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July 17, 2009

Via Electronic and U.S. Mail

Public Utility Commission
Attn: Filing Center
550 Capitol St. NE #215
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Re: In the Matter of PORTLAND GENERAL ELECTRIC COMPANY
Application to Amortize the Boardman Deferral.
Docket No. UE 196

Dear Filing Center:

Enclosed please find the original and five copies of the confidential Opening Brief on behalf of the Industrial Customers of Northwest Utilities ("ICNU") in Re-Opened Docket. Also included is a redacted version of the same. All confidential material has been sealed under separate envelope.

Thank you for your assistance.

Sincerely yours,

/s/ Allison M. Wils
Allison M. Wils

Enclosures
cc: Service List

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that I have this day served the foregoing Opening Brief of the Industrial Customers of Northwest Utilities in Re-Opened Docket, upon the parties, on the official service list shown below for UE 196, via electronic and U.S. Mail.

Dated at Portland, Oregon, this 17th day of July, 2009.

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BEFORE THE PUBLIC UTILITY COMMISSION

OF OREGON

UE 196

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

OPENING BRIEF OF THE INDUSTRIAL CUSTOMERS OF NORTHWEST UTILITIES IN RE-OPENED DOCKET

REDACTED VERSION

July 17, 2009

TABLE OF CONTENTS

TABLE OF AUTHORITIES

Cases and Orders **Page**

Statutes

I. INTRODUCTION

The Industrial Customers of Northwest Utilities ("ICNU") respectfully requests that the Public Utility Commission of Oregon ("OPUC" or the "Commission") deny Portland General Electric Company's ("PGE" or the "Company") Application to amortize the replacement power costs associated with the 2005 outage at the Boardman generating plant. ICNU addresses the eight questions raised in the Commission's December 8, 2008 Bench Request (the "Bench Request") and focuses on the new evidence submitted following the Commission's re-opening of the record in this docket. ICNU also addresses the arguments raised in PGE's Opening Brief, submitted on June 12, 2009 ("PGE Opening Brief"). Contrary to PGE's assertions, the evidence submitted following the Commission's re-opening of the record establishes that:

- PGE did not have experience with the execution of projects similar to the 2000 upgrade of the LP turbines or the 2004 upgrade of the HP/IP turbine; thus, PGE was not qualified to prudently manage the activities of Siemens Westinghouse ("Siemens").

- In the absence of qualified and experienced in house staff, standard industry practice for the installation and maintenance of a new turbine would be to employ an experienced engineer/constructor or turbine expert to act as the utility's agent during the installation, startup and testing of the turbine. PGE imprudently failed to comply with this standard industry practice.

- PGE's decision to rely exclusively on Siemens' quality assurance/quality control ("QA/QC") program, coupled with PGE's failure to specify the project QA/QC requirements and to keep adequate records of Siemens QA/QC activities, deviated from standard industry practice and was imprudent.

- PGE failed to maintain adequate records, including records related to: 1) QA/QC procedures and documents regarding the LP turbine upgrade in 2000 and the HP/IP upgrade in 2004; 2) an inventory of parts in/parts out; 3) documents regarding the structural analysis (if any) that was performed to determine if the generator train could

support the upgraded turbines; and 4) PGE's review comments of Siemens' work.

- PGE's failure to inspect and discover the loose and missing nuts on the bearing support structure ("soleplate") of the new low pressure turbine 1 rotor ("LP1 rotor") is a significant QA/QC failure, which demonstrates PGE's imprudence.

- The LP1 turbine failed because of high cycle fatigue. The only causes that have been identified are misalignment of the turbine rotor and an unsecured bearing pedestal. Prudent management should have detected these problems.

Despite being given an additional and unwarranted opportunity to present more evidence in this case, PGE has not met its burden of establishing that it prudently maintained and operated the Boardman generating plant. The Commission should therefore deny PGE's request to recover the deferred power costs associated with the outage.

II. BACKGROUND

ICNU's prior briefs contain background sections summarizing the events leading up to the 2005 outage. ICNU incorporates those sections herein by reference.

On December 8, 2008, after three rounds of testimony and two rounds of briefing, the Commission issued a Bench Request, re-opening the record in this docket, and ordering PGE to provide responses to eight questions (including a number of sub-questions). On January 15, 2009, ICNU and the Citizens' Utility Board ("CUB") filed a joint application for reconsideration of the Commission's decision to re-open the record. On February 5, 2009, the Commission denied the joint application in Order No. 09-046. ICNU filed a petition for judicial review of the OPUC's order on April 3, 2009. On June 29, 2009, the Oregon Court of Appeals dismissed ICNU's petition for review on the grounds that Order No. 09-046 was not a final order.

