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April 24, 2008

Via Electronic Filing and U.S. Mail

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- **REBUTTAL TESTIMONY OF STEPHEN QUENNOZ (PGE/300-301/BOARDMAN OPERATIONS/REPLACEMENT POWER COSTS)**

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**BEFORE THE PUBLIC UTILITY COMMISSION
OF THE STATE OF OREGON**

UE-196

Boardman Deferral Amortization

PORTLAND GENERAL ELECTRIC COMPANY

Rebuttal Testimony and Exhibits



Portland General Electric

April 24, 2008

UE 196 / PGE / 300
Quennoz

**BEFORE THE PUBLIC UTILITY COMMISSION
OF THE STATE OF OREGON**

**Boardman Operations / Replacement
Power Costs**

PORTLAND GENERAL ELECTRIC COMPANY

Rebuttal Testimony and Exhibits of

Stephen Quennoz



Portland General Electric

April 24, 2008

Table of Contents

I.	Introduction	1
II.	Staff Issues	2
III.	CUB Issues	5
IV.	ICNU Issues	9
V.	Conclusions	17

I. Introduction

1 **Q. Please state your name and position with Portland General Electric (PGE).**

2 A. My name is Stephen Quennoz. My position is Vice President, Power Supply. My
3 qualifications are in PGE Exhibit 100, Section VI.

4 **Q. What is the purpose of your testimony?**

5 A. The purpose of my testimony is to address the issues identified by the Industrial Customers
6 of Northwest Utilities (ICNU), the Citizens' Utility Board (CUB), and the OPUC Staff
7 (Staff) in relation to PGE's proposal to amortize the Boardman deferral that was authorized
8 in OPUC Docket No. UM 1234. Specifically, I rebut CUB's and ICNU's concerns over the
9 risk associated with PGE's 2000 upgrade of Boardman's low pressure turbines and its
10 relationship to the October 23, 2005 - February 5, 2006 outage (the outage). The 2000
11 upgrade was a reasonable, cost-effective measure to save costs for customers. Detailed
12 explanations of the outage were reported in the Root Cause Analyses provided as PGE
13 Exhibits 105C-A, 105C-B, and 105C-C. Finally, PGE took all reasonable and prudent
14 measures to correct the outage as quickly as possible.

15 **Q. How is your testimony organized?**

16 A. In Section II, I comment on Staff's testimony. In Section III, I respond to CUB's issues and
17 in Section IV, I address ICNU's issues. In Section V, I present my conclusions.

II. Staff Issues

1 **Q. Please summarize Staff's conclusions.**

2 A. Staff concluded that PGE "did not behave imprudently and that the Boardman excess power
3 costs deferral amortization should be allowed" with one condition (Staff 100 at p. 18. lines
4 15-16).

5 **Q. Do you agree with Staff's testimony and conclusions?**

6 A. PGE agrees with most of Staff's testimony and conclusions. In particular, we agree with
7 Staff that:

- 8 • The rotor crack was not caused by PGE operations at Boardman;
- 9 • PGE's efforts to repair the rotor were prudent; and
- 10 • PGE should be allowed to amortize the full amount that it was allowed to defer (which
11 represented about 62% of our total excess power costs from the outage).

12 **Q. What issue or issues has Staff raised with which you disagree?**

13 A. PGE disagrees with the one condition noted in Staff's conclusions. This relates to Staff's
14 view that the outage was a scenario risk but that "if a similar outage were to happen again, it
15 might well be viewed as a predictable stochastic risk event" (Staff 100 at 18, lines 11-12).

16 **Q. Why do you disagree with this position?**

17 A. Staff's position is based on the possible change in affordability of risk mitigating measures
18 "that would defray some or all of the excess power costs should this or a similar event
19 happen again" (Staff 100 at p. 18, lines 9-10). PGE disagrees with this view because it
20 assumes that a number of variables are predictable and quantifiable. These variables would
21 include:

- 1 • The difference between the cost of producing power at Boardman and the wholesale
2 market electric price.
- 3 • The availability of cost-effective hedges.
- 4 • The cause and probability of subsequent outages.
- 5 • The expected value of a spare rotor, given the cost and probability of use.

