

**BEFORE THE PUBLIC UTILITY COMMISSION  
OF OREGON**

**UE 196**

|                                      |   |                           |
|--------------------------------------|---|---------------------------|
| In the Matter of                     | ) |                           |
|                                      | ) |                           |
| PORTLAND GENERAL ELECTRIC            | ) |                           |
| COMPANY                              | ) | <b>REPLY BRIEF OF</b>     |
|                                      | ) | <b>APPLICANT PORTLAND</b> |
| Application to Amortize the Boardman | ) | <b>GENERAL ELECTRIC</b>   |
| Deferral.                            | ) | <b>COMPANY</b>            |
|                                      | ) |                           |

**I. INTRODUCTION**

Portland General Electric Company ("PGE") submits its Reply Brief in this amortization docket.

In their opening briefs, PGE and Staff addressed the various arguments raised in this docket by the Industrial Consumers of Northwest Utilities ("ICNU") and the Citizens Utility Board ("CUB"). Staff agreed with PGE that the Commission should allow PGE to amortize \$26.4 million in deferred expenses related to the cracked rotor in the LP1 turbine at the Boardman coal-fired power plant.

In its opening brief, ICNU repeated, with little variation, the arguments that it has made through four rounds of testimony in this matter. PGE has already addressed those arguments in testimony and in its opening brief and will endeavor not to repeat its earlier briefing here. Instead, PGE will focus on addressing misstatements and mischaracterizations of the record in ICNU's brief. PGE will also address new arguments that ICNU raises for the first time in its brief.

## II. DISCUSSION

### A. PGE's Decision to Upgrade the LP Turbines at Boardman Was Prudent

As it has throughout this docket, ICNU mischaracterizes the nature of the LP turbine upgrade and exaggerates the "experimental" nature of the LP turbines. The purpose of this upgrade was to increase efficiency. The primary changes to the turbines were a solid shaft and longer, reshaped last-row blades. PGE 300; July 23 hearing transcript at 101-03.

As PGE witness Stephen Quennoz explained on cross-examination, these changes were not in themselves "experimental." The upgraded components were already in use in other Siemens turbines. July 23 hearing transcript at 101-03. The only "experiment" was whether the upgraded turbines would actually deliver increased efficiency, as Siemens promised. *Id.* at 100-03. This was the "business risk" that PGE assumed in the upgrade; the risk that the new turbines would not make more electricity from the same amount of fuel. And PGE mitigated that risk in its contract with Siemens, through liquidated damages if efficiency gains were not achieved. *Id.* at 102.

ICNU repeats its buzzwords throughout its brief – "experimental," "unproven," and "risky." ICNU apparently hopes that if it repeats these words often enough, it can create the false impression that the LP turbines themselves were some radical new design that was tested for the first time at Boardman. But again, the "new" features of these turbines were well-known and commonly used by 2000. The "experiment" was whether they would produce electricity more efficiently at Boardman. And they did, exceeding Siemens' contractual guarantees. UM 1234, PGE 200 at 2.

It is not enough for ICNU to say that the LP upgrade was experimental. Without some evidence – or even argument – that the "experimental" aspect of this upgrade was connected to the LP1 rotor crack, ICNU's repetition of these buzzwords adds nothing of substance to the case.

**B. PGE's Operation of the LP Turbines at Boardman was Prudent**

**1. PGE Reasonably Contracted With Siemens For Alignment and Maintenance of The LP Turbines**

PGE contracted with Siemens, the manufacturer of the LP turbines, to align and maintain the turbines. Alignment of steam turbine arrays is a highly technical process. PGE has limited expertise in this area. Companies like Siemens, who align steam turbine arrays, do so according to proprietary methodologies and equations. PGE contracted with Siemens to perform alignment and maintenance work because it determined that Siemens was by far the most qualified party to perform these services on the LP turbine array. July 23 hearing transcript at 65. The alternatives, from PGE's perspective, were to either gain internal expertise in maintenance and alignment of the steam turbines at Boardman, or to contract with some third party other than Siemens. Neither choice was reasonable or cost effective, given that Siemens was an industry leader and the party most familiar with these turbines.

Hiring Siemens to perform alignment and maintenance on these turbines was a prudent operational choice on the part of PGE. Prudence is judged based on the information available at the time the decision was made. *In re PGE*, UE 102, Order No. 99-103 at 36-37. In 2000, when PGE contracted with Siemens to perform this work, Siemens was clearly the party most knowledgeable about alignment and maintenance protocols along this turbine array. Neither ICNU nor any other party to this docket has ever argued that PGE should have hired someone else to do this work, or done it internally.

