BEFORE THE PUBLIC UTILITY COMMISSION

OF OREGON

UM 1302

In the Matter of an Investigation into the Treatment of CO2 Risk in the Integrated Resource Planning (IRP) Process.	STAFF'S ADDITIONAL COMMENTS January 17, 2008

Along with minor editing suggestions, the January 3, 2008, workshop produced a major movement seemingly to reduce the scope of the CO_2 RISK ADAPTABILITY topic (refer to the ATTACHED) by relocating that paragraph's leading sentence to the second paragraph and eliminating the balance of the adaptability paragraph. While staff does not object to eliminating the last sentence of the subject paragraph, it makes little sense to eliminate the rest. In fact, the requirements of the preserved sentence can only be fulfilled by satisfying the demands of the other sentences. If the Commission decides that, in the interest of broadness and generality, the leading sentence is sufficient as a guideline on this topic, then staff recommends the Commission provide the balance of staff's recommendation as direction in the discussion accompanying its ruling so as to give the utilities a proper sense of the Commission's expectations on the subject. Further, staff recommends that the Commission retain the adaptability portion of the guideline in a distinct section. The thrust of the CO_2 risk adaptability charge is sufficiently distinct from the mandates of the other paragraphs within the guideline to merit its own paragraph.

The purpose of the following discourse is to make a case for the recommendations above through illustrative numerical examples that follow the order of the guideline's paragraphs. If anything, one might conclude (and Staff did conclude) from the exercise that the CO_2 RISK ADAPTABILITY paragraph needed to be augmented slightly, not attenuated.

CO_2 RISK ADAPTABILITY AND ITS PLACE WITHIN THE ENVIRONMENTAL COSTS GUIDELINE (#8): A Hypothetical Exercise

BASE CASE AND OTHER COMPLIANCE SCENARIOS: The following table is an abridged version of the table from page 20 of PacifiCorp's 2007 IRP, Appendix A. These scenarios (plus a $0 adder) are what the various portfolios were tested against.

CO_2 Cost Adder Level Time Paths ($/Ton, 2008 Dollars)

Year↓/ Adder I.D.→	$8 (Base Case)	$15	$38	$61
2010	$4.15	$4.15	$4.15	$4.15
2013	$8.78	$8.78	$8.78	$8.78
2014	$8.78	$11.05	$17.69	$24.34
2015	$9.10	$13.89	$35.63	$67.43
2020	$9.95	$18.96	$47.38	$75.82
2026	$11.13	$21.20	$52.99	$84.78

Note that, in every instance, departures from the $8 base case CO_2 adder trajectory are not assumed to commence until the year 2014. This point has relevance to the ADAPTABILITY matter, where the utility is asked to posit some future departure from the base case trajectory to an adder level time-path that would cause the utility to, say, cut short the useful lifetime of some high-cost, high-polluting resource. For a utility to hypothesize some departure in, for instance, 2020 would not be qualitatively different from – as shown – its hypothesizing a departure in 2014. But instead of some more-or-less arbitrarily selected year for departing from the base case trajectory, the ADAPTABILITY paragraph would have the utility determine the year (and the degree of the departure) that would lead it to make a substantial portfolio modification. More fundamentally, the utility simply would be incapable of "assess[ing] the cost, risks, and benefits" of the adaptable portfolio without setting out an assumed adder trajectory.

TESTING THE PREFERRED AND ALTERNATIVE PORTFOLIOS AGAINST THE COMPLIANCE SCENARIOS: The material in the following table came from pages 183-185 of PacifiCorp's 2007 IRP. The table summarizes the composition of the "Group 2" portfolio set. The Company chose its "preferred" portfolio on the basis of stochastic simulations performed on that set.

