

**Tutorial for the 2007 International Conference of Doble Clients**  
**The Importance of Proper Bushing Replacement**  
**Sponsored by the Bushings, Insulators and Instrument Transformers (BIIT) Committee**

This tutorial will review issues to be considered when the available spare bushing is not an exact match to the original bushing being replaced. The considerations will include the dimensions above and below the flange, the connection terminals to the transformer winding leads and to the electrical system, the mounting flange configuration, electrical clearances inside the transformer tank, phase to phase, and phase to ground clearances outside of the transformer tank and clearances to adjacent accessories. Discussed also will be the pros and cons of flange adapters, the need for draw lead cable adapters, connection terminals, replacing bushings with different weather shed housings and an overview of handling and storage for different bushing technologies. Upgrading to bushings with higher current ratings or conversions from bottom connection to draw lead connection will be considered.

The manufacturer presenters are Keith P. Ellis of The Trench Group and David M. Geibel of ABB. Case studies will be presented by Carl Pankratz of Lower Colorado River Authority, John Stead of AltaLink, and John Leech of Arizona Public Service.