ICNU argues for the first time that PGE is somehow trying to shift its responsibility to prudently operate the Boardman plant to Siemens. This is incorrect. PGE was responsible to make prudent choices about the alignment and maintenance of this turbine array. Hiring Siemens, an industry leader and the original equipment

manufacturer, to perform those services, was the most prudent choice PGE could have made based on the information available at the time.

**2. PGE Did Not Have A Practice Of Operating The LP1 Turbine At Excessive Steam Pressure**

ICNU repeats its argument that PGE contributed to the LP1 rotor crack by continually operating the turbine at higher than recommended steam pressure. According to ICNU's expert, John Martin, PGE regularly operated Boardman at more than 100% of recommended pressure. As evidence for this argument, ICNU notes that Boardman regularly generated more megawatts of electricity than the contractual minimums guaranteed by Siemens after the upgrade.

This argument is simply the result of ICNU's confusion. Megawatts measure electrical output, not steam input. The fact that Boardman generated more than the guaranteed minimum amount of electricity says nothing about whether PGE operated Boardman at more than 100% of recommended steam pressure.

Mr. Quennoz's testimony on cross-examination should have shown ICNU its mistake. As detailed in PGE's Opening Brief, Mr. Quennoz testified that PGE was not, in fact, in the practice of running the LP turbines at over 100% pressure. July 23 hearing transcript at 116-19. His testimony on this point is unrebutted and definitive.

Remarkably, however, ICNU repeats this argument in its Opening Brief. And ICNU continues to point to Mr. Martin's chart – which shows only that Boardman produced more megawatts of electricity than Siemens promised -- as evidence that PGE operated its turbines at excessive pressure. Of course, PGE does not dispute that Boardman produced more electricity; producing more electricity was the point of the upgrade. But what PGE *does* dispute is that Mr. Martin's calculations show *anything* about steam pressure levels in the turbine array.

Simply put, virtually ICNU's entire argument on this point is a mistake. PGE is not making a semantic distinction here. Megawatts are a measure of electrical

output. Steam pressure is measured in pounds per square inch. Arguing – as ICNU does – that a chart showing megawatts of electricity output is proof of excessive steam input shows ICNU's basic confusion on this point.

The only evidence in the record that PGE *ever* ran the LP1 turbines at over 100% of recommended steam pressure is Exhibit ICNU 314, which shows that PGE sometimes ran the plant at high levels during the California energy crisis in 2000. There is no evidence that PGE *ever* exceeded the 105% design maximum, even during that period. This is a far cry from Mr. Martin's false assertion that PGE ran the plant at over-pressure regularly from 2000-2005.

In sum, ICNU should have abandoned this argument after cross-examining Mr. Quennoz. The argument, and the "evidence" on which it rests, is entirely based on a misunderstanding.

### **3. PGE Did Not Fail To Mitigate Its Risks**

ICNU also repeats its argument that PGE should have either (1) contracted with Siemens to cover consequential damages or (2) obtained insurance to cover such damages in the event of an outage. ICNU persists in making this argument despite unrebutted evidence in the record – including evidence for ICNU's own expert – that (1) equipment manufacturers never contract to cover consequential damages and (2) no one can point to any company that sells insurance of this sort, or any utility that has ever bought it.

ICNU also mischaracterizes Mr. Quennoz's testimony about the "business risk" of the Siemens contract. July 23 hearing transcript at 102-03. Mr. Quennoz was referring to the risk that the upgraded turbines would not deliver the promised power increases, and ICNU's attempt to take his testimony out of context is disingenuous. ICNU argues that, because PGE saw some "business risk" in this upgrade, the Commission should force PGE to bear some of that risk. But that is exactly what the

Commission did in UM 1234, when it reduced PGE's requested deferral by nearly 40%, in part to account for business risk that should be borne by PGE and its shareholders.

**4. The Alstom and Siemens Root Cause Analyses Properly Address the Outage**

ICNU faults PGE for failing to adequately investigate the cause of the LP1 rotor crack. This criticism is unfounded. PGE commissioned an exhaustive root cause analysis from Alstom, as well as conducting its own analysis. Those analyses, along with Siemens' root cause analysis, are in the record in this case.

ICNU faults these analyses for being "potentially biased." With respect to Siemens, ICNU points to cross-examination testimony of Mr. Quennoz in which he expresses his concerns that Siemens, as designer and manufacturer of the LP turbines, might bring its own preconceptions to the analysis. What ICNU fails to point out is that the potential bias to which Mr. Quennoz referred was a bias against PGE as operator of the turbine. July 23 hearing transcript at 27-29. His concern was that Siemens might try to pin the blame on PGE's operations to shift focus away from its own design and manufacture of the turbine. This is precisely the opposite sort of bias that ICNU alleges. The fact that Siemens ultimately did not find that PGE's operations were the cause of this crack speaks both to the integrity of Siemens' analysis and the prudence of PGE's operations.