PGE submitted its second round of direct testimony on January 30, 2009, responding to the questions raised in the Bench Request. On March 6, 2009, ICNU, Staff and

CUB submitted response testimony. PGE submitted rebuttal testimony on March 27, 2009. A hearing was held on April 20, 2009; and, the witnesses for PGE and ICNU were cross-examined at the hearing.

On June 12, 2009, PGE submitted its Opening Brief in the re-opened docket, focusing on the evidence introduced following the Commission's re-opening of the record and responding to the questions raised in the Bench Request.

III. LEGAL STANDARD

The Oregon deferred accounting statute provides that the "commission's final determination on the amount of deferrals allowable in the rates of the utility is subject to a finding by the commission that the amount was prudently incurred by the utility." ORS § 757.259(5) (2007). Thus, the purpose of this proceeding is to determine whether the Boardman outage costs that were deferred pursuant to Order No. 07-049 were prudently incurred. The utility "is *solely* responsible for justifying whether its strategy was prudent." Re Avista Corp., UG 176/UM 1279, Order No. 06-610 at App. A at 15 (Oct. 30, 2006) (emphasis added). Consequently, ICNU's role in this proceeding is responsive, and ICNU is not required to show that PGE and/or Siemens were *imprudent* to prevail. In UM 1147, the Commission explained the utility's burden in a deferred accounting proceeding as follows:

> [A]n applicant is initially responsible for both the burden of persuasion and the burden of production in support of a deferred accounting request. The burden of production shifts to other parties to present evidence that rebuts what an applicant presented. However, the burden of persuasion always rests with the applicant, regardless of opposition to the filing. Thus, for example, an applicant does not necessarily meet its burden merely by presenting unrebutted evidence. The evidence must be persuasive enough to satisfy all requirements required by statute.

Re OPUC, Docket No. UM 1147, Order No. 05-1070 at 5-6 (Oct. 5, 2005).

The Bench Request was motivated by the Commission's finding "that there [was] insufficient information to determine whether [PGE] was prudent in the installation and maintenance of the" failed LP 1 turbine that caused the Boardman outage. Bench Request at 1. In effect, the Commission found that PGE had failed to establish the prudence of its actions with respect to the issues in the Bench Request. Thus, if the Commission finds that PGE has not adequately addressed the Commission's questions, then the Commission should find that PGE has failed to carry its burden of proof in this proceeding and deny the Application.

IV. ARGUMENT

PGE's Opening Brief inaccurately characterizes the evidence in this proceeding and fails to adequately address the questions raised in the Commission's Bench Request. PGE makes the following arguments:

- PGE states that it relied exclusively on Siemens for the installation and maintenance of the new turbine and argues that ICNU "agrees" that this is consistent with common and desirable industry practice. Instead, ICNU provided testimony establishing that PGE deviated from standard industry practice by failing to employ an experienced engineer/constructor or turbine expert to manage the project. PGE also contravened Oregon law, which required PGE to employ a licensed structural engineer to analyze the design of the new turbine.

- PGE now argues that it actively monitored Siemens' manufacture, installation, and maintenance of the upgraded turbines. Contrary to PGE's assertions, in the absence of an experienced engineer/contractor, PGE's staff did not have the experience to prudently manage Siemens' activities. Further, PGE's claims are inconsistent with PGE's earlier statements in this case that PGE relied heavily on Siemens' expertise.

- PGE now admits that it did not implement its own independent QA/QC program to direct Siemens' operations, but argues that it complied with standard industry practice by relying exclusively on Siemens' QA/QC program. PGE, however, failed to specify the project QA/QC requirements and to keep adequate records concerning Siemens' QA/QC activities.

A. PGE Has Not Established that Its Exclusive Reliance on Siemens for Installation and Major Maintenance Services Associated with the Boardman Turbines Was Prudent

Question No. 1(a) in the Bench Request asks whether it is standard industry practice for a utility to rely exclusively on the original equipment manufacturer ("OEM")—in this case, Siemens—for the installation and maintenance of a new turbine. In response to this question, PGE acknowledges that using "engineers/constructors to oversee the construction of new generating facilities" is standard industry practice. PGE Opening Brief at 26. Given the complexity of installing a turbine in a new facility, PGE recognizes that it is imprudent to rely exclusively on a single OEM to oversee the entire project. Id. PGE, nonetheless, argues that it was prudent and consistent with standard industry practice to rely exclusively on Siemens because projects involving a single OEM are simple and do not require the involvement of an engineer/constructor. Id.