Main Candidate Portfolios' Cumulative Added Nameplate Capacities (MW, 2007-2016)

Resource Category↓ / Portfolio I.D.→	RA13	RA14 Preferred	RA15	RA16	RA17
Pulverized Coal	877	877	877	877	877
CCCT (Gas)	0	1507	1150	1698	602
Renewable (Wind)	1000	1600	1600	1600	1600
Front Office Transactions (Annual avg.)	922	351	364	319	627
Class 1 Demand Side Management	104	104	104	104	104
Combined Heat and Power	100	100	100	100	100

OBSERVATIONS: Observe first that <u>all</u> of the candidate portfolios selected for the ultimate stochastic risk studies had identical and substantial amounts of pulverized coal capacity. Then recall that elsewhere in PacifiCorp's 2007 IRP (page 149) it is noted that the CEM model (Capacity Expansion Model) "removes" three pulverized coal plants from the expansion portfolio as the CO_2 adder moves up from $8 to $25/ton. The implication is that in order to have been seriously considered as a "preferred" candidate, the portfolio must have performed well with an $8 adder, but that quite a different set of candidate portfolios would have been constructed if the base case CO_2 adder had been at $25/ton or higher. Accordingly, while the preferred and reasonable alternative portfolios were *tested* regarding their performances at the higher CO_2 adder levels, none of those portfolios was assembled with the purpose of *optimizing* (i.e., to achieve a best cost-risk relationship) for those levels. Furthermore, the studies assumed that the portfolios themselves are not altered regardless of the adder level that comes to prevail.

RELEVANCE TO THE ISSUE AT HAND: Shifting the leading ADAPTABILITY sentence to paragraph b. would place the task of designing a potentially dynamic portfolio that is somehow optimized in consideration of a much higher CO_2 adder trajectory within a paragraph where the

tendency, in contrast, may be 1) to focus on portfolios that appear optimal given a relatively low base case CO_2 adder, and then 2) to observe how those portfolios would perform if in fact higher adders come into being and the portfolios aren't altered. As comprising a substantially different investigation, and contrary to the suggestion made by some parties in the January 3, 2008, workshop, the ADAPTABILITY matter calls for a separate guideline paragraph.

TRIGGER POINT ANALYSIS: The following hypothetical table illustrates a point to be developed later in this section.

Stochastic Mean PVRR (Million $) for the Preferred Portfolio and Two "Trigger-Point" Portfolios

Portfolio↓ / Adder→	$8 (Base Case)	$15 (Trigger-Point)	$38	$61
Trigger Portfolio #1	22,000	23,900	26,100	30,800
Preferred Portfolio	20,000	24,500	27,000	32,000
Trigger Portfolio #2	20,200	23,900	25,000	29,500

OBSERVATION: While the two candidate trigger-point portfolios have identical performances at the $15 trigger-point CO_2 adder level, they have quite different expected costs at the other adder levels. Possessing the knowledge that some trigger-point-identified alternative portfolio would perform better than the preferred portfolio at CO_2 adder levels modestly above the base case level is insufficient to the task of determining if in fact the alternative represents a superior portfolio. More than anything, that determination requires an understanding of how much more the alternative would cost under baseline scenario conditions. A decision maker might well be willing to pay a modestly larger amount for the alternative portfolio in the event that base case conditions prevail than it would have paid for the "preferred" portfolio under those same conditions -- provided there is the promise of reaping substantial savings from adopting the alternative portfolio in the event of more stringent, trigger-point conditions. An understanding of how the alternative portfolio would perform at more stringent CO_2 regulations would also be useful.

RELEVANCE TO THE ISSUE AT HAND: We should not delete the sentence/requirement within the proposed CO_2 RISK ADAPTABILITY guideline paragraph that calls for the utility to "compare its [i.e., the adaptable portfolio's] cost and risks with those of the preferred portfolio in the contexts of: 1) The base case scenario itself…." To be able to select an "adaptable" portfolio over the ostensibly "preferred" portfolio requires knowing how the adaptable portfolio's cost and risk performances, given base case CO_2 regulations, would compare with the performances of the "preferred" portfolio under those same conditions.

CO_2 RISK ADAPTABILITY: The following three tables were constructed to illustrate what would be key modeling results pursuant to this paragraph of the proposed guideline.

