

EXHIBIT NO. ___(JAB-1T)
DOCKET NO. UE-141335
WITNESS: JENNIFER A. BOYER

**BEFORE THE
WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION**

In the Matter of the Petition of:

**King County, Washington; BNSF Railway;
Frontier Communications Northwest, Inc.;
Verizon Wireless; and New Cingular Wireless
PCS, LLC.**

Docket No. UE-141335

For a Declaratory Order

**PREFILED DIRECT TESTIMONY (NONCONFIDENTIAL) OF
JENNIFER A. BOYER
ON BEHALF OF PUGET SOUND ENERGY, INC.**

NOVEMBER 19, 2014

1 **PUGET SOUND ENERGY, INC.**

2 **PREFILED DIRECT TESTIMONY**
3 **(NONCONFIDENTIAL) OF JENNIFER A. BOYER**

4 **Q. Please state your name, business address and position with Puget Sound**
5 **Energy, Inc. (“PSE”).**

6 A. My name is Jennifer A. (“Jenny”) Boyer, my business address is 355 110th Street
7 NE, Bellevue, Washington, 98009-5591. I am Manager, Electric Operations, at
8 PSE.

9 **Q. Have you prepared an exhibit describing your professional qualifications?**

10 A. Yes, I have. It is Exhibit No. ____ (JAB-2).

11 **Q. What is the nature of your prefiled direct testimony in this proceeding?**

12 A. This prefiled direct testimony describes the facilities known as the Maloney Ridge
13 line. I will also discuss the engineering issues and challenges related to serving
14 the customers on the Maloney Ridge line, and I will discuss options for service
15 that PSE has investigated.

16 **Q. Please describe the facilities known as the Maloney Ridge line.**

17 A. The Maloney Ridge line is a cable underground distribution line 8.5 miles long,
18 located in a remote section of the Snoqualmie National Forest. It was built in or
19 around 1971 pursuant to an Agreement Relating to the Extension of Electrical

1 Service, dated September 23, 1971, between PSE and the General Telephone
2 Company of the Northwest, Inc. (“GTE”), wherein GTE requested PSE to extend
3 single phase electric service to GTE’s microwave station. Lynn F. Logen
4 describes this agreement, and subsequent agreements, more fully in his Prefiled
5 Direct Testimony, Exhibit No. ____ (LFL-1T).

6 The Maloney Ridge line originates at a pole located at approximately 10004 Foss
7 River Road NE, in Skykomish, Washington. Skykomish substation has a 9.37
8 MVA transformer, which transforms the voltage from the transmission voltage of
9 115 kV three-phase to the distribution feeder voltage of 12.5 kV three-phase, and
10 a 75 MVA, 12.5 kV, three phase regulator. The Maloney Ridge line itself is a
11 single phase (7.2 kV) jacketed underground cable.

12 **Q. Is this a typical system configuration for PSE?**

13 A. This was generally a normal cable construction for the time it was installed. If
14 constructed today, the line would be constructed differently. For instance, the
15 cable would be placed in conduit, the cable itself would be constructed of longer-
16 lasting (more modern) material, and PSE would install more junction boxes,
17 which would allow smaller sections to be replaced as needed, should cable failure
18 occur.

19 **Q. Please describe the terrain in the area of the Maloney Ridge line.**

20 A. The 8.5 miles containing the Maloney Ridge line is steep, rugged, mountainous
21 terrain that includes boulders, creeks and rivers. It is covered in heavy snowpack

1 several months out of each year, and access is usually limited from early October
2 through early July. Photos of the terrain taken in the summer are provided in the
3 Second Exhibit to the Prefiled Direct Testimony of Jason M. Sanders, Exhibit
4 No. ____ (JMS-3).

5 **Q. Please describe the current quality of electrical service on the Maloney Ridge**
6 **line.**

7 A. The quality of service is subjective, but the line does experience frequent cable
8 faults. A summary of faults on the line is provided as Exhibit No. ____ (JAB-3).
9 These faults are caused by several factors. Primarily, the cable is simply reaching
10 the end of its useful life. Additionally, the cable was constructed with material
11 that is no longer used because it is not as reliable as other products. Over the
12 years, PSE has installed splices to repair portions of the cable. These splices add
13 a potential for degradation of cable integrity. Each time a fault occurs on the
14 system, the cable experiences “fault current”, which can itself degrade the
15 insulation over time, leading to additional faults.