6 PGE believes there is too much uncertainty to assume that the risk of a future outage is
7 stochastic. In addition, if future outage risks were treated as stochastic, this would need to be
8 reflected in the forced outage calculations for PGE's Annual Update Tariff filings. At
9 present, most risk mitigation measures are too costly relative to the potential benefit.

10 **Q. What does PGE propose instead?**

11 A. PGE agrees that we should continue to monitor the availability of risk mitigation measures
12 and consider adoption of those that become reasonable and prudent. In fact, PGE has
13 already undertaken several measures to avoid future outages, including:

- 14 • We retained independent consultants to conduct alignment checks, measure turbine
15 component movement, and train PGE personnel on rotating equipment alignment
16 theory and application.
- 17 • We tested the foundation and verified that there was no "soft foot."
- 18 • We plan to uncouple each segment of the turbine generator train to make alignment
19 measurements. This will be done in either or both the 2008 and 2009 planned
20 maintenance outages. We are gathering information to optimize alignment during the
21 2009 maintenance outage, if needed. Based on this same information gathering, we
22 will correct any significant alignment issues during the 2008 maintenance outage.
- 23 • We inspected the crack location area on the other low-pressure turbine (LP 2).

- 1 • We ‘shot-peened’ locations on both LP 1 and LP 2 to reduce the potential for crack
2 initiation. ‘Shot-peening’ increases resistance to cracking at the surface.
- 3 • We examined the governor ends of LP 1 and LP 2, visually and using liquid dye
4 penetrant testing, after one year of operation. The area was free of linear indications.
5 We will continue these examinations on a routine basis.

6 **Q. Are all of these additional measures normal practice within the industry?**

7 A. No. While some measures may be conducted at some other plants, I believe that we are
8 operating above and beyond the industry norm.

III. CUB Issues

1 **Q. What is CUB's position regarding the Boardman outage?**

2 A. CUB's principal assertions are that "PGE purchased untested, experimental technology" for
3 the 2000 Boardman low-pressure turbine upgrade and that PGE's lack of adopting
4 appropriate measures to mitigate the associated risks "directly contributed to the financial
5 impact associated with the outage" (CUB 100 at p. 1, lines 6-11). Consequently, CUB
6 asserts "there are no grounds to charge customers for the costs of the 2005-2006 Boardman
7 outage" (CUB 100 at p. 1, lines 12-13).

8 **Q. What is the basis for CUB's assertion that the LP 1 turbine was "untested,
9 experimental technology" when purchased?**

10 A. PGE's contract with Siemens¹ for purchase of the LP 1 and LP 2 turbines characterized the
11 turbines as "experimental." That contract language is the sole basis for CUB's
12 characterization.

13 **Q. Why did the contract characterize the LP 1 and LP 2 turbines as "experimental" in its
14 purchase contract with Siemens?**

15 A. The contract characterized the turbines as "experimental" because LP 1 and LP 2 were the
16 first turbines in the BB271 fleet to feature last row blades of particular size and shape. PGE
17 anticipated that other purchasers of BB271 turbines would choose this size and shape of
18 last-row blades, and so negotiated a \$200,000 per sale rebate from Siemens for new sales of
19 turbines with this blade configuration.

¹ PGE began negotiations for the low-pressure turbine upgrade with Westinghouse, which then merged with Siemens to form Siemens-Westinghouse. Now the relevant firm is simply Siemens. The low-pressure turbine upgrade was done under a contract with Siemens-Westinghouse, provided in PGE's Response to ICNU Data Request No. 012. In my testimony, I will simply refer to Siemens, rather than distinguishing between Westinghouse, Siemens-Westinghouse, and Siemens.

1 **Q. Why was it important to PGE to upgrade the last-row blades in the LP 1 and LP 2**
2 **turbines?**

3 A. Before the upgrade, the smaller last-row blades limited production of electricity at
4 Boardman. The additional length and modified shape of the upgraded last-row blades was
5 the primary factor in increasing turbine efficiency and output from the LP 1 and LP 2
6 turbines, thereby reducing power costs.

