EXHIBIT NO. ___(RB-1T)
DOCKETS UE-17___/UG-17___
2017 PSE GENERAL RATE CASE
WITNESS: ROQUE BAMBA, JR.

BEFORE THE
WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION, **Complainant,** **v.** **PUGET SOUND ENERGY,** **Respondent.**	**Docket UE-17____** **Docket UG-17____**

PREFILED DIRECT TESTIMONY (NONCONFIDENTIAL) OF

ROQUE BAMBA, JR.

ON BEHALF OF PUGET SOUND ENERGY

JANUARY 13, 2017

PUGET SOUND ENERGY

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PUGET SOUND ENERGY

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I. INTRODUCTION

Q. Please state your name and business address.

A. My name is Roque Bamba, and my business address is 10885 N.E. Fourth Street, Bellevue, Washington 98004. I am employed by Puget Sound Energy ("PSE") as Manager, Major Projects.

Q. Have you prepared an exhibit describing your education, relevant employment experience, and other professional qualifications?

A. Yes. It is the First Exhibit to my Prefiled Direct Testimony, Exhibit No. ___(RB-2).

Q. Please summarize the purpose of your testimony.

A. The purpose of my testimony is to provide an update on the redevelopment work at the Snoqualmie hydroelectric redevelopment project ("Snoqualmie Falls Project") and the cost of this work. This work was undertaken by PSE in compliance with the Federal Energy Regulatory Commission ("FERC") relicensing orders.

II. HISTORY AND DESCRIPTION OF SNOQUALMIE FALLS PROJECT

Q. Please briefly describe the history of the Snoqualmie Falls Project.

A. The Snoqualmie Falls Project is a run-of-the-river project consisting of a diversion weir and two powerhouses located on the Snoqualmie River in the City of Snoqualmie and King County, Washington. Powerhouse 1 was originally constructed in 1898 with four Pelton turbines (Units 1–4). A horizontal Francis turbine (Unit 5) was installed in 1905. Powerhouse 2 began operation in 1910 with a horizontal Francis turbine (Unit 6), and an additional vertical Francis machine was brought online in 1957.

The Snoqualmie Falls Project is a FERC licensed project, FERC Project No. 2493. Under the new FERC license issued in 2004, as amended in 2005 and 2009, PSE was authorized to increase the original installed capacity of 44.4 megawatts ("MW") to 54.4 MW. The terms of that license were the basis for the scope of the upgrade project.

Snoqualmie Falls has been a cost-effective, stable producer of firm, carbon-free electricity. It is PSE's oldest power-generating resource, with a park and trails that make it one of the most popular scenic destinations in the Pacific Northwest.

Q. Please describe the Commission's prior review of the Snoqualmie Falls Project.

A. PSE previously demonstrated the need for the Snoqualmie Falls Project in its 2005 power cost only rate case ("PCORC"). In that case, the Commission determined that PSE's decision to pursue relicensing of the project as well as the costs related to the relicensing process were prudent.[1] Additionally, as discussed in more detail below, the Commission previously approved the prudence of the majority of the costs for the Snoqualmie Falls Project in PSE's 2013 PCORC. In PSE's 2014 PCORC, the parties agreed as part of a settlement that PSE would seek approval of the remainder of the costs of the project after all costs were known and measurable.

III. UPDATED COSTS FOR SNOQUALMIE FALLS PROJECT

Q. What is PSE requesting in this case with respect to the Snoqualmie Falls Project?

A. PSE is requesting that the Commission approve for recovery in rates the remainder of the costs incurred for the Snoqualmie Falls Project.

[1] Docket UE-050870, Order 4 ¶30, and Appendix A, Settlement Agreement, p. 5.

Q. What is the updated level of capital costs included in this case for the Snoqualmie Falls Project?

A. Table 1, below, shows the updated level of capital costs as of September 30, 2016, included in this case. The numbers do not reflect any credits from the Treasury Grant that was received for the project and which is discussed in more detail later in this testimony. All of the redevelopment costs have been booked through September 30, 2016 and are reflected in the table below.

