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March 27, 2009

Via Electronic Filing and U.S. Mail

Oregon Public Utility Commission
Attention: Filing Center
550 Capitol Street NE, #215
PO Box 2148
Salem OR 97308-2148

Re: UE 196 - Boardman Deferral Amortization

Attention Filing Center:

Enclosed for filing in the captioned docket are an original and five copies of:

- **ALJ Bench Request Rebuttal Testimony and Exhibits of Stephen Quennoz – PGE Exhibits 700 through 709. Portions of PGE Exhibit 700 are redacted and included under separate cover, pursuant to the protective order 07-433 in this docket. PGE Exhibit 702C is also confidential and subject to protective order 07-433 and sent under separate cover.**

This document is being filed by electronic mail with the Filing Center. An extra copy of the cover letter is enclosed. Please date stamp the extra copy and return to me in the envelope provided.

These documents are being served upon the UE 196 service list. The confidential portions will be served upon parties that have signed the protective order.

Thank you in advance for your assistance.

Sincerely,

DOUGLAS C. TINGEY

DCT:smc
Enclosures
cc: Service List-UE 196

CERTIFICATE OF SERVICE

I hereby certify that I have this day caused **ALJ BENCH REQUEST REBUTTAL TESTIMONY AND EXHIBITS OF STEPHEN QUENNOZ – PGE EXHIBITS 700 through 709.** 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 27th day of March, 2009.

DOUGLAS C. TINGEY

SERVICE LIST

OPUC DOCKET # UE 196

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BEFORE THE PUBLIC UTILITY COMMISSION

OF THE STATE OF OREGON

UE 196

Boardman Deferral Amortization

PORTLAND GENERAL ELECTRIC COMPANY

March 27, 2009

UE 196 / PGE / 700
QUENNOZ

BEFORE THE PUBLIC UTILITY COMMISSION

OF THE STATE OF OREGON

PGE Responses to Bench Request Nos. 1-8

Rebuttal Testimony

Redacted Version

PORTLAND GENERAL ELECTRIC COMPANY

Stephen Quennoz

March 27, 2009

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I. Introduction

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

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

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to address issues identified in response testimony filed March 6, 2009 by OPUC Staff ("Staff"), the Industrial Customers of Northwest Utilities ("ICNU") (filed March 11), and the Citizens Utility Board ("CUB") in relation to PGE's proposal to amortize the Boardman deferral that was authorized in OPUC Docket UM 1234 (Order 07-227).

Q. How is your testimony organized?

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

II. Staff Testimony

Q. Please summarize Staff's conclusions.

A. Staff concluded that "the Commission should allow the amortization to proceed and the company to recover the excess power costs plus interest on the unpaid balance as requested." (Staff 300; at p. 6, lines 20-22).

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

A. Yes. In particular, I agree with Staff that:

- The original equipment manufacturer ("OEM") is often not only the best source but the only viable source for post-sales installation and servicing of turbines of this class (600 MW);
- Siemens outage reports provided in response to the Commission's Bench Requests make a strong case for Siemens' organizational capabilities in turbine upgrades, modifications, and repair work;
- Siemens ISO 9001 certification supports the contention that Siemens had a robust QA/QC program;
- The appropriate question in assessing QA/QC is not whether PGE created QA/QC programs to govern Siemens, but "Does the contractor have a robust QA/QC program and demonstrated conformance to the program and does the product/service conform to the specifications, form, and function required by the owner?"; and
- The alloys used in the upgraded LP turbines are a common choice for this class of rotor.

III. CUB Testimony

Q. Please summarize the conclusions in CUB Exhibit 300 that you rebut.

A. I rebut the following assertions by CUB witness Gordon Feighner:

- CUB asserts that PGE installed "experimental" technology at Boardman without reasonable safeguards. (CUB 300; at p. 2, lines 2-3);
- PGE was imprudent for negotiating the contract with Siemens that only covered liquidated damages for one year. (CUB 300; at p. 2; lines 18-20);
- PGE failed to conduct its own "technical analysis" of the LP turbine upgrade. (CUB 300; at p. 4, lines 7-8);
- PGE's Fossil Operation and Maintenance Information Service (FOMIS) survey is unhelpful and misleading; and
- PGE summarily dismissed the October 2006 report and recommendation from Sensoplan, Inc.

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

A. CUB concludes that "PGE's response to the Bench Request does little to demonstrate that the company has operated prudently with regards to its decision to install experimental technology or with regards to its installation and maintenance practices thereafter." (CUB 300; at p. 8; lines 12-14).

Q. Is CUB correct that PGE "chose to install, without any reasonable due diligence, experimental technology" at Boardman? (CUB 300; at p. 2, lines 2-3).

A. No. As it has throughout this docket, CUB argues that the upgraded LP turbines were untested, experimental technology that PGE installed without adequate guarantees. PGE has responded to this allegation in written and oral testimony and briefing in this docket. This

issue was not raised in the Commission's Bench Requests or in PGE's responses to those Requests. However, CUB raises it again here, and so I am obligated to recap my previous testimony on this issue.

It is not accurate to say that the upgraded LP turbines were "experimental" or "untested" at the time of the upgrade. As I have previously testified, the only significant design changes in the upgraded LP turbines were that they had ruggedized (*i.e.*, solid) shafts and elongated and reshaped last-row blades. (PGE 300; at p. 6, lines 9-11; at p. 5, lines 15-18). These were not new or experimental technologies. As I have discussed previously, ruggedized rotors and lengthened and redesigned last row blades have been in use in Siemens' turbines and in the industry since the 1980s. (July 23 Hearing Transcript from p. 101, line 3 through p. 102, line 7). The industry replaced bored, shrunk-on-disc low pressure turbine rotors with non-bored, monoblock designs starting in the 1980s.

PGE's purpose in upgrading the LP turbines was to generate more electricity for the same amount of fuel burned. (July 23 Hearing Transcript at pps. 101-104). The only thing that was "experimental" about the upgrade was whether it would really produce the gains in efficiency that Siemens had promised. To mitigate the risk that the changes might not in fact produce the promised gains in efficiency, we included performance guarantees and liquidated damages in our contract with Siemens. If the turbines had not performed as expected, Siemens would have been required to remedy the underperformance or compensate us. (July 23 Hearing Transcript at pps. 104-105).

So when Mr. Feighner testifies about PGE installing experimental or risky new technology, he just misses the point. The "risk" was not in the redesign itself, because ruggedized shafts and elongated last-row blades have been used successfully for years. The

risk was a business risk, that the upgraded turbines would not perform as efficiently as promised. PGE mitigated that risk through contractual performance guarantees and liquidated damages. It turned out, however, that those contractual remedies never came into play because the upgraded LP turbines actually exceeded Siemens' performance guarantees.

Further, CUB has never argued that the redesign of the ruggedized shaft or longer last-row blades somehow caused or contributed to the crack in the LP1 rotor. The Root Cause Analyses did not identify the design as a cause of this crack. CUB's testimony faults PGE for adopting "experimental" technology, but does not even attempt to link any "experimental" feature of these upgraded turbines to the rotor crack.

Q. CUB faults PGE for negotiating a contract with Siemens that only covered liquidated damages from a forced outage during the turbines' first year of operation. (CUB 300; at p. 2, lines 19-20). Is this criticism accurate?

A. No. Mr. Feighner appears to misunderstand the terms of PGE's contract with Siemens. The contract does not provide for PGE to recover replacement power costs in the event of an outage. The contract provides for liquidated damages in some circumstances during the first year of the turbines' operation, and also provides for a 10-year warranty.

Mr. Feighner appears to be faulting PGE for not negotiating a contract that would require Siemens to cover PGE's replacement costs in this case, when the outage occurred more than five years after the LP turbines were installed. I am not aware of any component manufacturer ever agreeing to cover consequential damages such as replacement power costs in a contract for the sale of a component like a turbine. It would not be feasible for a manufacturer to offer such a guarantee, because the cost of replacement power for an outage at a generating plant is likely to be much greater than the sale price of any particular

component. Here, for example, the cost of replacement power during the LP outage was approximately $45.7 million, which is much greater than the total cost of the upgraded LP turbines, which PGE purchased from Siemens for approximately $12 million. I am not aware of any contract in which a component manufacturer has agreed to take on the risk of paying replacement power costs for any length of time (let alone five years), given that those costs would likely dwarf the entire value of the contract. This was acknowledged by Mr. Martin in his deposition. (April 1, 2008 Deposition of Martin, pps. 47-50, provided in PGE Exhibit 301).

Q. Is CUB correct that PGE failed to conduct its own "technical analysis" of the proposed turbine upgrade? (CUB 300; at p. 4, lines 7-8).

A. No. As I testified before, PGE worked actively with Siemens for three years to finalize the design for the upgraded turbines before manufacturing of the turbines even began. (July 23 Hearing Transcript at p. 104, lines 13-19). Again, the background of this design work was that the new components of the upgraded LP turbines – the ruggedized shaft and longer, reshaped blades – had been in use in the industry for years. After we agreed on a design with Siemens, we monitored Siemens' manufacturing of the upgraded turbines through site visits, contractual witness points, and review of metallurgy and other tests. (PGE 600; at pps. 2-4).

Mr. Feighner also suggests that PGE was somehow unable to properly monitor the installation and maintenance of the LP turbines because of our supposed lack of diligence before purchasing the turbines. (CUB 300; at p. 4, lines 9-13). I do not understand this statement. PGE personnel with experience in turbine installations and maintenance were

present and monitored the installation and subsequent maintenance of the upgraded LP turbines.

If Mr. Feighner is suggesting that PGE somehow lacked knowledge about the upgraded components of the new turbines – the ruggedized shaft and last-row blades – this assertion is simply incorrect. PGE personnel were actively involved in the design of the upgraded LP turbines. PGE employees were also involved in major turbine maintenance with Siemens at Boardman before the upgrade, including removing and reinstalling the turbine rotors and inspecting and repairing turbine blades. Further, as I have testified before, there is nothing in the record or the various root cause analyses that links the upgraded design or upgraded components of the LP turbines to the LP1 rotor crack. So even if Mr. Feighner were right (and he is not) that PGE lacked the expertise to oversee the installation or maintenance of a turbine with a ruggedized shaft and longer last-row blades, there is nothing here to link those new components to this outage.

Q. Is CUB's criticism of PGE's FOMIS survey accurate?

A. CUB faults PGE for its survey of other utilities about their use of OEMs for installation services, distributed through the FOMIS service. PGE sent this survey in response to several Bench Requests from the Commission. The Commission asked: "What is standard industry practice for turbine installation and maintenance?" (Bench Request No. 1(a)); and "Provide examples of other utilities that have relied on the original equipment manufacturer to provide such services." (Bench Request No. 1(b)). I had previously testified that, based on my experience in the utility industry, using the OEM to provide installation and maintenance services is a common and accepted practice. We circulated the FOMIS survey

in hopes of getting more information from other utilities in response to the Commission's Bench Requests.

