited metals may occur if the metalloid is not resuspended or leached off the leaves by rainfall. Although most particulates are rapidly leached off leaf surfaces, certain metals (i.e., cadmium, lead, zinc, manganese and chromium) are retained on foliar surfaces. In general, small particles (< 7 μm in diameter) are retained by surface tension effects of water. Metals soluble in absorbed water enter the plant through stomatal and cuticular routes (Dybing and Currier 1961).

Trace metal availability to plants through root uptake is determined by the composition of the soil solution (pH, organic matter, etc.) and the soluble chemical species present in the rhizosphere (Cataldo and Wildung

1978). Root cells are capable of concentrating the elements within the root, altering the form of the elements within the symplast, and regulating transport to other tissues (Clarkson and Hanson 1980). From a relatively dilute soil solution, plants can concentrate metals in the root and/or the above-ground biomass to high levels (Rogers et al. 1978; Adriano et al. 1980; Tolle et al. 1983; Gutenmann et al. 1976). Subsequently, animals feeding on these plants accumulate high body burdens of the metals (Furr et al. 1978; Stoewsand et al. 1978; Mandisodza et al. 1979). Similar bioconcentrations of metalloids have been observed in aquatic organisms inhabiting contaminated watersheds (Vaughn et al. 1975; Thompson et al. 1972; Ng et al. 1969).

Maximum dietary uptake of deposited metals was determined for each of the alternative power-generation scenarios at each site by assuming bioconcentration of the metals in food sources and dependence on the contaminated food for all daily dietary needs of local populations of wild animals. The above-ground biomass of plants and aquatic organisms were considered as primary food sources. The concentration of particulate matter available for uptake by plants was calculated assuming total incorporation of deposited particulate into the soil to the depth of a typical forage rhizosphere (15 cm) and a soil bulk density of 1.5 g/cm3 (Brady 1974). Assuming total availability of the metals for uptake by plants, bioconcentration of the metals was calculated using reported concentration ratios (Vaughan et al. 1975).

Maximum annual uptake of metals from aquatic organisms was estimated by calculating the maximum annual deposition to a hypothetical watershed and the bioconcentration factors reported by Thompson et al. (1972) and Ng et al. (1969). The receiving watershed was assumed to be 4 km^2 with an instantaneous volume of 7,500 m^3 of water and all metals deposited to the watershed were assumed to be in a chemical form available for accumulation by aquatic biota.

Waterfowl Production Estimates

Acid precipitation can alter the abundance and diversity of aquatic organisms which are principal components of the diet of water birds. Anatids (ducks, geese, and swans) are particularly vulnerable because of their requirement for protein-rich invertebrates for egg production (Swanson and

Meyer 1973; Reinecke and Owen 1980) and duckling growth (Sugden 1973; Reinecke and Owen 1979). Acidification of wetland habitat has recently been shown to adversely affect growth, physiological condition and survival of ducklings by reducing food availability (Rattner et al. 1987).

To estimate the reduction in waterfowl production from acid deposition, waterfowl production per acre was obtained from local wildlife biologists and multiplied by the estimated acres of appropriate habitat receiving acid deposition of pH 5.0 and below. This product was multiplied by 0.38. The 38% factor was obtained from Haramis and Chu (1987) and is the duckling mortality seen on acidified wetlands (pH 5.0) minus the mortality observed on control wetlands (pH 6.8). The brood size was assumed to be seven young per pair of adults.

The acid neutralizing capacity of the soils and waters of all sites, except Centralia, exceeded 200 μeg/L; thus, these sites are probably not sensitive to acidification from acid rainfall. Therefore, duckling mortality from acidification was calculated only for the Centralia site. The area within 400 km of Centralia that may receive acid precipitation in the year 2010 is shown in Figure 1. Twenty-five percent of the lakes and ponds in this area were assumed to be located at altitudes that support waterfowl production, to be used by dabbling ducks (Stromberg and Longcore 1987), and not to be actually enhancing dabbling duck brood survival as a result of acidification (Eriksson 1979; Pehrsson 1979). Acreage values were obtained from "Lakes of Washington, Volume I, Western Washington," by E. E. Wolcott (1973). The acreage reported does not include streams, ditches, and other wetlands within the area that may provide breeding habitat for waterfowl.

RESULTS

Impacts of Airborne Contaminants

Estimates of the wildlife mortality from SOX and TSP exposures for each resource alternative at each site for the years 1991, 2000, and 2010 are shown in Tables 4, 5, and 6. The number of additional deaths of birds and mammals (over background mortality) that would occur from exposure to ozone in the power plant plumes is shown in Table 7. The number of SOX- and TSP-induced

deaths of wild birds and mammals living within a 32-km radius of the power plant stack was highest for avian species and for small rodents. Although some of the mortality estimates appear large (e.g., over 300 birds and 12,000 rodents per year at Centralia), these values represent reductions in local populations of less than 0.02%.

Ozone exposure predictions also indicate minimal impact to large mammal populations or wild bird communities. The minimum exposure scenario (i.e., 20 days of atmospheric conditions conducive to ozone production) resulted in additional deaths only for rodent populations. Death rates of typical small rodent populations even under the maximum conditions would be increased by less than 4 to 10%. Under maximum exposure conditions, one to four additional avian deaths may occur per year.

The reductions due to ozone, like those for SOX and TSP, will have minimal impact unless endangered or threatened species are present in the downwind areas. Loss of even a few individuals from a limited population can have profound impact on the species survival in that area. The habitat of all four sites supports several state or federally listed endangered and threatened birds and/or mammals.

The spotted owl (Strix occidentalis), grey wolf (Canis lupus), and Columbia white-tailed deer (Odocoileus virginianus leucurus) are endangered species listed by the federal government that may occur in the Centralia impact area. The bald eagle (Haliaeetus leucocephalus) (Federal Threatened Species List) and the osprey (Pandion haliaetus) (one occurrence and two nests) have been observed near the Centralia power plant.

One occurrence of peregrine falcon (Falco peregrinus) (Federal Endangered list) has been recorded for the Boardman area. The area potentially impacted by the Boardman emissions (including part of the Columbia River) may be a seasonal home to the Aleutian Canada goose (Branta candensis leucopareia) (Federal Endangered Species List), American white pelican (Pelecanus erythrorhynncos), sandhill crane (Grus canadensis), ferruginous hawk (Buteo regalis) (Washington State Endangered Species List), the bald eagle, and the sage grouse (Centrocercus urophasianus) (Federal Candidate Level II species).

Habitat surrounding the Colstrip area supports golden eagles (Aquila chrysaetos) (Montana State Threatened Species List) and is favorable for the black-footed ferret although none have been observed in the area. Three dancing grounds of the sharp-tailed grouse (Pedioecetes phasianellus) (Federal Candidate Level II species) lay within the Colstrip impact area.

