



Department of Energy

Bonneville Power Administration
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TRANSMISSION BUSINESS LINE

November 24, 2003

In reply refer to: T-DITT-2

To: Landowners interested in the SnoKing Tap to Monroe-Echo Lake Line Voltage Increase

Bonneville Power Administration (BPA) committed to releasing a 30-day update on its investigation activities following the Oct. 23 Echo Falls Homeowners Association meeting. Our investigation of the source and remedy of the noise are continuing. The details and findings to date are included in this letter along with a brief background on the project.

Background

The SnoKing Tap to Monroe-Echo Lake 500-kilovolts (kV) transmission line was energized on Sept. 29, 2003. The voltage increase was part of the SnoKing Tap Relocation project needed to allow our existing SnoKing Tap to Monroe-Sammamish 230-kV transmission line to tap (connect) to our Monroe-Echo Lake 500-kV transmission line. The original transmission line was constructed in the 1970's as a 500-kV line, but had been operated at 230-kV until recently. An increase in ambient noise levels was anticipated but the level of concern from area residents along the transmission line and in the vicinity of the SnoKing Substation was not.

Preliminary investigation activities focused on the conductor and concerns of landowners living along the transmission line right of way. As BPA analyzed measurements taken and landowner comments, the scope of the investigation expanded to include the SnoKing Substation located in Bothell, Wash. BPA began an extensive investigation including field surveys/inspections, conductor observations and one-on-one meetings with affected residents. Investigation activities and results within the past 30 days are listed below by date in two categories: conductor (line) and substation investigation and results.

Conductor Investigation and Results

- **Oct. 29, 2003**
 - Noise measurements were taken in the early evening (5:30 p.m.-6:30 p.m.) at two different residences along the line. Under cold, clear conditions, the noise levels ranged from 44-46 dBA.
- **Nov. 13, 2003**
 - Noise measurements were taken in the early morning (12:30 a.m.-2:00 a.m.) at six locations along the line. Under cold, clear sky, patchy ground fog/frost conditions, the noise was quite variable depending on location. At two locations the noise levels ranged from 34-40 dBA. At four other locations, the levels ranged from 46-50 dBA.
 - Noise measurements were also taken in the early afternoon (12:30 p.m.-3:30 p.m.) at four different locations along the line. Under cool, clear sunny conditions, the noise levels ranged from 40-46 dBA.

- **Oct. 30, 2003**
 - Contract helicopter inspection patrols were performed using specialized photographic equipment. Unusual high levels of contamination (moss, bird droppings, etc.) were observed on the hardware and insulators of a few towers, and at locations along the line. Attempts to obtain clear, close-up photographs of the conductor contamination surface proved unsuccessful.
- **Nov. 13, 2003**
 - A ground-based inspection of the conductor surface was performed using a specialized, high-powered spotting scope on two separate spans. The surface appeared to be coated with greenish-brown colored material with intermittent dark spots. Some of the spots resembled small bits of dried vegetation (possibly moss), which protruded the surface several millimeters.
 - A ground-based corona inspection of the conductor was also performed (along two spans) using a specialized daytime corona detection camera. Under cool, clear sunny conditions, numerous corona sources were observed all along the conductor. These observations of fair weather corona are consistent with earlier inspections.

Potential Options for Reducing Transmission Line Noise

BPA is researching and analyzing several options, which may reduce some of the line noise. One option BPA is moving forward with is an investigation into whether or not conductor cleaning might be effective at reducing corona noise during fair weather. Close range inspections show that there is a fair amount of dirt and moss that has settled on the 33-year old conductor that could be related to the increase in noise levels. A 10-hour outage is planned for the first weekend in December to allow BPA crews to physically clean one full span (midpoint of the line about six miles from the substation), replace two dead end tower conductor jumpers and any damaged conductor spacers. In order to clean the conductor, BPA crews will get carts up on the conductor and use steel brushes to scrub the conductor. Noise measurements and corona observations will be made before, during, and after the cleaning in an effort to determine its effectiveness. The jumpers will be delivered to BPA's laboratories for additional electrical testing and investigation of cleaning methods. BPA will release the results of this scheduled activity as soon as they are available.

SnoKing Substation Investigation and Results

BPA began receiving calls from landowners in the vicinity of the SnoKing Substation after Oct. 23. As a result, BPA conducted noise measurements and transformer investigations at the substation.

- **Oct. 29, 2003**
 - Preliminary, spot noise measurements were taken in the evening (4:30 p.m.-9:00 p.m.) at a single residence south of the SnoKing Substation. Under cold, clear conditions, the noise levels were quite variable, ranging from 45-57 dBA.
- **Nov. 12, 2003**
 - Noise measurements were taken in the evening (11:00 p.m.-12:00 a.m.) at seven locations/residences surrounding the SnoKing substation. Under cold, clear conditions, the noise levels were quite variable, ranging from 37 - 54 dBA.

- **Nov. 13, 2003**
 - Noise measurements and observations were made inside the substation (close to the 500-kV transformer bank) during daytime hours on Nov. 12 and 13. The Nov. 12 noise levels were considerably higher (approximately 15-20 dBA) than those observed on Nov. 13. BPA is very concerned about the unexpected variation in noise measurements taken near and within the substation.
- **Nov. 18, 2003**
 - Gas in oil samples were collected from the three single phase 500-kV transformers and are currently being analyzed to help determine if the transformers are working properly. A team of BPA engineers has been formed to perform additional investigations on the transformers.
- **Nov. 24, 2003**
 - A power quality measurement program will be initiated to help determine whether possible power system disturbances might be contributing to the variation in noise levels.

Potential Options for Reducing Substation Noise

One option BPA is currently exploring to potentially reduce the substation noise is the use of sound barrier walls within the substation. These are similar to the sound walls used in residential areas near major highways. BPA has used sound walls successfully at several substations in its territory. However, more comprehensive inspection of the substation and transformer is needed to determine if the use of sound walls is a viable and effective solution for this situation. Additional measurements and inspections are scheduled and the results will be released.

Next Steps

BPA will be holding a follow-up meeting on Jan. 27, 2004 for residences affected by the substation and transmission line noise. A letter will be sent early January with details about this meeting. In addition, the results of the conductor cleaning activity and transformer tests will be released as soon as that information is collected and analyzed.

For More Information

We will continue to keep area landowners updated on our findings. If you have questions or would like more information about the project, please call our toll-free number 1-888-276-7790. You may also access additional information on our Web site at:

http://www2.transmission.bpa.gov/PlanProj/Transmission_Projects/. We look forward to hearing from you.

Sincerely,

/s/ Doug Riehl, Nov. 24, 2003

Doug Riehl
Project Manager