7 **Q. Other than the last-row blades, were any features of the LP 1 and LP 2 turbines**
8 **“experimental” at the time of the upgrade?**

9 A. No. Other than the last-row blades, the only other significant upgrade to the turbines was a
10 switch from non-ruggedized to ruggedized shafts. Ruggedized shafts are an industry norm
11 and were common in low-pressure steam turbines at the time of the upgrade.

12 **Q. Is there any evidence linking the “experimental” last-row blades to the crack in the LP**
13 **1 turbine?**

14 A. No. None of the root cause analyses suggest any link between the design of the last-row
15 blades and cracking in the turbine shaft. The last-row blades are a separate part of the LP 1
16 turbine and are not located at the site of crack initiation, which is on the shaft.

17 **Q. On Page 6 of CUB Exhibit 100, CUB implies that PGE misrepresented the upgrade in**
18 **its UE 115 filing. Is this an accurate characterization?**

19 A. No. PGE accurately described the costs and expected benefits of the new low-pressure
20 turbines. Subsequent to the upgrade, increased output of the plant justified the investment.
21 Based on PGE’s response to a data request, Staff notes that “customers have benefited by
22 more than \$28 million from 2001 through 2007 as a result of the upgrade and customers
23 continue to save approximately \$6.8 million annually on power costs.” (Staff 100 at p. 15,

1 lines 14-17) These benefits more than offset the cost of the turbine installation and the
2 deferral amount that is the subject of this docket.

3 **Q. Did CUB challenge the upgrade in UE 115?**

4 A. PGE is not aware of any challenge by CUB to the upgrade in UE 115.

5 **Q. CUB asserts that its Exhibit 5, a one-page PGE summary document that was the basis**
6 **for PGE internal approval of the low-pressure turbine upgrade, demonstrates that**
7 **PGE failed to perform adequate due diligence. Is this characterization accurate?**

8 A. No. CUB Exhibit 5 summarizes PGE's conclusions about the projected power cost savings
9 that PGE would achieve by upgrading the LP 1 and LP 2 turbines. The summary document
10 indicates that the expected benefits greatly outweighed expected costs. As discussed above,
11 PGE has achieved significant power cost savings as a result of the LP 1 and LP 2 upgrade.
12 CUB Exhibit 5 accurately summarized the rationale behind PGE's decision to upgrade to
13 more efficient, cost-saving turbine technology.

14 **Q. CUB states that "PGE acknowledges that a forced outage is the largest financial risk,"**
15 **(CUB 100 at p. 7, line 18) citing a PGE-Enron document stating that "This risk, while**
16 **not quantifiable, could also have the largest impact on the profitability of the project."**
17 **(CUB 106 at p. 3). Is this surprising?**

18 A. No. A forced outage of a generating unit is always a major risk. An outage at Boardman,
19 whatever the cause, would affect the economics of the project.

20 **Q. CUB then states that PGE "utterly failed to mitigate that risk in any meaningful way."**
21 **(CUB 100 at p. 10, line 15). Is CUB's last statement accurate?**

22 A. No. PGE mitigated risk through contractual provisions with Siemens which included:

- 23
- A 10-year equipment warranty;

- 1 • An output guarantee;
- 2 • Liquidated damages in the event of equipment failure during the first year of
- 3 operation (up to a ceiling amount); and
- 4 • Liquidated damages in the case of delay.

5 **Q. Did PGE take any additional steps to guard against forced outages resulting failure of**
6 **the “experimental” last-row blades?**

7 A. Yes. After monitoring the wear on the last-row blades, PGE negotiated with Siemens to
8 produce and retain spare blade forgings, so that PGE could quickly replace the last-row
9 blades in the event that they failed. The last-row blades have not failed, and are still
10 operating, but Siemens continues to hold spare blade forgings for PGE to guard against
11 protracted outages.