CO_2 Cost Adder Level Time Paths ($/Ton, 2008 Dollars)

Year↓ / Adder I.D.→	$8 (Base Case)	$61	**"Adverse Step-Up"**
2010	**$4.15**	$4.15	**$4.15**
2013	**$8.78**	$8.78	**$8.78**
2017	**$9.43**	$71.85	**$9.43**
2018	$9.60	$73.15	**$88**
2020	$9.95	$75.82	**$92**
2026	$11.13	$84.78	**$100**

Note: $8 and $61 columns replicate the figures from page 20 of PacifiCorp's 2007 IRP Appendix.

Stochastic Mean PVRR (Million $) by Cap & Trade Equivalent CO_2 Adder Level

Portfolio↓ / Adder →	$8 (Base Case)	$15	$61	Adverse Step-Up
Preferred Portfolio	20,000	24,500	32,000	50,000
Trigger Portfolio #2	20,200	23,900	29,500	45,000
Flexible (Early Mkt. Purch.)	21,000	24,700	29,600	40,000
IGCC (Add Sequest. Later)	23,000	25,000	29,000	39,000
Nuclear (Near-Term)	25,000	25,500	28,000	37,500

Stochastic Upper-Tail Mean PVRR (Million $) by Cap & Trade Equivalent CO_2 Adder Level

Portfolio↓ / Adder →	$8 (Base Case)	$15	$61	Adverse Step-Up
Preferred Portfolio	65,000	67,500	85,000	90,000
Trigger Portfolio #2	65,500	66,500	83,500	85,000
Flexible (Early Mkt. Purch.)	68,000	70,000	75,000	77,000
IGCC (Add Sequest. Later)	67,000	70,000	72,000	75,000
Nuclear (Near-Term)	66,000	69,500	71,000	73,000

OBSERVATIONS:

- The first step in this hypothetical exercise is for the utility to discern the timing and subsequent trajectory of "an unexpected future shift in the CO_2 compliance requirements that causes the utility to fundamentally change course – by abandoning or scaling back key operating or planned-for resources and substituting new resources." [The quoted material comes from the guideline sentence that the parties seemed agreeable to retain – albeit relocated to paragraph b. The $8 and $61 columns are shown to enable convenient comparisons.]
- *Shown* in the next step are the expected costs of three new portfolios that were expressly "designed to be more adaptable than the preferred portfolio in the event" of the stated CO_2 compliance up-shift." [The quoted material also comes from the same guideline sentence that the parties seemed agreeable to retain. The results of the "trigger point portfolio" are repeated for convenience.]
- The subsequent table displays the various portfolios' risks (as measured by their stochastic upper tail means) that were estimated and compiled for the various CO_2 adder scenarios.

- Conclusions: If the objective was to discern the lowest-cost/lowest-risk portfolio *assuming* the adverse step-up in CO_2 regulatory stringency, then the nuclear option would be the choice. But if the greater expectation would be for the base case CO_2 adder to prevail, but with the proviso that the adverse step-up be "insured" against, then the "Flexible" (Early Mkt. Purch.) portfolio would likely be the rational choice. Finally, taking risk into greater consideration could well lead to the choice of the portfolio with the early IGCC installation (to be followed, as appropriate, with CO_2 sequestration).

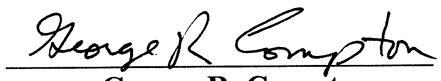
RELEVANCE TO THE ISSUE AT HAND:

- If the utility is to be able to "assess the cost, risks and benefits of a portfolio designed to be more adaptable than the preferred portfolio…" – as called for by the guideline sentence that the parties seemed agreeable to retain – then it would seem imperative for the utility to posit some associated adverse CO_2 regulatory trajectory and then estimate and compare the cost and risk of the new and preferred portfolios at least at the base case level and at potentially higher CO_2 adder levels, as well.
- To capture the multiple dimensions of the attempt to assess the costs and benefits of a more "risk adaptable" portfolio in the sense of imparting confidence that the portfolio achieves some "best cost/risk standard" (as called for by the guideline sentence which Staff believes should be retained), it would seem necessary that more than one complying portfolio be developed. Only then can a cost versus risk trade-off be displayed which would reveal the degree to which risk can be mitigated by accepting additional base costs.