CUB faults the survey because only 13 of the 77 FOMIS utilities responded. This was a voluntary survey conducted with a short turnaround time. We could not compel utilities to answer our questions. Whether or not this is a statistically significant sample, it is telling that every respondent reported using the OEM for some installation or maintenance services on its turbines. This is consistent with my testimony, and with the statements of Loren Mayer that are referenced in Staff's testimony. (Staff 300; at p. 3, lines 4-12). CUB may find fault with our methods or response rate, but they have not attempted to put any evidence in this record to contradict my testimony or the FOMIS survey.

CUB also criticizes the wording of one of our FOMIS questions: "Did you have the original equipment manufacturer (OEM) install or verify proper installation of the steam turbines during original installation?" (PGE 500; at 501a, Question #1). CUB suggests that this question is somehow misleading because it does not reveal whether the OEM (1) actually physically performed the installation or (2) monitored and verified the installation. But again, the Commission's Bench Request was not "Do all OEMs physically install their turbines?" but rather, "What is standard industry practice for turbine installation and maintenance?" Our question was designed to discover whether it is common practice for the OEM to be closely involved in the installation of new turbines, either through actual installation or monitoring and verification. What we learned from the FOMIS survey fits with my testimony and experience in the industry. It is the common practice to have the OEM significantly involved in the installation and maintenance of new turbines, which is

what occurred at PGE's Boardman Plant. None of our survey respondents reported that the OEM was uninvolved in installation or maintenance.

Q. Did PGE "dismiss" the October 2006 report and recommendations prepared by Sensoplan, Inc.?

A. No. After the outage, PGE commissioned Sensoplan, Inc. to conduct an analysis of vibrations and performance of the turbines. CUB sent PGE a Data Request asking about PGE's responses to the conclusions and recommendations in the Sensoplan report. A copy of CUB Data Request No. 023 is PGE Exhibit 701. A copy of PGE's Response (Attachment 023-A) to this Data Request is confidential PGE Exhibit 702C.

Mr. Feighner testified, "While it is beyond the expertise of any member of CUB's staff to assess the validity of these particular actions on an engineering basis, we are troubled by PGE's simple one page dismissal of these recommendations . . ." (CUB 300; at p. 7, lines 19-21). But PGE did not "dismiss" Sensoplan's recommendations in one page. Mr. Feighner is confusing PGE's response to CUB's Data Request with PGE's response to the Sensoplan report. We answered the Data Request in one page. We took Sensoplan's recommendations seriously, in conjunction with recommendations from other consultants we hired, and made reasonable decisions about whether to implement those recommendations based on our expertise and knowledge of the situation at Boardman. Where we did not adopt a particular suggestion or recommendation from Sensoplan, our decision was based on careful consideration and analysis. Mr. Feighner's suggestion that we somehow dismissed or ignored these suggestions is simply wrong. Finally, this issue has no relevancy to this proceeding since the analysis and report were done after the Boardman outage.

IV. ICNU Testimony

Q. Please summarize the assertions in ICNU Exhibit 300 that you rebut.

A. I rebut the following assertions by ICNU witness John R. Martin:

- PGE was negligent for failing to hire an engineer/constructor to oversee the LP turbine upgrade. (ICNU 400; at p. 2, lines 17-20);
- The upgrade of the LP turbines resulted in a 40% increase of the weight borne by the underlying turbine pedestal, necessitating a new analysis of the weight-bearing capabilities of the pedestal. (ICNU 400; at p. 6, lines 5-8 redacted);
- PGE's staff was inexperienced in replacement of steam turbines. (ICNU 400; at pps. 7-8);
- The FOMIS survey was inaccurate and unhelpful. (ICNU 400; at pps. 8-9);
- PGE's internal QA/QC programs are inadequate. (ICNU 400; at pps. 11-16);
- PGE failed to adequately monitor the LP turbine installation and maintenance. (ICNU 400; at p. 11-14); and
- PGE has misrepresented the visibility of the soleplate nuts of the bearing 3 support. (ICNU 400; at p. 16, lines 21-23; p. 17, lines 1-15).

Q. Do you agree with ICNU's criticism that PGE should have hired an engineer/constructor to oversee the LP turbine upgrade? (ICNU 400; at p. 2, lines 17-20).

A. No. This is the first time that ICNU or Mr. Martin has made this argument in this docket. It is not responsive to the Bench Request or to PGE's testimony. It is not PGE's practice to hire a separate or independent engineer/constructor for an upgrade of existing components

like the LP turbine rotors. In my experience, it is not a standard practice in the industry to hire a separate or independent engineer/constructor to oversee an upgrade like this.

Q. ICNU points out that PGE used an engineer/constructor at Port Westward and criticizes PGE for not following the same practice for the LP turbine upgrade. Is this a fair criticism?

A. No. The Port Westward project involved the construction of an entirely new generating facility, not the upgrade of an existing component at an existing facility. It is industry practice in my experience to use an engineer/constructor when constructing a new facility, which will encompass many disparate components manufactured by many different OEMs. In those circumstances with multiple construction contractors and OEMs and multiple new components, it is not prudent or reasonable to have a single OEM oversee the entire project. This was not the case in the LP turbine upgrade, where we had a single OEM, Siemens.

Q. Has PGE ever used an engineer/constructor at Boardman?

A. Yes. PGE used an engineer/constructor, Bechtel, during the initial construction of the Boardman facility, just as we used Black and Veatch at Port Westward.

Q. Do you agree with ICNU's assertion that upgrading an existing turbine is a more complex construction project than installing a new turbine in a new facility? (ICNU 400; at p. 5, lines 19-20).

A. No. Mr. Martin's testimony on this point is misleading. When a new turbine is installed in a new facility, it is only one small piece of an extremely complicated, integrated construction project. By contrast, the upgrade of the LP turbines involved replacement of a few components of the existing steam turbine and integrating those new components with the

existing components. The upgrade took six weeks to complete and was far less complex than the construction of a new generating facility, which usually takes years to complete.

More to the point, it is a single project, with a single OEM. In a circumstance like this, no outside engineer/constructor will be able to duplicate the knowledge and experience of the OEM. We would typically hire an engineer/constructor for a large construction project with multiple OEMs (like the construction of Port Westward or Boardman), because the engineer/constructor can oversee the entire construction and work with multiple OEMs and with PGE. But in this case, PGE worked directly with Siemens, the OEM who manufactured the only components we were replacing.

It is also important to point out that Mr. Martin does not identify any aspect of Siemens' installation that he believes was performed incorrectly, or could have been done better with the services of an engineer/constructor. Nor has he identified any specific shortfall or deficiency in Siemens' installation of the LP turbines that caused the rotor crack.

Q. Did the LP turbine upgrade result in a 40% increase of the weight borne by the pedestal on which the LP turbines rest? (ICNU 400; at p. 6, lines 5-8 redacted).

A. No. Mr. Martin claims that the upgrade resulted in a 40% increase in the weight of the turbines. From this he argues that PGE and Siemens were "extremely imprudent" in not performing a renewed analysis of the structural design, weight-bearing capacity, and underlying soil and geology of the pedestal on which the turbine-generator components rest.

This might be a reasonable conclusion if the LP turbine upgrade had actually resulted in a 40% increase of the weight borne by the pedestal. But here, Mr. Martin has made a mistake. It is true that the weight of the <u>rotors</u> in the upgraded LP turbines increased by 40% over the rotors in the original turbines. However, the rotors are only one component of

the LP turbines, which in turn are only one component of the turbine-generator set that rests on the pedestal. Mr. Martin made a site visit to Boardman, and should have observed first-hand that the very massive pedestal also bears the weight of the HP/IP turbine, the generator, piping, valves, and other components.

The LP turbine upgrade increased the weight of the LP turbine rotors. Since the rotors compromise only a part of the LP turbines and an even smaller portion of the entire turbine-generator set, the total weight increase that resulted from the LP turbine upgrade was approximately 3%, much less than the 40% that Mr. Martin asserted. As required by the contract, Siemens evaluated the effect of the weight increase on the pedestal and concluded that no changes were required. This argument is entirely based on a simple misunderstanding on Mr. Martin's part.

Q. Is Mr. Martin correct when he states "Based on my review of the experience of PGE's staff, I do not believe its staff has ever been engaged in the complex replacement of a large steam-turbine"? (ICNU 400; at p. 7, lines 17-18).

A. No. As explained above, Mr. Martin exaggerated the complexity of the rotor upgrade and understated PGE's staff experience. The upgrade involved replacement of some of the turbine components, not the replacement of the entire steam turbine. As for PGE's staff experience, Siemens and PGE staff inspected and overhauled the turbines every five years as part of major scheduled maintenance. During those outages, the rotors were removed from the LP turbines for internal bore inspections, and other turbine components were examined for wear or damage. Loren Mayer, Bryan Timms and Tom Kingston, among others, assisted in those removals and replacements of the LP turbine components. Mr. Mayer, Mr. Timms and Mr. Kingston also participated in PGE's monitoring of the LP turbine upgrade. The

turbine rotor removal and replacement activities were similar in that regard to the upgrades that were done in 2000 and in 2004.

Q. Do you agree with Mr. Martin's criticisms of the FOMIS survey?

A. No, for many of the same reasons I stated in response to CUB's testimony. Again, the Bench Request to which we were responding asked us to determine standard industry practice with respect to turbine installation and maintenance. The survey responses uniformly showed that the responding utilities had used the OEM in some significant capacity for turbine installation and maintenance, as we did with the LP1 upgrade.

Q. Do you agree with any of Mr. Martin's conclusions about industry practices for installation or maintenance of turbines?

A. In part, yes. Mr. Martin testifies that "[u]sing the OEM for major maintenance is a common and desirable practice in the industry, but it is not an industry standard." (ICNU 400; at p. 3, lines 18-19). I agree that using the OEM for major maintenance is a common and desirable practice. That is what PGE did at Boardman, as I have previously testified. (PGE 500; at pps. 18-20). I do not understand the distinction that Mr. Martin is drawing between a "common and desirable practice" and "an industry standard." But I certainly agree with Mr. Martin that using the OEM in this capacity is common and desirable, and that is what we did at Boardman.