ICNU also suggests that Alstom was not an independent reviewer because Alstom repaired the cracked rotor. Of course, any expert who is commissioned to perform an analysis on behalf an interested party has some financial relationship with that party; for example, Mr. Martin has a financial relationship with ICNU, because they paid him for his expert testimony in this matter. By itself, the existence of such a financial relationship does not prove bias. Alstom is a leader in the industry and was the party most qualified to perform this analysis. That is why PGE chose Alstom.

ICNU also alleges that Alstom failed to consider key issues in its root cause analysis (ICNU Opening Brief, p. 12). This allegation is false with respect to every issue identified by ICNU. First, ICNU claims that Alstom failed to ask "Was the design of the LP1 turbine a contributing factor?" This issue is addressed in the Alstom root cause analysis starting on page 28. PGE 105C-B at 28. Alstom modeled the transition radius of the upgraded turbine and computed finite element stresses due to torsion and bending and found the as-designed rotor strength to be more than adequate for the primary loads on the rotor drain operation. Alstom also addressed bearing geometry and design in its analysis, at page 36.

Second, ICNU faults Alstom for failing to ask "Did PGE modify the unit alignment and contribute to the failure?" Alstom addressed alignment and modifications to alignment along the turbine array at pages 25-27 of its analysis. *Id.* at 25-27. As to the question whether PGE changed alignments on the turbine array, it is worth noting that there is absolutely no evidence that PGE ever did anything with the alignment along the turbine array. The evidence is all to the contrary. PGE does not align turbines, and did not align these turbines. This is simply a red herring. Surely, if Siemens, the party responsible for aligning the turbine, had had any suspicion that anyone at PGE had ever altered the alignment along the turbine array, it would have said so in its root cause analysis. But no one has ever suggested that this occurred, let alone presented any evidence of it. Alstom did, however, address the larger question, namely whether changes in alignment along the turbine array (regardless of who made those changes) caused or contributed to the rotor crack.

Third, ICNU faults Alstom for failing to ask "Did the upgrade to the HP/IP turbine in 2004 contribute to the failure?" But Alstom addresses the change in bearing elevations that resulted from the HP/IP retrofit beginning on page 25 of its report. *Id.* at 25.

Finally, ICNU argues that Alstom should have asked "Did the high operating capacity of the unit contribute to the failure?" Beginning on page 18 of its report, Alstom addressed power level in its review of operational data from Boardman. *Id.* at 18. Alstom also concluded, on page 41, that there was no supporting evidence that the plant had been misoperated. *Id.* at 41. Alstom did not address ICNU's mistaken allegation that PGE operated the LP array at above recommended steam pressure, probably because Alstom understood that this did not actually occur.

In sum, PGE has diligently sought to learn the cause of this crack through internal investigations and external root cause analyses. PGE has freely shared information with parties conducting those analyses. ICNU's allegations on this point are unfounded.

#### **5. The Missing Sole Plate Nuts Were Not Readily Visible**

PGE has addressed the missing sole plate nuts in testimony, briefing, and Mr. Quennoz's cross-examination. Here, ICNU repeats its incorrect claim that the missing nuts were plainly visible from the operating floor at Boardman. There is no support for this statement, as Mr. Quennoz explained on cross-examination. July 23 hearing transcript at 44-45.

PGE discovered these missing nuts months after the LP1 rotor cracked. Contrary to ICNU's repeated insinuations that PGE has tried to conceal or obscure the cause of this crack, PGE reported the missing nuts to Siemens and Alstom. *Id.* at 49-52. Both Siemens and Alstom considered the missing nuts in their root cause analyses, but neither concluded that the missing nuts were more than a possible contributor to the growth of the crack. If these missing nuts had in fact caused significant vibrations along the turbine array, those vibrations would have been detected, because PGE continually monitored vibrations along the LP turbine array. *Id.* at 113-15. As Mr. Quennoz testified, missing fasteners *can* cause anomalous vibration and related problems, but there is no evidence of that in this case. *Id.*

## **6. PGE Prudently Monitored Siemens**

Throughout this docket, ICNU has alleged that PGE left Siemens to its own devices at the Boardman plant and failed to monitor Siemens' maintenance or alignment along the LP turbine array. The evidence and testimony in this case show otherwise. PGE regularly monitored Siemens' performance, during the design, manufacture and maintenance of these turbines. *Id.* at 62-66. In addition to monitoring Siemens' work, PGE continually monitored minute variations in temperature and vibration along the turbine array itself. *Id.* at 114. Information gleaned from this monitoring allowed PGE to work with Siemens to adjust bearing levels and compensate for temperature shifts during the operation of the turbine, and also allowed PGE to discover the LP1 rotor crack before it grew to catastrophic proportions. PGE prudently monitored Siemens, and there is no evidence in the record suggesting otherwise.