Contrary to PGE's assertions, the complexity of a project is not always proportional to the number of OEMs involved. In fact, installing a new turbine in an existing facility is much more complex than installing an original turbine in a new facility. Thus, because Siemens installed an entirely new turbine in the Boardman plant, the project was highly complex. In situations where a utility does not have sufficient in-house experience, standard industry practice for complex turbine upgrades is to employ an experienced engineer/constructor to manage the project. In the absence of an engineer/constructor, PGE lacked the experience to prudently monitor Siemens' work. Accordingly, PGE has not established that its exclusive reliance on Siemens for the installation and maintenance of the new turbine was prudent and consistent with standard industry practice.

1. The LP Turbine Upgrade was a Complex Project

PGE asserts that "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." Id. PGE therefore implies that the turbine upgrade was a simple project, involving nothing more than the replacement of a few minor components. This characterization of the turbine upgrade is misleading.

For example, "[t]he maximum diameter of the new rotor was increased from 100 inches on the original LP turbine to 126 inches on the new LP turbine. ICNU/200, Martin/2. [redacted] Confidential ICNU/400, Martin/6; PGE Opening Brief at 37. In addition, "[t]he new LP turbines are a completely new design. The original LP turbines were designed and manufactured by Westinghouse Electric in Lester, Pennsylvania in 1977. Siemens Westinghouse designed the new LP turbines in Orlando, Florida in 1999." ICNU/200, Martin/2. Finally, PGE acknowledges that "this was a new design[,]" it was "unproven," there "were risks involved," and that the new blades "look[ed] *markedly* different." July 23 Tr. at 100-01 (emphasis added). Thus, it is clear that the new LP1 turbine had an entirely *new* rotor, with new turbine blades, and involved much more than the "replacement of a few components." PGE Opening Brief at 26.

PGE asserts that the upgrade to the LP turbines "was far less complex than the construction of a new generating facility, which usually takes years to complete." Id. ICNU does not dispute that it takes longer to construct an entire generating facility than it does to replace a turbine in an existing plant. Rather, Mr. Martin testified that replacing the turbine in an *existing facility* is more complex than installing a turbine in a *new facility*. ICNU/400, Martin/5.

The installation of a new turbine in an existing facility is more complex because it requires "complex structural, mechanical, electrical, and control interfaces between the new turbine and the existing plant." Id. Similarly, the [redacted] of the new rotor required that a dynamic structural analysis be performed to ensure that the supporting structure would be able to support the static and dynamic loads imposed on the new turbine. Confidential ICNU/400, Martin/6. When turbines are installed in a new facility, conversely, the structural, mechanical, electrical, and control interfaces are easier to implement because the facility and the turbine are designed and constructed concurrently. Accordingly, although it involved a single OEM, the installation of the new turbine at the Boardman facility was a highly complex project.

2. PGE Lacked the Experience to Prudently Monitor Siemens' Installation and Maintenance

In response to Question No. 5 in the Bench Request, PGE asserts that it "actively monitored Siemens' manufacture, installation, and maintenance of the upgraded turbines." PGE Opening Brief at 22. PGE states that it conducted this monitoring through various "witness points" and "QA/QC reviews" allowed under the 2000 turbine upgrade contract with Siemens ("Turbine Upgrade Contract"). Id. at 23. PGE now claims that it actively supervised Siemens; however, in the earlier phases of this case, PGE said that they relied on Siemens because Siemens was the expert. Specifically, PGE justified its exclusive reliance on Siemens for the installation and maintenance of the turbine by emphasizing its lack of experience with similar projects:

> 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 LP1 turbine array.

PGE Reply Brief at 3 (emphasis added).

Further, the evidence demonstrates that "[t]his was the first rotor replacement that PGE had performed[]" and that this was the first turbine replacement that PGE's QA/QC observer had ever been "solely in charge of." April 20 Tr. at 276. Thus, PGE lacked the expertise and experience to prudently manage Siemens' work. PGE's recent unsupported assertion that its "employees had significant experience in the installation and maintenance of the LP turbines" is plainly inconsistent with PGE's earlier position. PGE Opening Brief at 29.

3. PGE Should Have Employed an Experienced Engineer/Constructor or Turbine Expert to Manage the Project

PGE argues that Mr. Martin "agrees" that it is consistent with common and desirable industry practice to rely on the OEM for installation and maintenance of new LP turbines. PGE Opening Brief at 11. Mr. Martin, however, testified that:

> Because of the complexities of this project and the inexperience of its staff, PGE should have retained the services of an Engineer/Constructor that was experienced with the design and installation of replacement turbine generators in large power plants.

ICNU/400, Martin/2.