The Creston area contains peregrine falcon, ferruginous hawk, bald eagle, golden eagle, Swainsons hawk (Buteo swainsoni) (Washington State Threatened Species List) and northern goshawk (Accipiter gentilis) (Washington State Threatened Species List) habitat. In addition, the western bluebird (Sialia mexicana), sage thrasher (Oreoscoptes montanus), loggerhead shrike (Lanius ludovicianus) and sage sparrow (Amphispiza belli) are Washington State Candidate species that also inhabit the area around the Creston site. Two occurrences of burrowing owls (Athene cunicularia) (Washington State Candidate Species List), one sighting of a sharp-tailed grouse, and two occurrences of long-billed curlews (Numenius americanus) have been documented in the area. Sightings of Townsends big-eared bat (Plecotus townsendii), a Federal Candidate Level II Species, and Merriam shrew (Sorex merriami) (Washington State Candidate Species) have also been reported in the area around Creston. It should be noted that incidence of mortality will be less for species receiving seasonal exposure to the plume than for those animals receiving a year-round or critical season (i.e., summer for ozone production) exposure.

Impact of Metal Deposition

Estimated values of annual uptake of metals by plants and the dietary levels of the metals known to cause toxic responses in animals were calculated for the resource alternative (conventional coal) that generated the largest amount of particulates deposited within 400 km of the stack at each power-generation site. All of the metals in the plants were found to be below threshold toxicity levels reported for laboratory rats (Bowen 1979). Therefore, metal uptake by plants and animals was not calculated for the other, less polluting, alternatives. Whether the rat adequately represents the sensitivity of all wildlife species to metal toxicosis has not been determined; however, it appears that short-lived wildlife foraging on plant biomass at the sites would not be at risk of metal toxicosis.

A potential adverse effect on plants was noted for Centralia and Colstrip where copper, manganese and molybdenum levels exceeded reported threshold toxicity levels for certain plant species (Welch 1981; Bollard 1983; Shrif 1969; Rosenfeld and Beath 1964). Changes in plant biomass or plant community structure can affect the number and distribution of wildlife and wildlife species in the impacted area. However, the estimated concentrations of these metals in the plants are made on the assumption that all of the metal deposited is available for uptake by the plants. Actual bioavailability is often much less and is dependent on the water and soil composition and the physiology of the plant species. Therefore, plant loss or community changes from metal deposition are not anticipated. The exception may be for those areas in the Centralia region that are susceptible to acid deposition. The lowered pH increases the solubility of several metals (Dickson 1980) which then increases their uptake by plants.

Two metals, arsenic and selenium, pose a potential health problem to wildlife feeding on aquatic vertebrates. All resource alternatives at Centralia and Colstrip introduced potentially toxic levels of arsenic into the food chain during 1991, 2000, and 2010. Toxic levels were introduced only by the conventional coal alternative at Creston in the year 2010 and at Boardman in the year 2000. All resource alternatives contributed toxic levels of arsenic at Boardman in 2010. Because the actual concentration of arsenic that would be available to aquatic organisms is probably much less than the total availability assumed for our concentration estimates (Eisler 1988), and because arsenic is more bioavailable under basic conditions, the impact of the arsenic load to the watersheds will probably be seen only at Colstrip. However, arsenic levels in the water at Colstrip would probably not exceed the criteria levels for protection of natural resources (Eisler 1988). Long-lived, resident (non-migrating) wildlife feeding on the aquatic biota at all of the sites may acquire toxic levels of arsenic in their tissues. An estimation of the potential population impacts of such a chronic exposure is precluded by the lack of information on the arsenic species that would predominate at the sites and the absorption/excretion rates of the wildlife species.

Although selenium concentrations probably will not reach levels that may pose a direct threat to wild animals feeding on aquatic organisms for any of the resource alternatives at any of the sites, selenium concentrations in the water may greatly alter the food resources of wildlife at Centralia and Colstrip. Selenium concentrations in surface waters at these sites may exceed 20 μg/L. The conventional coal resource at Boardman in the year 2010 may also introduce potentially harmful levels (13 μg/L) of selenium into the aquatic environment which, subsequently, may impact wildlife populations. Wildlife impacts at these concentrations are related to the severe effects that selenium can have on fish populations. At concentrations between 9 and 12 μg/L, whole populations of certain fish species have been eliminated from waters receiving seleniferous fly ash from coal-fired power plants (Lemly 1985, Cumbie and Van Horn 1978, and Gillespie and Bauman 1986). Migratory birds that rely on aquatic biota for food may be affected by these changes in the aquatic food web. For example, loss of fish due to selenium contamination may adversely effect populations of piscivorous species such as the osprey and common loon (Gavia immer), but may benefit insectivorous species such as the hooded merganser (Lophodytes cucullatus) and common goldeneye (Bucephala clangula).

Impacts of Acidification

Lakes and streams in the Pacific Northwest, along the Cascade range, are particularly vulnerable to acid deposition and can receive episodic acidification from rapid snowmelt and run-off that can be many more times acidic than the precipitation. This episodic acidification can significantly impact waterfowl production because it coincides with two critical waterfowl dependencies on aquatic biota, i.e., the need by female waterfowl to consume aquatic organisms during late winter to meet elevated requirements for calcium and protein for egg production and the requirement for protein-rich aquatic organisms by ducklings during the first 2 months of life for normal growth and development.

Acid deposition in unbuffered systems has been shown to reduce the quantity and quality of avian food items and result in reduced reproductive success for a great diversity of birds including passerines, raptors, and both diving and dabbling waterfowl (DeGranges and Rodrigue 1986; Raddum and Steigen

1981; Glooschenko et al. 1986; Havas and Hutchinson 1983; Driver et al. 1974; Eriksson 1986). However, avian mortality rates due to wetland acidification are available only for dabbling ducks. Haramis and Chu (1987) found that mallard ducklings feeding on acidified ponds died at a rate 38% higher than ducklings raised on ponds with a pH above 5.0. When this mortality rate is applied to the estimated number of dabbling ducks (one breeding pair/acre) for the potentially acidified Centralia area (Figure 1), about 2,000 additional dabbling duckling deaths per year may be anticipated under the assumptions and data constrictions mentioned in the Waterfowl Production Estimates section.

Although reduced survival or breeding success has been observed in waterfowl populations near acidic lakes (McNichol et al. 1987; Blancher and McAuley 1989), some studies have shown that acidic (fish-free) lakes may actually be preferred by dabbling ducks (Ericksson 1979; Pehrsson 1979) and waterfowl production increased. It should be noted that the mortality rates used in this report were established in studies with captive ducks on emergent wetlands and may not reflect the trophic interactions or natural behaviors of free-ranging birds.