I also agree with Mr. Martin that it is not standard to use the OEM exclusively for all routine annual maintenance on a turbine. (ICNU 400; at p. 3, lines 19-21). Again, this is consistent with PGE's practice. PGE performed routine maintenance on the LP turbines and used Siemens during annual maintenance outages for specific tasks on an as-needed basis. (PGE 500; at pps. 18-20). Again, I agree with Mr. Martin about use of the OEM for

maintenance of turbines. Based on his testimony, Mr. Martin should approve PGE's use of Siemens for maintenance at Boardman.

Q. Are ICNU's objections to PGE Exhibit 502C accurate?

A. No. PGE Exhibit 502C is a 19-page list of facilities at which Siemens has provided installation and maintenance services for turbines. PGE sought this list in response to the Commission's Bench Request 1(c), which asks for a list of other facilities at which Siemens "provided installation services."

ICNU criticizes this list because it does not specify exactly what installation services Siemens provided at these facilities. Mr. Martin states "it is doubtful that Siemens provided the complete plant design and construction services normally provided by an Engineer/Constructor." (ICNU 400; at p. 10, lines 16-17). I have no idea if this is true, but it is not the question we were asked. The issue in this case is not whether Siemens has provided "complete plant design and construction services" at any facilities. We did not hire Siemens to perform “complete plant design and construction services” at Boardman. We hired Siemens to design, manufacture, and install upgraded turbine components. PGE Exhibit 502C provides a list of facilities at which Siemens has provided installation and maintenance services, which is what the Bench Request asked for. From a risk perspective, it is highly preferable to have a single entity, if well qualified, perform the design, manufacture, and installation activities to prevent contention if guarantee or warranty provisions are exercised.

Mr. Martin also points out that the Boardman upgrade is the only upgrade of a BB 271 turbine listed in PGE Exhibit 502C. (ICNU 400; at pps. 10-11). But there are other upgrades and installations of similar turbines listed in PGE Exhibit 502C. Turbines are

divided into basic models, like the BB 271. Slight differences are made to accommodate preferences and application needs (e.g., because of different boilers, condensers, ambient site conditions and power output requirements). If Mr. Martin's suggestion is that Siemens is incompetent to install a BB 271 turbine because their recent experience is in installing turbines with slight differences, then his suggestion is off-base. The point is that Siemens has significant experience in upgrading, manufacturing, installing and maintaining steam turbines, as PGE Exhibit 502C shows.

Q. Is ICNU's criticism of PGE's QA/QC programs consistent with its prior criticisms?

A. Not in my opinion. Up until this testimony, ICNU has criticized PGE in this docket for not having a QA/QC program for Siemens' activities. (*See*, for example, ICNU 100; at p. 4, lines 15-23). As I explained in my previous testimony, it is not typical for a purchaser like PGE to create a separate QA/QC program for a manufacturer's activities. (PGE 500; at p. 11). Rather, the typical practice is to ensure that the manufacturer has a robust QA/QC program and to monitor the manufacturer's compliance with that program. (Staff 300; at p. 5, lines 10-14). That is what PGE did in this case. My experience with GE, Westinghouse/Siemens, Mitsubishi, Alstom, and other large vendors is that typically they do not want, and will not allow, customer QA/QC inspectors, all with different requirements, in their shops. A customer’s presence could present potential safety liabilities, impose additional burdens on the OEM’s staff, and could potentially result in loss of proprietary design information and fabrication technologies.

In this testimony, Mr. Martin seems to have changed tack. Now he is criticizing PGE for not having an adequate QA/QC "that applies to PGE staff and its activities." (ICNU 400;

at p. 12, lines 5-6). This is the first time in this docket that we have been asked to defend PGE's internal QA/QC.

Q. Are Mr. Martin's criticisms of PGE's internal QA/QC programs fair and accurate?

A. No. According to Mr. Martin, PGE's internal QA/QC programs are based on PGE's desire to "absolve itself of responsibility if something goes wrong." He also describes PGE's QA/QC programs for our plant operation as "unofficial, passive and hands off." (ICNU 400; at p. 12, lines 11-12 and 14-15).

These characterizations are extremely inaccurate and unfair. They are also contradicted by the facts of this case and by PGE's responses to ICNU's data requests, which Mr. Martin simply ignores.

As an initial point, none of the root cause analyses of this outage has ever identified PGE's operation of the Boardman plant as a cause of the rotor crack. Mr. Martin himself previously testified that he did not believe that PGE's operation of the Boardman plant was a major cause of the crack. (PGE Exhibit 301 at p. 1, lines 8-18). But now he has changed his mind and states that "[i]t is my opinion that PGE needs to actively protect its facilities." (ICNU 400; at p. 12, lines 17-18).

What Mr. Martin does not point out is that it was PGE's monitoring of the operation of the Boardman turbine that led to the discovery of this crack in the first place. PGE continuously monitors bearing vibration and temperature along the length of the turbine, with assistance from outside experts as needed. PGE detected temperature anomalies through its monitoring and insisted that Siemens make improvements. This resulted in the replacement of bearings 3-6 in 2002. And when PGE discovered changes in vibrations at bearing 3 in 2005, we took the turbine offline and brought in Siemens and other outside

experts to determine the cause of the increased vibrations. Our monitoring of vibrations and our decision to take the turbine offline led us to discover the crack before it became worse. This diligent monitoring and appropriate response is why none of the catastrophic events that Mr. Martin speculates about in his testimony actually occurred. This is not passive, hands-off monitoring. We did not sit back and rely on Siemens, with the idea that PGE could "absolve itself of responsibility if something goes wrong." When something went wrong, it was PGE who discovered it, and PGE who took action. Mr. Martin's testimony about our supposed lack of interest in actively protecting our facilities is simply false, and is not borne out by any of the events in this case.

Q. ICNU makes some specific criticisms of PGE's monitoring of the LP turbine installation and maintenance. Are these criticisms fair and accurate?

A. Not at all. In fact, they are contradicted by the testimony and Data Responses in this case.

First, Mr. Martin's statement that PGE somehow failed to ensure that Siemens had an adequate QA/QC program for the LP turbine installation is false. Mr. Martin points to the contractual requirement that Siemens have a QA/QC for the installation and then faults PGE and Siemens for not preparing a separate QA/QC program for the installation. (ICNU 400; at p. 13-14).

What Mr. Martin fails to point out is that Siemens had a QA/QC program that covered both manufacturing and installation of the LP turbines. PGE ensured that Siemens had that program in place during pre-installation meetings, and Siemens kept a copy of the program on site and followed it during the installation. Mr. Martin should know this, because we reported this to ICNU in response to several separate data requests, which ICNU does not include with Mr. Martin's testimony. In case there is any confusion on this point, I have

attached copies of PGE's responses to ICNU Data Requests No. 92, 101, and 105 in PGE Exhibit 703. All of these attachments, which we provided to ICNU before it filed this testimony, explained that Siemens had an ISO 9001 certified QA/QC program in place for the LP turbine installation.

Second, Mr. Martin is incorrect in suggesting that PGE did not take an active role in the design and installation of the upgraded LP turbines. (ICNU 400; at p. 14, lines 7-14). As I have previously testified, PGE worked actively with Siemens over the course of three years to finalize the design of the upgraded LP turbines. (July 23 Hearing Transcript at p. 104, lines 15-16). PGE also actively participated in the installation of the upgraded turbines, as can be seen from Janet Kahl's testimony in this docket (PGE 600; at p. 5), as well as her detailed job notes and several hundred photographs from the installation. (PGE Exhibit 607). I do not know what Mr. Martin means by "challenging the alignment" during the installation of the upgraded turbines, but Ms. Kahl's notes show that PGE actively participated in and monitored the alignment. We pointed this out to ICNU in response to Data Request 114, which Mr. Martin does not reference in his testimony, but which I have attached. (PGE Exhibit 704).

Further, as we have pointed out in past testimony, we actively monitored the condition of the turbine through temperature and vibration monitoring while the turbine was in operation. We provided details of PGE's monitoring program in response to Staff Data Requests Nos. 057 and 058. (I have attached those Data Responses as PGE Exhibit 705). It was PGE's active monitoring that led us to shut down the turbine and subsequently discover the LP rotor crack.

Third, Mr. Martin's criticisms of PGE's recordkeeping are unfounded. Mr. Martin claims that PGE was unable to provide any job notes, diaries or other references from the turbine installations. (ICNU 400; at pps. 14-15). But Mr. Martin fails to acknowledge the detailed job notes and hundreds of photographs from the LP turbine installation provided by Janet Kahl in connection with her testimony in this docket. (PGE Exhibit 607). Nor does Mr. Martin acknowledge that PGE has provided significant information about the PGE employees who participated in the installation and the roles in the installation in response to another ICNU Data Request. (*See* ICNU Data Request 98, attached as PGE Exhibit 706).

Again, this is the first time we have been asked to comment on PGE's internal QA/QC programs governing PGE's operations. Until now, ICNU has criticized us for not implementing QA/QC programs to govern Siemens' operations. However, the Data Responses that we have provided to ICNU, as well as our previous testimony in this case, show that ICNU's criticism of PGE's internal quality procedures is false and misleading.

Q. Are ICNU's statements about loose and missing soleplate fasteners accurate?

A. No. ICNU continues to misstate my testimony in this case. Mr. Martin says: "In its testimony, PGE has stated that these fasteners could not be seen." (ICNU 400; at p. 16, lines 22-23). I have never said that. What I actually testified, in both written testimony and at the hearing, was that the missing nuts were not easily visible from the operating deck at Boardman. Here is the testimony that Mr. Martin references:

[redacted]

[redacted]

[redacted]

[redacted]

(July 23 Confidential Hearing Transcript at p. 44, lines 7-23).

During his site visit to Boardman, Mr. Martin photographed the base of the bearing 3 support, by climbing up on platforms between the HP/IP LP1 turbines and taking a photograph with a flash into a dark recess below the deck. To get to the area where Mr. Martin took the picture, it is necessary to first leave the turbine operating deck and climb a ladder to access the area between high pressure and LP1 turbines. (See photograph in PGE Exhibit 707). It is then necessary to step down between the turbines onto an area next to the turbine shaft, look down past a gap in the steel, and peer into a recessed area where the nut was located. This location cannot possibly be seen from the turbine operating deck. To give an idea of where Mr. Martin is standing, and how he got there, we have attached a photograph of Mr. Martin in the area where he took his picture. (See photograph in PGE Exhibit 708).

I would also note that Mr. Martin's photographs do not seem to clearly identify the nuts in question. For example, in his photograph in ICNU Exhibit 404, the missing nut is actually the nut that is partially hidden under the flange at the left of the photograph, not the more prominent nuts located in the foreground of the picture. The picture is also misleading because it was taken with a flash that illuminated the recessed area where the nut is located.

