



Oregon

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Public Utility Commission

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March 6, 2009

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OREGON PUBLIC UTILITY COMMISSION

ATTENTION: FILING CENTER

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SALEM OR 97308-2148

RE: **Docket No. UE 196** - In the Matter of PORTLAND GENERAL ELECTRIC
COMPANY Application to Amortize the Boardman Deferral.

Enclosed for filing in the above-captioned docket is the Public Utility Commission Staff's Response Testimony. This document is being filed by electronic mail with the PUC Filing Center.

/s/ Kay Barnes

Kay Barnes

Regulatory Operations Division

Filing on Behalf of Public Utility Commission Staff

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**PUBLIC UTILITY COMMISSION
OF OREGON**

UE 196

STAFF RESPONSE TESTIMONY OF

Ed Durrenberger

**In the Matter of
PORTLAND GENERAL ELECTRIC COMPANY
Application to Amortize the Boardman Deferral.**

March 6, 2009

CASE: UE 196
WITNESS: Ed Durrenberger

**PUBLIC UTILITY COMMISSION
OF
OREGON**

STAFF EXHIBIT 300

Response Testimony

March 6, 2009

1 **Q. PLEASE STATE YOUR NAME, OCCUPATION, AND BUSINESS**
2 **ADDRESS.**

3 A. My name is Ed Durrenberger. I am a Senior Utility Analyst employed by the
4 Public Utility Commission. I have provided Direct and Surrebuttal Testimony in
5 this proceeding entered as Exhibit Staff/100/Durrenberger and Exhibit Staff/
6 200/ Durrenberger. My Witness Qualification Statement is found in Exhibit
7 Staff/101.

8 **Q. DID YOU PREPARE AN EXHIBIT FOR THIS DOCKET?**

9 A. Yes, I have included exhibits in Direct and Surrebuttal testimony previously
10 submitted in this docket but I will not be including any exhibits in this Response
11 Testimony.

12 **Q. COULD YOU PLEASE SUMMARIZE THIS RESPONSE TESTIMONY?**

13 A. Yes. The Commission determined that the record was inadequate to reach a
14 determination of prudence on the part of Portland General Electric Company
15 (PGE or company) relating to the installation and maintenance of the turbine at
16 the Boardman Generating Plant (Boardman or plant), and issued a bench
17 request for additional information about these matters. Since that time I
18 initiated further discovery, generally about the capabilities of the individuals
19 from Siemens and about PGE's oversight and management of installation and
20 maintenance projects. In addition I visited the plant site where I met with the
21 plant management and corporate engineering services personnel involved with
22 the turbine operations and maintenance and reviewed, step by step, the roles
23 and responsibilities of the PGE staff with regards to the turbine. In this

1 testimony I will provide my interpretation of the company's response to some of
2 the bench request questions, discuss the results of my recent discovery, and
3 relate what I learned from my plant visit. Finally I will summarize my position,
4 on behalf of Staff, on the matter of whether the company prudently installed
5 and maintained the Boardman turbine.

6 **Q. FIRST, WHAT WOULD YOU LIKE TO SAY ABOUT THE BENCH REQUEST**
7 **QUESTIONS?**

8 A. One area that the bench request is seeking information on is the installation
9 and maintenance of the LP1 turbine. The first question seeks to find out about
10 Siemens, the original equipment manufacturer (OEM), and its capabilities to
11 install and maintain the turbines they sell. The first question also seeks to
12 discover if using the OEM for post sales installation and servicing as PGE
13 states they have done, is unique in the industry. The company attempts to
14 answer this from a couple of different directions in their bench request
15 response. First Mr. Quennoz, the Vice President of Power Supply, states that
16 it was and is PGE's practice to use an OEM in this way and, based on his
17 experience, standard industry practice also. Although my personal experience
18 is in industrial power plant installations, Mr. Quennoz's response is consistent
19 with my experience, where the OEM was often not only the best source but the
20 only viable source for these services.

21 Second, the company reports on a survey of 77 other companies
22 operating utility scale generation plants in which the companies were asked
23 about their use of the turbine OEM. The survey received a rather tepid

1 response with only 13 out of the 77 utilities responding however, of those
2 responding it was common for the companies to involve the OEM in installation
3 and maintenance.

4 When I discussed the capabilities of the OEM with plant management
5 during my recent Boardman visit, Mr. Mayer, the Plant Manager, told me that
6 one recurring topic when he attends industry gatherings of his peers is the
7 shortage of contractors with the capabilities to perform major turbine
8 maintenance that are not affiliated with an OEM. Finally PGE presented a
9 document showing that Siemens has an active role in large turbine installation
10 and maintenance in the U.S. This OEM has been involved with either
11 performing the maintenance on or providing technical services for more than
12 15 turbine maintenance outages each year for the last several years.