ADDED BENEFITS OF RETAINING THE BROADER RISK ADAPTABILITY REQUIREMENT:

- While the other paragraphs of the CO_2 risk guideline call for the utility to estimate the expected costs of various portfolios in the event that very high CO_2 costs come to pass, those sections of the guideline do not require the utility to formulate a portfolio (or portfolios) that would somehow be optimal in the presence of such high adders. There seems to be considerable value in knowing what such an optimal portfolio would look like, and how much it also would cost under less stringent CO_2 regulatory environments, including the base case environment. One objective of the adaptability portion of the proposed guideline is to achieve that value.
- Rather than assume a very high CO_2 adder will begin in the relatively near future, it makes more sense to assume the base case level for some period, to be followed by a large ramp-up. By explicitly asking the utility to posit a large increase at some time in the future (relating to some CO_2 adder magnitude and timing that would entail, for instance, the effective abandonment of an existing or planned-for major production facility), this sub-guideline achieves a greater level of credibility and relevance than would be the case if the utility were merely required to develop a portfolio that was optimized for, say, an average future CO_2 adder of $100/ton (2008 dollars).
- The other paragraphs of the CO_2 risk guideline call for the utilities to produce what can be regarded as static candidate portfolios. No matter how high is the assumed CO_2 adder , the articulated portfolio (including the "trigger-point portfolio") remains whatever it was laid out to be at the outset. There is value in the utility developing one or more dynamic (in the sense of their being adaptable to a changing regulatory environment) portfolios, and showing their costs and risk metrics.

Dated at Salem, Oregon this 17th day of January, 2008



George R. Compton
Economic Research & Financial Analysis Division

OPUC Staff Recommendation: Final Draft (Mark-Up)

Guideline 8: Environmental Costs

a. BASE CASE AND OTHER COMPLIANCE SCENARIOS: The utility should construct a base-case scenario to reflect what it considers to be the most likely regulatory compliance future for carbon dioxide (CO_2), nitrogen oxides, sulfur oxides, and mercury emissions. The utility also should develop several compliance scenarios ranging from the present CO_2 regulatory level to the upper reaches of credible proposals by governing entities. Each compliance scenario should include a time profile of CO_2 compliance requirements. The utility should identify whether the basis of those requirements, or "costs," would be CO_2 taxes, a ban on certain types of resources, or CO_2 caps (with or without flexibility mechanisms such as allowance or credit trading or a safety valve). ~~, and potentially~~ The utility should recognize~~inge~~ upstream greenhouse gas emissions ~~relating to energy purchases)~~that would likely have a significant impact on its resource decisions. Each compliance scenario should maintain logical consistency, to the extent practicable, between the CO_2 regulatory requirements and other key inputs including, but not limited to, expected interactive effects with sales volumes and fuel and electricity prices.

b. TESTING THE PREFERRED AND ALTERNATIVE PORTFOLIOS AGAINST THE COMPLIANCE[%1] SCENARIOS: The utility should estimate, under each of the compliance scenarios, the present value of revenue requirement (PVRR) costs and risk measures, over at least twenty years, for both its preferred portfolio and a set of reasonable alternative portfolios. The utility should incorporate end-effect considerations in the analyses to allow for comparisons of portfolios containing resources with economic or physical lives that extend beyond the planning period.

The utility should also modify projected lifetimes as necessary to be consistent with the compliance scenario under analysis. In addition, the utility should include, if material, sensitivity analyses on a range of reasonably possible regulatory futures for nitrogen oxides, sulfur oxides, and mercury to further inform the preferred portfolio selection.

c. TRIGGER POINT ANALYSIS: The utility should identify at least one ~~minimum~~ CO_2 compliance ~~costs~~ "turning point" scenario which, if anticipated now, would lead to, or "trigger," the selection of a portfolio of resources that is substantially different from the preferred portfolio. The utility should develop a substitute portfolio appropriate for this trigger point scenario and compare the substitute portfolio's expected cost and risk performance to that of the preferred portfolio -- under the base case and each of the above CO_2 compliance scenarios. The utility should provide its assessment of whether a CO_2 regulatory future that is equally or more stringent than the identified trigger point will be mandated.

