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May 20, 2005

VIA EMAIL AND U.S. MAIL

Public Utility Commission of Oregon
Attention: Filing Center
550 Capitol Street, NE
PO Box 2148
Salem, OR 97308-2148
PUC.FilingCenter@state.or.us

Re: *In the Matter of PacifiCorp 2004 Integrated Resource Plan*
PUC Docket No. LC 39
DOJ File No. 330-050-GN0082-05

Filing Center:

Enclosed is OREGON DEPARTMENT OF ENERGY'S INITIAL COMMENTS IN LC 39 (PACIFICORP'S IRP) in the above-captioned matter for filing with the Public Utility Commission today.

Sincerely,

/s/ Janet L. Prewitt
Assistant Attorney General
Natural Resources Section

Enclosures
c: Phil Carver, ODOE
LC 39 Service List

JLP:jrs/GENM7123

BEFORE THE PUBLIC UTILITY COMMISSION

OF OREGON

IN THE MATTER OF PACIFICORP 2004 INTEGRATED RESOURCE PLAN	LC 39 OREGON DEPARTMENT OF ENERGY'S INITIAL COMMENTS IN LC 39 (PACIFICORP'S IRP)

EXECUTIVE SUMMARY

The Oregon Department of Energy (ODOE) appreciates the helpful workshops and technical quality of many of the analyses in PacifiCorp's Final 2004 IRP. Even so, ODOE respectfully disagrees with PacifiCorp's proposal to acquire or build new coal-fired plants starting in 2011. PacifiCorp has provided very little analysis of wind or other renewable resource additions beyond 1,400 nameplate MW under conditions of higher CO_2 cost adders or higher natural gas prices. PacifiCorp's analysis in support of new coal plants rests on the assertion that building new coal plants reduces risk. This alleged risk reduction benefit is an artifact of analyzing gas price risk inside a *stochastic* model, but only analyzing the risks of higher CO_2 adders as required by Order No. 93-695 in a separate scenario analysis.

ODOE recognizes that absent significant constraints on PacifiCorp's CO_2 emissions, new coal plants might be part of a least-cost and least-risk method of meeting load growth. However, PacifiCorp's base case CO_2 cost adder of \$8.38 per ton of CO_2 (2010\$) does not begin to capture the stringency of likely future constraints. There is mounting scientific evidence of climate change and growing regulatory actions by states and other countries. Of industrialized countries, only the U.S. and Australia have not ratified the Kyoto Protocol of the United Nations Framework Convention on Climate Change.

Multiple studies support the likelihood of adders equal to or above the \$40 per ton of CO_2 (in 1990\$, \$59.60 in 2010\$, IRP page 158) that Order 93-695 requires be analyzed. These studies indicate that large adders will be required in coming decades to stabilize CO_2 concentrations in the atmosphere at non-dangerous levels.

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In addition to cap and trade scenarios, binding constraints on PacifiCorp's CO_2 emissions would be problematic during the planned 40-year lifetimes of new coal plants. If PacifiCorp is forced to cap its total CO_2 emission and trading is not allowed, the value from new coal plants will only be $12.36 per MWh compared to a cost of $35.60 per MWh. If this occurs shortly after completing construction of the 958 MW of coal plants in Portfolio E, the net present value of these plants over their costs would be a negative $2 billion.

When the risks of future CO_2 regulations are fully considered, a preferable strategy to Portfolio E appears to be a strategic combination of renewable resources beyond the artificial 1,400 nameplate MW cap in the IRP Action Plan, backstopped by new natural gas plants (as in Portfolio M or possibly smaller gas plants) and demand response programs.

PacifiCorp caps its renewable acquisitions through 2015 at 1,400 MW. This limit results from a PacifiCorp decision to cut off the renewable supply curve at the present value of its forecast of wholesale electric prices (pages 145-146 of the Technical Appendix). This cutoff is inappropriate for two reasons:

1. The projects in the supply curve come from only one request for proposals issued in 2004 but the appropriate supply curve should be developed from multiple RFPs through 2012.
2. The cut-off ignores the reduced exposure to the risks of high gas prices and CO_2 regulations beyond the base case $8.38 (2010$) CO_2 adder that more renewable resources would offer. PacifiCorp conducted no analyses of these benefits.

The lack of analysis of the risk reduction benefits of renewables contrasts sharply with the detailed and extensive (albeit flawed) risk analysis that PacifiCorp conducted to justify acquiring coal plants.

PacifiCorp's first RFP indicates an additional 1,500 MW are available at or below a 20 percent premium over forecasted base case wholesale market prices (pages 145-146 of the Technical Appendix). Future RFPs, almost certainly, will offer more MW within this cost range. Given the high risks of CO_2 regulation discussed below, this would be a modest premium. Over

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the next ten years, renewable technologies will likely improve and this premium should decline. There will likely be sufficient renewable resources to meet load growth at a modest premium. Although there may be transmission challenges with integrating the proposals from its 2004 renewable RFP, the IRP contains no information regarding this.

Although PacifiCorp's IRP does not advocate building integrated gasification combined-cycle (IGCC) coal instead of pulverized coal, this idea may have merit. This resource option comes with a cost premium as well. The cost premium of IGCC coal over super-critical pulverized coal is 24 percent (page 67, Technical Appendix) and this does not include the forecasted sequestration cost of $10 per ton of CO_2. Because IGCC produces 0.85 tons of CO_2 per MWh, IGCC would cost $52.80 per MWh (2004$) at a $10 per ton of CO_2 sequestration cost.

If confirmed by site specific analysis, this could become an appropriate cost cut-off for acquiring new renewable resources. PacifiCorp should investigate the site specific IGCC costs (including sequestration) of the Hunter site in Utah to further refine a cut-off value. Even if there is a cutoff value for acquisitions of renewable resources, there still may be a need for building extra transmission capacity to respond quickly to changes in state or U.S. carbon policies.

In addition, pulverized coal plants cannot ramp up and down nearly as fast as gas plants. PacifiCorp has indicated in public meetings, however, that integrating 1,400 MW of intermittent wind generation may present serious challenges to their system, particularly in the eastern control area, where hydro shaping resources are limited. It makes little sense to make this integration problem worse by adding additional inflexible coal plants.

Given the short lead times for many wind projects and the ability of PacifiCorp to facilitate transmission, additional renewable resources beyond the 1,400 MW cap are possible and desirable. This appears to better balance risks and costs than acquiring new coal plants. The Oregon Public Utility Commission (PUC) should not acknowledge acquiring new coal plants instead of these more desirable renewable resources. There appears to be time to build

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transmission to new renewables, in lieu of building a new coal plant and its associated transmission, but it will require quick actions by PacifiCorp. These actions should be in this action plan.