Although Mr. Martin agreed that it is a common and desirable practice for a utility to rely on the OEM in some circumstances, Mr. Martin testified that is not a common and desirable practice for an *inexperienced* utility to rely exclusively on the OEM for *complex* projects, such as the installation of a new LP turbine in an existing facility. Id. Rather, standard industry practice for complex turbine upgrades involving an inexperienced utility is to retain the services of an experienced engineer/constructor to manage the project. Id. at 2, 4-5, 7, 21. The engineer/constructor would normally be responsible for: 1) training the utility's staff in the operation and maintenance of the turbine generator; 2) preparing operation and maintenance

procedures for the plant; 3) specifying the QA/QC requirements on behalf of the utility and; 4) retaining the OEM for technical support. Id. at 5. This position is consistent with Mr. Martin's earlier testimony that it was imprudent for PGE to "not provide for independent quality assurance and quality control to monitor Siemens' maintenance of the turbines" ICNU/100, Martin/4. In sum, given the complex nature of the turbine replacement and PGE's inexperience with similar projects, PGE should have retained an experienced engineer/constructor or turbine expert to manage the project. PGE's failure to do so deviated from standard industry practice and was imprudent.

4. PGE Has Not Established that Other Utilities Rely Exclusively on the OEM for all Installation and Maintenance Work or that Siemens Regularly Provides Such Services

Question No. 1(b) in the Bench Request asks PGE to provide examples of other utilities that have relied exclusively on the OEM for all installation and maintenance services. Bench Request at 1. In response to this question, PGE conducted a survey of 77 utilities, 13 of which responded. ICNU/400, Martin/8. [redacted] Confidential ICNU/400, Martin/8. [redacted]

In addition to its limited size, the survey contained the following ambiguous question: "Did you have the OEM install or verify proper installation of the steam turbine during original installation?" ICNU/400, Martin/8. This question is ambiguous because it concerns two separate activities (installation and verification). Id. In effect, a respondent could truthfully answer "yes" to this question in a situation where the OEM merely supervised or "verified" the installation of the turbine. PGE, however, interpreted all affirmative answers to mean that the OEM provided *all* installation services normally provided by an engineer/constructor. PGE

states that this question "was designed to discover whether it is common practice for the OEM to be involved in the installation and maintenance of turbines, *either* through actual installation *or* monitoring and verification." PGE Opening Brief at 15 (emphasis added). In order to adequately address the Commission's request, PGE should have asked whether exclusive reliance on the OEM for actual installation, rather than passive monitoring and verification, is consistent with standard industry practice. PGE's survey therefore fails to establish that other utilities regularly rely on the OEM for all installation services.

Further, Question No. 1(c) in the Bench Request asks PGE to provide examples of other instances in which Siemens has provided all installation and maintenance services to PGE and other utilities. Bench Request at 1. In response to this question, PGE submitted Exhibit PGE/502C, which is a "list of facilities at which Siemens has provided installation or maintenance services for turbines." PGE Opening Brief at 16. According to PGE, the purpose of this exhibit is to establish that [redacted] Confidential April 20 Tr. at 181. PGE's list of upgraded turbines, however, fails to establish that Siemens' had experience with installing similar turbine upgrades. [redacted] Id. [redacted] Id. at 181-82. [redacted] Id. at 182.

PGE's response also fails to address the Commission's request because Question No. 1(c) specifically requests examples of other instances in which PGE or another utility has exclusively relied on Siemens for all installation and maintenance services. PGE's list, nonetheless, fails to indicate whether the utilities relied *exclusively* on Siemens for *all* installation

and maintenance services. Because PGE has failed to adequately address this question, the Commission should find that PGE has failed to carry its burden of proof in this proceeding.

B. PGE Has Not Established that its Exclusive Reliance on Siemens' QA/QC Program Was Prudent and Consistent with Standard Industry Practice

Throughout this proceeding, ICNU has consistently argued that PGE's exclusive reliance on Siemens' QA/QC program and failure to implement its own independent program was imprudent and deviated from standard industry practice. E.g., ICNU/100, Martin/4; ICNU/200, Martin/1-2; ICNU Opening Brief at 17-18; ICNU Reply Brief at 3-4. Prior to the Commission's re-opening of the record, PGE denied this allegation by asserting that "PGE staff provided independent [QA/QC] of Siemens' manufacturing, installation, and maintenance of both the LP turbines installed in 2000 and the HP/IP turbine installed in 2004." PGE/300, Quennoz/12-13. Contrary to its earlier position, in response to Question No. 4 in the Bench Request, PGE now admits that it "did not use its own separate QA/QC program to direct Siemens' operations" but rather, relied exclusively on Siemens' QA/QC program. PGE Opening Brief at 21. PGE asserts that "[r]eliance on a vendor's certified QA/QC program, together with appropriate monitoring, is accepted industry practice." Id.