PGE took a picture of this same area without a flash and the nut was not visible. (See photographs in PGE Exhibit 709).

ICNU also includes a picture of a different nut that is visible from the turbine operating deck (No. 2, as shown in ICNU 406). It is important to realize that nut No. 2 was not missing (*i.e.*, it was in place), and the "as found" torque reading was 300 ft. lbs. This means that even though nut No. 2 was not tightened to optimal torque, it was tight to a point where it would not have been possible to visually detect looseness.

Q. Do you agree with Mr. Martin's catastrophic predictions about what might have happened if the LP1 turbine had completely failed? (ICNU 400; at p. 17-20)

A. I do not agree with some of Mr. Martin's comparisons. By comparing the kinetic energy of the turbine rotors with that of a jetliner traveling at 500 miles per hour, Mr. Martin makes an implied comparison of the effects of a turbine failure with the effects of a passenger jet crash. While this is a dramatic comparison, it is not reasonable to compare the effects of these disparate hypothetical events. However, I do agree with Mr. Martin that a total failure and breakage of the LP1 turbine rotor would have been a very serious event. This is why PGE carefully monitored turbine bearing vibration and temperatures. In response to minute increases in vibration, PGE took the turbine offline and disassembled it before any of the catastrophic events that Mr. Martin hypothesizes actually occurred.

V. Conclusions

Q. Please summarize your conclusions.

A. PGE acted prudently in purchasing the upgraded LP turbines, operating the Boardman facility during and after the upgrade, and detecting and repairing the cracked LP1 rotor. In response to testimony from CUB and ICNU:

- PGE did not install "experimental" technology at Boardman;
- PGE actively participated in the design of the upgraded LP turbines;
- It is a reasonable and accepted industry practice to use the OEM for installation and maintenance of steam turbines;
- PGE was not negligent for failing to hire an engineer/constructor to oversee the LP turbine upgrade;
- The upgrade of the LP turbines resulted in a much smaller increase of the weight borne by the turbine pedestal than ICNU asserted;
- PGE's staff was experienced in removal, inspection, and reinstallation of steam turbine rotors;
- PGE insured that Siemens had an ISO 9001 certified QA/QC program for the manufacture and installation of the LP turbines;
- PGE adequately monitored the manufacture, installation, maintenance and operation of the LP turbine; and
- The soleplate nuts on the bearing 3 support are not easily visible from the operating deck at Boardman.

Q. Does this conclude your testimony?

A. Yes.

List of Exhibits

PGE Exhibit	Description
703	CUB's Data Request No. 023
702C	**Attachment to PGE's Response to CUB Data Request No. 023**
703	PGE's Responses to ICNU Data Request Nos. 092, 101, and 105
704	PGE's Response to ICNU Data Request No. 114
705	PGE's Responses to OPUC Data Request Nos. 057 and 058
706	PGE's Response to ICNU Data Request No. 098
707	Photograph of PGE Staff and Mr. Martin leaving the Turbine Operating Deck
708	Photograph of Mr. Martin taking a photograph of nut No. 25
709	Photographs of nut No. 25 taken by PGE with and without a flash

March 3, 2009

TO: Gordon Feighner
Citizens' Utility Board

FROM: Patrick G. Hager
Manager, Regulatory Affairs

PORTLAND GENERAL ELECTRIC
UE 196
PGE Response to CUB Data Request
Dated February 19, 2009
Question No. 023

Request:

UE 196/ PGE Revised Exhibit / 5l7C, aka the Sensoplan report, provides numerous recommendations for PGE's Boardman Plant operations. Recommendations are listed in Sections 7.1.5, 7.2.4, 7.3.4, 7.3.5, and 7.4. What - if any - actions did PGE take to address the following recommendations?

a. Perform a model analysis on the bearing supports during the next shut down to identify any resonance-related issues associated with the bearing support structure. Also recommended is a measurement of relative shaft and absolute bearing vibration during coast down and start-up.

b. Investigate and eliminate the root cause for the large, cyclic change in vibration magnitude.

c. Perform measurements during coast down and start-up to investigate if the sub-synchronous vibration is speed dependent.

d. Verify if the large magnitude of the built-in probes can partially be attributed to the measurement location at an offset from the actual bearing housing.

e. Conduct tests to verify if the vibration vector circling described in 7.2.1 may be related to one or more specific brushes.

Response:

Attachment 023-A contains the requested information.

UE 196
Attachment 023-A

Confidential and Subject to Protective Order No. 07-433

PGE's Response to CUB Data Request No. 023

February 18, 2009

TO: Brad Van Cleve
Industrial Customers of NW Utilities

FROM: Patrick G. Hager
Manager, Regulatory Affairs

PORTLAND GENERAL ELECTRIC
UE 196
PGE Response to ICNU Data Request 12.5
Dated February 3, 2009
Question No. 092

Request:

Please provide a copy of the QA/QC program developed at the Pre-Construction Conference for the LP turbine installation.

Response:

PGE objects to this request because it is vague and misstates the record. Without waiving its objections, PGE responds as follows:

There was no contractual requirement for Siemens to develop a new QA/QC program at the Pre-Construction Conference for the LP turbine installation. The LP turbine upgrade contract required that Siemens have an ISO 9001 certified QA/QC program and that PGE be allowed to monitor compliance with that certified QA/QC program. As discussed in PGE's Response to Bench Request No. 4(a) (see PGE Exhibit 500/Quennoz 13-15), Siemens met these contractual requirements by using its existing ISO 9001 certified QA/QC program and allowing PGE to monitor Siemens' compliance with that program.

Prior to the start of installation, PGE representatives, including Janet Kahl, the sponsor of PGE Exhibit 600, reviewed Siemens' QA/QC program documentation. Aspects of the QA/QC program were discussed during the LP Pre-Construction Conference, as reflected in the meeting minutes, provided as Attachment 091-A to PGE's Response to ICNU Data Request No. 091. During the LP turbine installation, Siemens kept a copy of its QA/QC manual in its office at the Boardman site. During installation, Janet Kahl looked at the QA/QC manual in Siemens' on-site office as needed. Siemens did not leave PGE a copy of this manual after completion of the installation and they were not contractually

required to do so. In response to Bench Request No. 4(a), PGE requested copies of Siemens' QA/QC documentation. Siemens provided the Quality Management Manual which is included in PGE Exhibit 513C (see Quennoz 47-59). This manual is dated 2006, but it is consistent with the QA/QC program Siemens had in place in 2000.

February 19, 2009

TO: Melinda Davison
Industrial Customers of NW Utilities

FROM: Patrick G. Hager
Manager, Regulatory Affairs

PORTLAND GENERAL ELECTRIC
UE 196
PGE Response to ICNU Data Request 13.5
Dated February 5, 2009
Question No. 101

Request:

Please provide documentation demonstrating that PGE reviewed and accepted Siemens QA/QC program specifically for the installation (not the manufacturing) of the LP turbines in 2000 and the HP/IP turbines in 2004. See UE 196/PGE/500/Quennoz /13/lines2-3.

Response:

PGE's testimony stated that "In connection with the manufacturing and installation of the LP and HP/IP turbines, PGE reviewed and accepted Siemens' QA/QC program." It does not refer to an installation-only QA/QC program. Siemens' QA/QC program was a general one that applied to Siemens' manufacturing or installation activities.

The LP turbine upgrade contract required that Siemens have an ISO 9001 certified QA/QC program and that PGE be allowed to monitor compliance with that certified QA/QC program. As discussed in PGE's Response to Bench Request No. 4(a) (see PGE Exhibit 500/Quennoz 13-15), Siemens met these contractual requirements by using its existing general ISO 9001 certified QA/QC program and allowing PGE to monitor Siemens' compliance with that program. Siemens also had an ISO 9001 certified QA/QC program in effect for the HP/IP upgrade in 2004. (See Page 15 of Tab 15 of Attachment A to PGE's Response to ICNU Request No. 096.)

February 19, 2009

TO: Melinda Davison
Industrial Customers of NW Utilities

FROM: Patrick G. Hager
Manager, Regulatory Affairs

PORTLAND GENERAL ELECTRIC
UE 196
PGE Response to ICNU Data Request 13.9
Dated February 5, 2009
Question No. 105

Request:

UE 196/PGE/513C/Quennoz/27 is PGE's approval of Siemens Quality Assurance Specification for manufacturing the HP/IP turbine. Does PGE have a similar document that shows the approval of the Siemens QA/QC program for the installation of the LP turbines in 2000 and the installation of the HP/IP turbine in 2004? If so, please provide copies.

Response:

PGE's Response to ICNU Data Request No. 101 discusses how the LP turbine upgrade contract required that Siemens have an ISO 9001 certified QA/QC program covering manufacturing and installation and that PGE be allowed to monitor compliance with that certified QA/QC program. Siemens met those contractual obligations. PGE's Response to Bench Request No. 4(a) provides additional detail for the LP upgrade.

Page 15 of Tab 15 of Attachment A to PGE's Response to ICNU Data Request No. 096 states that Siemens had an ISO 9001 certified QA/QC program (covering both manufacturing and installation) in place for the 2004 HP/IP upgrade.

February 19, 2009

TO: Melinda Davison
Industrial Customers of NW Utilities

FROM: Patrick G. Hager
Manager, Regulatory Affairs

PORTLAND GENERAL ELECTRIC
UE 196
PGE Response to ICNU Data Request 13.18
Dated February 5, 2009
Question No. 114

Request:

Please refer to UE 196/PGE/600/Kahl /7, line 1 and 15. Please provide copies of all PGE review comments of Siemens work during installation of the LP turbines including the review of the rotor alignment and field measurements and the communication with the Siemens engineers in Florida to confirm the correct alignment for both the LP turbines and the HP/IP turbines.

Response:

In her role as project manager, Ms. Kahl ensured that the actual field measurements were reviewed and accepted by Siemens design engineering in Florida. Ms. Kahl did this by witnessing verbal communications between Siemens field personnel and Siemens design engineering in Florida. PGE did not submit written comments. PGE's monitoring of Siemens' alignment activities is documented in her job notes, previously provided as PGE Exhibit 607 (see Pages 1-21). The relevant job note entries are:

- June 20, 2000: "SWPC is working on bearing moves today. Our machine was naturally very close to being in alignment so this work is small." (See Page 17 of PGE Exhibit 607.)

- June 21, 2000: "Coupling alignment is done. Luckily we only had to make a few moves." (See Page 18 of PGE Exhibit 607.)