At a minimum, the PUC should not acknowledge the acquisition of new coal plants pending completion of risk analyses comparing renewables beyond the 1,400 MW cap with new coal as well as other analyses discussed here. These other studies include:

- An analysis of the excess costs if PacifiCorp builds a coal plant without the option to sequester CO_2 and then faces an immediate or delayed requirement to reduce emissions below 2000 levels.
- An analysis of the costs of alternative long-run strategies to respond to a binding and declining cap on PacifiCorp's existing CO_2 emissions through 2050.
- Site specific analyses of IGCC with sequestration at various sites, including the Hunter site.
- An analysis of the transmission needed to integrate sufficient renewable and gas-fired resources to meet load growth through 2025. Alternative plans might include IGCC plants with a sequestration option or compressed air storage for shaping wind if these resources are least-cost or least-risk.

A CO_2 LIMITED FUTURE IS REALISTIC

States are already requiring significant additions of renewable resources, in part due to concerns over climate change. The Union of Concerned Scientists estimates existing renewable portfolio laws and regulations in 18 states plus the District of Columbia will lead to 25,550 MW (nameplate) of new renewable power by 2017 (See http://www.ucsusa.org/clean_energy/renewable_energy/page.cfm?pageID=47)

This includes the following electric renewable standards for 5 of the 11 states in the Western Interconnection:

State	Percent of Renewables Energy	Year

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California	20%	2017
Nevada	15%	2013
Colorado	10%	2015
New Mexico	10%	2011
Arizona	1.1% (60% of this is solar)	2007

In contrast, PacifiCorp plans to derive only 7 percent of its energy (MWh) in FY 2015 from non-hydro renewable resources (PUC Staff's April 25th data request, question number 2).

Closer to home, *The Oregon Strategy for Greenhouse Reductions* was adopted by the Governor's Advisory Group on Global Warming in December 2004 (See http://egov.oregon.gov/ENERGY/GBLWRM/docs/GWReport-FInal.pdf). The strategy includes a Scientific Consensus Statement on the likely impacts of global warming on the Northwest signed by 50 leading Northwest scientists. PacifiCorp was on the Advisory Group and was aware of the draft recommendations in October 2004. The strategy sets the following emission reduction goals for Oregon:

- By 2020, achieve a 10 percent reduction below 1990 greenhouse gas levels.
- By 2050, achieve a "climate stabilization" emissions level at least 75 percent below 1990 levels.

Note that Oregon's 2000 CO_2 emissions from fossil fuels were 17 percent above 1990 emissions.

One of the key recommendations of the strategy is to

> *"create a special interim task force to examine the feasibility of, and develop a design for, a load-based allowance standard. This standard would reduce the total amounts of CO_2 and other greenhouse emissions due to the consumption of electricity, petroleum and natural gas by Oregonians …*
> *The task force should be directed to provide the Governor with its recommendation in time for legislative action, if necessary, in the 2007 session. "* (See page 68).

The Governor has since indicated he plans to create the task force.

The possibilities of an Oregon or Federal renewable portfolio standard or a CO_2 cap have significant implications for PacifiCorp. PacifiCorp emitted 52 percent of the 2003 emissions

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from Oregon electric utilities. (See attached spreadsheet *2003-net-mix.xls*. This spreadsheet is the basis for CO_2 emissions information sent to retail customers of PacifiCorp and Portland General Electric) In 2000, the last date for comprehensive emissions data, electric utilities emitted 42 percent of Oregon's fossil fuel CO_2 emissions. (*Oregon Strategy for Greenhouse Gas Reductions*, page B-3). Combined, these data indicate PacifiCorp emits roughly 22 percent of Oregon's total CO_2 emissions.

If a CO_2 cap or renewable resource requirements are imposed by the Oregon Legislature, it would have to address and potentially cap PacifiCorp's system emissions. Yet, PacifiCorp's preferred portfolio increases its system-wide CO_2 emissions from 52,111 million tons to 62,516 million tons over the period 2005 to 2018, a total growth of 20 percent (PacifiCorp response to ODOE Data Request 1.3). PacifiCorp's proposed action plan leaves it unprepared for possible changes in Oregon laws. Oregon's and PacifiCorp's plans regarding CO_2 are in direct conflict, with potentially negative results for PacifiCorp shareholders or customers or both.

STUDIES INDICATE HIGH CO_2 ADDERS ARE NEEDED TO AVOID DANGEROUS CLIMATE CHANGE

The stringent CO_2 reduction goals of the Oregon Advisory Group come from the necessity of stabilizing the CO_2 concentration in the atmosphere this century at a non-dangerous level. If the CO_2 concentration rises to twice the pre-industrial level, it would increase the risk of catastrophic climate changes to dangerous levels. This will likely occur around mid-century, absent governmental intervention.

If all CO_2 emissions ended up in the atmosphere, stabilizing CO_2 concentrations in the atmosphere would require reducing emissions to zero. However, oceans and other sinks currently absorb about 50 percent of human-emitted CO_2 (http://www.eia.doe.gov/oiaf/1605/ggrpt/emission_tbls.html *Table 3*).

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This indicates that a reduction of 50 percent in worldwide emission would halt net CO_2 additions to the atmosphere and stabilize the concentrations.

Unfortunately, the absorptive capability of the oceans is apparently declining, so worldwide emissions reductions of greater than 50 percent will likely be needed by mid-century. Because the U.S. emits far more than its per-capita share of emissions, it will likely need to reduce its emissions more than the worldwide average.

Even though President Bush opposes action on climate change, the Congress is beginning to seriously address the issue. The Climate Stewardship Act of 2003 (S. 139) proposed by Senators McCain (R, Arizona) and Lieberman (D, Connecticut) would cap U.S. greenhouse gas emissions. The proposed emissions reductions in early decades are modest compared to requirements later this century. The bill would cap sectors at their 2000 emissions in Phase I of the program, running from 2010 to 2015, and then to their 1990 emissions in Phase II starting 2016.

