

## **Sustain Steel Program Defective Damper Replacements**

The bulk of the 500 kV main grid (4,870 miles) is composed of conductor bundles in each phase or pole position. Spacer dampers are installed on triple bundle transmission lines to maintain sub-conductor spacing and to damp vibration. The spacer dampers are critical line components with their condition and performance important to line reliability. BPA has a spacer replacement program that began in 2001 and will conclude in FY 2013 with the complete replacement of all twin and triple spacers.

As part of the spacer damper replacement program, BPA purchased spacer dampers from Powerline Products, Inc. (PPI) between 2001 and 2009. This manufacturer supplied approximately 140,000 spacer dampers which were installed by contract crews and BPA linemen on approximately 1,700 circuit miles of the BPA 500kV transmission system.

In 2009 BPA discovered that the PPI spacer dampers did not meet several BPA technical material specification requirements. A Life Cycle Assessment (LCA) project was completed to assess the condition and performance of the PPI spacer dampers on the BPA system and to determine their expected service life. The LCA study included removing PPI spacer dampers from service, inspecting them, noting their characteristics, and performing tests. Inspection of the removed PPI spacer dampers discovered multiple failure modes with 21 percent in a terminal mode (on the path to failure). Failures of PPI spacer dampers have damaged conductor and pose a significant line reliability and safety risk. This project, when completed, will replace all of the PPI spacer dampers on the BPA transmission system. Replacing PPI spacer dampers will reduce or avoid risk of future outages on BPA's most critical steel transmission lines (category 1 and 2) due to premature failure of faulty spacer dampers.