12 **Q. Do the facts in this case support CUB’s characterization of PGE’s decision to install**
13 **the new low-pressure rotors in 2000 as “unfathomable” (CUB 100 at p. 6, line 18)?**

14 A. No. Under the “worst case” scenario that occurred, equipment failure and associated
15 replacement power costs, customers still benefit from the decision to install the new
16 low-pressure turbines even if the Commission authorizes collection of the full deferral
17 amount that is the subject of this proceeding. Given that customers gain even under the
18 “worst case” scenario, the expected net benefits to customers associated with the
19 low-pressure turbine upgrade were strongly positive and the decision was prudent.

IV. ICNU Issues

1 **Q. Is the purpose of this section of your testimony to rebut various assertions made by**
2 **ICNU Witness John Martin in ICNU Exhibits 100-109?**

3 A. Yes.

4 **Q. First, are there any statements by Mr. Martin with which you agree?**

5 A. Yes. PGE agrees with Mr. Martin's conclusions that PGE was not negligent in operating the
6 LP 1 turbine. (ICNU 100 at p. 15). PGE also agrees with Mr. Martin that PGE's operations
7 of the Boardman plant were not a major cause of the LP 1 rotor crack. (Deposition of John
8 Martin ("Martin Dep."), 34:8-18).²

9 **Q. Please summarize the ICNU assertions that you will rebut.**

10 A. ICNU's assertions that PGE disagrees with include:

- 11 • The 2000 low-pressure turbine upgrade was very experimental in nature and PGE
12 failed to take appropriate risk mitigation measures.
- 13 • PGE did not adequately monitor Siemens' installation and maintenance of the
14 low-pressure turbine that failed (LP 1).
- 15 • The root cause analyses were incomplete and made by biased parties.
- 16 • PGE failed to take appropriate measures against Siemens after the LP 1 rotor cracked.
- 17 • PGE operated Boardman at higher than the design capacity.
- 18 • PGE did not investigate whether Siemens was responsible for loose or missing
19 fasteners on the supporting structure for bearings 2 and 3.

² Excerpts from the April 1, 2008, Deposition of John Martin are included in PGE Exhibit 301. The pages in PGE Exhibit 301 are marked confidential, but they should not be treated as such. To expedite the process of producing a transcript of the Martin Deposition, substantially all pages were marked confidential, with the understanding that PGE could later re-designate some of the pages as non-confidential. PGE is following this understanding in re-designating as not confidential the Martin Deposition pages included in PGE Exhibit 301.

1 **Q. ICNU criticizes PGE's decision to install the new low pressure turbines, stating that**
2 **"most utilities do not want to be test-beds for new equipment, due to the inherent risks**
3 **involved." (ICNU 100 at p. 18, lines 8-9). Does this characterization exaggerate the**
4 **experimental nature of the low-pressure turbines installed at Boardman in 2000?**

5 A. Yes. As with CUB's testimony, Martin admits that his only basis for characterizing the LP
6 1 and LP 2 turbines as "experimental" is PGE's purchase contract with Siemens. (ICNU
7 Response to PGE Data Request No. 001 and Martin Dep., 53:10-53:19). Martin did not
8 review the turbine design and had no knowledge of what design modifications were made,
9 or whether those modifications were linked to the LP 1 rotor crack. (Martin Dep.,
10 53:20-57:25). As discussed above, the only "experimental" feature of the upgraded turbines
11 was the last-row blades, which are not the part of the LP 1 turbine that failed. Because those
12 blades were modified, Siemens did agree to compensate PGE for some of the research and
13 development costs if it sold similar turbines to other entities, and PGE did eventually receive
14 approximately \$1.4 million from Siemens. The moderate level of compensation for research
15 and development costs reflects the fact that the new Boardman low pressure turbines were
16 only moderately different from previous models.

17 **Q. Why did PGE install the new low-pressure turbines?**

18 A. PGE installed the new low-pressure turbines to save power costs for customers. The
19 expected increased efficiency and output greatly outweighed the expected costs. As stated
20 in Section III, even with the failure of LP 1 and collection by PGE of the deferral amount
21 that is the subject of this docket, customers will benefit from the decision to install the new
22 low-pressure turbines. In Section III, I also discussed how PGE mitigated the risk to the
23 extent possible through contractual provisions.