13 **Q. BENCH REQUEST QUESTION TWO REQUESTS COPIES OF OUTAGE**
14 **REPORTS GENERATED BY SIEMENS FOR TURBINE UPGRADES,**
15 **MODIFICATIONS, AND REPAIR WORK. WHAT RELEVANCE DO THESE**
16 **REPORTS HAVE TO THE QUESTION OF PRUDENCE ON THE PART OF**
17 **PGE IN INSTALLING AND MAINTAINING THE LOW PRESSURE**
18 **TURBINE?**

19 A. The reports make a good case for the organizational capabilities of the party
20 performing the work, in this case Siemens. The reports document the roles
21 and responsibilities of the contract personnel involved in the outage. There are
22 work scope outlines and details of the actual tasks performed and of the
23 condition of the turbine components as they were found, inspected, and left

1 after the rebuild. In addition the reports have test readings that monitor
2 machine clearances and wear patterns that are important to keeping on top of
3 the ongoing maintenance.

4 **Q. WHAT ABOUT PGE'S ROLE IN THESE OUTAGES AS INDICATED IN THE**
5 **REPORTS?**

6 A. The reports list a number of PGE personnel involved in the outage. The
7 Siemens reports do not detail who, from PGE, does what but there are a large
8 number of both plant and corporate PGE staff involved in the outage.

9 **Q. IS THERE ANY WAY TO VERIFY THAT PGE PERSONNEL ARE ACTUALLY**
10 **INVOLVED IN THE OUTAGES AND NOT JUST CIRCULATED ON THE**
11 **REPORT?**

12 A. Yes. At my visit to the Boardman plant I requested that one of the PGE staff
13 involved in the outage walk me through how a typical turbine outage was
14 monitored and managed by the company. An engineer from the Boardman
15 plant, Roger Lewis, discussed the way he and others on the PGE staff kept
16 track of turbine maintenance both during the maintenance outages and at other
17 times when a forced outage or other shutdown would allow for a minor repair or
18 adjustment to be made. In addition, Janet Kahl, the head of the PGE corporate
19 mechanical engineering group and project engineer for the Boardman turbine
20 upgrade work, was on hand at the plant visit and discussed corporate office
21 shutdown support.

22 **Q. ARE THERE OTHER BENCH REQUEST QUESTIONS YOU WISH TO**
23 **COMMENT ON?**

1 A. Yes, question four asks if it is standard practice for a utility to rely exclusively
2 on a contractor's QA/QC program. PGE's response speaks for itself, but I
3 have had personal ISO 9001 QA/QC experience, having managed a machine
4 shop and manufacturing floor under ISO 9001 certification, and would like to
5 elaborate further on this program. First, I can attest to the robust nature of
6 such a quality assurance program. Every step from initial design to parts
7 procurement to assembly included inspection hold points and carefully scripted
8 documentation. Siemens's certification under ISO 9001 gives me no reason to
9 expect their QA/QC was lacking. Second, and again based on personal
10 experience with ISO 9001 certificated, the customer's QA/QC program would
11 not typically be a duplicate of the contractor's program. Rather, the question
12 for them is: "Does the contractor have a robust QA/QC program and
13 demonstrated conformance to the program and does the product/ service
14 conform to the specifications, form and function required by the owner?" In
15 other words, does the turbine start up and run once the installation or
16 maintenance is complete and produce electricity as designed?

17 **Q. DO YOU HAVE ANY FURTHER COMMENTS ON THE BENCH REQUEST**
18 **QUESTIONS?**

19 A. No.

20 **Q. ARE THERE ANY OTHER POINTS THAT YOU WISH TO DISCUSS?**

21 A. Yes. I performed a cursory investigation on the internet to see what I could find
22 out about industry experience with turbine shaft high cycle fatigue cracking and
23 to see if there are any issues with the shaft metallurgy within the industry.

1 Although Siemens has said they have not experienced a similar failure on a
2 similar rotor I though it appropriate to see if there were other manufacturers
3 that had experienced problems.

4 **Q. WERE YOU ABLE TO LEARN ANYTHING USEFUL?**

5 A. No, not really. I learned that the alloy class used in this rotor is considered to
6 be a common choice for this type of application. I learned that, although there
7 is a lot of information about turbine shaft failures on the internet, it is difficult to
8 tease out the exact cause of failures unless it was the result of an obvious
9 excursion such as from an over speed incident. And I learned that there has
10 been quite a lot of investigation and reporting about cracking in turbine rotors of
11 this alloy class. I would summarize my investigation in to the shaft metallurgy
12 issue as follows: It is common for rotors in this type of application to be made
13 of the alloy used in PGE's LP1. It also is not unheard of for rotors constructed
14 of this alloy to experience high cycle fatigue cracking, and high cycle fatigue
15 cracking has been extensively investigated in shafting of this alloy class and
16 found to be most prevalent at higher temperatures than this rotor operates at.

17 **Q. WHAT DO YOU THINK THE COMMISSION SHOULD DO ABOUT PGE'S**
18 **REQUEST TO AMORTIZE THE PORTION OF EXCESS POWER COSTS**
19 **THEY HAVE DEFERRED IN THIS MATTER?**

20 A. The Commission should allow the amortization to proceed and the company to
21 recover the excess power costs plus interest on the unpaid balance as
22 requested.

23 **Q. DO YOU HAVE ANY FURTHER COMMENTS?**

- 1 A. No. That concludes my testimony.

CERTIFICATE OF SERVICE

UE 196

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 6th day of March, 2009.

Kay Barnes

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**UE 196
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