Even for these modest requirements the cost per ton of CO_2 reduced is high. The report *Emissions Trading to Reduce Greenhouse Gas Emissions in the United States: The McCain-Lieberman Proposal* by Paltsev, S., J.M. Reilly, H.D. Jacoby, A.D. Ellerman & K.H. Tay (June 2003 from http://mit.edu/globalchange/www/MITJPSPGC_Rpt97.pdf) states:

> *"Based on these scenarios an estimate of the cost of the Act [S. 139] as it is currently written would be a CO_2-equivalent price ranging from under \$20 to nearly \$40 in 2010, rising to about \$30 to \$65 by 2020 (1997\$)."*

For comparison, Order No. 93-695 CO_2 cost adders range from \$11.88 to \$47.54 (1997\$ assuming 2.5 percent inflation from 1990 to 1997). S. 139 received 44 votes in the U.S. Senate in 2004.

A recent research study (**"**Probabilistic Integrated Assessment of 'Dangerous' Climate Change**"** Michael D. Mastrandrea and Stephen H. Schneider, *Science*, 23 April 2004; 304: 571-575. *Science*, published by the American Association for the Advancement of Science, is the leading U.S. science journal) is instructive on the worldwide levels of CO_2 adders needed to

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stabilize climate. While the U.S. has not signed the Kyoto Treaty, it has, along with 164 other countries, formally ratified the United Nations Framework Convention on Climate Change. This treaty has an ultimate objective of "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system." The research paper indicates that a worldwide equivalent of a tax of $41 per ton of CO_2 (2004$) is needed before 2050 to reduce this danger to below 1 percent probability.

This assessment is based on a temperature increase of 2.85 degrees C as the threshold for dangerous climate change. If instead the threshold for dangerous climate change is 1.92 degrees C, then a CO_2 tax of $109 per ton of CO_2 (2004$) before 2050 would only reduce the likelihood of dangerous interference to a 15 percent probability. Both the 1 percent and the 15 percent chances are much greater risks than modern society normally tolerates for large catastrophes (e.g. major floods, nuclear accidents, etc.).

For comparison, the worldwide temperature range for the last 10,000 years has been about plus or minus 2 degrees C based on Antarctic ice core data (Woods Hole Institute, See: http://www.whrc.org/resources/online_publications/warming_earth/scientific_evidence.htm). The 0.6 degree rise experienced in the last 120 years (http://www.eia.doe.gov/oiaf/1605/ggrpt/emission.html) has already placed Earth's temperature near the top of this range.

The scientific consensus is that worldwide emissions cannot continue to grow without endangering even the most robust economic and ecological systems. Within a few decades, worldwide emissions must decrease substantially. These decreases would have to apply to the U.S. electric sector which emits about 10 percent of total worldwide CO_2. With about 22 percent of Oregon's fossil fuel CO_2 emissions, mandatory reductions below current levels will likely to apply to PacifiCorp as well. These reductions will likely cost significantly more than $8.38 per ton of CO_2 (2010$).

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WHY PACIFICORP'S CO_2 SCENARIO IS UNLIKELY

PacifiCorp views the higher CO_2 adders of Order No. 93-695 ($37.25 and $59.60 per ton of CO_2, restated as 2010 dollars) as unlikely. However, the studies above indicate that adders this large are needed to stabilize climate. To cap and then reduce CO_2 emissions from U.S. power plants in the next few decades will require CO_2 adders this large. The alternative to worldwide policies to reduce CO_2 emissions is to knowingly cause catastrophic climate change. This would be irrational and unethical. With high adders likely, new pulverized coal is imprudent.

A forecast of low CO_2 adders requires either a forecast of weak or non-existent caps on CO_2 emissions or an almost limitless supply of low-cost CO_2 offsets. PacifiCorp implicitly assumes one or the other. There is growing evidence of increasing stringent CO_2 policies in international, U.S. and state forums. As to low-cost offsets, PacifiCorp does not even indicate what sectors might supply them.

Below is additional evidence that high CO_2 cost adders are likely, beyond the studies above relating to the emission targets in the McCain-Lieberman bill and avoiding world temperature increases of 2.85 and 1.92 degrees C.

Looking at the U.S. electricity sector in isolation, a 50 percent reduction in emissions would require that the U.S. replace existing coal plants, that would economic except for the need to limit CO_2 emissions, with new power plants with zero or low CO_2 emissions. Substituting new IGCC with sequestration or wind for existing PacifiCorp coal plants yields a cost per ton of CO_2 removed of about $32 to $45 per ton of CO_2 (2010$).

This range is based on assumed costs of new IGCC or wind of $50 to $60 per MWh and the fuel and other operating costs of the existing coal plants of $15.00 to $17.50 per MWh (costs per MWh 2004$, See near the bottom of attached spreadsheet *cap-coal-CO2-with-and w-o new coal plant.xls*). The need to resort to higher cost wind is plausible given the likelihood that lower cost wind in the West will be used to meet load growth or renewable portfolio standards. As

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noted above, PacifiCorp estimates IGCC would cost \$52.80 per MWh with a \$10 per ton of CO_2 sequestration cost. Higher costs for zero-CO_2 resources or lower operating costs for existing coal plants would imply costs per ton of CO_2 above \$45.

Some may argue that stringent CO_2 adders or caps will never be implemented because of their impact on the U.S. economy. This ignores the possible political context if the climate continues to change in highly noticeable ways that begin to threaten U.S. or European populations. Regarding the impact on the U.S. economy, the recent experience with large increases in petroleum and natural gas prices is instructive.

The highest CO_2 adder in Order No. 93-695 (restated as \$59.60 per ton of CO_2, 2010\$) vs. a zero CO_2 adder implies a doubling of wholesale electric prices in 2023 (See graphs on page 107 in the Technical Appendix or page 156 in the IRP). Although a significant cost impact for consumers, such an increase in wholesale electric prices is unlikely to crush the U.S. economy. Since 1995 U.S. wholesale distillate prices have increased by 250 percent and U.S. wholesale natural gas prices have tripled (EIA *Monthly Energy Review*, Feb. 2005, Table 9.10). Yet this has not crushed the U.S. economy.

Further, a doubling of wholesale petroleum and natural gas prices would have a more significant impact on the economy than a doubling of wholesale electric prices. Total direct fossil fuel expenditures (excluding fuel purchased by the electric power sector) were 65 percent of retail U.S. energy expenditures in 2001. Retail electricity purchases were only 35 percent of retail energy expenditures that year (See
http://www.eia.doe.gov/emeu/states/sep_prices/total/pr_tot_us.html
Data for 2001 is the most current data available)

Note the impact on the economy for fossil fuel costs increases includes the fuel purchased by the electric power sector, so this ratio underestimates the relative macro-economic impact of fossil fuel vs. electric price increases.