1 **Q. On Page 20 of ICNU Exhibit 100, ICNU states that PGE could have procured**
2 **insurance to cover consequential damages associated with equipment failure, stating**
3 **that “These types of risk mitigation are available in the marketplace.” To your**
4 **knowledge, is this a correct statement?**

5 A. No. As noted in Section III above, PGE does not know of any cost-effective products
6 available to cover consequential damages. Although Mr. Martin stated in his testimony that
7 insurance to cover an outage like this one is “available in the marketplace,” he clarified and
8 retreated from that statement in his deposition. Martin testified that his written testimony
9 referred to independent projects, not to utility generation facilities like Boardman. With
10 respect to facilities like Boardman, Martin testified that he does not know whether insurance
11 that would cover the cost of replacement power in the event of an outage is available to
12 utilities, or what the cost of such insurance would be if it were available. He also testified
13 that he is not aware of any instance in which a utility has purchased insurance that would
14 cover the cost of replacement power in the event of an outage. (Martin Dep., 59:9-62:23).

15 Mr. Martin also testified that PGE could have contracted for standby power to cover the
16 risk of possible outage. (ICNU 100 at p. 20, lines 13-15). Martin clarified in his deposition
17 that he believes that PGE should always purchase standby power to backup all of its
18 obligations to deliver power, regardless of turbine upgrades, but that he does not know
19 whether ICNU endorses that view. (Martin Dep., 65:8-67:15). While PGE could backup all
20 of its generation capacity with standby power contracts, such an approach would be
21 extremely expensive. Even with the unforeseen “worst case” outage, the LP 1 and LP 2
22 upgrade still confers benefits on customers.

23 **Q. What other risk mitigation measures are available for plant outages?**

1 A. There are very few additional risk mitigating measures available, and those that potentially
2 exist would be very expensive. In PGE's Response to OPUC Data Request No. 003, we
3 stated:

4 PGE does not have, nor has it ever had, business interruption or
5 consequential damage insurance for any of the thermal plants such as
6 Boardman. As stated in PGE's Response to OPUC Staff Data
7 Request 014 in Docket UM 1234, "To PGE's knowledge, there are
8 no equipment manufacturers that will enter into a contract that
9 contains penalties for consequential damages. Discussions with
10 suppliers have indicated that the selling prices would rise to
11 prohibitive levels, if a sale could be negotiated, with coverage of
12 consequential damages."

13 Mr. Martin testified that he is not aware of any contract between a utility and an
14 equipment manufacturer that would allow the utility to recover consequential damages like
15 power replacement costs. (Martin Dep. 47:16 – 50:17)

16 **Q. What does ICNU assert about independent monitoring of Siemens' installation and**
17 **monitoring of the turbines?**

18 A. ICNU states that "PGE did not provide for independent quality assurance and quality control
19 to monitor Siemens' installation of the new equipment" and "PGE did not provide for
20 independent quality assurance and quality control to monitor Siemens' maintenance of the
21 turbines." (ICNU 100 at p. 4, lines 15-19). Martin clarified in his deposition that his
22 reference to "independent" monitoring could refer to either monitoring by PGE itself, or by
23 a third party. (Martin Dep., 72:15-72:18).

24 **Q. Are these statements accurate?**

25 A. No. PGE staff provided independent quality assurance and quality control of Siemens'
26 manufacturing, installation, and maintenance of both the LP turbines installed in 2000 and

1 the HP/IP turbine installed in 2004. PGE personnel assigned to monitor Siemens' work
2 were regularly at the Boardman site during turbine installation and maintenance. PGE hired
3 Siemens, an industry leader, to manufacture, install, and maintain the LP 1 and LP 2
4 turbines, but PGE has monitored Siemens' work throughout the upgrade.