Table 1. Updated Level of Capital Costs as of September 30, 2016

Project	Costs from 2013 PCORC	Current Costs through September 30, 2016
Snoqualmie Falls Project		
Diversion Dam	$6,945,418	$6,945,418
Snoqualmie Falls Plants 1 and 2	$298,252,357	$328,914,729
Total	$305,197,775	$329,610,147

Q. Why are the remaining costs of the project appropriate for recovery in rates?

A. The costs PSE seeks to recover in this case for the Snoqualmie Falls Project were necessary and prudently incurred to comply with the terms of the FERC license. Although faced with difficult geological challenges associated with the project, PSE followed sound design, engineering, and construction management principles to redevelop the project according to FERC license requirements at the lowest reasonable cost, and in a manner that allowed PSE to receive Treasury Grants for the benefit of its customers. The incremental hydro generation that was attained through the redevelopment project allows PSE to generate Renewable Energy

Credits that are used in meeting its Renewable Portfolio Standards requirements under RCW 19.285.070 and WAC 480-109-210.

Additionally, the project allows PSE to maintain this reliable, emissions-free resource in a cost-effective manner for the remaining 29 years of the FERC license term. The Snoqualmie Falls Project will contribute up to 54.4 MW of capacity and an estimated 270 gigawatt hours ("GWh") per year of energy to PSE's resource portfolio. The license amendment approved by FERC in 2009, combined with the Treasury Grants for the project, allow the benefits of the Snoqualmie Falls Project to be delivered at a cost significantly lower than under the license as originally issued.

Q. Has PSE sought recovery of project costs in previous filings?

A. Yes. PSE filed testimony and exhibits in the 2013 and 2014 Power Cost Only Rate Cases (PCORC) (Dockets UE-130617 and UE-141141) requesting a determination by the Commission that its implementation of the FERC license for the Snoqualmie Falls Project was prudent and that all costs associated with the project are reasonable for recovery in rates.

Q. What was the Commission's decision in the 2013 PCORC?

A. In the Final Order in PSE's 2013 PCORC, the Commission approved the all-party settlement stipulation, in which the parties agreed that the renovations and upgrades to Snoqualmie Falls to implement the FERC license were prudent. The

Commission likewise agreed that the plant additions at Snoqualmie were prudent. The settlement stipulation also addressed the Treasury Grant that PSE was to receive for this project which was to provide regulatory treatment that is equivalent to a reduction of rate base; the unamortized grant amounts are, in effect, offsets to the fixed production rate base with its unamortized balance spread over the remaining life of the associated plant asset.[2]

Q. Did the parties to the 2013 PCORC Settlement recognize that there would be additional capital expenditures related to the Snoqualmie Falls Project beyond those included in the 2013 PCORC Settlement?

A. Yes, although both Plant 1 and 2 began commercial operations in 2013, prior to the date of the Commission's Final Order in the 2013 PCORC, the parties recognized that there was additional work that needed to be completed on the project. In Paragraph 24 of the Settlement Stipulation the parties agreed that PSE could include post-test year capital additions related to the Snoqualmie Falls Project in its 2014 PCORC filing.

Q. How was the Snoqualmie Falls Project treated in the 2014 PCORC?

A. On September 5, 2014, PSE, Staff, Public Counsel, and the Industrial Customers of Northwest Utilities reached agreement on all issues in the 2014 PCORC and filed a Settlement Stipulation with the Commission. The Settlement Stipulation

[2] *See WUTC v. PSE*, Docket UE-130617 et al., Settlement, Exh. No. S-1 ¶ 22.

used the Commission-approved rate base level of $305,197,775 for the Snoqualmie Falls Project from the 2013 PCORC, adjusted for depreciation and deferred income taxes per Order 04 in Docket UE-141141.

Q. Please explain the decision to use the rate base level from the 2013 PCORC in the 2014 Settlement Stipulation rather than updating PSE's rate base to reflect additional project costs.