January 22, 2009

TO: Vikie Bailey-Goggins
Oregon Public Utility Commission

FROM: Patrick G. Hager
Manager, Regulatory Affairs

PORTLAND GENERAL ELECTRIC
UE 196
PGE Response to OPUC Data Request
Dated January 5, 2009
Question No. 057

Request:

Please provide an overview of the vibration monitoring system used on the Boardman turbine generator:

- **What kind of monitors are used?**
- **How many monitors are used on the turbine?**
- **Where are the monitor results displayed? Are monitor results recorded?**
- **Are there high vibration alarm points? What sort of alarm do they have?**
- **Are there high high vibration trip points?**
- **Does the plant operate the turbine with the vibration monitoring system or any of the individual monitors bypassed, jumpered or otherwise not in operation?**
- **Is there a written procedure that describes the vibration monitoring system, its use, alarm points and trips, and what the operators are supposed to do in the case of a vibration alarm or trip? Have the operators been trained to the procedure?**
- **Were there additional vibration monitors added to the LP1 rotor after the cracking and subsequent repair?**

Response:

What kind of monitors are used, how many monitors are used on the turbine, where are the monitor results displayed, and are monitor results recorded?

The vibration monitoring system used on the Boardman turbine generator is a Bently Nevada system that uses two dual probe transducers mounted at nine (9) bearing locations along the turbine generator set. Each dual probe transducer consists of one proximity probe and one velocity probe. System data are captured and stored on a continuous basis in a Bently Nevada Data Manager. Vibration levels are also archived in the Distributed Control System (DCS).

Monitor indications are displayed on the vibration monitoring panel in the control room and are displayed on the large Distributed Control System (DCS) display monitor on the main control panel all of the time.

Are there high vibration alarm points, what sort of alarm do they have, are there high high vibration trip points?

The vibration monitoring system also provides audible and text alarms on the DCS screens on the main control panel. Vibration trends can also be displayed during times such as turbine startups or shutdowns or when a vibration alarm has been received. Vibration data going to the DCS are permanently archived in the DCS historian.

All vibration inputs to the DCS are alarmed. The alarm vibration level setpoint is 5 mils and the recommended plant trip vibration level is 10 mils. The alarm priority was given the second highest priority level. When the high vibration level alarm is reached, its priority is such that the plant control room operators will trend and pay close attention to the vibration level with the purpose of determining if action is required prior to reaching the action level to trip the plant.

Audible alarms with text messages alert plant operators when vibration setpoints are reached or exceeded. The alarm setpoint is 5 mils (.005") displacement and the recommended trip setpoint is 10 mils (.010") displacement. This is not an automatic trip.

Does the plant operate the turbine with the vibration monitoring system or any of the individual monitors bypassed, jumpered or otherwise not in operation?

It is not normal to operate the turbine when the vibration monitoring system is compromised, however, if there was an absence of other indications of vibration problems, the turbine would not necessarily be shut down if portions of the system failed. Loss of a single element of the vibration monitoring system would not cause a loss of ability to monitor vibration

conditions on the Main Turbine. Vibration measurements taken with hand held instruments can be used to back up a failed component in the installed system.

Is there a written procedure that describes the vibration monitoring system, its use, alarm points and trips, and what the operators are supposed to do in the case of a vibration alarm or trip? Have the operators been trained to the procedure?

There are vibration monitoring system technical manuals supplied by the manufacturer that describe operation of the system. System performance and operation is monitored by a vibration specialist at the plant. Plant operators have been trained on how to operate the turbine in accordance with Operating Instruction OI-5-1. They would trip the turbine if they received a trip alarm and would contact the vibration specialist if they received any other vibration monitoring system alarm.

Were there additional vibration monitors added to the LP1 rotor after the cracking and subsequent repair?

No additional vibration monitors were added subsequent to the rotor repair. The installed system provided adequate warning of an impending problem. There was an attempt made to attach a strain gauge to the rotor in the vicinity of the crack. It failed within minutes of returning the turbine to service.

Plant engineers routinely monitor vibration trends. The vibration specialist periodically reviews vibration levels and phase angles with the plant engineering staff. During plant startups after planned outages, and during planned outage shutdowns, main turbine critical vibration levels are monitored along with vibration angular displacement readings.

January 22, 2009

TO: Vikie Bailey-Goggins
Oregon Public Utility Commission

FROM: Patrick G. Hager
Manager, Regulatory Affairs

PORTLAND GENERAL ELECTRIC
UE 196
PGE Response to OPUC Data Request
Dated January 5, 2009
Question No. 058

Request:

Can vibration monitor records inform a trained technician about what may be happening when vibration readings change (for instance a loose support pedestal anchor or cracked shaft)? If so, does PGE have technicians who can interpret vibration trends and make these determinations?

Response:

(a) Can vibration monitor records inform a trained technician about what may be happening when vibration readings change (for instance a loose support pedestal anchor or cracked shaft)?

Vibration monitoring can provide clues about what is happening when readings change. However, interpretation of vibration readings is not always a straight forward process and is considered to be one of the most difficult tasks for a machinery diagnostician. For instance, the shaft vibration response to a loose support pedestal anchor may or may not manifest itself in vibration levels. Vibration response to changes in the shaft or its support structure must be analyzed over a wide operating range, including startup and shutdown. Other sources of vibration such as an imbalance condition or bowed rotor also typically affect vibration over these ranges. A cracked rotor may also affect vibrations in these RPM ranges.

The vibration technicians and plant engineers interpret trends and records based upon technical knowledge, judgment, and experience. When making recommendations for corrective action, one must consider items such as the time required to perform the task, the cost associated with performing the task and the probability that the suspected condition is the cause of vibration problems.

Plant engineering staff personnel may enlist the resources of outside experts to try to determine the source of unexplained turbine vibration problems and to suggest corrective action. PGE routinely enlists the help of an independent vibration expert, Robert Kowalczyk (RK Ltd.) to monitor the Main Turbine Vibration signatures. This is typically performed at the completion of an extended outage. During the startups following extended outages, Mr. Kowalczyk is on site to evaluate shaft resonance vibration levels, which include vibration magnitude and position information. Based on this information, he is able to provide the plant with information regarding the stability and condition of the Main Turbine Shaft. When increased vibrations were detected following a plant trip in July 2005, and could not be explained, Mr. Kowalczyk was contacted for technical assistance. Data were obtained and sent to him for analysis. Vibrations continued and Mr. Kowalczyk and a Siemens vibration expert were brought on-site to help evaluate the Main Turbine vibration level. Additionally, Siemens design personnel in Orlando, Florida were contacted in October when the vibration levels were increasing. The consensus among these individuals was that a rub had occurred, which was responsible for the increased vibrations. They did not suspect a cracked rotor because the detailed vibration analysis did not support a cracked rotor.

(b) If so, does PGE have technicians who can interpret vibration trends and make these determinations?

Yes. PGE employs members of the maintenance staff at the Boardman plant who are trained in vibration monitoring and use of the Boardman vibration monitoring system. This training was provided by the Bently Nevada Company, who is the manufacturer of the Boardman Main Turbine vibration monitoring system.

Technicians' duties in part require them to routinely monitor the status of the vibration monitoring system and to identify indications of abnormal conditions or changes in the turbine vibration readings. They report any unusual readings or changes in Main Turbine vibrations to the plant engineering staff.

February 19, 2009

TO: Melinda Davison
Industrial Customers of NW Utilities

FROM: Patrick G. Hager
Manager, Regulatory Affairs

PORTLAND GENERAL ELECTRIC
UE 196
PGE Response to ICNU Data Request 13.2
Dated February 5, 2009
Question No. 098

Request:

Please provide records to document the PGE staff that was assigned to inspect the installation of the LP turbine in 2000 and the HP/IP turbine in 2004. The records should include a management organization chart of the assigned staff and a definition of the assigned duties, inspection reports, and hours spent. See UE 196/PGE/500/Quennoz/11/lines 5-8.

Response:

The reference cited states that "PGE personnel were assigned day and night to monitor Siemens' activities, including installation, interface problems, QA program compliance, and any material or program nonconformance." PGE has already provided materials supporting this statement. Pages 44-77 of PGE Exhibit 607 provide examples from the hundreds of LP and HP/IP installation photographs taken by PGE. The full set of photographs is in PGE Exhibit 608. Pages 1-23 of PGE Exhibit 607 are job notes from the LP installation. Many of these notes concern inspections made of various installation tasks.

Page 6 of PGE Exhibit 600 and PGE Exhibit 610 provide the names, experience, and training of PGE employees assigned to monitor and inspect the LP installation in 2000. Many of these employees also performed the same or similar roles in the HP/IP installation in 2004. Other PGE people who monitored Siemens' compliance with Siemens' QA/QC program for the HP/IP upgrade had similar experience and qualifications. Attachment 98-A is a copy of the Pre-Construction Meeting Notes related to the HP/IP upgrade. It lists several of the PGE employees assigned to monitoring and inspection roles for the HP/IP upgrade.

The PGE employees discussed above worked either in PGE's Power Supply Engineering Services (PSES) group or at the Boardman plant. Attachment 98-B contains organization charts for PSES and the Boardman plant in 2000 and in 2004. PGE's practice is to retain timesheets for only three years. Timesheets for the LP and HP/IP installations are not available.

UE 196
Attachment 098-A

HP/IP Pre-Construction Meeting Minutes

Portland General Electric - Boardman Power Plant
Tuesday November 18, 2003
Pre Construction Meeting
8:30 am
AGENDA

GENERAL SESSION:

This meeting is the first of three pre-construction planning meetings, second in January and last one in March.

Second meeting to be scheduled January 27, 2004 starting at 10 AM at the Boardman Plant.

1. Team Players - Group Introductions, Review the roles of PGE team players and Contractor team players.

2. PGE Assistance:

Janet Gulley - HP/IP and Boiler Project Manager
John Linn - Generator Project Manager
John Wacker - Static Exciter, Iso Phase Bus, and Step Up Transformer Project Manager
Roger Lewis - HP/IP Turbine
Randy Curtis - Boiler
Jim Chartrey - Nights
Rick Neimann, Randy Curtis, Jim Chartrey - NDE
Bob Ball - Crane Scheduler

SWPC Team

Shane Patton - Commercial Project Manager (Orlando, FL)
Tom Kucera - Site Project Manager (Installation - Boardman Site)
Bill Howarth - Babcock Project Manager (Worcester, MA)

3. Commercial Terms and Technical Assistance - Go to the Project Manager

	Office	Cell	email
• Janet Gulley	503 464 8167	503 789 4230	janet_gulley@pgn.com
• John Wacker	503 464 8152	503 703 2618	john_wacker@pgn.com
• John Linn	503 464 8453	503 703 2619	john_linn@pgn.com

4. Potable Water - Drinking water on the turbine deck will be provided daily in large orange coolers by PGE onsite maintenance contractor.

