



SnoKing Tap to Monroe-Echo Lake

500-kV Transmission Line

Bonneville Power Administration's Transmission Business Line (TBL) owns and operates three-fourths of the Pacific Northwest's electric system. BPA is in the process of building new transmission infrastructure projects to improve the distribution of power to meet existing and future power needs.

The SnoKing Tap to Monroe-Echo Lake transmission line is part of a comprehensive plan to maintain reliable electric service to consumers in the Puget Sound area. The project strengthens the connection between BPA's 500-kilovolt grid that brings power across the Cascade Mountains and the 230-kV grid that delivers power to local utilities such as Snohomish County Public Utility District, Seattle City Light and Puget Sound Energy.

Background

Bonneville Power Administration constructed a new three-pole steel transmission structure to allow the SnoKing Tap to Monroe-Sammamish 230-kV transmission line to connect to the Monroe-Echo Lake transmission line. The SnoKing Tap to Monroe-Echo Lake transmission line was energized on Sept. 29, 2003. As a result, while an increase in noise levels was anticipated, the actual noise levels experienced by landowners in the vicinity of the transmission line and SnoKing substation exceeded those expectations.

Transmission Line Cleaning Results

The March 28 – April 4 transmission line cleaning was completed one week ahead of schedule. Line crews cleaned the entire 13-mile transmission line with a brush specially designed and fabricated for this activity. Line crews were also able to replace old spacers dampers with new vibration-reducing models.

Noise measurements taken after the cleaning showed a significant decrease with noise levels ranging from 34 – 40 dbA. On April 22, noise levels were even lower ranging from ranging from 34 – 37 dbA.

BPA is satisfied with the results of the cleaning and will continue to monitor noise levels along the transmission line.

Substation Noise Levels

Noise levels generated from the SnoKing substation are louder than expected and BPA is attempting to pinpoint the exact cause of transformer noise. Early investigation activities included taking gas-in-oil samples to see if the transformer insulation had broken down. BPA also gathered numerous sound measurements at the fence line and beyond.

BPA analyses suggest that direct current on the system is causing excessive vibration, which produces higher noise levels. Tests have confirmed that when the direct current is blocked, noise levels drop dramatically. The direction of the direct current has been located, and BPA is searching for the source.

Several outages at the SnoKing substation are required to further investigate the direct current. BPA is trying to get outages scheduled to pinpoint the source of the direct current and block it. In the meantime, BPA has a temporary solution that will reduce the noise at the SnoKing substation.

Substation Temporary Solution

BPA will install Sound Seal Acoustic mats in order to absorb some of the sound being generated from the SnoKing transformer bank. Fifteen (4'x 16') mats will be draped around portions of the SnoKing transformer bank. The mats consist of a four-inch, fiberglass, quilted facing which serves as the sound absorbing material. This material is attached to a vinyl backing which acts as sound blocking material. BPA expects a significant reduction in noise, up to 10 dbA, with



the installation of the mats. The installation of the mats is only a test to determine their effectiveness, similar to the Dec. 6, 2003 transmission span test cleaning. The mats have been used by other utilities in the industry and have provided significant reductions in sound.

The mats were ordered on March 16 and are scheduled to be shipped by May 5 and an outage is tentatively scheduled for May 15 to install them.

Next Steps

Once the mats are installed BPA will monitor the transformers and noise levels. Noise readings will be taken at various hours of the day. If the mats meet BPA's expectations, additional mats may be installed on other portions of the SnoKing transformers, which would require an additional outage.

In addition, ongoing discussions with the transformer manufacturer are happening to determine the mechanical effects on the transformers. Further testing on the effects of direct current on the transformers will be done at other locations on the BPA transmission system the first week of May.

Project updates and noise readings will be posted on TBL Web site and explained in future public letters.

Questions or Comments

If you have questions or would like more information about the project, please contact BPA toll free at 1-888-276-7790 or visit the TBL Web site at:

http://www.transmission.bpa.gov/PlanProj/Transmission_Projects