A. At the time of the 2014 PCORC settlement, some work on the project upgrades were not yet completed. The parties to the settlement agreed to wait until all work relating to the project was completed before seeking approval and inclusion of the additional costs in rate base. Therefore, the Settlement Stipulation delayed the consideration of the final costs of redevelopment to a future proceeding after all additions, changes or improvements to the Snoqualmie Falls Project were completed and were known and measurable.[3]

Q. Please summarize the additional costs incurred that were not yet approved in the 2013 PCORC.

A. The additional costs incurred for the Snoqualmie Falls Project can be generally attributed to the following work categories:

(i) Completion of work and close-out for changes consistent with PSE's 2013 PCORC, related to geotechnical conditions,

[3] *See WUTC v. PSE*, Docket UE-141141, Settlement Stipulation ¶ 12.

electrical and mechanical systems, and the related schedule extension;

(ii) PSE staff support for schedule extension, plant commissioning and completion of punch list items; and

(iii) Grouting, concrete application (shotcrete) and drain installation in select areas of the Plant 1 elevator shaft to control excessive water seepage through the bedrock.

Q. Why did PSE incur additional costs to complete the work described above?

A. The primary causes for the additional project costs remain the same as those described in PSE's 2013 PCORC: geotechnical conditions encountered during construction and the complexities of retrofitting a hundred-year-old hydroelectric project.

Q. Did PSE conduct geotechnical surveys prior to construction?

A. Yes, PSE performed a great deal of geotechnical boring investigations, ground penetrating radar surveys and review of historical information prior to construction to better understand the nature of the subsurface conditions. However, the challenging topography and access limitations prohibited PSE from conducting extensive geotechnical investigations along the Plant 2 penstocks hillside and the Plant 1 shaft, cavern and high-level tunnel, as can be seen in the second exhibit to my prefiled direct testimony, Exhibit No. ___(RB-3). Specifically, the Plant 2 penstock hillside is very steep and lacks access roads and flat work areas that would have been necessary to site the exploratory drilling

equipment. This is shown on pages six through eight of Exhibit No. ___(RB-3). The Plant 1 shaft was occupied by two large penstocks and an elevator making it infeasible to perform core drilling. This is shown on pages three through five of Exhibit No. ___(RB-3). The Plant 1 cavern is underground and was occupied by existing hydroelectric turbines, generators, penstocks, piping and associated equipment which made it infeasible to get the necessary equipment into the cavern, and there was no room to perform the drilling if equipment could have been disassembled/reassembled for access. This is shown on pages one through three of Exhibit No. ___(RB-3). Finally, the high-level tunnel access locations were not large enough to support the equipment necessary for drilling. This can be seen on page 10 of Exhibit No. ___(RB-3). Furthermore, because the geotechnical issues are widespread and site specific, the number of core samples necessary to identify these areas would have been time and cost intensive with limited benefit. The issues associated with accessing these locations for geotechnical surveys would have been extremely challenging; therefore, PSE used existing information based on the borings, ground penetrating radar surveys and historical photographs, job reports and as-built drawings from prior construction work in these locations rather than trying to conduct geotechnical surveys of these hard to reach areas.

Q. Please elaborate on the work undertaken on the Plant 1 elevator shaft to control excessive water seepage through the bedrock.

A. Water leakage in the newly excavated elevator shaft was significantly greater than anticipated and resulted in an environment that was not suitable for the elevator equipment. The elevator equipment for the Plant 1 shaft was intended to withstand occasional water splashing. The condition of the pre-project elevator shaft was very dry with only occasional minor pinpoint leakage during times of significant precipitation. Based on a geologic assessment it was assumed that the post-project conditions would be similar. However, fractures in the newly excavated shaft transported a significant volume of water from the surface into the elevator hoist-way, and the equipment was subjected to constant water raining on the equipment. Therefore, PSE incurred additional costs to address the leakage; specifically, PSE installed a drainage system and gutters, reinforced shotcrete, created a temporary access, and replaced and modified the elevator equipment that had been compromised by the wet environment.

Q. How did PSE control and track project changes during the Snoqualmie Falls Project construction?

A. The project changes were tracked and controlled against a baseline scope, schedule, and budget established prior to the start of construction. The project baselines are set based upon the design specifications, specific scopes of work, contractor bids and work flow. As the project progressed, changes to the scope,

schedule, and cost of work went through a review and approval process. PSE maintained a change log summarizing individual change proposals and their disposition. PSE Project Management and Project Controls staff analyzed the impacts of change items on project budgets, schedules and forecasts at completion. PSE and the contractor created mitigation plans to minimize change impacts and their cost to the project. As previously discussed, many of these change orders related to design changes due to geotechnical conditions and challenges encountered during construction. While these conditions were identified as potential risks in the project risk assessment, the probability, magnitude and consequences of the actual conditions were greater than the project team could have reasonably estimated.