5. Plant Facilities - Bathrooms for ladies in the control room, vending machines by PGE will be on near the elevator. No access to PGE locker rooms.

6. Scope of Work - Review in summary:

   a. HP/IP upgrade
   b. Generator
   c. Stub Shaft

d. Static Exciter Electronics
e. Iso Phase Bus
f. Transformer
g. Boiler

The Scope of Work was covered in generalities by the PGE, SWPC, and Alsthom team representatives.

7. Schedule - Review the project schedule as required. Coordinate other Contractor activities in the areas of work.

- Boiler Monday May 3 7am to Friday July 2 7am
- Turbine Wednesday May 5 7am to Friday July 2 7 am
- Generator Monday May 3 7 am to Tuesday July 6 7am (Preliminary)
- **Boiler Feed Pump (three weeks of work during the outage)**

Plant shutdown will be midnight April 30. The schedules from SWPC and Alstom were discussed in generalities, particularly at the beginning and end of the outages when crane is most in need. Bob Ball, PGE, will be the coordinator of crane activity during the outage. Some discussion occurred as to possibility of SWPC entertaining the BFPT scope to help stay load-leveled in regards to staffing during the outage period for contingency (additional unplanned work in regards to steam inlets, for example) concerns.
Action: The January meeting will continue discussion regarding crane usage. Further discussion, if warranted, regarding SWPC participation in BFPT scope of work.

8. Lay Down Areas - Location for new material, equipment, work areas, tool cribs, toilets, dumpsters, trailers, and break areas. Mark up drawing and give to PGE.

A general turbine/generator deck area drawing was given to each Contractor and spatial requirements were requested by PGE.
Action: Each Contractor is to prepare a markup of space requested for laydown area (Babcock is exempted as this should not be a concern in the boiler area) for the January meeting for continued discussion on this topic.

9. Crane Coordination - Bob Ball PGE Crane Scheduler. Review Contractors crane usage schedules. Develop a preliminary crane usage schedule.

CONTRACTOR BREAK OUT SESSION:

10. Correspondence - Written correspondence addressed to whom, verbal direction will be followed with written.

SWPC Commercial Issues - Shane Patton, Orlando, 407-736-5501, shane.patton@siemens.com
4400 Alafaya Trail, MC 208
Orlando, FL 32826
SWPC Site Issues (During Installation)
Tom Kucera (Boardman Site)

11. Contingency Scope(s) of Work - OMM 13 inspection by PGE, Steam inlet replacement, straightening steam inlets.

Discussion was held regarding possible steam inlet replacement if severe cracking is found upon disassembly/inspection. Forgings are relatively long lead items and could be disastrous to the outage schedule if not procured early. A level III magnetic particle test to be provided by PGE.
Action: Shane Patton to determine lead time and price for each forging (8 inlets). Contingency initial thoughts are to have two or three inlet forgings on hand.

12. Contract Change Notices (CCN) – Review the form, procedure and commercial terms.

13. Time Sheets for extra work – Review the process of signature, etc. Required for all Time and Material (T & M) work.

14. Getting Material out of the Warehouse – Review procedure for Contractor to get material from warehouse. Set up account for Contractors.

15. Portable Toilets – Contractor is responsible for providing their own portable toilets.

Discussion was held relative to the portable toilets and it was agreed that it made more sense for PGE to supply the portable toilets to SWPC turbine and boiler teams. Portable toilets and a lunch area are to be provided by PGE for boiler and turbine teams close to the respective work areas.

16. 480V & 120 V Power – Where located for Contractor's use.

17. Hazardous Waste – Discuss handling, storage, and disposal.

18. Material Disposal – Review procedure and location of debris and waste material disposal.

19. Phone Numbers – # outside lines required by Contractor. Plant personnel extension lists, Contractor plant extensions and motel numbers.

Request was made by SWPC for three phone lines. SWPC wishes to revisit this item during the January meeting.

20. LAN Connection – Discuss Contractor access to PGE LAN system with VPN hardware.

Discussion was held regarding LAN requirements for SWPC at site – three bandwidths were requested by SWPC. Action was taken by PGE and SWPC to provide experts to communicate needs. PGE has provided their expert contact.

21. Lead Paint – Discuss lead paint here at the Plant

Discussion was held and PGE agreed to do some sampling prior to the outage, particularly in the boiler scope areas.

22. Working hours per each shift

The boiler preliminary plans are for a 2 x 10 x 5 schedule. The turbine plans are for a 2 x 10 x 6 schedule once the unit is ready to be assembled and a one shift schedule during the first part of the outage (prior to arrival of new HP turbine).

23. Contractor pre-outage onsite representatives

24. PGE Crafts Labor Requirements

25. Division of Responsibilities

26. Lay down areas for the Boiler

27. Bearing work - #3 elevation adjustment

Discussion was held concerning the fact that the #2 bearing has been running hot - approximately 20 degrees hotter than #3 bearing. With the slightly heavier HP rotor, the post-upgrade concern may be greater. Data was given to SWPC regarding current operational conditions.
Action: SWPC Engineering to analyze data and determine course of action during the outage in terms of bearing elevation and coupling alignment.

28. Air In-leakage in Gland Steam

SWPC, Tom Kucera, made some recommendations for checks to be made during current operation of the turbine to Mr. Bryan Timms, PGE.
Action: PGE to implement SWPC suggestions and to report if any improvements have been made at the January meeting.

29. Oil Leak on #4 Bearing

This will be addressed and corrected during the outage by Tom Kucera, SWPC Site Manager.

SAFETY & SECURITY:

1. Safety - Review the emergency response procedure here at the Plant. Company and Contractor responsibilities.

PGE to train SWPC Site Manager Tom Kucera and Tom has the responsibility to train the contractors of SWPC/Babcock team.

2. Contract Personnel - Explain security's role and requirements.

Regarding truck delivery, the front desk is to be notified prior to any truck deliveries. Phone number 481-9356. No deliveries are possible on Friday unless prior agreement is reached within PGE.

3. Contractor Parking - Identify contractor parking area(s).

4. Contractor Vehicle Access - Contractor parking lot

5. Housekeeping -

PGE to provide dumpsters.

6. Paging System - Explain the procedure here at the plant for paging.

7. Personnel Protective Equipment (PPE)

Following items are required: hardhat, glasses (no sideshields required), cotton shirt with sleeves, leather shoes (steel toes not required), earplugs.

8. Clearance Procedure - Review the tag-out procedure and requirements.

9. Material Safety Data Sheets (MSDS) -

10. Smoking Policy - Outside only, no smoking in the boiler.

11. Confined Space - Operations will sniff the area, post a clearance.

12. Weld Permit -

13. Contractor Safety Orientation - Schedule

14. HERP - Hazardous Energy Removal Procedure

Dave Rogers, PGE, should be contacted for any material that would be included under "Hazardous Energy" for disposal and consultation.

QUALITY CONTROL:

1. Q.C. Documentation - Q.C. procedure and documentation. Quality Control documentation shall be completed per contract specification.

PGE will x-ray X% of welds. X-rays are done while Contractors are not welcome (night, weekends, etc.).

2. Inspection - Contractor that the Company Inspection Points

Hydro-test will occur approximately early April 2004 for the boiler scope of supply in Erie, PA. Customer notification is requested two weeks prior to test. PGE would like to attend.
Turbine Rotor Overspeed test and Final Assembly Clearance Check to occur in Germany approximately early March and April 2004, respectively.

3. Welding inspections for the boiler by PGE

MEETINGS & REPORTS:

1. Progress / Outage Meetings - Review time and location, purpose, and requirements of Contractor for these meetings.

Roger Lewis, HP/IP Turbine Lead, will attend turbine/boiler shift meetings periodically for status.

2. Crane Scheduling meetings -

Will be held daily during the outage, particularly during critical beginning and end of outage time periods, and led by Bob Ball, PGE.

3. Contractor Daily Force Report - Requested weekly.

4. Other Reports - Review other reports that may be require submittal by the Contractor per contract specification.

Accident reports are necessary to be completed when an unfortunate accident occurs. Progress reports will also be required and as quantitative as possible in terms of progress to date.

OPEN DISCUSSION:

Question and Answer - Open discussion.

A discussion was held regarding PGE placing screens in the throttle valves.
Action: PGE to determine whether or not it wishes to place temporary screens for the intercept valves.

Boiler Cleaning Logistics - Randy Curtis is contact and was unavailable for November 2003 meeting. It is suggested that this topic be included in the January 2004 meeting as a continuance of a discussion that occurred at the Project Kickoff Meeting in August 2003.

New Items for January Meeting

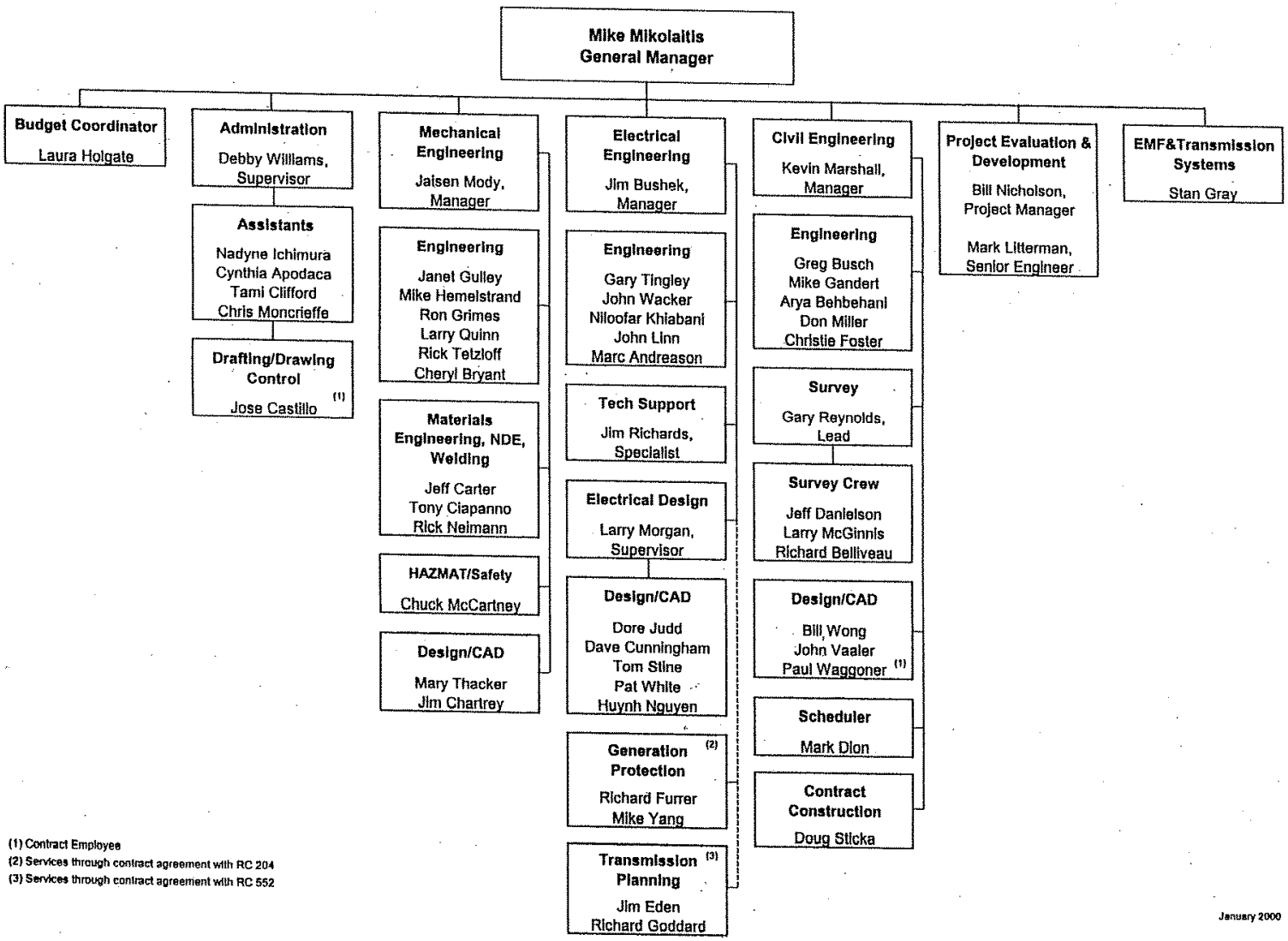
SWPC/Babcock - Status of Installation Contract for Boiler Scope.