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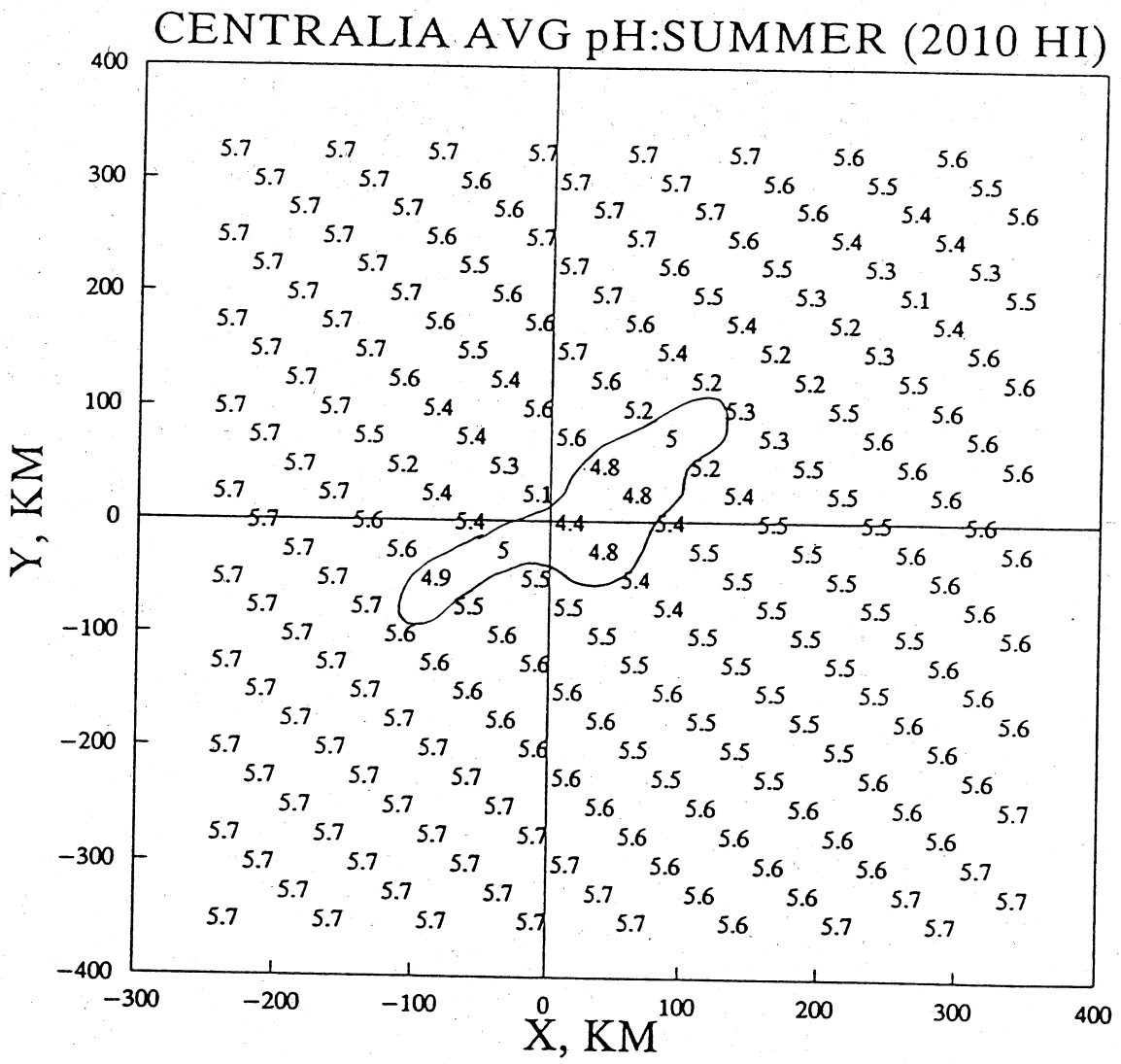

FIGURE 1. Acid Precipitation at Centralia, Washington, as Projected for 2010. Outlined area was used for waterfowl production estimates.

TABLE 1. Downwind Impact Areas Having Ozone Concentrations in Excess of Ambient Levels (in km^2 (mi^2))

	Production Facility Location			
Year	Centralia	Creston	Boardman	Colstrip
1991	960 (364)	1276 (486)	1276 (486)	1276 (486)
2000	802 (305)	1115 (424)	1115 (424)	702 (267)
2010	802 (305)	1115 (424)	1276 (486)	292(111)

TABLE 2. Ranges of Metal Concentrations in Fly Ash

Metal	Fly Ash (ppm)	Soil (ppm)	Percentage Composition
Aluminum	1000-173,000	10,000-30,000	17.3
Arsenic	2-6,300	0.1-40	0.63
Beryllium	up to 8000	--	--
Cadmium	0.7-130	0.01-2	0.013
Chromium	10-1,000	5-1,500	--
Cobalt	7-520	0.05-65	0.052
Copper	14-2,800	2-250	0.28
Lead	3-5,000	2-600	0.50
Manganese	58-3,000	20-10,000	0.30
Mercury	up to 33	0.01-0.5	0.0033
Molybdenum	7-160	0.1-40	0.16
Nickel	6-4,300	2-750	0.43
Selenium	10-3,500	0.01-2	0.35
Zinc	10-3,500	1-900	0.35

Source: Mattigod, S. V. and A. L. Page 1983.

TABLE 3. Total Species Populations at Each Location (number per mile^2)

Species	Centralia	Creston	Colstrip	Boardman	Total
Small Rodent	103600	103600	103600	103600	414400
Beaver	6	6	0	6	18
Ground Squirrel	0	30	30	30	90
Mink	2	0	2	2	6
Black Tailed Deer	20	0	0	0	20
Mule Deer (arid lands)	0	0	0	12	12
Mule Deer (other)	0	0	0	20	20
Mule Deer	0	0	2	32	34
Mule & White Tailed Deer	0	8	0	0	8
Deer (all species)	20	8	2	32	62
Elk	1	1	0	1	3
Avian (all species)	2560	1024	1024	1024	5632

TABLE 4. Animal Mortalities Due to SOX and TSP Exposures for Each Alternative in 1991

Mortality per Year Associated with SOx Exposure
by Primary Number: 1991

Species:	Status Quo	Base Case	Fuel Switching	Nuclear	Imports	Cogeneration	Combustion Turbines	Pulverized Coal	Clean Coal	High Conservation	Conservation	Renewables
Small Rodent	39270	39270	39270	39270	39270	39270	39270	39270	39270	39270	39270	39270
Beaver	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33
Ground squirrel	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1
Mink	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76
Deer (all Species)	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Elk	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Avian spp.	607	607	607	607	607	607	607	607	607	607	607	607

Mortality per Year Associated with TSP Exposure
by Primary Number: 1991

Species:	Status Quo	Base Case	Fuel Switching	Nuclear	Imports	Cogeneration	Combustion Turbines	Pulverized Coal	Clean Coal	High Conservation	Conservation	Renewables
Small Rodent	1518	1518	1518	1518	1518	1518	1518	1518	1518	1518	1518	1518
Beaver	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Ground squirrel	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
Mink	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Deer (all Species)	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Elk	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Avian spp.	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5

TABLE 5. Animal Mortalities Due to SOX and TSP Exposures for Each Alternative in 2000