d. CO_2 RISK ADAPTABILITY: The utility should assess the cost, risks and benefits of at least two portfolios ~~designed~~that use different strategies and technologies to be more adaptable than the preferred portfolio in the event of an unexpected future shift in the CO_2 compliance requirements that causes the utility to fundamentally change course – by abandoning or scaling back key operating or planned-for resources and substituting new resources. The utility should employ a best cost/risk standard in ~~design~~formulating the adaptable portfolio, and compare its cost and risks with those of the preferred portfolio in the contexts of: 1) The base case scenario itself, and 2) the as-shifted CO_2 compliance time profile that would cause the course change. The

utility should describe the timing and magnitudes of the new CO_2 requirements that would elicit the indicated portfolio modifications and provide an assessment of such a CO_2 regulatory shift taking place. ~~The utility should include the time periods required for site acquisition, engineering, and construction in the characterizations of the preferred and the adaptable portfolio.~~

e. OREGON COMPLIANCE PORTFOLIO: If none of the above portfolios is consistent with Oregon energy policies (including state goals for reducing greenhouse gas emissions) as they are applied to the utility, the utility should construct the best cost/risk portfolio that achieves that consistency, present its cost and risk parameters, and compare them to those of the preferred and alternative portfolios.

OPUC Staff Recommendation: Final Draft (1/17/08)

Guideline 8: Environmental Costs

a. BASE CASE AND OTHER COMPLIANCE SCENARIOS: The utility should construct a base-case scenario to reflect what it considers to be the most likely regulatory compliance future for carbon dioxide (CO_2), nitrogen oxides, sulfur oxides, and mercury emissions. The utility also should develop several compliance scenarios ranging from the present CO_2 regulatory level to the upper reaches of credible proposals by governing entities. Each compliance scenario should include a time profile of CO_2 compliance requirements. The utility should identify whether the basis of those requirements, or "costs," would be CO_2 taxes, a ban on certain types of resources, or CO_2 caps (with or without flexibility mechanisms such as allowance or credit trading or a safety valve). The utility should recognize upstream greenhouse gas emissions that would likely have a significant impact on its resource decisions. Each compliance scenario should maintain logical consistency, to the extent practicable, between the CO_2 regulatory requirements and other key inputs including, but not limited to, expected interactive effects with sales volumes and fuel and electricity prices.

b. TESTING THE PREFERRED AND ALTERNATIVE PORTFOLIOS AGAINST THE COMPLIANCE SCENARIOS: The utility should estimate, under each of the compliance scenarios, the present value of revenue requirement (PVRR) costs and risk measures, over at least twenty years, for both its preferred portfolio and a set of reasonable alternative portfolios. The utility should incorporate end-effect considerations in the analyses to allow for comparisons of portfolios containing resources with economic or physical lives that extend beyond the planning period. The utility should also modify projected lifetimes as necessary to be consistent with the compliance scenario under analysis. In addition, the utility should include, if material, sensitivity analyses on a range of reasonably possible regulatory futures for nitrogen oxides, sulfur oxides, and mercury to further inform the preferred portfolio selection.

c. TRIGGER POINT ANALYSIS: The utility should identify at least one CO_2 compliance "turning point" scenario which, if anticipated now, would lead to, or "trigger," the selection of a portfolio of resources that is substantially different from the preferred portfolio. The utility should develop a substitute portfolio appropriate for this trigger point scenario and compare the substitute portfolio's expected cost and risk performance to that of the preferred portfolio -- under the base case and each of the above CO_2 compliance scenarios. The utility should provide its assessment of whether a CO_2 regulatory future that is equally or more stringent than the identified trigger point will be mandated.

d. CO_2 RISK ADAPTABILITY: The utility should assess the cost, risks and benefits of at least two portfolios that use different strategies and technologies to be more adaptable than the preferred portfolio in the event of an unexpected future shift in the CO_2 compliance requirements that causes the utility to fundamentally change course – by abandoning or scaling back key operating or planned-for resources and substituting new resources. The utility should employ a best cost/risk standard in formulating the adaptable portfolio, and compare its cost and risks with those of the preferred portfolio in the contexts of: 1) The base case scenario itself, and 2) the as-shifted CO_2 compliance time profile that would cause the course change. The utility should describe the timing and magnitudes of the new CO_2 requirements that would elicit the indicated portfolio modifications and provide an assessment of such a CO_2 regulatory shift taking place.