Update of Progress for Turbine/Boiler Scope of Work including Witness Points ahead

UE 196
Attachment 098-B

Organization Charts

Power Supply Engineering Services



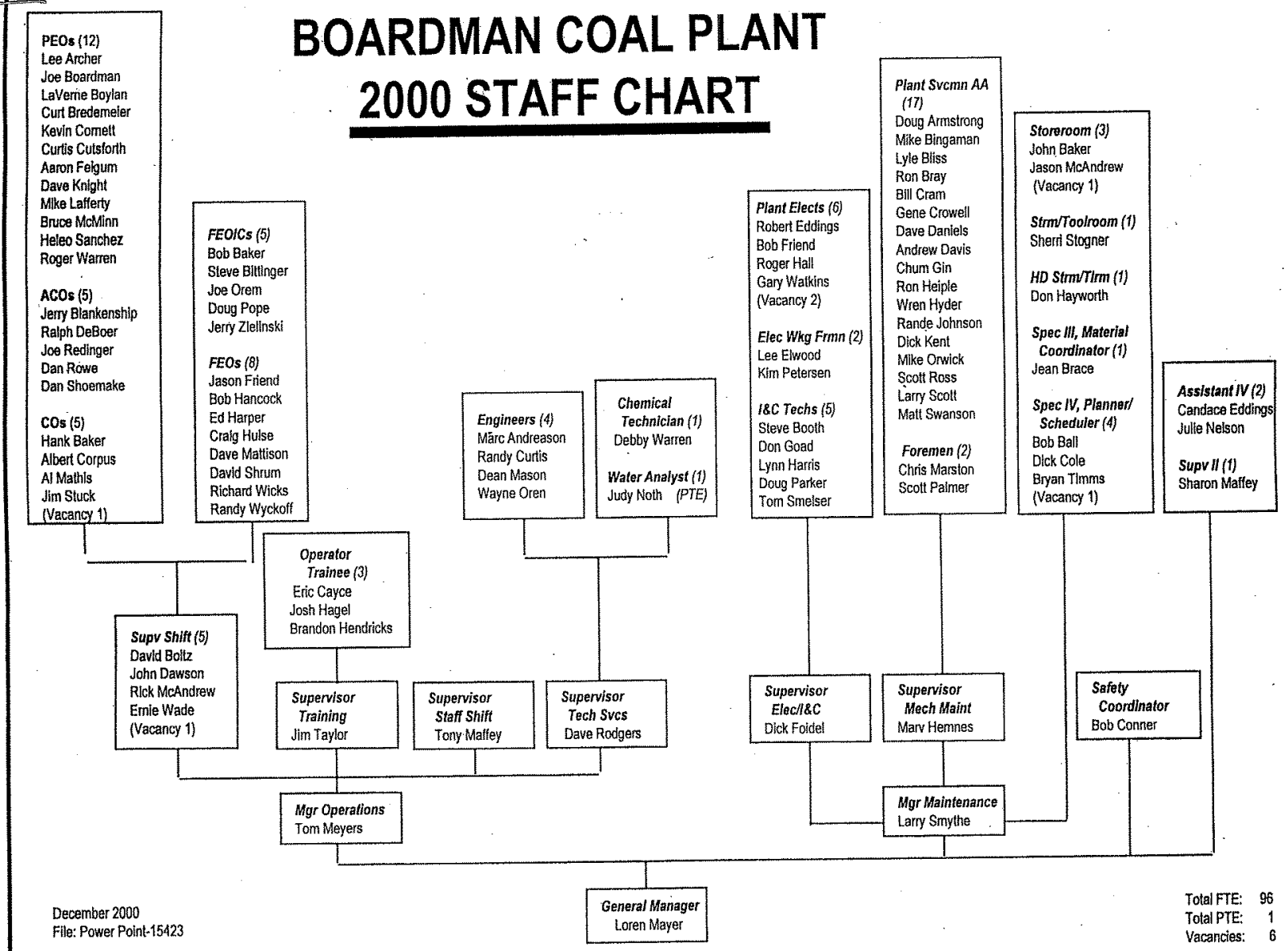
(1) Contract Employee
(2) Services through contract agreement with RC 204
(3) Services through contract agreement with RC 552