Mortality per Year Associated with SOx Exposure
by Primary Number: 2000

Species:	Status Quo	Base Case	Fuel Switching	Nuclear	Imports	Cogeneration	Combustion Turbines	Pulverized Coal	Clean Coal	High Conservation	Conservation	Renewables
Small Rodent	53630	53270	54042	52652	55123	50799	53321	56461	53630	51314	53270	53270
Beaver	1.96	1.94	1.97	1.91	2.04	1.82	1.94	2.05	1.93	1.84	1.94	1.93
Ground squirrel	10.6	10.5	10.7	10.3	10.9	10.0	10.5	11.1	10.5	10.1	10.5	10.5
Mink	0.99	0.98	1	0.97	1.02	0.94	0.98	1.04	0.99	0.95	0.98	0.98
Deer (all Species)	8.3	8.2	8.4	8.1	8.6	7.7	8.2	8.6	8.1	7.8	8.2	8.2
Elk	0.33	0.32	0.33	0.32	0.34	0.3	0.32	0.34	0.32	0.31	0.32	0.32
Avian spp.	784	780	790	771	807	742	780	825	788	754	780	781

Mortality per Year Associated with TSP Exposure
by Primary Number: 2000

Species:	Status Quo	Base Case	Fuel Switching	Nuclear	Imports	Cogeneration	Combustion Turbines	Pulverized Coal	Clean Coal	High Conservation	Conservation	Renewables
Small Rodent	2640	2635	2707	2573	2882	2579	2666	3222	2779	2522	2630	2645
Beaver	0.1	0.1	0.1	0.09	0.11	0.09	0.1	0.12	0.1	0.09	0.1	0.1
Ground squirrel	0.55	0.54	0.55	0.53	0.56	0.53	0.55	0.69	0.58	0.52	0.54	0.54
Mink	0.04	0.04	0.05	0.04	0.05	0.04	0.04	0.05	0.05	0.04	0.04	0.04
Deer (all Species)	0.37	0.37	0.38	0.36	0.42	0.36	0.37	0.48	0.39	0.35	0.37	0.37
Elk	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Avian spp.	37.2	37.3	38.7	36.3	42.5	36.5	37.8	44.5	39.2	35.5	37.1	37.5

TABLE 6. Animal Mortalities Due to SOX and TSP Exposures for Each Alternative in 2010

Mortality per Year Associated with SOx Exposure
by Primary Number: 2010

Species:	Status Quo	Base Case	Fuel Switching	Nuclear	Imports	Cogeneration	Combustion Turbines	Pulverized Coal	Clean Coal	High Conservation	Conservation	Renewables
Small Rodent	63461	61505	61659	61608	57902	61350	61505	66806	63100	61505	61505	61608
Beaver	2.32	2.27	2.28	2.28	2.05	2.27	2.27	2.5	2.34	2.27	2.27	2.28
Ground squirrel	13.3	12.7	12.7	12.7	13.2	12.6	12.7	14.0	13.1	12.7	12.7	12.7
Mink	1.16	1.14	1.14	1.14	1.07	1.14	1.14	1.23	1.16	1.14	1.14	1.14
Deer (all Species)	10.1	10.0	10.1	10.1	9.4	10.0	10.0	11.0	10.3	10.0	10.0	10.1
Elk	0.39	0.38	0.38	0.38	0.34	0.38	0.38	0.42	0.39	0.38	0.38	0.38
Avian spp.	890	871	873	872	755	870	871	934	888	871	871	872

Mortality per Year Associated with TSP Exposure
by Primary Number: 2010

Species:	Status Quo	Base Case	Fuel Switching	Nuclear	Imports	Cogeneration	Combustion Turbines	Pulverized Coal	Clean Coal	High Conservation	Conservation	Renewables
Small Rodent	4117	3840	3814	3855	3829	3798	3840	4560	3927	3814	3840	3840
Beaver	0.15	0.15	0.15	0.15	0.17	0.14	0.15	0.18	0.15	0.15	0.15	0.15
Ground squirrel	0.94	0.85	0.85	0.85	0.78	0.85	0.86	1.05	0.91	0.85	0.85	0.85
Mink	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.08	0.07	0.07	0.07	0.07
Deer (all Species)	0.63	0.62	0.62	0.63	0.69	0.62	0.62	0.76	0.63	0.62	0.62	0.62
Elk	0.03	0.02	0.02	0.02	0.03	0.02	0.02	0.03	0.02	0.02	0.02	0.02
Avian spp.	53.8	51.4	50.6	51.6	54.9	50.2	51.1	58.8	50.6	50.8	51.4	51.2

TABLE 7. Animal Mortalities Due to Ozone Exposure for All Alternatives in 1991, 2000, and 2010

		YEAR 1991		YEAR 2000		YEAR 2010	
		Minimum (20 days)	Maximum (90 days)	Minimum (20 days)	Maximum (90 days)	Minimum (20 days)	Maximum (90 days)
Species:	No./ml^2	0.05 ug Ozone/m^3	0.05 ug Ozone/m^3	0.02 ug Ozone/m^3	0.21 ug Ozone/m^3	0.03 ug Ozone/m^3	0.15 ug Ozone/m^3
Small Rodent	414400	77	379	20.54	423	72	316
Beaver	18	0	0.02	0	0.02	0	0.02
Ground squirrel	90.0	0.0	0.1	0.02	0.1	0.0	0.1
Mink	6	0	0	0.0	0	0	0
Deer (all Species)	55.0	0.0	0.1	0.01	0.1	0.0	0.1
Elk	3	0	0	0.2	0	0	0
Avian spp.	10240	2	9	2	10	2	8

APPENDIX F

SECTION 8

EVALUATION OF BPA RESOURCE PROGRAM IMPACTS ON PLANTS AND CROPS

SECTION 8

EVALUATION OF BPA RESOURCE PROGRAM IMPACTS ON PLANTS AND CROPS

Air quality analyses of the 12 alternative power-generation scenarios were used to estimate the impact of production facility emissions on the terrestrial vegetation within the plume predicted for Creston, Boardman, Centralia, and Colstrip. Land-use areas were estimated for each of the sites. Land-use estimates were partitioned into croplands, timber, and pasture (Table 1). Impacts to vegetation were given as production loss for several types of crops. The crop production estimates were obtained from Agricultural Stabilization and Conservation Service (ASCS) offices in the Washington, Oregon, Idaho, Montana, and North Dakota counties affected by the plumes. The total acreage estimates provided by the ASCS offices were adjusted for the percentage of the county affected by a plume. The effects of metals, sulfur dioxide, nitrogen oxide, and ozone were estimated using results published in the cited literature. Only the greatest concentration predicted to occur in the plume was used to estimate potential impacts. Potential impacts are given for the years 2000 and 2010.

AIR QUALITY, PARTICULATE DEPOSITION, AND OZONE ESTIMATES

Air concentrations of sulfur dioxide, nitrogen oxides, ozone, and total suspended particles were obtained from the air quality task. Airborne concentrations of the pollutants were determined for each generation alternative using meteorological data and the emission characteristics of the power-production facilities at each site. Vegetation production effects were calculated for the entire plume. Production effects were not calculated for nitrogen oxides because of lack of direct production effects data for chronic low-level exposure to these compounds.