5 **Q. ICNU characterizes the PGE, Siemens, and Alstom root cause analyses as incomplete,**
6 **stating that the "PGE Boardman LP 1 Rotor Failure Investigation' was not a root**
7 **cause analysis" (ICNU 100 at p. 13, lines 8-9) and "Both root cause analyses, and**
8 **PGE's report, fail to address why the rotor was misaligned, and who was responsible."**
9 **(ICNU 100 at p. 14, lines 7-8). Is this characterization of incompleteness accurate?**

10 A. No. ICNU seems to discredit the root cause analyses because they do not reach conclusions
11 desired by ICNU. On Page 14 of ICNU Exhibit 100, ICNU lists other factors that, in
12 ICNU's view, should have been examined in the analyses. Some factors, such as design and
13 manufacturing, were considered and rejected as causes of the outage in the Root Cause
14 Analyses. Others, such as "business decisions" and "management" are simply too vague to
15 be meaningful; nowhere does Martin explain how further inquiries in those general areas
16 would help PGE learn why the LP 1 rotor cracked. PGE and two recognized experts,
17 Siemens and Alstom, each analyzed the factors they thought most relevant, and reached
18 reasonable conclusions based on their analyses.

19 **Q. On Page 13 of ICNU Exhibit 100, ICNU implies that the Siemens and Alstom root**
20 **cause analyses are biased because neither Siemens nor Alstom is really independent of**
21 **PGE. Could other entities have performed more reliable root cause analyses?**

22 A. No. Siemens and Alstom are the two entities best able to perform the analyses. Siemens is
23 the original equipment manufacturer (OEM) and Alstom performed the repairs. Thus, they

1 have more direct knowledge than other entities. In addition, both have very extensive
2 industry experience.

3 If anything, Siemens would be biased to find PGE at fault. They did not. Alstom, as a
4 competitor of Siemens, could be biased to find Siemens at fault. They did not. While it
5 would be more satisfying to find a “smoking gun,” failure to do so should not impugn the
6 integrity or technical ability of these firms. Any review or analysis that is commissioned by
7 an interested party – including Mr. Martin’s analysis paid for by ICNU – is subject to the
8 same generalized allegation of bias that ICNU makes here.

9 **Q. Does ICNU criticize PGE’s decision to have Alstom, rather than Siemens, perform the**
10 **repair work needed when the LP 1 rotor cracked?**

11 A. Yes. ICNU cites a letter from Siemens that states “PGE has taken a course of action outside
12 of the contract, and Siemens has advised PGE that, because of PGE’s actions, the contract
13 warranties can no longer apply.” (ICNU 109 at p. 1) ICNU uses this Siemens statement to
14 criticize PGE’s decision because having Alstom do the repair work led to Siemens denying
15 PGE’s warranty claim against Siemens for the cost of the LP 1 repairs. (ICNU 100 at p. 21)

16 **Q. Is ICNU’s criticism relevant to this proceeding?**

17 A. No. PGE is not asking for recovery of repair costs in this proceeding.

18 **Q. Why did PGE choose Alstom, rather than Siemens, to do the repair work?**

19 A. As I discussed in my direct testimony (PGE Exhibit 100), PGE chose Alstom because
20 Alstom was able to do the necessary repair work approximately one month faster than
21 Siemens. This substantially reduced the replacement power costs that are the basis for the
22 deferral amount, the disposition of which is the subject of this proceeding.

1 **Q. On Pages 20 and 21 of ICNU Exhibit 100, ICNU asserts that PGE's Response to ICNU**
2 **Data Request No. 031, was incorrect because the response stated that Siemens rejected**
3 **PGE's warranty claim because of the inconclusive root cause analyses, rather than**
4 **because PGE decided to have Alstom, rather than Siemens, perform the repair work.**
5 **Is ICNU correct?**

6 A. Yes. PGE corrected this error in its Response to ICNU Data Request No. 050 and its First
7 Supplemental Response to ICNU Data Request No. 031.