16 Further, the terrain itself contributes to faults due to the movement of earth and
17 rocky material. Rockslides and other rock movement are common on the steep
18 slopes of Maloney Ridge, and these can cause direct damage to, and degradation
19 of, the cable. Additionally, shifts in the terrain (including rock and landslides)
20 expose the cable to dig-ins and rock damage.

1 **Q. Please describe how PSE currently responds to a fault or other maintenance**
2 **issue on the line.**

3 A. Before resolving an outage on the Maloney Ridge line, PSE must assesses the
4 current conditions affecting the safety of their personnel and the personnel of its
5 contractor, Potelco. For instance, in the winter months (after snowfall), PSE does
6 not respond during the night because of visibility issues. In these cases, the
7 Maloney Ridge customers are able to use back-up generators, which they have.
8 PSE first responds by sending service linemen to the site to investigate the cause
9 of the outage. During the winter, this involves using special equipment like a
10 snow cat. Some of the equipment used to identify the location of a fault is audio.
11 Therefore, snow, rain or other weather conditions can impair a lineman's ability
12 to identify the location of the fault.

13 Once the fault is identified, a crew must dig to the location of the fault before
14 repairing it. This may involve a backhoe or hand-digging, if a backhoe cannot
15 reach the location. When faults have occurred in very steep or otherwise less
16 accessible locations, repair times are greatly extended.

17 **Q. Has PSE identified options to improve the service on the Maloney Ridge line?**

18 A. Yes, I was involved in identifying five different options presented to the Maloney
19 Ridge line customers in March 2013. These options include replacing portions of
20 the line with new material and replacing the entire line. The options are presented

1 the in the Third Exhibit to the Prefiled Direct Testimony of Jason M. Sanders,
2 Exhibit No. ____ (JMS-4).

3 **Q. Has PSE looked at alternatives besides those provided to the Maloney Ridge**
4 **customers?**

5 A. Yes, in response to WUTC Staff's inquiry, PSE analyzed the feasibility of a
6 photovoltaic installation. PSE also considered wind installation and combustion
7 generators at the point of delivery. PSE also considered installing an overhead
8 distribution line.

9 **Q. What did PSE conclude?**

10 A. There are several challenges with each. With regard to a photovoltaic installation,
11 PSE conducted a basic review of the site conditions and determined that currently
12 it would not be economically feasible to install a solar array of sufficient size to
13 provide the electrical needs for the Maloney Ridge customers. Due to snow pack
14 and animal encounters, a solar array would need to be mounted several feet above
15 ground and tipped, but this would reduce solar exposure. Others issues such as
16 battery back-up during winter months, snow shading, steep and uneven terrain,
17 and the need to physically clear snow off the solar array led PSE to the initial
18 determination that photovoltaic installation will not be economically feasible.

19 Regarding overhead lines, PSE determined it would be not be feasible due to
20 worse weather-related reliability and difficult installation. Overhead installation

1 would require the construction of new, widened, or improved roads, as well as
2 extensive tree removal (and U.S. Forest Service permits).

3 Regarding wind installation, for context, PSE's Wild Horse wind farm performs
4 at a 32 percent capacity factor. So if the Maloney Ridge site had the same
5 favorable wind characteristics as Wild Horse, the site would need a roughly 46
6 kW wind turbine. Most customer-owned wind turbines, however, operate at 4
7 percent capacity or less in the Puget Sound region, so a 367 kW wind turbine
8 would be likely required for Maloney Ridge. More study on wind resource could
9 be a logical next step compared to solar. However, since the Maloney Ridge line
10 is located in a National Forest, the U.S. Forest Service would have to provide a
11 permit for a large scale wind turbine operation.

12 PSE and the Maloney Ridge customers explored the option of supplying power to
13 Maloney Ridge customers with combustion generators at the points of delivery
14 (e.g., diesel or propane), but these were discussions only and there was no formal
15 analysis of initial construction and startup and average annual maintenance costs
16 for such power. There would likely be logistical restrictions or emissions
17 permitting restrictions that could affect the viability of the option of supplying
18 power to Maloney Ridge customers with combustion generators, but these details
19 were not studied

20 **Q. Does this conclude your prefiled direct testimony?**

21 A. Yes, it does.