

Docket No. UE 263  
Exhibit PAC/400  
Witness: Dana M. Ralston

**BEFORE THE PUBLIC UTILITY COMMISSION  
OF OREGON**

**PACIFICORP**

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**Direct Testimony of Dana M. Ralston**

**March 2013**

**DIRECT TESTIMONY OF DANA M. RALSTON**

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1 **Q. Please state your name, business address, and present position with**  
2 **PacifiCorp d/b/a Pacific Power (PacifiCorp or Company).**

3 A. My name is Dana M. Ralston. My business address is 1407 West North Temple,  
4 Suite 320, Salt Lake City, Utah 84116. My present position is Vice President of  
5 Thermal Generation. I am responsible for the coal, gas, and geothermal resources  
6 owned by the Company.

7 **QUALIFICATIONS**

8 **Q. Briefly describe your education and professional experience.**

9 A. I have a Bachelor of Science degree in Electrical Engineering from South Dakota  
10 State University. I have been the Vice President of Thermal Generation for  
11 PacifiCorp Energy since January 2010. Before 2010, I held a number of positions  
12 of increasing responsibility with MidAmerican Energy Company for 28 years in  
13 the generation organization, including the plant manager position at the Neal  
14 Energy Center, a 1600 megawatt generating complex. In my current role, I am  
15 responsible for the operation and maintenance of the thermal generation fleet.

16 **PURPOSE OF TESTIMONY**

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

18 A. The purpose of my testimony is to provide information supporting the prudence of  
19 the turbine upgrade project at Unit 2 of the Jim Bridger generating plant located  
20 near Rock Springs, Wyoming. I discuss the scope, benefits, and economic  
21 analysis of the project.

**PROJECT DESCRIPTION**

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**Q. Please describe the Jim Bridger Unit 2 turbine upgrade project.**

A. Recent advances to steam turbine design have resulted in increases in efficiency of new steam turbines. These improvements are transferable to existing power plants. The turbine upgrade project at Jim Bridger Unit 2 consists of installing a new steam turbine that includes the high pressure, intermediate pressure, and low pressure turbine sections with the new advanced design. The upgraded turbine is expected to produce 12 megawatts of additional generation with no increase in fuel input or emissions at full load.

**Q. Did PacifiCorp conduct a competitive bidding process for the turbine replacement project?**

A. Yes. In 2008, PacifiCorp solicited and competitively bid the procurement and installation of turbine upgrades for all units of the Jim Bridger generating plant. At the conclusion of the bidding process, the Company awarded the contract to Mechanical Dynamics and Analysis, LTD, a wholly owned subsidiary of Hitachi, Ltd.

**Q. Were issues encountered during the project?**

A. Yes. After the design had been finalized by the supplier and the manufacturing process started, the supplier provided engineering data that was used in a transmission study. The transmission study revealed that the mechanical resonance of the turbine would conflict with the transmission system electrical resonance. This phenomenon is called sub-synchronous resonance (SSR).

1 SSR has the potential to cause catastrophic damage to the turbine shaft requiring a  
2 lengthy outage to repair.

3 **Q. What did PacifiCorp do when this information was discovered?**

4 A. Due to the SSR issue, PacifiCorp suspended the fabrication of the Jim Bridger  
5 Unit 1 low pressure turbine in September 2009 and the high pressure,  
6 intermediate pressure, and low pressure turbines for Jim Bridger Units 2, 3, and 4  
7 in February 2010, until a resolution to the SSR issue could be found. In  
8 December 2010, notice was sent to the vendor that the contracts for the high  
9 pressure, intermediate pressure, and low pressure turbines for Jim Bridger Units 2  
10 and 4 and the low pressure turbine for Jim Bridger Unit 3 would be terminated.

11 **Q. Did PacifiCorp solicit the assistance of third-party experts to study the SSR  
12 issue?**

13 A. Yes. To fully study and understand what solutions could be applied to resolve the  
14 SSR issue, the Company hired General Electric to conduct a series of studies.

15 **Q. Was a solution to the SSR issue found?**

16 A. Yes. In November 2011, General Electric determined that installation of a  
17 blocking filter at the generator step up transformer would resolve the SSR issue.  
18 The estimate for the blocking filter for Jim Bridger Unit 2 is approximately  
19 \$4.4 million and is part of the project costs used in the economic evaluation of the  
20 project discussed below.

21 **Q. After a solution was found, what did PacifiCorp do?**

22 A. PacifiCorp negotiated with the vendor to determine the feasibility and cost of  
23 finishing and installing the partially fabricated Jim Bridger Unit 1 low pressure

1 turbine and the Jim Bridger Unit 3 high pressure and intermediate pressure  
2 turbines, and installing all three sections at Jim Bridger Unit 2. In October 2011,  
3 the vendor provided a proposal for the modified scope. PacifiCorp evaluated the  
4 total costs of the project to determine the current value to the customers with the  
5 updated costs and scope. PacifiCorp determined that with the new costs and  
6 scope, the project's PVRR(d) analysis showed a \$28.9 million benefit to  
7 customers from the turbine upgrade project. The PVRR(d) analysis compares  
8 operation of the unit with the upgraded turbine to continued operation of the unit  
9 with the existing turbine.

10 PacifiCorp then finalized the termination of the Jim Bridger Unit 2 and 4  
11 turbines and the low pressure section of the Jim Bridger Unit 3 turbine, and  
12 restated the contracts to complete the procurement and installation of the  
13 upgraded turbine for Jim Bridger Unit 2 in December 2011.

14 **Q. What is the capital investment associated with the turbine upgrade project?**

15 A. The turbine upgrade project is expected to cost approximately \$31.0 million on a  
16 total-company basis. The capital costs are included in this case as a known and  
17 measurable change to the test period as detailed by Mr. Gary W. Tawwater in  
18 Exhibit PAC/1002, Tawwater/8.5.5.

19 **Q. When will the turbine upgrade project be placed in service?**

20 A. The project is expected to be placed in service in May 2013.

**PROJECT BENEFITS**

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2 **Q. What are the benefits of the turbine upgrade project?**

3 A. Recent advances to steam turbine design have resulted in increases in efficiency  
4 of new steam turbines. These improvements are transferable to existing power  
5 plants and, when applied to Jim Bridger Unit 2, will improve efficiency and  
6 increase the maximum output with no increase in fuel input.

7 **Q. What is the expected increase in maximum output?**

8 A. The expected increase in maximum output is 12 megawatts. This is due to the  
9 increase in turbine efficiency. This increase will occur with no additional fuel  
10 input required at maximum output.

11 **Q. Will there be efficiency gains over the entire normal operating range of the  
12 unit?**

13 A. Yes, the new turbine will consume less fuel for the same megawatt output over  
14 the normal operating range of the unit when compared to the existing turbine.  
15 This improvement will average approximately 500 BTU/kwh over the normal  
16 operating range. This benefit was not included in the PVRR(d) benefit listed  
17 below because the total fuel savings benefit is very dependent on the operating  
18 load profile of the unit, which can change from year to year, and to add  
19 conservatism to the analysis.

20

**PROJECT ECONOMICS**

21 **Q. Did the PVRR(d) analysis show a benefit to customers from this project?**

22 A. Yes. The PVRR(d) analysis shows a \$28.9 million benefit to customers from the  
23 turbine upgrade project when compared to continued operation of the existing

1 turbine. The positive PVRR(d) results are from the capacity increase benefit only.  
2 To add conservatism, no benefit was included for the resulting lower fuel  
3 consumption at outputs below maximum load when compared to the existing  
4 turbine.

5 **Q. Does this conclude your direct testimony?**

6 A. Yes.