Air concentrations of ozone were obtained from the RPM-II model which provides ozone concentrations for a "puff" release of ozone-precursor compounds as a function of time and distance from the source. Concentrations were initially given for the entire plume area at each site. Because the

production effects were given as 7-hour/day averages, the ozone data were analyzed in this manner. The maximum 7-hour/day averages for the years 1991, 2000, and 2010 were compared to production response curves for five crops.

Metal contamination was calculated using particulate (mg/m^2) estimates obtained from the air quality task, and published metal concentrations of coal fly ash (Table 2). These values were used to estimate the potential metal deposition (mg/m^2) to the soil and vegetation. This report addresses the potential impact of only those metals with known plant toxicity.

PLANT TOXICITY

Plant toxicity for sulfur dioxide was assessed by comparing the maximum concentrations expected in the plumes during the years 2000 and 2010 (Table 3). The maximum concentration at any of the sites was about 1.2 ppm. This compares to potential toxic concentrations of 18 to 165 ppm (Moriarty 1983). Based on the difference in reported concentrations that might be toxic and the potential concentrations in the plume, no potential impact is expected.

The potential toxicity from total suspended particles had to be based on the potential toxicity from the metals that might be in the TSP. Based on the metal composition of the fly ash reported by Mattigod and Page (1983) the potential toxicity of eight metals was assessed (Tables 4 and 5). The $\mu g/m^2$ of metal deposited in the area of the plume was obtained from the air quality task. The percent of each metal (Mattigod and Page 1983) was used to determine the $\mu g/m^2$ of each metal that might be deposited within the plume. The plant concentration ratio was determined for each metal. Given the depth of the rhizosphere as 15 to 20 cm, there is 150,000 cm^3 of soil for each square meter of plume. Given an average soil bulk density of 1.5 gm/cm^3, there is 225,000 gm of soil in each meter of the plume. Therefore, for each mgm of metal that is deposited, there is 4.44×10^{-6} mgm of metal per gm of soil.

The toxicity is then determined from the plant concentration ratios multiplied by the metal deposited. The potential for a reduction in plant productivity is possible when metal concentration is greater than the toxicity

level. There are no values during the years 2000 and 2010 where the metal concentration factor is greater than the report toxic levels.

The percent yield reduction for these crops is reported by relationships between the seasonal 7-h/day mean concentration and crop yield which were developed by Heck et al. (1982). They provide linear relationships between ozone concentration and the percent reduction for corn, soybean, kidney bean, lettuce, spinach, turnip, and wheat crops (see Table 6). The ozone data used for this assessment is an incremental increase in ozone concentration at Boardman, Creston, Centralia, and Colstrip. The incremental increase is given as the seasonal 7-h day increase. Since the absolute concentration is not given, the potential change in yield for each crop was estimated by multiplying the slope given for each of the linear functions in Heck et al. (1982) by the change in ozone concentration predicted for each site in the years 1991, 2000, and 2010.

At Colstrip, the seasonal 7-h average incremental increase is negative for all estimates. This provides an estimated change in yield that is negative, in other words, a positive impact. These positive effects on yields should be considered as neutral or no potential change.

At Boardman, the seasonal 7-h average incremental increase is negative for the 2010 estimates. The increase is positive for 1991 and 2000. All estimates are less than 1% reduction in yield except for lettuce and turnips during 1991. A liberal estimate of potential impacts would be that plant yield is reduced by 1% during 1991 and 2000 near Boardman.

At Creston, the seasonal 7-h average incremental increase is positive for the 2000 and 2010 estimates. No estimate is applied for 1991. All estimates are less than 1% reduction in yield except for turnips during 2000. A liberal estimate of potential impacts would be that plant yield is reduced by 1% during 2000 near Creston.

At Centralia, the seasonal 7-h average incremental increase is negative for estimates except for the 2000 high values. All estimates are less than 0.1% reduction in yield. A liberal estimate of potential impacts would be that plant yield is reduced by 0.1% during 2000 near Centralia.

ACID PRECIPITATION AND THE AQUATIC ENVIRONMENT

The pH of the rain and snow can effect the Ph of the surface waters. Changing the pH of surface waters used by fish can adversely affect fish production. In some places, low pH levels have resulted in the loss of fish populations and caused other changes to the aquatic environment. These adverse effects are related to precipitation levels that are less than 4.5. Because none of the precipitation levels reported by the air quality team approach this level, no adverse impact to the surface water environment is expected.

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TABLE 1a. Acreage Under Plume from Plant Facility at Boardman

State	County	Km2 in County	KM2 in Plume	Cropland in Plume	Timber in Plume	Pasture in Plume	Major Crops in each County
Washington	Benton	4442	2433	1427	0	40	wheat, barley, oats, corn, hay, mint potatoes, asparagus, carrots, peas, onions
	Grant	6889	2541	1654	0	158	wheat, barley, oats, corn, hay, mint, beans potatoes, asparagus, carrots, peas, onions
	Franklin	3219	3219	2674	0	249	wheat, barley, oats, corn, hay, beans potatoes, asparagus, carrots, onions
	Walla Walla	3266	2524	2067	75	38	wheat, barley, oats, corn, hay, potatoes asparagus, peas, onions
	Columbia	2238	184	107	49	1	wheat, barley, oats, hay
	Whitman	5571	3867	3948	31	69	wheat, barley, oats, hay, peas
	Garfield	1829	256	192	41	1	wheat, barley, oats, hay, peas
	Adams	4978	4978	4726	0	91	wheat, barley, oats, corn, hay, mint beans, asparagus, carrots, onions
	Lincion	5983	2196	2197	94	30	wheat, barley, oats, hay
Oregon	Umatilla	8368	1302	465	1203	236	wheat, other grains, peas, hay orchard fruit
	Morrow	5307	173	53	0	0	wheat, potatoes, alfalfa
Idaho	Kootenai/ Shoshone	12069	1576	55	667	24	wheat, barley, lentils, bluegrass
	Benewah/ Shoshone	10888	3345	106	1742	31	wheat, barley, lentils, bluegrass
	Latah	2789	1330	514	740	62	wheat, barley, peas, lentils, rape
Montana	Mineral	3149	409	0	2	2	wheat, hay
	Sanders	7120	360	1	360	0	wheat, barley, oats, hay
Totals		88107	30692	20185	5003	991	