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Also note that the impact of CO_2 adders on the wholesale price of electricity is substantially more than the impact on natural gas and gasoline prices. While the highest Order No. 93-695 adder of $59.60 per ton of CO_2 (2010$) would double wholesale electricity prices (a 100 percent increase), it would add only $0.58 to the price of a gallon of gasoline. At the May 2005 N.Y. Harbor price of $1.48 http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/weekly_petroleum_status_report/current/pdf/table14.pdf) this is an increase of 40 percent. The adder of $59.60 per ton of CO_2 would add $3.49 to the price per MMBtu of natural gas. This is about 50 percent of the current wholesale price of $7.00. Although difficult for consumers and industrial customers, this is hardly the end of the world, given recent natural gas and oil price increases.

High CO_2 adders are needed given the scale of worldwide emission reductions needed (at least 50 percent by 2050) and the scale of U.S. utility emissions (10 percent of the world total, primarily coal-fired power).

An alternative justification for PacifiCorp's hypothesis of a CO_2 adder below $10 per ton through 2050 is a huge supply of low-cost CO_2 offsets. Although some of the early offsets have had low costs, these have been niche applications. Other than electricity generation, the other major worldwide CO_2 sources are transportation and stationary fossil fuel use. Neither sector shows the promise of low-cost offsets.

Europe and Japan have had gasoline taxes of several dollars per gallon for decades. Prices for regular unleaded have been well over $3 per gallon in Germany and Japan in all years since 1992 except one. Prices for premium unleaded have been over $3.40 for all of the years since 1990 in France and Italy and since 1997 in the United Kingdom. Even with these high prices, petroleum consumption was flat or increased slightly over the period 1990 to 2002 in every country except the U.K. . (See *Annual Energy Review, 2003*, Tables 11.8 and 11.10, US DOE/EAI-0384).

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In the U.K. prices increased from an average of $2.94 per gallon for 1990-1994 to an average of $4.29 for 1999-2002 (nominal prices for inclusive years). This price increase of 46 percent induced only a 6 percent decrease in use in 2002 relative to the base period. The highest case CO_2 adder from Order No. 93-695 would raise the average retail price per gallon of U.S. gasoline from $1.92 in 2004 (EIA *Monthly Energy Review*, Feb. 2005, Table 9.4) to $2.50, an increase of 30 percent.

This indicates the transport sector is an unlikely source of low-cost or easy offsets. Similarly with stationary fuel use, there are not enough low cost energy efficiency or renewable resources alternatives to reduce use by 50 percent.

The likelihood of high worldwide prices for oil and natural gas in coming years is unlikely to be a CO_2 salvation as it makes coal an economical fuel, absent CO_2 considerations. If prices for light-sweet crude oil remain above $50 per barrel, producing diesel fuel from coal becomes a economically promising alternative.

The only other possible sector for major low-cost CO_2 offsets is biological sequestration. This option is unlikely to be successful in the face of large changes in climate. Even with a 50 percent reduction in emissions by 2050, the climate will change. While temperature changes for local areas are fairly predictable, precipitation is not. It will be difficult to maintain the existing inventory of trees and biomass. Planting trees when we don't know what species will survive is unlikely to yield dependable low-cost CO_2 offsets.

PACIFICORP'S COMPARISION OF COAL AND GAS IGNORES CO_2 RISKS

Under its base case assumptions, PacifiCorp's preferred Portfolio E does not have the lowest deterministic present value of revenue requirements (PVRR). The all-gas Portfolio M has *lower* PVRR than PacifiCorp's preferred Portfolio E by 0.2 percent. This is a virtual tie. PacifiCorp chooses Portfolio E over the all-gas Portfolio M based largely on the reduced

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exposure to natural gas price risk (see IRP pages 113-154, especially the "Conclusions" at the bottom of page 154).

It is apparent from PacifiCorp's scenario risk analyses, however, that the reduced gas-price risk from building new coal plants in its preferred Portfolio E is roughly comparable to its increased risk of CO_2 adders. Yet, the stochastic risk analysis of gas vs. coal focuses almost exclusively on gas price risk. If a high renewable resource portfolio were studied, it would likely be the portfolio with the least overall risks, albeit with some increase in the PVRR with base case assumptions. It is important to remember that PacifiCorp's base case gas price and CO_2 adder assumptions are only their best guesses at the time.

PacifiCorp's IRP puts great import into the stochastic analysis of the gas-price risk comparison of Portfolios E and M. Because gas price is bounded by zero but almost unbounded at the upper end, all-gas Portfolio M's average total cost of 100 stochastic iterations (stochastic PVRR) is greater than Portfolio E's by $366 million (See Figure 8.12 on page 139 of the IRP). Portfolio E's PVRR also has less variance. PacifiCorp notes this risk advantage for Portfolio E is "due to gas price volatility." (page 154, IRP)

PacifiCorp's presumed risk advantage of Portfolio E over Portfolio M occurs because PacifiCorp did not include CO_2 risk in its stochastic analyses. CO_2 adders are also bounded by zero. While the preferred Portfolio E performs better than the all-gas Portfolio M under a zero CO_2 adder, the difference is only $104 million PVRR. This is smaller than the $132 million advantage of Portfolio M under the $14.90/ton CO_2 adder (in 2010$, $10 per ton in 1990$). The advantage of all-gas Portfolio M under the two highest CO_2 adders under Order No. 93-695 is 3.6 and 6.0 times the advantage of preferred Portfolio E under the zero CO_2 adder scenario (See IRP, page 158).

Under the base case CO_2 adder of $8.38 per ton of CO_2 (2010$) and the high gas price scenario, the all-gas Portfolio M has a PVRR that exceeds preferred Portfolio E's by $564 million (IRP, page 161). However, under the two highest CO_2 adder scenarios Portfolio E's

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PVRR exceeds Portfolio M's by $374 million at $37.25/ton CO_2 (2010$) and $623 million at $59.60/ton CO2 (2010$) (IRP, page 158; these are $25 per ton and $40 per ton respectively in 1990$). This indicates similar risks levels for portfolios E and M. The $564 million gas-price risk of Portfolio M is in the middle of CO_2 risks of $374 million and $623 million for Portfolio E. Note that the high CO_2 adder scenarios incorporate the associated higher gas prices.