e. OREGON COMPLIANCE PORTFOLIO: If none of the above portfolios is consistent with Oregon energy policies (including state goals for reducing greenhouse gas emissions) as they are applied to the utility, the utility should construct the best cost/risk portfolio that achieves that consistency, present its cost and risk parameters, and compare them to those of the preferred and alternative portfolios.

CERTIFICATE OF SERVICE

UM 1302

I certify that I have this day served the foregoing document upon all parties of record in this proceeding by delivering a copy in person or by mailing a copy properly addressed with first class postage prepaid, or by electronic mail pursuant to OAR 860-13-0070, to the following parties or attorneys of parties.

Dated at Salem, Oregon, this 17th day of January, 2008.

Lois Meerdink

Lois Meerdink
Public Utility Commission
Regulatory Operations
550 Capitol St NE Ste 215
Salem, Oregon 97301-2551
Telephone: (503) 378-5763

UM 1302
Service List (Parties)

CABLE HUSTON BENEDICT HAAGENSEN & LLOYD LLP	
EDWARD A FINKLEA	1001 SW 5TH - STE 2000 PORTLAND OR 97204 efinklea@cablehuston.com
CHAD M STOKES	1001 SW 5TH - STE 2000 PORTLAND OR 97204 cstokes@cablehuston.com
CASCADE NATURAL GAS	
JON T STOLTZ SR VICE PRESIDENT--REGULATORY & GAS	PO BOX 24464 SEATTLE WA 98124 jstoltz@cngc.com
CITIZENS' UTILITY BOARD OF OREGON	
LOWREY R BROWN UTILITY ANALYST	610 SW BROADWAY - STE 308 PORTLAND OR 97205 lowrey@oregoncub.org
JASON EISDORFER ENERGY PROGRAM DIRECTOR	610 SW BROADWAY STE 308 PORTLAND OR 97205 jason@oregoncub.org
ROBERT JENKS	610 SW BROADWAY STE 308 PORTLAND OR 97205 bob@oregoncub.org
DAVISON VAN CLEVE	
IRION A SANGER ASSOCIATE ATTORNEY	333 SW TAYLOR - STE 400 PORTLAND OR 97204 ias@dvclaw.com
DAVISON VAN CLEVE PC	
MELINDA J DAVISON	333 SW TAYLOR - STE 400 PORTLAND OR 97204 mail@dvclaw.com
DEPARTMENT OF JUSTICE	
STEPHANIE S ANDRUS ASSISTANT ATTORNEY GENERAL	REGULATED UTILITY & BUSINESS SECTION 1162 COURT ST NE SALEM OR 97301-4096 stephanie.andrus@state.or.us

DAVID HATTON ASSISTANT ATTORNEY GENERAL	REGULATED UTILITY & BUSINESS SECTION 1162 COURT ST NE SALEM OR 97301-4096 david.hatton@state.or.us
JANET L PREWITT ASST AG	1162 COURT ST NE SALEM OR 97301-4096 janet.prewitt@doj.state.or.us
ECUMENICAL MINISTRIES OF OREGON	
JAMES EDELSON	415 NE MIRIMAR PL PORTLAND OR 97232 edelson8@comcast.net
EMO ENVIRONMENTAL MINISTRIES DIRECTOR	
JENNY HOLMES	inec@emoregon.org
ESLER STEPHENS & BUCKLEY	
JOHN W STEPHENS	888 SW FIFTH AVE STE 700 PORTLAND OR 97204-2021 stephens@eslerstephens.com
IDAHO POWER COMPANY	
RIC GALE VP - REGULATORY AFFAIRS	PO BOX 70 BOISE ID 83707 rgale@idahopower.com
BARTON L KLINE SENIOR ATTORNEY	PO BOX 70 BOISE ID 83707-0070 bkline@idahopower.com
MONICA B MOEN ATTORNEY	PO BOX 70 BOISE ID 83707-0070 mmoen@idahopower.com
LISA D NORDSTROM ATTORNEY	PO BOX 70 BOISE ID 83707-0070 lnordstrom@idahopower.com
MICHAEL YOUNGBLOOD SENIOR PRICING ANALYST	PO BOX 70 BOISE ID 83707 myoungblood@idahopower.com