PGE's exclusive reliance on Siemens' QA/QC program and failure to implement its own independent program was imprudent and deviated from standard industry practice. In the alternative, exclusive reliance on a vendor's QA/QC program is only prudent and consistent with standard industry practice if the utility or its engineer/constructor specifies the QA/QC requirements for the project and adequately documents the vendor's QA/QC activities. Here, however, the evidence demonstrates that PGE failed to specify the project QA/QC requirements and did not keep adequate records of Siemens' QA/QC activities. In addition, Siemens QA/QC program is focused primarily on *manufacturing*. It was therefore imprudent for PGE to not

implement a separate QA/QC program for the *installation* of the turbine. [redacted] Confidential ICNU/103, Martin/10. [redacted] The Commission should not allow a utility to contract away its obligation to have a prudent QA/QC program [redacted].

1. PGE Failed to Specify the Project QA/QC Control Requirements for the LP1 Turbine Upgrade

[redacted] Confidential ICNU/400, Martin/13 (*citing* PGE/510C, Quennoz/76-77). [redacted] Id. [redacted] Mr. Martin testified that standard industry practice is for either the utility or its retained engineer/constructor to specify the QA/QC requirements for the project. ICNU/400, Martin/15. Because PGE did not retain an engineer/constructor to manage the turbine upgrade, this duty fell solely on PGE.

PGE argues that it [redacted] because it "ensured that Siemens had [a QA/QC] program in place during [the] pre-installation meetings at Boardman." PGE Opening Brief at 19. [redacted] Confidential April 20 Tr. at 307; ICNU/402, Martin/65-69. [redacted]

[redacted] Confidential April 20 Tr. at 306-08. Contrary to PGE's assertions, the mere discussion of a few QA/QC issues at the pre-construction conference does not satisfy [redacted] specifying the QA/QC requirements for the project. In fact, PGE did not even retain a copy of Siemens' QA/QC program after installation in 2000 and admits that it cannot produce one. PGE Opening Brief at 21; see also Confidential April 20 Tr. at 192. In the absence of any documentation of Siemens' QA/QC program, and any mention of it in the pre-construction conference meeting minutes, PGE cannot establish that it specified the QA/QC requirements for the project. This failure deviates from standard industry practice and was imprudent. ICNU/400, Martin/15.

2. PGE Has Not Established that Siemens' QA/QC Program Addressed both the Manufacture and Installation of the Turbine

In response to Question No. 4(a) in the Bench Request, PGE stated that it reviewed and accepted Siemens' QA/QC program because it is ISO 9001 certified and, therefore, meets the industry standard. PGE Opening Brief at 20. Contrary to PGE's assertions, the mere fact that Siemens' QA/QC program is ISO 9001 certified does not establish that Siemens had an adequate program for the installation of the turbine. A company's formal QA/QC program applies only to the specific company, its staff, and the products it produces. ICNU/400, Martin/11-12. Because Siemens is an equipment *manufacturer*, Siemens' QA/QC program is, unsurprisingly, focused on manufacturing. Id. at 12.

PGE's conclusory statements that "Siemens followed a QA/QC program that covered both manufacturing and installation" and that Siemens' QA/QC program "had the necessary components" find no support in the record. PGE Opening Brief at 19, 21. [redacted]

[redacted] Confidential April 20 Tr. at 192; PGE Opening Brief at 21. In the absence of a copy of Siemens' QA/QC program, it is unclear whether Siemens' program contains any of the "[k]ey elements" that, according to PGE, should be included in any robust QA/QC program. PGE Opening Brief at 20. Accordingly, PGE has failed to carry its burden of establishing that Siemens—an original equipment *manufacturer*—had a QA/QC program that adequately covered the *installation* of the turbine.

3. PGE Failed to Adequately Document Siemens' QA/QC Activities

PGE acknowledges that "details of record storage, retention, and retrieval" are an important part of a QA/QC program. April 20 Tr. at 190; PGE/508, Quennoz/5. Accordingly, PGE was required to adequately document Siemens' QA/QC activities *and* implement a procedure for storing, retaining and retrieving that documentation. The evidence in this proceeding, however, demonstrates that PGE either: 1) failed to adequately document Siemens' QA/QC activities; or 2) failed to adequately store, retain and retrieve that documentation. For example, ICNU requested that PGE provide records documenting which staff members PGE assigned to inspect Siemens' installation of the LP turbine in 2000 and the HP/IP turbine in 2004. ICNU/400, Martin/14 (*citing* ICNU/402, Martin/78-87). PGE was unable to produce such information. Id. ICNU also requested copies of all reports prepared and submitted by PGE employees to the Boardman management during the installation of the LP turbines. ICNU/400, Martin/14 (*citing* ICNU/402, Martin/73). In response, PGE stated that it "did not retain copies of the Siemens meeting reports for the LP turbine upgrade." ICNU/402, Martin/73; April 20 Tr. at 268-69. PGE was also unable to produce written records of any PGE review comments of Siemens' work during installation. ICNU/400, Martin/15 (*citing* ICNU/402, Martin/88).