Had PacifiCorp instead conducted a complete *stochastic* analysis on the full range of CO_2 adders and natural gas prices, the variance of PVRRs of Portfolios M and E would have been similar. Therefore, the virtual tie between Portfolio M and E in PacifiCorp's deterministic analysis, which uses base-case assumptions, is also a good indicator of how the two portfolios would compare under a stochastic analysis of gas prices and CO_2 adders.

RISKS OF A FIRM EMISSIONS CAP ON THE ECONOMICS OF NEW COAL

In addition to the risks of CO_2 cost adders, there is a future risk of building new coal plants that PacifiCorp did not analyze. On short notice, PacifiCorp might face a firm constraint on its total CO_2 emissions, without an opportunity to trade for or buy offsets. Whether pursued by West Coast states, required by the U.S. or imposed by international economic pressure, such a scenario is plausible over the next few decades. If transportation and other CO_2 emitting sectors are also capped or regulated there may be no sectors from which to buy CO_2 offsets. This is a significantly different scenario than the cap and *trade* scenarios PacifiCorp assumed in its IRP analyses.

If PacifiCorp pursues its preferred strategy and firm caps are suddenly placed on its CO_2 emissions by state or federal laws, there will be costs that could have been avoided. The acquisition of the new coal plants could then be viewed as grossly imprudent. This potential imprudence finding is made more likely by this risk being noted in this proceeding. PacifiCorp can avoid this cost recovery risk by pursuing a different strategy that emphasizes more renewable resources, backed up by new gas plants and demand response resources.

Note the cost of the gas backstop in Portfolio M is no more expensive than the preferred Portfolio E with the base case CO_2 adder and gas prices. If PacifiCorp pursues new pulverized coal plants and these excess costs occur above the assumed $8.38 per ton of CO_2, these costs should be recovered from PacifiCorp's shareholders, not its Oregon customers.

ODOE strongly disagrees with PacifiCorp's assertion that:

> *"If a new generating plant were to become uneconomic to some degree as a result of government action regarding carbon emissions, that plant would not be imprudent. At this time, the potential costs of government actions regarding CO_2 emissions are highly uncertain. This IRP evaluates new generating resources assuming a CO_2 allowance charge of $8 per ton"* (IRP, the next to last bullet on page 67, 2008$).

Uncertainty is no excuse for inaction or the low $8 adder PacifiCorp *assumes.* ODOE believes that regulatory costs several times PacifiCorp's cost adder of $8 per ton of CO_2 will be required in coming decades to avoid catastrophic climate change. Instead of looking at what seems politically possible today, PacifiCorp should analyze the cost risks associated will changes in government policy needed to avoid "dangerous anthropogenic interference with the climate system." (United Nations Framework Convention on Climate Change).

The attached spreadsheet (*cap-coal-CO2-with-and w-o new coal plant.xls*) provides a rough estimate of the kind of excess costs over benefits of a new pulverized coal plant if total PacifiCorp CO_2 emissions are capped, without trading being allowed or available, shortly after the completion of 958 MW of new pulverized coal plants in 2014.

If PacifiCorp's total CO_2 emission are capped at 2005 levels, any increase in emissions from the new coal plants would have to be offset by reduced emissions from its existing plants. The lower emission rate of the new plant would mean that the reduced output of existing plants would not be one-for-one with the output of the new plant, but it would be close. New pulverized coal plants are about 17 percent more efficient than PacifiCorp's oldest coal plants (assuming a heat rate of 9,129 Btu per kWh for new super-critical pulverized coal from page 67 of the Technical Appendix vs. 11,000 Btu per kWh for a mid-range of existing older plants; per Dave Johnson, Carbon and Naughton, See page 60 of the Technical Appendix).

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Thus, for every MWh generated by a new coal plant, 0.17 MWh of old coal could also continue to operate under a CO_2 cap, but 0.83 MWh would have to retired directly as a result of the addition of a new coal plant. This would greatly diminish the value of new coal plants for meeting load growth. The other benefit of replacing existing coal plants with new ones would be reduced fuel and operating costs (fixed and variable operation and maintenance and capital replacement). The combined value of these benefits is quite small relative to the fully amortized cost of a new coal plant.

PacifiCorp does assume retirement of some of its older coal plants in its IRP starting in 2019 (Technical Appendix, page 60), but there is no economic analysis indicating why the plants are retired. Absent new regulations limiting CO_2 or other pollutants, it is unclear whether any of the plants would be retired. In any case, for the following analysis to be valid, it is only necessary that a CO_2 cap on PacifiCorp forces some coal plant retirements, even in the case where no coal plants are built. The key assumption is that new coal plants would increase the amount of existing coal plants that would have to be retired.

If CO_2 emissions are capped and PacifiCorp had to retire existing coal plants, it would have to replace the output with new zero or low CO_2 power sources. This incremental resource could be renewable power plants or IGCC with sequestration of the CO_2. Based on an assumed cost of incremental zero-CO_2 resources of $60 per MWh, the present value of excess costs over benefits of 958 MW of new coal plants in Portfolio E could be as high as $2.4 billion. If only the Utah coal plant in the Action Plan is considered the cost could be as high as $1.4 billion.

This risk from the coal plants in Portfolio E is more than *four times* the estimated risk of the all-gas Portfolio M as compared to PacifiCorp's preferred Portfolio E under a high-cost natural gas scenario (where natural gas prices are almost 20 percent above the company's base case assumptions in 2006 and 35 percent above in 2025, from the graph on page 32 of the Technical Appendix) assuming base case CO_2 adders. While the probabilities of a future cap on CO_2 emissions without trading and PacifiCorp's high gas scenario can be debated, it is

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instructive that PacifiCorp did not even consider the risks of a firm CO_2 cap scenario, except to assert that the excess cost "would not be imprudent." PacifiCorp may not be allowed to buy its way out of a CO_2 cap and that risk should be evaluated and considered.

This analysis is relatively insensitive to the cost of zero-CO_2 replacement resources. In fact, zero-CO_2 replacements resources with costs lower than the $60 assumed would increase the net cost of the new coal plants. Most of the value of the new coal plants comes from the 17 percent displacement of the zero-CO_2 replacement resource.

New IGCC plants are more efficient than pulverized coal. This improvement, alone, is not sufficient to produce a positive economic value if a firm cap is imposed. However, if an IGCC sequestration option did cost $10 per ton of CO_2 then IGCC would likely have positive economic value even if a firm CO_2 cap were imposed.