TABLE 1b. Acreage Under Plume from Plant Facility at Colstrip

State	County	Km2 in County	Km2 in Plume	Cropland in Plume	Timber in Plume	Pasture in Plume	Major Crops in County
Montana	Rosebud	13033	7049	352	285	190	Wheat, hay, corn, sugar beets
	Custer	9712	9712	340	300	125	Wheat, oats, corn
	Powder River	8508	3633	255	396	310	Oats, hay
	Carter	8581	4637	215	161	214	Wheat, hay
	Fallon	4229	3203	421	0	337	Wheat, oats
	Wibaux	2302	2302	532	20	187	Wheat, oats
	McCone	6718	4076	1534	5	272	Wheat, barley
	Prairie	4473	4473	489	0	152	Wheat, barley, corn, sugar beets
	Garfield	11901	1314	261	0	70	Wheat, barley, oats
	Richland	5348	4611	1710	12	303	Wheat, oats, corn, sugar beets
	Dawson	5478	5478	1573	17	285	Wheat, oats, corn, sugar beets
North Dakota	McKenzie	7132	5025	667	68	227	Wheat, hay, oats, barley, sugar beets, dry beans, corn
	Dunn	5162	492	90	0	66	Hay, wheat, oats, barley, corn
	Slope	3158	367	64	0	25	Wheat, barley, oats, corn, rye
	Stark	3464	711	223	0	116	Wheat, oats, barley, corn
	Golden Valley	2597	2597	499	0	134	Wheat, hay, barley, oats, corn
	Billings	2982	2767	223	0	283	Hay, wheat, oats, barley
Total		104780	62447	9448	1265	3297	

TABLE 1c. Acreage Under Plume from Plant Facility at Creston

State	County	Km2 in county	Km2 in plume	Cropland in Plume	Timber in Plume	Pasture in Plume	Major Crops in County
Washington	Ferry	5698	3	2	3	0	wheat, barley, oats, hay
	Stevens	6392	3016	1004	2345	104	wheat, barley, oats, potatoes
	Pend Oreille	3626	1536	107	1358	40	wheat, barley, oats, hay
	Spokane	4569	35	19	11	2	wheat, barley, oats, hay, lettuce
	Lincion	5983	537	537	130	7	wheat, barley, oats, corn, hay
Idaho	Boundary	3284	158	12	18	373	wheat, barley, oats, hops
	Bonner	4473	565	43	614	13	wheat, barley, lentils, bluegrass
Totals		34025	5850	1724	4479	539	

TABLE 1d. Acreage Under Plume from Plant Facility at Centralia

State	County	Km2 in County	Km2 in Plume	Cropland in Plume	Timber in Plume	Pasture in Plume	Major Crops in County
Washington	Pacific	2352	907	54	804	10	hay
	Wahkiakum	676	737	64	635	0	corn, hay, carrots
	Cowlitz	2950	942	49	819	6	corn, hay, carrots
	Thurston	1883	1046	128	708	26	wheat, barley, oats, corn hay, peas
	Lewis	6239	3315	263	2828	103	corn, hay
	Pierce	4338	1651	90	1187	13	corn, hay, lettuce
	King	5512	536	22	387	4	corn, hay, lettuce
Oregon	Clatsop	2261	612	28	518	0	
Totals		26211	9746	698	7887	162	

TABLE 2. Ranges of Metal Concentrations in Fly Ash

Metal	Fly Ash (ppm)	Soil (ppm)	Percent Composition
Arsenic	2-6,300	0.1-40	0.63
Cadmium	0.7-130	0.01	0.013
Copper	14-2,800	2-250	0.28
Lead	3-5,000	2-600	0.50
Molybdenum	7-160	0.1-40	0.16
Nickel	6-4,300	2-750	0.43
Selenium	10-3,500	0.01	0.35
Zinc	10-3,500	1-900	0.35

From: Mattigod, S. V. and A. L. Page 1983.

TABLE 3. Maximum Air Pollutant Concentrations (in ppb) for NOX, SO_2, and O_3

Site	NOx, Yr 2000	NOx, Yr 2010	SO2, Yr 2000	SO2, Yr 2010	O3, Yr 2000	O3, Yr 2010
Boardman	0.765	1.476	0.360	0.552	131	131
Centralia	1.972	2.932	0.876	0.902	151	150
Creston	0.346	0.389	0.095	0.112	112	114
Colstrip	1.308	1.967	1.109	1.243	109	107

TABLE 4. Estimates of Metal Deposits from Plume and Potential Plant Toxicity in 2000

Site	Metal Deposited ug/m2	Metal	Metal % of Deposited Mass	Plant Concen. Ratio	Metal Depostion (ug/m2	Metal Concen. in Plants - ppm	Plant Toxicity -ppm	Metal Concen. minus toxicity	Plant Toxicity/ Metal Concen.
Centralia	16432	Arsenic	0.0063	4.2	103.5	0.002	0.02 to 7.5	-0.018	10.3
Creston	3350		0.0063	4.2	21.1	0.000	0.02 to 7.5	-0.020	50.8
Boardman	4297		0.0063	4.2	27.1	0.001	0.02 to 7.5	-0.019	39.6
Colstrip	14574		0.0063	4.2	91.8	0.002	0.02 to 7.5	-0.018	11.7
Centralia	16432	Cadmium	0.00013	222	2.1	0.002	0.5	-0.498	237.2
Creston	3350		0.00013	222	0.4	0.000	0.5	-0.500	1163.6
Boardman	4297		0.00013	222	0.6	0.001	0.5	-0.499	907.2
Colstrip	14574		0.00013	222	1.9	0.002	0.5	-0.498	267.5
Centralia	16432	Copper	0.0028	1000	46.0	0.204	0.5 to 10.0	-0.296	2.4
Creston	3350		0.0028	1000	9.4	0.042	0.5 to 10.0	-0.458	12.0
Boardman	4297		0.0028	1000	12.0	0.053	0.5 to 10.0	-0.447	9.4
Colstrip	14574		0.0028	1000	40.8	0.181	0.5 to 10.0	-0.319	2.8
Centralia	16432	Lead	0.005	2	82.2	0.001	3 to 20	-2.999	4107.8
Creston	3350		0.005	2	16.8	0.000	3 to 20	-3.000	20149.3
Boardman	4297		0.005	2	21.5	0.000	3 to 20	-3.000	15708.8
Colstrip	14574		0.005	2	72.9	0.001	3 to 20	-2.999	4631.5
Centralia	16432	Molybdenum	0.0016	900	26.3	0.105	0.5 to 2.0	-0.395	4.8
Creston	3350		0.0016	900	5.4	0.021	0.5 to 2.0	-0.479	23.3
Boardman	4297		0.0016	900	6.9	0.028	0.5 to 2.0	-0.472	18.2
Colstrip	14574		0.0016	900	23.3	0.093	0.5 to 2.0	-0.407	5.4
Centralia	16432	Nickel	0.0043	331	70.7	0.104	10 to 50	-9.896	96.2
Creston	3350		0.0043	331	14.4	0.021	10 to 50	-9.979	471.9
Boardman	4297		0.0043	331	18.5	0.027	10 to 50	-9.973	367.9
Colstrip	14574		0.0043	331	62.7	0.092	10 to 50	-9.908	108.5
Centralia	16432	Selenium	0.0035	4	57.5	0.001	2	-1.999	1956.1
Creston	3350		0.0035	4	11.7	0.000	2	-2.000	9594.9
Boardman	4297		0.0035	4	15.0	0.000	2	-2.000	7480.3
Colstrip	14574		0.0035	4	51.0	0.001	2	-1.999	2205.5
Centralia	16432	Zinc	0.0035	40	57.5	0.010	60 to 400	-59.990	5868.3
Creston	3350		0.0035	40	11.7	0.002	60 to 400	-59.998	28784.6
Boardman	4297		0.0035	40	15.0	0.003	60 to 400	-59.997	22440.9
Colstrip	14574		0.0035	40	51.0	0.009	60 to 400	-59.991	6616.5