8 **Q. ICNU asserts that "The design output capacity of the steam turbine generator after the**
9 **2000 modifications to the low-pressure turbines was 580 MW. However, from 2000,**
10 **through the time of failure in 2005, Boardman consistently operated in excess of 580**
11 **MW," (ICNU 100 at p. 15, lines 4-7) and that, although operation at the higher load**
12 **should not have caused the failure, "Nevertheless, the higher load operation would**
13 **have caused the failure to appear sooner." Do you agree with ICNU's view?**

14 A. No. The industry standard is that turbines are designed to regularly operate at 105% of their
15 design maximum. Given the industry standard, the maximum operational level of
16 Boardman was 601 MW following the low-pressure turbine upgrade. PGE followed
17 industry practices in running Boardman at output levels somewhat higher than 580 MW
18 after the 2000 low-pressure turbine upgrade, but always lower than the 601 MW maximum
19 operation level. With the HP/IP turbine upgrade in 2004, the maximum operational level
20 increased. However, after the HP/IP upgrade, PGE always operated Boardman at levels less
21 than the new maximum operational level.

22 **Q. Has ICNU advocated running Boardman at output levels higher than the design**
23 **maximum?**

1 A. Yes. ICNU is aware of the industry practice of safely operating within maximum operation
2 levels above quoted “design maximums,” and in previous dockets has criticized PGE for not
3 operating more aggressively at higher levels. For example, in ICNU Exhibit 100 in Docket
4 UE 149, ICNU took the position that PGE’s power cost modeling for 2004 should assume
5 that Boardman could operate at a (gross) output level greater than 585 MW.

6 **Q. ICNU asserts that “Another very important question that should be investigated is**
7 **whether the loose and missing fasteners that were discovered by PGE in 2006 were**
8 **caused by Siemens during the low-pressure turbine replacement in 2000 and the HP/IP**
9 **turbine modifications in 2004.” (ICNU 100 at p. 16, line 22 through p. 17, line 1). Do**
10 **you agree with this assertion?**

11 A. No. PGE considered the possibility that Siemens removed the fasteners in 2000 or 2004
12 during the turbine upgrade work. However, none of the work that Siemens did would have
13 required removal of the fasteners and no evidence was found to indicate that Siemens did so.

V. Conclusions

1 **Q. Please summarize your conclusions.**

2 A. Based on Sections II, III, and IV above, I conclude the following:

- 3 • PGE operations did not cause the rotor crack, PGE's repair efforts were prudent, and
4 PGE should be allowed to amortize the full deferral amount.
- 5 • The risk of a future outage is not a stochastic event.
- 6 • PGE did not assume a huge technology risk in its decision to install the new
7 low-pressure turbines in 2000.
- 8 • PGE took the cost-effective measures available to mitigate the technology risk that
9 did exist to the extent possible.
- 10 • PGE installed the new turbines to reduce costs for customers, which is occurring,
11 even under the "worst case scenario" that has led to this proceeding.
- 12 • Independent of Siemens, PGE monitored all of Siemens' turbine installation and
13 maintenance work.
- 14 • Siemens and Alstom were the outside entities best qualified to perform root cause
15 analyses.
- 16 • PGE's decision to have Alstom, rather than Siemens, perform the LP 1 repair work,
17 saved approximately one month of replacement power costs, and Siemens related
18 warranty claim denial is not relevant to this proceeding.
- 19 • PGE did not operate Boardman at output levels higher than accepted industry
20 standards.

21 **Q. Does this conclude your testimony?**

22 A. Yes.

List of Exhibits

<u>PGE Exhibit</u>	<u>Description</u>
301	Excerpts from April 1, 2008 Deposition of John Martin

CERTIFICATE OF SERVICE

I hereby certify that I have this day caused **REBUTTAL TESTIMONY OF STEPHEN QUENNOZ (PGE/300-301/BOARDMAN OPERATIONS/REPLACEMENT POWER COSTS)** to be served by electronic mail to those parties whose email addresses appear on the attached service list, and by First Class US Mail, postage prepaid and properly addressed, to those parties on the attached service list who have not waived paper service from OPUC Docket No. UE 196.

Dated at Portland, Oregon, this 24th day of April 2008.



DOUGLAS C. TINGEY

SERVICE LIST

OPUC DOCKET # UE 196

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Steve Grove

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Description: UE 196 Rebuttal Testimony

Docket #: UE 196

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