January 2000

UE 196 / PGE Exhibit / 706
Quennoz / 12

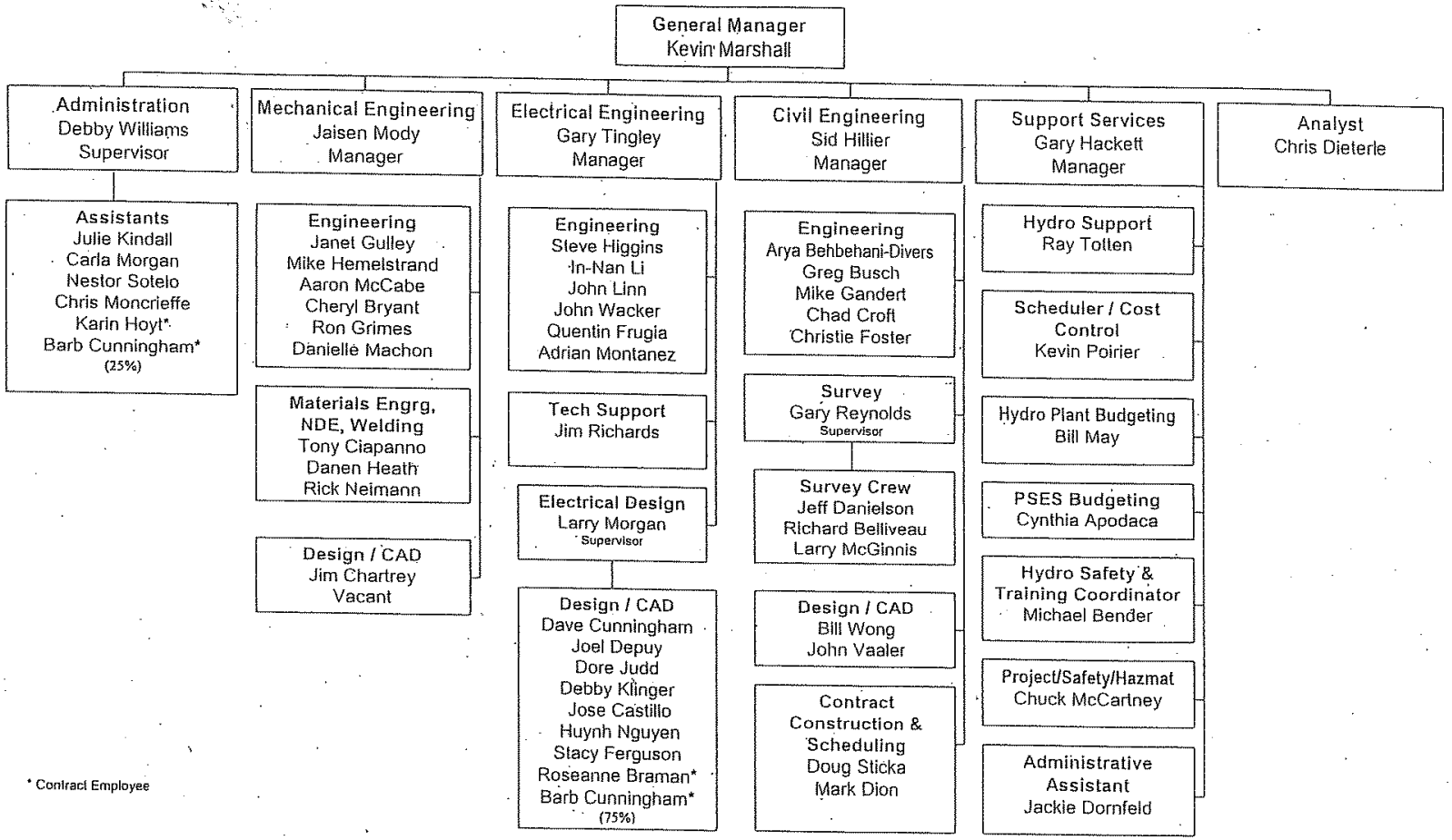
2000

BOARDMAN COAL PLANT
2000 STAFF CHART



UE 196 / PGE Exhibit / 706
Quennoz / 13

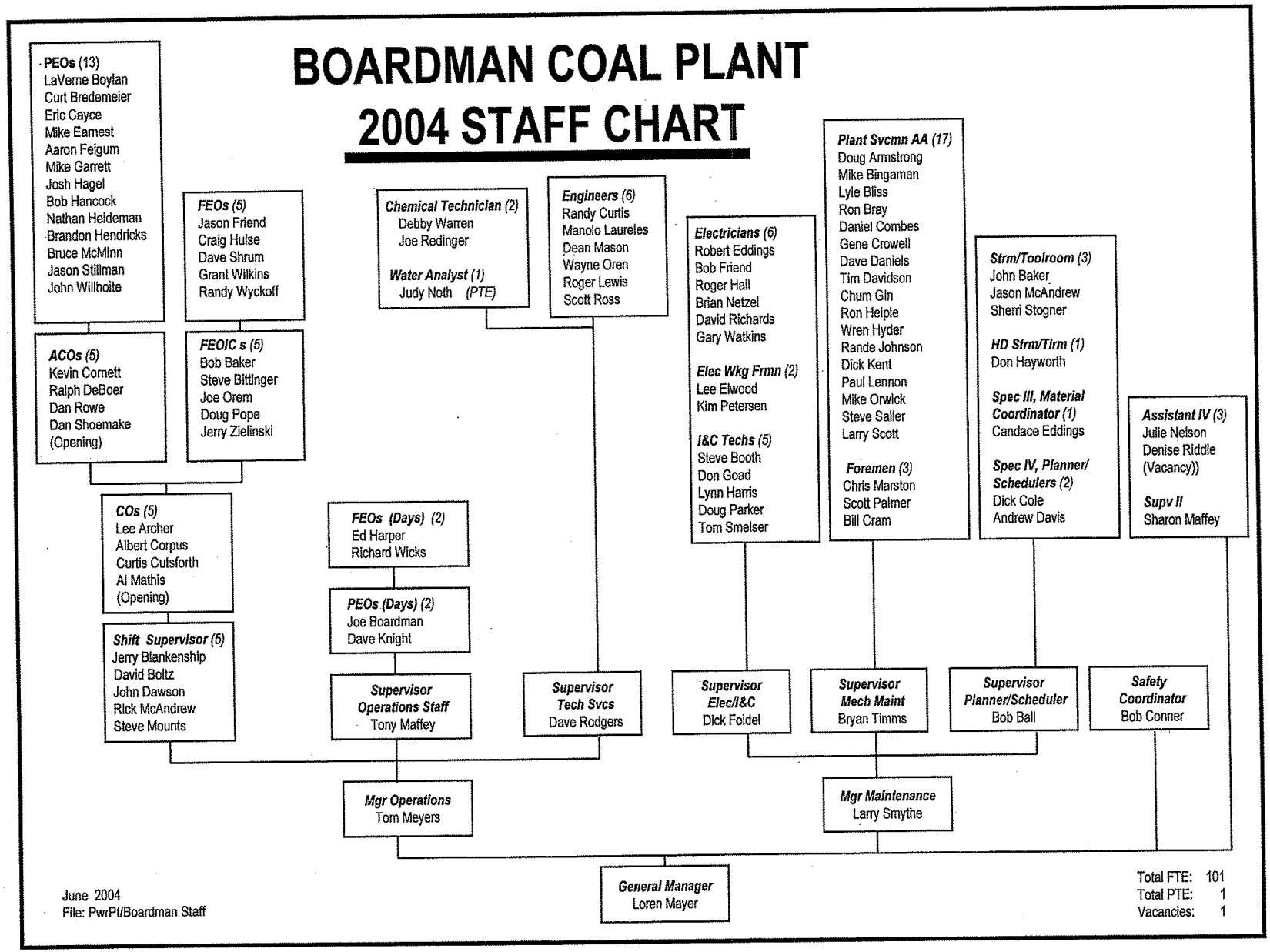
Power Supply Engineering Services



* Contract Employee

June 2004

UE 196 / PGE Exhibit / 706
Quennoz / 14


BOARDMAN COAL PLANT
2004 STAFF CHART
PEOs (13)
LaVerne Boylan
Curt Bredemeier
Eric Cayce
Mike Earnest
Aaron Feigum
Mike Garrett
Josh Hagel
Bob Hancock
Nathan Heideman
Brandon Hendricks
Bruce McMinn
Jason Stillman
John Willhoite
ACOs (5)
Kevin Cornett
Ralph DeBoer
Dan Rowe
Dan Shoemake
(Opening)
FEOs (5)
Jason Friend
Craig Hulse
Dave Shrum
Grant Wilkins
Randy Wyckoff
FEOIC s (5)
Bob Baker
Steve Bittinger
Joe Orem
Doug Pope
Jerry Zielinski
COs (5)
Lee Archer
Albert Corpus
Curtis Cutsforth
Al Mathis
(Opening)
Shift Supervisor (5)
Jerry Blankenship
David Boltz
John Dawson
Rick McAndrew
Steve Mounts
Chemical Technician (2)
Debby Warren
Joe Redinger
Water Analyst (1)
Judy Noth (PTE)
FEOs (Days) (2)
Ed Harper
Richard Wicks
PEOs (Days) (2)
Joe Boardman
Dave Knight
Supervisor Operations Staff
Tony Maffey
Engineers (6)
Randy Curtis
Manolo Laureles
Dean Mason
Wayne Oren
Roger Lewis
Scott Ross
Supervisor Tech Svcs
Dave Rodgers
Electricians (6)
Robert Eddings
Bob Friend
Roger Hall
Brian Netzel
David Richards
Gary Watkins
Elec Wkg Frmn (2)
Lee Elwood
Kim Petersen
I&C Techs (5)
Steve Booth
Don Goad
Lynn Harris
Doug Parker
Tom Smelser
Supervisor Elec/I&C
Dick Foidel
Plant Svcmn AA (17)
Doug Armstrong
Mike Bingaman
Lyle Bliss
Ron Bray
Daniel Combes
Gene Crowell
Dave Daniels
Tim Davidson
Chum Gin
Ron Helple
Wren Hyder
Rande Johnson
Dick Kent
Paul Lennon
Mike Orwick
Steve Sailer
Larry Scott
Foremen (3)
Chris Marston
Scott Palmer
Bill Cram
Supervisor Mech Maint
Bryan Timms
Strm/Toolroom (3)
John Baker
Jason McAndrew
Sherri Stogner
HD Strm/Tlrm (1)
Don Hayworth
Spec III, Material Coordinator (1)
Candace Eddings
Spec IV, Planner/ Schedulers (2)
Dick Cole
Andrew Davis
Supervisor Planner/Scheduler
Bob Ball
Assistant IV (3)
Julie Nelson
Denise Riddle
(Vacancy))
Supv II
Sharon Maffey
Safety Coordinator
Bob Conner
Mgr Operations
Tom Meyers
Mgr Maintenance
Larry Smythe
General Manager
Loren Mayer
June 2004
File: PwrPt/Boardman Staff
Total FTE: 101
Total PTE: 1
Vacancies: 1

Turbine Operating Deck

HPIP Turbine

Area Between Turbines Where Photo of Nut 25 Taken

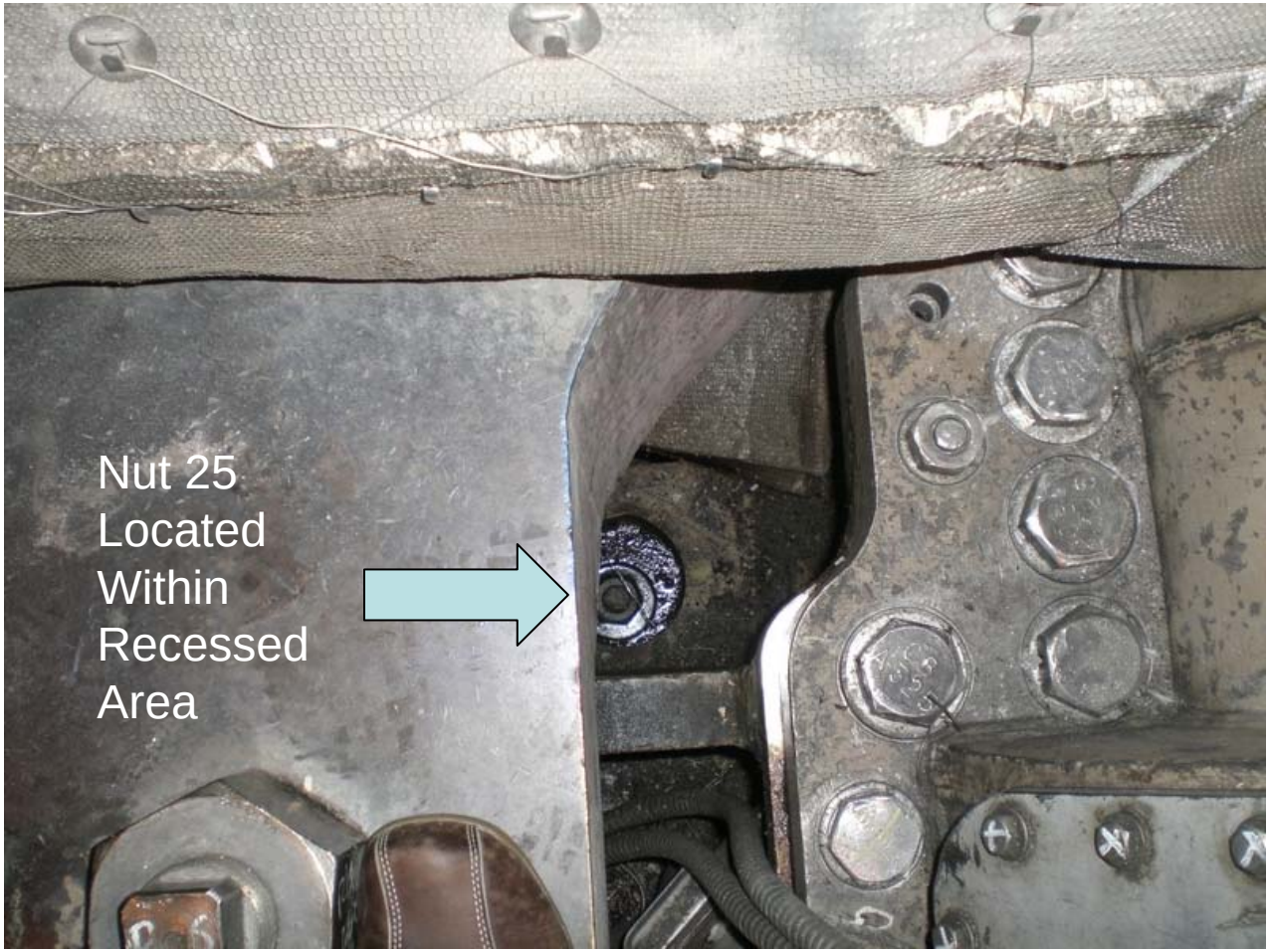
Turbine Operating Deck

LP1 Turbine

Note: Nut 25 is not visible from the turbine operating deck

Approach to Nut 25

Recessed Area With Flash



Recessed Area Without Flash