LACK OF ANALYSIS OF ADDITIONAL RENEWABLES IN HIGH GAS PRICE AND CO_2 ADDER SCENARIOS

PacifiCorp's IRP did not examine the usefulness of expanding renewable resource acquisitions before 2015 beyond 1,400 nameplate MW of wind. An expanded renewable strategy is likely superior to either PacifiCorp's Portfolio E or M. This is the strategy it should analyze and pursue. If PacifiCorp finds that it cannot acquire sufficient renewable resources by the date of need for east side resources, there are several backstop strategies that can assure reliable and economical electric service.

Backup strategies include building the gas-fired resources in Portfolio M or more aggressive implementation of demand response resources. While PacifiCorp's planning margin study indicates that a 15 percent planning margin is desirable with assumed unserved energy costs above $5,000 per MWh ($5 per kWh), there are many customers willing to voluntarily reduce their use at prices well below 100 times normal retail prices. PacifiCorp did not consider a serious "buy back" program to assure reliability in a resource short situation.

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NEW COAL PLANTS A POOR FIT WITH NEW WIND RESOURCES

In another example of its incomplete analysis, PacifiCorp's preferred Portfolio E would decrease rather than increase its ability to integrate wind and other intermittent renewable power plants, at least compared to Portfolio M. PacifiCorp has stated in several public meetings that it is uncertain whether it can integrate more than 1,400 nameplate MW of intermittent wind into its largely thermal system

PacifiCorp's goal of 1,400 MW would result in only 7 percent of its 2015 projected system energy composition being non-hydro renewables (PacifiCorp response to PUC Staff's April 25th data request, question number 2). At least 5 electric utilities in the West are planning to acquire significantly more renewable resources than PacifiCorp as a percent of electric energy sales. The goals are 20 percent for San Diego Gas and Electric, 15 percent for Nevada Power, and 10 percent for Puget Sound Energy, all for 2014, 11 percent for Idaho Power for 2010 and 8 percent for Pacific Gas and Electric for 2010. Idaho Power and Puget Sound Energy are in the Northwest and are pursuing higher renewable resource targets without the requirement of a renewable portfolio standard. Nevada Power and SDG&E lack significant hydro resources (Source: Draft Report: *Balancing Cost and Risk: The Treatment of Renewable Energy in Western Utility Resource Plans,* Ernest Orlando Lawrence Berkeley National Laboratory, May 2005).

There are only two possible explanations for PacifiCorp's lackluster goals for renewable resource acquisition:

1. PacifiCorp already relies too heavily on inflexible coal plants to incorporate more intermittent wind power or
2. Its system is no more inflexible for integrating wind than other utility systems in the West, but it is overly cautious.

If the first reason is true, adding more inflexible coal makes a bad situation worse. If the second reason is true, the 1,400 MW cap is inappropriate.

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Combined-cycle combustion turbines (CCCTs) are superior to pulverized coal plants in their ability to follow loads and shape intermittent renewable resources (e.g., wind). The advantage of CCCTs compared to pulverized coal comes from shorter minimum times to full load, and quicker ramp rates (MW per minute). Minimum times to full load are 54 percent quicker and ramp rates are 44 percent faster for 2x1 wet-cooled CCCTs compared to pulverized coal (PacifiCorp responses to ODOE data requests 2.1 and 2.2). If shaping ability is the constraint that prevents PacifiCorp from developing more than 1,400 MW nameplate of wind, these are substantial advantages for the CCCT technology of Portfolio M. This is yet another unanalyzed advantage of Portfolio M over PacifiCorp's preferred Portfolio E.

DATED this ____th day of May, 2005

Respectfully submitted,

HARDY MYERS
Attorney General

/s/ Janet L. Prewitt
____
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CERTIFICATE OF SERVICE

I hereby certify that on the 20th of May, 2005, I served the forgoing OREGON DEPARTMENT OF ENERGY'S INITIAL COMMENTS IN LC 39 (PACIFICORP'S IRP) upon, the persons named on the attached service list, by email and by mailing a full, true and correct copy thereof addressed to the persons at the addresses on the service list.

DATED: May 20, 2005

/s/ Janet L. Prewitt

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Effects of Cap on CO_2 on New Coal Economics (the benefit vs. cost of adding a new coal plant)
(and CO_2 Adders to Make Wind Cost-Effective vs. Existing and New Coal Plants)

Assuming a cap on total CO_2 emissions, there are two benefits of a new more efficient coal plant:

Benefit #1: More coal MWh can be generated under the CO_2 cap, displacing some new resources
Benefit #2: The new coal plant has lower fuel and perhaps maintenance costs than the displaced old plant

Assumptions:

Coal fuel cost is	$	1.00	per MMBtu		
Levelized Cost of zero CO_2 resource	$	60.00	per MWh		
Heat Rate (HR) of existing coal plant assumed to be				11,000	Btu per kWh (between HRs of D. Johnson and Colstrip Units)
Heat Rate (HR) of new coal plant assumed to be				9,129	Btu per kWh (super-critical from page 67)
Pounds per MMBtu	Nat. Gas	118		Coal	205
All Costs in 2004 dollars					

CO_2 Emissions New vs. Old Coal

Old Coal	2.26	lb. CO_2 per kWh
New Coal	1.87	lb. CO_2 per kWh
Difference	0.38	lb. CO_2 per kWh

Assuming a fixed cap on emissions, every kWh of new coal that displaces a kWh of old coal allows another 17% of a kWh of old coal to continue to operate, and still stay under the CO_2 cap.

Levelized cost of new coal plant	$	35.60	per MWh (super-critical from page 67)
MWh of new resource displaced		17%	per MWh of new coal
Cost of new resource at gas cost	$	60.00	per MWh of new marginal resource (likely wind with gas backup)
Benefit #1	**$**	**10.21**	**per MWh of new coal**

Fuel Savings = Heat rate difference (old minus new) times coal cost

Benefit #2	**$**	**1.87**	**per MWh of new coal**

Total Benefit (#1 + #2)	**$**	**12.08**	**vs. total cost of**	**$**	**35.60**	**per MWh of new coal**

Net Economic Impact			**$**	**(23.52)**	**per year per MWh of new coal**
Present Value at	7.53%	Cap. Recovery Fac.	$	(312.40)	per MWh (40 year life)
Planned Coal Plants	958	MW			
Planned Cap. Fac.	92%				
Annual MWh	7,720,714				

Pres. Value Excess Cost $ 2,412 Million

Demonstration of Small or Possibly Negative O&M Savings:

Var O&M	D. Johnson	$	0.19	1995$/MWh (from p. 223 PAC 2003 IRP)
Var O&M	J. Bridger	$	0.46	1995$/MWh (from p. 223 PAC 2003 IRP)
Var O&M	Avg.	$	0.33	1995$/MWh
inflation per year			2.5%	p. 223 PAC 2003 IRP
Var O&M	old coal	$	0.41	2004$/MWh
Var O&M	new coal	$	0.78	2004$/MWh (page 67of PAC 2005 IRP)

Difference @ 92% Cap Factor = $ 3 per kW of installed capacity

This could be used to offset part or all of the extra fixed maintence and capital replacement costs of the old coal plant. The extra capital replacement cost will depend on Clean Air Act impacts

Result: Negative variable O&M savings and likely small overall O&M savings depending on old vs. new total O&M and capital replacement costs

COST PER TON OF CO2 TO SUBSTITUTE NEW WIND FOR EXISTING COAL

	$/MWh	$/MWh	$/MWh	
Assumed cost of new wind plant	$ 40.00	$ 50.00	$ 60.00	(note IGCC with a cost of sequestration
Operating and Replacement Capital				of $10 per ton of CO2 is $52.80/MWh)
Cost of Existing Coal Plan	$ 20.00	$ 17.50	$ 15.00	
Net Cost per MWh of Coal Displaced	$ 20.00	$ 32.50	$ 45.00	
Tons of CO2 displace per MWh	1.13	1.13	1.13	
Cost per Ton of CO2 Displaced	$ 17.74	$ 28.82	$ 39.91	(2004 dollars)
Escallate to 2010 $ (Tech App. Page 29)	$ 20.00	$ 32.50	$ 45.00	(2010 dollars)

CO2 ADDER THAT LEADS TO EXCESS COSTS OVER BENEFIT OF NEW PULVERZIED COAL

New Pulverized Coal Cost $ 35.60 $/MWh (Super-Critical from page 76 of Technical Appendix)

	$/MWh	$/MWh	$/MWh	
Assumed cost of new wind plant	$ 40.00	$ 50.00	$ 60.00	
Excess Cost of Wind w/o CO2 Adder	$ 4.40	$ 14.40	$ 24.40	
Wind = Coal @ CO2 Adder of	$ 4.70	$ 15.39	$ 26.08	$/Ton of CO2

PacifiCorp Net Fuel Mix (Generation is based on PacifiCorp ownership share.)

Plant	Type of Plant		MWh 2003	2003 OR Share	2003 OR Share to Load	2003 Natural Gas Gen. (from WA)	
Dave Johnston	Steam		5,302,493	1,469,098	1,329,709		
Jim Bridger	Steam		9,653,111	2,674,472	2,420,715		
Wyodak	Steam		2,197,461	608,824	551,058		
Colstrip	Steam		1,066,118	295,377	267,351	95	
Carbon	Steam		1,371,293	379,928	343,880		
Naughton	Steam		4,799,139	1,329,640	1,203,482	5,886	
Huntington	Steam		7,213,219	1,998,480	1,808,862		
Hunter	Steam		8,494,782	2,353,547	2,130,240		
Cholla	Steam		2,873,317	796,075	720,543		
Craig	Steam		1,244,763	344,872	312,150		
Hayden	Steam		592,399	164,129	148,556		
Total Coal		5,115 AMW	44,808,095		11,236,546	5,980	
Little Mountain			86,653	25,126	22,742		
Gadsby	Steam - Gas		543,370	157,556	142,607		Oregon's Part
James River@6MMBtu/MWh	Gas - Co-gen		219,324	63,595	57,561		Total Hermistion
Hermiston (owned)	Gas Turbine		1,762,710	511,115	462,620		925,266
PG&E-Hermiston (purchase)	Gas Turbine		1,762,807	511,144	462,646		
West Valley	Gas Turbine		580,823	168,415	152,436		
Total "Owned" Gas			4,955,687		1,300,612		
PPL Hydro			3,549,497				
UPL Hydro			221,643				
Misc Hydro (Swift No 2 PUD)			-				
Total Hydro	Hydro		3,771,140	1,371,164	1,241,066		
Foote Creek (gross)	Wind		101,321				
Foote Creek (sales)	Wind		38,575				
Foote Creek (net)	Wind		62,746	18,194	16,468		
Blundell	Geothermal		198,465	-			
InterMT. Coal (gross)	Steam		502,629				
InterMT. Coal (sales)	Steam		502,629				
InterMT. Coal (net)			-				
Other Resource Specific Purchases							
QF Biomass	Biomass		791,808	228,905	207,187		
Gas - QF	Co-gen		2,797	809	732		
QF - Hydro	Hydro		261,782	75,679	68,499		
QF - Misc	Misc		1,040	301	272		
Total resource specific purchases			1,560,056				
Non specific wholesale purchases			21,266,645				
Non specific wholesale sales			24,676,609				
Net non specific wholesale transactions			(3,409,964)				
Other							
Net power exchanges			60,024				
Wheeling losses			(119,322)				
Energy used by the Company			(139,190)				
Total losses			(4,206,816)				
Total Other			(4,405,304)				
PacifiCorp Total Specific Resources				15,546,444	26,608,539		

PacifiCorp Oregon Fuel Mix				
Coal	**79.7%**	12,414,441	11,220,793	(Includes coke but excludes natural gas and oil#)
Oil used in Coal Plants	**0.1%**		9,773	(from WA data base#)

Source Color Code Key

Yellow = Oregon Annual Report (from Regulation)
Blue = 2003 Generation Report (Cathy Wright 813-5213)
Orange = Book Run [Purchase Power: Hermiston Gen Purch, IPP Firm Energy
Green = QF's Renewable Energy Source Generation Report (Keith Johnson 813
Pink= FERC Form 1, pg. 401
Turquoise = (Paul Wrigley 813-6048)

Emissions Worksheet = From Tom Wiscomb (801) 220 2373

Reconciliation:

2003 Net Gen Report		Energy Mix Rpt	Difference	
3,771,140	Hydro	3,771,140		Same
46,948,430	Steam	44,808,095	2,140,335	(James River, Hermis
1,052,545	Gas	4,955,687	(3,903,142)	(James River, Hermis
101,321	Wind	101,321		Same
198,465	Geothermal	198,465		Same
(272)	Nuclear		(272)	Nuclear not included
52,071,629		53,834,708	(1,763,079)	