## **7. The Alstom Root Cause Analysis Was Not Changed to Conform With The *Hunter 1* Decision**

For the first time, ICNU alleges that the Siemens root cause analysis was changed to conform with the Commission's decision in the *Hunter 1* docket, *In Re PacifiCorp Application for an Accounting Order regarding Excess Net Power Costs*, UM 995/UE 121/UC 578, Order No. 02-469 (July 18, 2002). This peculiar allegation has no basis in reality or in the record. The change to the Siemens root cause analysis to which ICNU refers is the change of the draft phrase "unreported operational condition" to the final phrase "unknown operational condition." As Mr. Quennoz explained on cross-examination, PGE questioned the use of the word "unreported," because it suggested that some party knew the cause of the cracking but had not reported it. July 23 hearing transcript at 84-85. Since this was not accurate, "unreported" seemed to PGE a poor word choice. Siemens changed that word in its final report, not to conform with *Hunter 1*, but because there was no evidence that anyone had failed to report any aspect of this problem at any time.

So, ICNU's allegation is unfounded. It is worth noting, however, that ICNU does not successfully distinguish *Hunter 1* in its Opening Brief. Here, as in *Hunter 1*, although it is clear that a component was damaged, no expert has been able to pinpoint the underlying cause of the problem. Further, as noted above, the LP rotors were not "experimental" technology, and so *Hunter 1* cannot be distinguished on that basis. Finally, ICNU notes that the Commission required PacifiCorp to absorb about 50% of the costs of the outage when it established the deferral account in *Hunter 1*. In this case, the Commission did the same, requiring PGE to absorb nearly 40% of the costs of this outage (in addition to the costs of the repair and transportation of the cracked rotor, which PGE also absorbed). So, although *Hunter 1* was not the inspiration for the Siemens root cause analysis, it is a relevant commission precedent that ICNU has failed to satisfactorily distinguish.

### **C. PGE's Repair of the LP1 Rotor was Prudent**

ICNU makes no argument that PGE's repair of the LP1 Rotor was imprudent. However, ICNU argues for the first time that the second outage at Boardman was caused by PGE's negligence and, as support for its new argument, points the Commission to an analysis of that second outage performed by the plaintiffs in the Turlock litigation.

Of course, as ICNU acknowledges, PGE is not seeking to recover any expenses related to the second outage in this or any other docket. The cause of the second outage was completely unrelated to the rotor crack that caused the first outage. Simply put, these are unrelated incidents. ICNU does not attempt to connect the two outages, except by the thinnest possible thread. The crux of ICNU's argument is that, because someone at Boardman is alleged to have negligently caused the second outage, it follows that PGE employees at Boardman are negligent, and therefore probably did something to cause the first outage, too.

This argument is not well taken. The second outage is irrelevant and has not been the subject of any testimony in this docket. This is because the two outages were unrelated. Understanding the cause of the second outage does not aid in understanding the cause of the first outage. Nor does the second outage somehow create a presumption of negligence on the part of PGE's employees. PGE, again, is not seeking to recover costs related to the second outage here. Accordingly, evidence related to that outage is beside the point.

### III. CONCLUSION

For the reasons stated, PGE respectfully requests that the Commission allow amortization of the full amount approved for deferral by the Commission in UM 1234.

DATED this 24<sup>th</sup> day of September, 2008.

TONKON TORP LLP

By

  
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**CERTIFICATE OF SERVICE**

I hereby certify that on this day I served the foregoing **REPLY BRIEF OF PORTLAND GENERAL ELECTRIC COMPANY** by electronically mailing a copy thereof to each party listed below and by placing in a sealed envelope, first-class postage prepaid, addressed to those parties who have not waived paper service, deposited in the U.S. Mail at Portland, Oregon.

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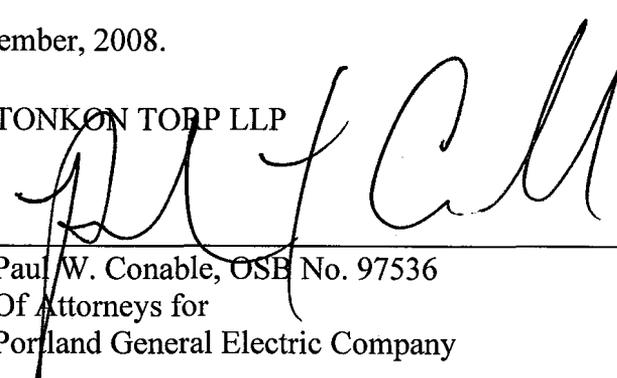
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DATED this 24<sup>th</sup> day of September, 2008.

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