MCDOWELL & RACKNER PC WENDY MCINDOO	520 SW 6TH AVE STE 830 PORTLAND OR 97204 wendy@mcd-law.com
LISA F RACKNER ATTORNEY	520 SW SIXTH AVENUE STE 830 PORTLAND OR 97204 lisa@mcd-law.com
NORTHWEST ENERGY COALITION STEVEN WEISS SR POLICY ASSOCIATE	4422 OREGON TRAIL CT NE SALEM OR 97305 steve@nwenergy.org
NORTHWEST INDUSTRIAL GAS USERS PAULA E PYRON EXECUTIVE DIRECTOR	4113 WOLF BERRY CT LAKE OSWEGO OR 97035-1827 ppyron@nwigu.org
NORTHWEST NATURAL ELISA M LARSON ASSOCIATE COUNSEL	220 NW 2ND AVE PORTLAND OR 97209 eml@nwnatural.com
INARA K SCOTT REGULATORY AFFAIRS MANAGER	220 NW 2ND AVE PORTLAND OR 97209 iks@nwnatural.com
OREGON DEPARTMENT OF ENERGY PHILIP H CARVER SENIOR POLICY ANALYST	625 MARION ST NE STE 1 SALEM OR 97301-3742 philip.h.carver@state.or.us
PACIFIC POWER & LIGHT MICHELLE R MISHOE LEGAL COUNSEL	825 NE MULTNOMAH STE 1800 PORTLAND OR 97232 michelle.mishoe@pacificorp.com
PAUL M WRIGLEY MANAGER - REGULATION	825 NE MULTNOMAH ST, STE 2000 PORTLAND OR 97232 paul.wrigley@pacificorp.com
PACIFICORP KYLE L DAVIS MGR ENV POLICY & STRATEGY	825 NE MULTNOMAH PORTLAND OR 97232 kyle.l.davis@pacificorp.com

GREG N DUVALL DIRECTOR - IRP & REGULATORY STRATEGY	825 NE MULTNOMAH - STE 600 PORTLAND OR 97232 greg.duvall@pacificorp.com
NATALIE HOCKEN VICE PRESIDENT & GENERAL COUNSEL	825 NE MULTNOMAH SUITE 2000 PORTLAND OR 97232 natalie.hocken@pacificorp.com
PACIFICORP OREGON DOCKETS	
OREGON DOCKETS	825 NE MULTNOMAH ST STE 2000 PORTLAND OR 97232 oregondockets@pacificorp.com
PERKINS COIE LLP	
JAMES M VAN NOSTRAND	1120 NW COUCH STREET, 10TH FLOOR PORTLAND OR 97209-4128 jvannostrand@perkinscoie.com
PORTLAND GENERAL ELECTRIC	
PATRICK HAGER RATES & REGULATORY AFFAIRS	121 SW SALMON ST 1WTC0702 PORTLAND OR 97204 pge.opuc.filings@pgn.com
PORTLAND GENERAL ELECTRIC COMPANY	
J RICHARD GEORGE	121 SW SALMON ST 1WTC1301 PORTLAND OR 97204 richard.george@pgn.com
PUBLIC UTILITY COMMISSION OF OREGON	
GEORGE COMPTON	PO BOX 2148 SALEM OR 97308-2148 george.compton@state.or.us
RENEWABLE NORTHWEST PROJECT	
ANN ENGLISH GRAVATT	917 SW OAK - STE 303 PORTLAND OR 97205 ann@rnp.org
JESSE JENKINS	917 SW OAK ST STE 303 PORTLAND OR 97205 jesse@rnp.org