Q. Please explain how PSE and the construction contractor shared the additional costs for the Snoqualmie Falls Project.

A. In December 2012, in an effort to control and share the costs associated with the change orders and associated schedule extensions, PSE exercised a provision in the contract that allowed a fee modification that fixed the contractor's fee by setting a fee cap. For all remaining work, the contractor was reimbursed only for the actual cost of the work, without profit. Further, in August 2013, PSE and the construction contractor negotiated a direct reduction of $1 million in the contractor fee.

Q. Would it have been reasonable for PSE to abandon the project when the increase over the original plan was known?

A. No. Abandonment of the project was not an option. PSE was granted the FERC license after years of negotiating with stakeholders regarding the terms of the license. Once granted, PSE has an obligation to comply with the terms of the FERC license, which requires redevelopment and operation of the hydroelectric project. Furthermore, drawing from the analysis PSE prepared in the FERC relicensing proceeding, decommissioning would likely require removal of the generation infrastructure, including both intakes, the diversion dam, penstocks, generation units in the Plant 1 cavity, Plant 2 gatehouse, Plant 2 powerhouse, transmission lines and generally return the project to "pre-project" conditions. PSE would also incur the cost of implementing the FERC decommissioning process, as well as potential transitional costs (of an uncertain duration) for ongoing maintenance and or construction activities associated with the Snoqualmie Falls Park and preservation of the historic district, including the Plant 1 cavern, machine shop, transformer house, carpenter shop, Plant 2 powerhouse and gatehouse, and other buildings.

Q. Please discuss the benefits the Snoqualmie Falls Project provides to PSE and its customers.

A. The Snoqualmie Falls Project is part of PSE's existing resource portfolio and provides 54.4 MW of installed capacity and an estimated average annual carbon-

free output of approximately 287,000 MWh. In addition, this generation resource is uniquely situated in close proximity to a developed urban load center with existing transmission and distribution infrastructure. Thus, the location of the Snoqualmie Falls Project provides a distinct benefit that other alternative resources do not provide. Additionally, PSE's strategy is to diversify its generation portfolio with a mix of resource technologies and fuel types. Hydroelectric generation—including the Snoqualmie Falls Project—is an important part of this mix. The diversified approach provides an important means to avoid the concentration of risks that could result from relying exclusively on a single resource technology to meet all the need.

Q. What is the current status of the Snoqualmie Falls Project?

A. Plant 2 began commercial operations on April 17, 2013, and Plant 1 began commercial operation on September 5, 2013. They have been operating and generating power for use by PSE customers since that time.

Q. Are the final punch list items complete?

A. Yes, all punch list items including the elevator shaft drainage system are complete, and the Department of Labor and Industries has inspected and issued a permit to operate the elevator.

Q. Are the additional costs for redevelopment of the Snoqualmie Falls Project that PSE incurred, above the amount approved in the 2013 PCORC, reasonable?

A. Yes, as previously discussed, the additional costs were incurred in response to unexpected and unforeseeable field conditions that arose during the redevelopment of this century-old hydroelectric plant that is partially located underground in a cave. These conditions included the quality of bedrock and the river channel, and wetter than average weather conditions that complicated construction.

Q. Are there any remaining costs associated with the project that have not been accounted for?

A. No. All construction cost for the project are included in this filing. Any further work at the Snoqualmie Falls plant will be maintenance or betterment costs.

Q. Would the Snoqualmie Falls Project still have been economical if the final project cost had been used in the economic analysis conducted in 2009 and used to obtain the amendments to the FERC license that were approved in 2009?

A. In June 2009, prior to accepting the project with the amended FERC license, PSE performed an economic analysis on the initial project costs. In that analysis, PSE assumed a total project cost of $316.6 million (including escalation and AFUDC).

Thus, the levelized cost of the project over the term of the license was assumed to be approximately $86 per MWh, and PSE's analysis determined that this cost was reasonable and economical. With the known project costs of $330 million, and levelized costs of $88 per MWh, the Snoqualmie Falls Project remains reasonable and economical.

IV. CONCLUSION

Q. Does this conclude your testimony?

A. Yes, it does.