Further, the weight increase of the LP1 turbine required that a structural analysis be performed to ensure that the supporting structure was able to support the static and dynamic loads imposed on the new turbine. ICNU/400, Martin/6. ICNU requested information about whether Siemens performed a structural analysis on the new LP turbines in 2000 and the HP/IP turbines in 2004. ICNU/400, Martin/6; ICNU/402, Martin/3. In response, PGE stated that "Siemens performed the structural analysis" for both upgrades and that it "has requested supporting documentation from Siemens." Id. PGE has not produced any documentation of the structural analysis. In fact, PGE now acknowledges that Siemens "did not supply [PGE]" with "any documentation for [Siemens'] efforts" regarding the structural analysis and that PGE "*never saw the structural analysis*." April 20 Tr. at 263 (emphasis added). PGE's failure to document this important step demonstrates the inadequacy of PGE's documentation efforts.

PGE and Siemens also failed to keep an inventory of "parts-out and parts-in," or a record of "torque applied to critical fasteners" during the installation of the turbine. ICNU/402, Martin/89-90. A "parts-out and parts-in" inventory is an important part of a QA/QC program. See ICNU/400, Martin/15. In addition, PGE's quality control observer for the HP/IP upgrade acknowledges that she did not retain job notes from the HP/IP upgrade because she "never thought that [she] would need them again." April 20 Tr. at 266-67.

Finally, PGE's assertion that it took "detailed job notes and hundreds of photographs from the LP installation" is misleading. PGE Opening Brief at 29. In order to adequately document Siemens' QA/QC activities, PGE should have documented its *discussions with Siemens* by retaining copies of the Siemens' meeting reports for the LP turbine upgrade. PGE's documentation of its own independent observations, without any documentation of PGE's communications with Siemens, is inadequate. Thus, PGE's failure to "retain copies of the

Siemens meeting reports for the LP turbine upgrade" and to produce written records of any PGE review comments of Siemens' work, demonstrates PGE's inadequate documentation of Siemens' QA/QC activities. ICNU/402, Martin/73, 88; April 20 Tr. at 268-69.

C. PGE Has Not Demonstrated that It Employed a Licensed Oregon Structural Engineer to Analyze the Turbine Upgrade, as Required by Oregon Law

Oregon law prohibits engineers from providing engineering services for "significant structures unless [they] possesses a valid professional structural engineer certificate of registration issued by the board [of Examiners for Engineering and Land Surveying]." ORS § 672.107(3). The Boardman generating plant appears to be a "significant structure" within the meaning of ORS § 672.107(3) because the facility is: 1) 45 feet above average ground level; and 2) customarily occupied by human beings. ORS § 672.107(1)(a)(D). Thus, Oregon law required PGE to employ a licensed structural engineer to design the Boardman facility, and a licensed structural engineer should have reviewed and certified any modifications to the Boardman structure or its equipment, including the installation of new turbines.

PGE's primary QA/QC observer for the turbine upgrade acknowledges that she is not a licensed structural engineer in Oregon. April 20 Tr. at 263. In addition, the substantial weight increase of the upgraded LP rotors required that a complete structural analysis of the new turbine be performed. ICNU/400, Martin/6. Under ORS § 672.107, a structural analysis of the turbine at the Boardman facility would have to be performed by a licensed structural engineer. When asked if a licensed structural engineer performed a structural analysis, PGE stated that

[redacted]

Confidential ICNU/402, Martin/3-5. When pressed on the issue, PGE's QA/QC observer acknowledged that she did "not know" whether Siemens employed an individual

licensed as a structural engineer in Oregon. April 20 Tr. at 263. In fact, PGE presented no evidence demonstrating that a structural analysis was ever performed. The fact that PGE cannot show that a structural analysis was performed or that it was performed by a licensed Oregon structural engineer shows that PGE has failed to carry its burden of proof in this proceeding.

D. PGE's Failure to Inspect or Discover the Loose and Missing Soleplate Nuts is a Significant QA/QC Failure

In its Opening Brief, PGE repeats its argument that "[t]he missing [sole plate] nuts were not easily visible from the operating deck at Boardman, either while the plant was in operation or during the LP upgrade." PGE Opening Brief at 38. PGE further asserts that "the root cause analyses point to [the missing nuts] as only one of several potential contributing causes" of the outage. Id. Contrary to PGE's assertions, the fact the missing nuts were neither *easily* visible nor the *sole* cause of the Boardman outage is not dispositive. In prior briefs, ICNU has established that the missing and loose nuts were visible upon prudent inspection and that the missing nuts likely contributed to the failure. ICNU Opening Brief at 13-15; ICNU Reply Brief at 9-11. ICNU also established that the missing nuts would have been easily visible during the major turbine work performed in 2000, 2002, 2004, and 2005, because the vast majority of the turbine was removed. ICNU Reply Brief at 10-11.