Note: Only the Purchase side of InterMT Coal should be included in Total Resou

Hydro (w/ hydro QFs)	**9.3%**	1,446,843	1,309,565	
Net Wind	**0.1%**	18,194	16,468	
Gas (includes Gas QFs)	**8.5%**	1,308,722	1,190,529	(Includes natural gas used in coal plants#)
Biomass and Misc. QFs	**2.3%**	358,244	324,253	(note: WA data indicate James River is 82% biomass)
Total	**100.0%**	15,546,444	14,071,381	

2003				**USED**				
OR Retail Sales (excludes allocated customers)				12,298,387				
Losses				1,772,994		14.4%	Percent of Sales	
Oregon Retail Load				14,071,381			**Not Input to WA**	
% of OR Specific Resources to Oregon Load		110.5%					CO-AZ coal	1,181,249
From 2002 OPUC Stats page 16*	1.562	13.5238	loss/sales =	11.6%	not used		QFs	276,689
* this is Million MWh "Balance Loss" / "Totals Sales to Ultimate Customers"							omitted hydro	1,497
Allocation factors*	Coal Plant	Wholesale	Hydro	New Resouces			--	
	SNPPS	SG	SNPPH	SNPPO			sum not input	1,459,435
							Net Input	**12,611,946**
Oregon %	27.7%	28.9%	36.4%	29.0%			CKS ?	
*based on September 2003 semi-annual report							WA data base says input was:	**12,611,943**

HYDRO GENERATION BY PLANT

	HYDRO	2003 TOTAL	Oregon allocation	Allocation to OR loads		rounded up
WASHINGTON	**LEWIS RIVER**					
	SWIFT NO. 1	684,313	248,812	225,205	225204.5525	1
	SWIFT NO. 2(PUD)	-	-	-	0	
	YALE	565,961	205,780	186,255	186255.4032	
	MERWIN	501,921	182,495	165,180	165180.1065	
	MISC WASHINGTON					
	CONDIT	80,193	29,158	26,391	26391.18164	
	DROP	1,690	614	556	556.1719472	
	NACHES	7,646	2,780	2,516	2516.266691	
	SKOOKUMCHUCH	716	260	236	235.632612	x
CALIFORNIA	**KLAMATH RIVER**					
	COPCO NO. 1	91,502	33,270	30,113	30112.92634	1
	COPCO NO. 2	114,596	41,666	37,713	37713.06536	
	FALL CREEK	12,636	4,594	4,158	4158.454867	
	IRON GATE	113,562	41,290	37,373	37372.78028	1
OREGON						
	KLAMATH RIVER					
	EAST SIDE	11,817	4,297	3,889	3888.925385	1
	WEST SIDE	2,206	802	726	725.9853938	1
	J. C. BOYLE	259,137	94,221	85,281	85280.90526	1
	ROGUE RIVER					
	PROSPECT NO. 1	25,545	9,288	8,407	8406.752895	1
	PROSPECT NO. 2	233,574	84,926	76,868	76868.22864	
	PROSPECT NO. 3	34,577	12,572	11,379	11379.1464	
	PROSPECT NO. 4	4,852	1,764	1,597	1596.772951	1
	EAGLE POINT	15,279	5,555	5,028	5028.255137	
	UMPQUA RIVER					
	SODA SPRINGS	61,880	22,499	20,364	20364.44976	
	SLIDE CREEK	86,963	31,619	28,619	28619.16038	
	CLEARWATER NO. 2	50,168	18,241	16,510	16510.07944	
	CLEARWATER NO. 1	48,795	17,742	16,058	16058.23087	
	LEMOLO NO. 2	145,508	52,906	47,886	47886.07556	
	LEMOLO NO. 1	80,601	29,306	26,525	26525.45273	
	FISH CREEK	50,626	18,407	16,661	16660.80533	1
	TOKETEE	206,718	75,161	68,030	68030.03112	
	MISC. OREGON					
	POWERDALE	19,681	7,156	6,477	6476.934966	1
	WALLOWA FALLS	5,129	1,865	1,688	1687.932495	
	BEND	3,049	1,109	1,003	1003.413176	
	CLINE FALLS	2,101	764	691	691.430332	
IDAHO	**BEAR RIVER**					
	COVE	1,142	415	376	375.8274342	1
	GRACE	73,880	26,862	24,314	24313.59968	1
	ONEIDA	22,106	8,038	7,275	7274.992346	1
	SODA	11,949	4,345	3,932	3932.366034	
	MISC IDAHO					
	LIFTON	(5,339)	(1,941)	(1,757)	-1757.042619	x
	ASHTON	29,104	10,582	9,578	9578.004942	
	LAST CHANCE	3,369	1,225	1,109	1108.72384	1
	PARIS	1,484	540	488	488.3782069	
	ST. ANTHONY	(17)	(6)	(6)	-5.594629055	x
UTAH	**SANTA CLARA RIVER**					
	GUNLOCK	74	27	24	24.35309118	
	SANDCOVE	238	87	78	78.32480677	x
	VEYO	228	83	75	75.0338485	
	MISC. UTAH					
	CUTLER	31,874	11,589	10,490	10489.60038	1
	AMERICAN FORK	5,144	1,870	1,693	1692.868933	1
	UPPER BEAVER	7,493	2,724	2,466	2465.91503	1
	FOUNTAIN GREEN	553	201	182	181.9899922	1
	GRANITE	5,430	1,974	1,787	1786.990339	1

Input to WA*	
Coal Plants	10,055,297
Hydro	1,239,569
Nat. Gas	1,300,612
wind	16,468
Total	**12,611,946**

	OLMSTED	9,034	3,285	2,973	2973.051699	
	PIONEER	7,203	2,619	2,370	2370.47724	x
	SNAKE CREEK	1,728	628	569	568.6775886	1
	STAIRS	3,951	1,437	1,300	1300.257612	
	WEBER	11,098	4,035	3,652	3652.305485	
MT & WY						
	BIG FORK (MT)	26,555	9,655	8,739	8739.13968	
	VIVA NAUGHTON (WY)	(83)	(30)	(27)	-27.31495362	x
	TOTAL HYDRO	3,771,140	1,371,164	1,241,066	1241066.436	40%

Special Sales: BPA Foote Creek, LA IIP Firm] (Laurie Barbeau 813-5578)
3-5585/Robin Waterstradt 813-6177)

	TOTAL
	3,771,140
ston owned, Gadsby 1,2,3 +158,301)	46,948,430
ston Owned, Hermiston PGE, Gadsby 1,2,3 -158,301)	1,052,545
	101,321
	198,465
in Energy Mix Report	(272)
	52,071,629
	52,071,629

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ource Specific Purchases