TABLE 5. Estimates of Metal Deposits from Plume and Potential Plant Toxicity in 2010

Site	Metal Deposited ug/m2	Metal	Metal % of Deposited Mass	Plant Concen. Ratio	Metal Depostion (ug/m2	Metal Concen. in Plants - ppm	Plant Toxicity -ppm	Metal Concen. minus toxicity	Plant Toxicity/ Metal Conpen.
Centralia	17218	Arsenic	0.0063	4.2	108.5	0.002	0.02 to 7.5	-0.018	9.9
Creston	3995		0.0063	4.2	25.2	0.000	0.02 to 7.5	-0.020	42.6
Boardman	8165		0.0063	4.2	51.4	0.001	0.02 to 7.5	-0.019	20.8
Colstrip	19250		0.0063	4.2	121.3	0.002	0.02 to 7.5	-0.018	8.8
Centralia	17218	Cadmium	0.00013	222	2.2	0.002	0.5	-0.498	226.4
Creston	3995		0.00013	222	0.5	0.001	0.5	-0.499	975.8
Boardman	8165		0.00013	222	1.1	0.001	0.5	-0.499	477.4
Colstrip	19250		0.00013	222	2.5	0.002	0.5	-0.498	202.5
Centralia	17218	Copper	0.0028	1000	48.2	0.214	0.5 to 10.0	-0.286	2.3
Creston	3995		0.0028	1000	11.2	0.050	0.5 to 10.0	-0.450	10.1
Boardman	8165		0.0028	1000	22.9	0.102	0.5 to 10.0	-0.398	4.9
Colstrip	19250		0.0028	1000	53.9	0.240	0.5 to 10.0	-0.260	2.1
Centralia	17218	Lead	0.005	2	86.1	0.001	3 to 20	-2.999	3920.3
Creston	3995		0.005	2	20.0	0.000	3 to 20	-3.000	16896.1
Boardman	8165		0.005	2	40.8	0.000	3 to 20	-3.000	8267.0
Colstrip	19250		0.005	2	96.3	0.001	3 to 20	-2.999	3506.5
Centralia	17218	Molybdenum	0.0016	900	27.5	0.110	0.5 to 2.0	-0.390	4.5
Creston	3995		0.0016	900	6.4	0.026	0.5 to 2.0	-0.474	19.6
Boardman	8165		0.0016	900	13.1	0.052	0.5 to 2.0	-0.448	9.6
Colstrip	19250		0.0016	900	30.8	0.123	0.5 to 2.0	-0.377	4.1
Centralia	17218	Nickel	0.0043	331	74.0	0.109	10 to 50	-9.891	91.8
Creston	3995		0.0043	331	17.2	0.025	10 to 50	-9.975	395.7
Boardman	8165		0.0043	331	35.1	0.052	10 to 50	-9.948	193.6
Colstrip	19250		0.0043	331	82.8	0.122	10 to 50	-9.878	82.1
Centralia	17218	Selenium	0.0035	4	60.3	0.001	2	-1.999	1866.8
Creston	3995		0.0035	4	14.0	0.000	2	-2.000	8045.8
Boardman	8165		0.0035	4	28.6	0.001	2	-1.999	3936.7
Colstrip	19250		0.0035	4	67.4	0.001	2	-1.999	1669.8
Centralia	17218	Zinc	0.0035	40	60.3	0.011	60 to 400	-59.989	5600.5
Creston	3995		0.0035	40	14.0	0.002	60 to 400	-59.998	24137.3
Boardman	8165		0.0035	40	28.6	0.005	60 to 400	-59.995	11810.0
Colstrip	19250		0.0035	40	67.4	0.012	60 to 400	-59.988	5009.3

TABLE 6. Percent Reduction in Crop Yield Due to Incremental Increase in Ozone Concentration

crop	slope	colstrip 1991		colstrip 2000 high		colstrip 2000 low		colstrip 2010 high		colstrip 2010 low	
		ℓx (ozone)	ℓy (yeild)	ℓx (ozone)	ℓy (yeild)	ℓx (ozone)	ℓy (yeild)	ℓx (ozone)	ℓy (yeild)	ℓx (ozone)	ℓy (yeild)
corn	108	-0.0008	-0.0864	-0.0013	-0.1404	-0.0012	-0.1296	-0.0014	-0.1512	-0.0013	-0.1404
soybean	621	-0.0008	-0.4968	-0.0013	-0.8073	-0.0012	-0.7452	-0.0014	-0.8694	-0.0013	-0.8073
soybean	443	-0.0008	-0.3544	-0.0013	-0.5759	-0.0012	-0.5316	-0.0014	-0.6202	-0.0013	-0.5759
soybean	353	-0.0008	-0.2824	-0.0013	-0.4589	-0.0012	-0.4236	-0.0014	-0.4942	-0.0013	-0.4589
kidney bean	193	-0.0008	-0.1544	-0.0013	-0.2509	-0.0012	-0.2316	-0.0014	-0.2702	-0.0013	-0.2509
lettuce	652	-0.0008	-0.5216	-0.0013	-0.8476	-0.0012	-0.7824	-0.0014	-0.9128	-0.0013	-0.8476
spinach	527	-0.0008	-0.4216	-0.0013	-0.6851	-0.0012	-0.6324	-0.0014	-0.7378	-0.0013	-0.6851
spinach	517	-0.0008	-0.4136	-0.0013	-0.6721	-0.0012	-0.6204	-0.0014	-0.7238	-0.0013	-0.6721
spinach	594	-0.0008	-0.4752	-0.0013	-0.7722	-0.0012	-0.7128	-0.0014	-0.8316	-0.0013	-0.7722
spinach	599	-0.0008	-0.4792	-0.0013	-0.7787	-0.0012	-0.7188	-0.0014	-0.8386	-0.0013	-0.7787
turnip	818	-0.0008	-0.6544	-0.0013	-1.0634	-0.0012	-0.9816	-0.0014	-1.1452	-0.0013	-1.0634
wheat	290	-0.0008	-0.232	-0.0013	-0.377	-0.0012	-0.348	-0.0014	-0.406	-0.0013	-0.377
wheat	405	-0.0008	-0.324	-0.0013	-0.5265	-0.0012	-0.486	-0.0014	-0.567	-0.0013	-0.5265
wheat	250	-0.0008	-0.2	-0.0013	-0.325	-0.0012	-0.3	-0.0014	-0.35	-0.0013	-0.325
crop	slope	boardman 1991		boardman 2000 high		boardman 2000 low		boardman 2010 high		boardman 2010 low	
		ℓx (ozone)	ℓy (yeild)	ℓx (ozone)	ℓy (yeild)	ℓx (ozone)	ℓy (yeild)	ℓx (ozone)	ℓy (yeild)	ℓx (ozone)	ℓy (yeild)
corn	108	0.0016	0.1728	0.0004	0.0432	0.0009	0.0972	-0.0008	-0.0864	-0.0006	-0.0648
soybean	621	0.0016	0.9936	0.0004	0.2484	0.0009	0.5589	-0.0008	-0.4968	-0.0006	-0.3726
soybean	443	0.0016	0.7088	0.0004	0.1772	0.0009	0.3987	-0.0008	-0.3544	-0.0006	-0.2658
soybean	353	0.0016	0.5648	0.0004	0.1412	0.0009	0.3177	-0.0008	-0.2824	-0.0006	-0.2118
kidney bean	193	0.0016	0.3088	0.0004	0.0772	0.0009	0.1737	-0.0008	-0.1544	-0.0006	-0.1158
lettuce	652	0.0016	1.0432	0.0004	0.2608	0.0009	0.5868	-0.0008	-0.5216	-0.0006	-0.3912
spinach	527	0.0016	0.8432	0.0004	0.2108	0.0009	0.4743	-0.0008	-0.4216	-0.0006	-0.3162