1. The Missing and Loose Nuts Were a Likely Cause of the Outage

Alstom Power, Inc. ("Alstom") concluded that the primary propagation factor of the cracked rotor was [redacted] Confidential Exhibit PGE/105C-B, Quennoz/41. Alstom further stated that [redacted] Id. (emphasis added). Essentially, the LP1 Rotor failed after experiencing bending loads likely caused by a [redacted]

[redacted] Id. According to the minutes from a PGE Owners' Meeting held on February 20, 2007, [redacted] Confidential Exhibit ICNU/312 at 4 (emphasis added). The Owners' Meeting minutes further state that [redacted] Id. (emphasis added). Likewise, installing the missing nuts resulted in a [redacted] Id. Thus, contrary to PGE's assertions, ICNU's focus on the missing nuts is clearly not "misleading." PGE Opening Brief at 38.

2. The Location of the Missing Nuts Was Visible to Mr. Martin During His February 20, 2009 Visit to the Boardman Facility

In its Opening Brief, PGE provides a detailed description of the process required to view the location of the missing nuts and asserts that "[t]his location cannot be seen from the operating deck." PGE Opening Brief at 38. Mr. Martin visited the Boardman facility on February 20, 2009, for the purpose of observing the location of the loose and missing nuts. ICNU/400, Martin/16. Mr. Martin observed that, although the missing nuts are somewhat difficult to see when the turbine is assembled, they are visible. Id. at 17. Further, the fasteners that were reported to be loose were clearly visible to Mr. Martin from the operating deck. Id. Mr. Martin took pictures of the two missing nuts and compared them to pictures of the same nuts taken by the PGE technician who first observed them in June 2006. ICNU/404, Martin/1; ICNU/405, Martin/1. Plainly, the PGE technician was able to see that they were missing without dissembling the turbine. ICNU/400, Martin/17. At the very least, the missing nuts were visible in 2000 and 2004 when the turbine was completely disassembled and reassembled. Id. In sum, it is clear that the missing nuts were visible upon *prudent* observation. The fact that the missing

nuts were somewhat difficult to see should not relieve PGE of its duty to prudently maintain and inspect the Boardman facility. When the new turbines were installed in 2000 and 2004, PGE should have checked that the sole plate nuts were properly installed and torqued.

3. PGE Acknowledges that the Missing Nuts Were "Unsafe"

[redacted]. Confidential PGE/517C, Quennoz/1. PGE retained Sensoplan to determine if a "soft foot" or loose sole plate condition existed. ICNU/501 at 1. [redacted] Confidential PGE/517C, Quennoz/5. When asked why Sensoplan loosened only one nut at a time, PGE acknowledged that "[i]t would be unsafe to loosen several nuts." April 20 Tr. at 287. If it is unsafe for multiple nuts to be *loosened*, it is certainly unsafe for multiple nuts to be *missing*. In addition, PGE also acknowledged that "[i]t is likely that this condition existed for years before the upgrade." PGE Opening Brief at 38. Because this condition was admittedly "unsafe," allowing it to persist for "years" was imprudent.

E. Evidence Introduced Following the Commission's Re-Opening of the Record Further Demonstrates that the Turbine Failed Because it was Misaligned

In prior briefs, ICNU argued that the LP1 rotor failed because it was misaligned and that Siemens' incorrect setting of the shaft elevation at Bearing No. 3 caused the misalignment. ICNU Opening Brief at 12-13; ICNU Reply Brief at 1, 4, 7, 12. ICNU incorporates these sections herein by reference.

[redacted]

[redacted]. Confidential PGE/519C, Quennoz/7. [redacted] Id. [redacted] Id. at 27. [redacted] Id. at 52. [redacted] Confidential April 20 Tr. at 228, 230. [redacted] Id. at 229. [redacted] See ICNU Opening Brief at 10-12. [redacted]

F. PGE's Characterization of the Scope of this Proceeding Is Overly Narrow and Misleading

PGE states that "the central focus of this docket is on whether PGE's actions in connection with the upgrade of the LP turbines were prudent." PGE Opening Brief at 38. PGE argues that because the missing soleplate nuts "were not involved in any way in the upgrade," that they are not relevant to this case. Id. The central focus of this case, however, is on whether

the deferred power costs that PGE is requesting permission to amortize were prudently incurred. ORS § 757.259(5). Specifically, PGE is required to demonstrate the prudence of its actions with respect to: 1) the plant startup in 1980; 2) the replacement of the LP turbine rotors in 2000; 3) the HP/IP rotor upgrade in 2004; 4) the shutdown, inspection and repair of the LP1 rotor that occurred in 2005; and 5) the ongoing maintenance, inspection and alignment of the turbine. The scope of this case, therefore, involves much more than determining whether "PGE's actions in connection with the upgrade of the LP turbines were prudent." PGE Opening Brief at 38. The Commission should reject PGE's attempts to narrow the scope of this proceeding.

PGE also repeats its argument that it should prevail in this case because it deferred less than its total replacement power costs. E.g., PGE's Opening Brief at 1, 6-7, 40. In UM 1234, the Commission determined that PGE should only be allowed to defer those costs in excess of normal business risk. Re PGE, OPUC Docket No. UM 1234, Order No. 07-049 at 19 (Feb. 12, 2007). Hence, PGE is already compensated by current rates for those costs that were not deferred. More importantly, PGE is obligated to show that all of the costs that it currently seeks to recover are prudent. ORS § 757.259(5). Accordingly, the fact that PGE incurred replacement power costs in excess of the amount that it deferred is irrelevant to whether the deferred costs were prudently incurred and recoverable in this case.

G. The Commission's Decision to Re-Open the Record Violated Procedural Due Process

On February 5, 2009, the OPUC denied ICNU's and CUB's joint application for reconsideration of the Commission's decision to re-open the record in this proceeding. ICNU and CUB asserted that the Commission's decision to re-open the record and provide PGE with an additional and unwarranted opportunity to present evidence violated procedural due process.

ICNU reasserts and incorporates the arguments made in the joint-petition by reference and will not repeat them here.

H. Remaining Issues

ICNU will not reargue all of the arguments from the prior round of briefing. Below is a list of these issues, and ICNU incorporates its arguments made in its Opening and Reply Briefs and requests that the OPUC consider them in determining whether to grant PGE's UE 196 Application:

- The Turbine Upgrade Contract involved the installation of an experimental turbine design at the Boardman facility. PGE assumed all responsibility for any consequential damages resulting from the failure of the new turbine and failed to mitigate the risk of an experimental turbine. ICNU Opening Brief at 1-2, 8-9; ICNU Reply Brief at 7-8.

- PGE cannot contract away its statutory burden to prudently operate and maintain its facilities. ICNU Opening Brief at 6-7.

- The Boardman LP1 turbine experienced a "high cycle fatigue" failure in November 2005, after only 5 years of operation. Turbines that are properly designed and installed do not fail from "high cycle fatigue," and Siemens specifically stated that it has never experienced a similar failure. ICNU Opening Brief at 12, 15; ICNU Reply Brief at 4, 6-7.

- Despite claims that it was doing so, PGE failed to obtain an independent root cause analysis to provide an unbiased evaluation of the cause of the Boardman outage. Even if considered, the root cause analyses performed by Alstom and Siemens do not demonstrate that PGE acted prudently. ICNU Opening Brief at 9-16; ICNU Reply Brief at 5-7.

- PGE operated the Boardman plant well above its maximum design capacity between 2000 and the failure in 2005, which was a contributing factor to the failure. ICNU provided data from PGE's own records that shows PGE operated at outputs above the design output most of the time before the failure. ICNU Opening Brief at 16-17; ICNU Reply Brief at 8-9.

V. CONCLUSION

PGE has failed to establish that its exclusive reliance on Siemens for the installation and maintenance of the LP1 turbine was prudent and consistent with standard industry practice. Due to the complex nature of the turbine replacement and PGE's lack of experience with similar projects, PGE should have hired an experienced engineer/constructor or turbine expert to manage the project. In addition, PGE has failed to establish that its exclusive reliance on Siemens' QA/QC program was, under the circumstances, prudent and consistent with standard industry practice. PGE would have the Commission believe that the cause of the Boardman outage is some grand mystery; however, no reasonable explanation has been given for why the LP1 rotor at the Boardman facility failed, other than misalignment of the turbine and the loose and missing sole plate fasteners.

The record in this case is replete with evidence of missing parts, missing records, inadequate control measures, and unreliable alignment measurements. These failures point to a systemic failure of management oversight at the Boardman facility. A well documented QA/QC program for the design, installation and maintenance of the LP1 turbines and the HP/IP turbine should have discovered these problems. PGE has therefore failed to adequately address the questions contained in the Bench Request and continues to fall short of carrying its burden of proof in this proceeding. Accordingly, the Commission should deny PGE's UE 196 Application.

Dated this 17th day of July, 2009.

Respectfully Submitted,

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