TABLE 6. Percent Reduction in Crop Yield Due to Incremental Increase in Ozone Concentration (contd)

spinach	517	0.0016	0.8272	0.0004	0.2068	0.0009	0.4653	-0.0008	-0.4136	-0.0006	-0.3102
spinach	594	0.0016	0.9504	0.0004	0.2376	0.0009	0.5346	-0.0008	-0.4752	-0.0006	-0.3564
spinach	599	0.0016	0.9584	0.0004	0.2396	0.0009	0.5391	-0.0008	-0.4792	-0.0006	-0.3594
turnip	818	0.0016	1.3088	0.0004	0.3272	0.0009	0.7362	-0.0008	-0.6544	-0.0006	-0.4908
wheat	290	0.0016	0.464	0.0004	0.116	0.0009	0.261	-0.0008	-0.232	-0.0006	-0.174
wheat	405	0.0016	0.648	0.0004	0.162	0.0009	0.3645	-0.0008	-0.324	-0.0006	-0.243
wheat	250	0.0016	0.4	0.0004	0.1	0.0009	0.225	-0.0008	-0.2	-0.0006	-0.15
crop	slope	creston 1991		creston 2000 high		creston 2000 low		creston 2010 high		creston 2010 low	
		Δx (ozone)	Δy (yeild)	Δx (ozone)	Δy (yeild)	Δx (ozone)	Δy (yeild)	Δx (ozone)	Δy (yeild)	Δx (ozone)	Δy (yeild)
corn	108	not appl.	ERR	0.001	0.108	0.0015	0.162	0.0005	0.054	0.0009	0.0972
soybean	621	not appl.	ERR	0.001	0.621	0.0015	0.9315	0.0005	0.3105	0.0009	0.5589
soybean	443	not appl.	ERR	0.001	0.443	0.0015	0.6645	0.0005	0.2215	0.0009	0.3987
soybean	353	not appl.	ERR	0.001	0.353	0.0015	0.5295	0.0005	0.1765	0.0009	0.3177
kidney bean	193	not appl.	ERR	0.001	0.193	0.0015	0.2895	0.0005	0.0965	0.0009	0.1737
lettuce	652	not appl.	ERR	0.001	0.652	0.0015	0.978	0.0005	0.326	0.0009	0.5868
spinach	527	not appl.	ERR	0.001	0.527	0.0015	0.7905	0.0005	0.2635	0.0009	0.4743
spinach	517	not appl.	ERR	0.001	0.517	0.0015	0.7755	0.0005	0.2585	0.0009	0.4653
spinach	594	not appl.	ERR	0.001	0.594	0.0015	0.891	0.0005	0.297	0.0009	0.5346
spinach	599	not appl.	ERR	0.001	0.599	0.0015	0.8985	0.0005	0.2995	0.0009	0.5391
turnip	818	not appl.	ERR	0.001	0.818	0.0015	1.227	0.0005	0.409	0.0009	0.7362
wheat	290	not appl.	ERR	0.001	0.29	0.0015	0.435	0.0005	0.145	0.0009	0.261
wheat	405	not appl.	ERR	0.001	0.405	0.0015	0.6075	0.0005	0.2025	0.0009	0.3645
wheat	250	not appl.	ERR	0.001	0.25	0.0015	0.375	0.0005	0.125	0.0009	0.225
crop	slope	centralia 1991		centralia 2000 high		centralia 2000 low		centralia 2010 high		centralia 2010 low	
		Δx (ozone)	Δy (yeild)	Δx (ozone)	Δy (yeild)	Δx (ozone)	Δy (yeild)	Δx (ozone)	Δy (yeild)	Δx (ozone)	Δy (yeild)

TABLE 6. Percent Reduction in Crop Yield Due to Incremental Increase in Ozone Concentration (contd)

corn	108	not appl.	ERR	0.0001	0.0108	-0.0007	-0.0756	-0.0004	-0.0432	-0.0008	-0.0864
soybean	621	not appl.	ERR	0.0001	0.0621	-0.0007	-0.4347	-0.0004	-0.2484	-0.0008	-0.4968
soybean	443	not appl.	ERR	0.0001	0.0443	-0.0007	-0.3101	-0.0004	-0.1772	-0.0008	-0.3544
soybean	353	not appl.	ERR	0.0001	0.0353	-0.0007	-0.2471	-0.0004	-0.1412	-0.0008	-0.2824
kidney bean	193	not appl.	ERR	0.0001	0.0193	-0.0007	-0.1351	-0.0004	-0.0772	-0.0008	-0.1544
lettuce	652	not appl.	ERR	0.0001	0.0652	-0.0007	-0.4564	-0.0004	-0.2608	-0.0008	-0.5216
spinach	527	not appl.	ERR	0.0001	0.0527	-0.0007	-0.3689	-0.0004	-0.2108	-0.0008	-0.4216
spinach	517	not appl.	ERR	0.0001	0.0517	-0.0007	-0.3619	-0.0004	-0.2068	-0.0008	-0.4136
spinach	594	not appl.	ERR	0.0001	0.0594	-0.0007	-0.4158	-0.0004	-0.2376	-0.0008	-0.4752
spinach	599	not appl.	ERR	0.0001	0.0599	-0.0007	-0.4193	-0.0004	-0.2396	-0.0008	-0.4792
turnip	818	not appl.	ERR	0.0001	0.0818	-0.0007	-0.5726	-0.0004	-0.3272	-0.0008	-0.6544
wheat	290	not appl.	ERR	0.0001	0.029	-0.0007	-0.203	-0.0004	-0.116	-0.0008	-0.232
wheat	405	not appl.	ERR	0.0001	0.0405	-0.0007	-0.2835	-0.0004	-0.162	-0.0008	-0.324
wheat	250	not appl.	ERR	0.0001	0.025	-0.0007	-0.175	-0.0004	-0.1	-0.0008	-0.2

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