

T&D General Systems Subcommittee  
**Practical Aspects of Ferroresonance WG**  
Hotel Vancouver, Moresby Island  
Wed July 18, 2001

### **Meeting Minutes**

This was the first meeting of the working group. Much of the time was spent presenting and discussing the charge and organization of the Working Group, soliciting contributors, and having a round-table discussion of what the appropriate focus and level should be, given the targeted beneficiaries of the Working Group's efforts.

#### Working Group Officers:

Bruce Mork, Michigan Tech Univ, is the chair of the WG. Volunteers are being sought for co-chair and secretary.

#### Potential Contributors - suggested and volunteering:

- |                                  |           |
|----------------------------------|-----------|
| - Reigh Walling, GE              | - EDF     |
| - David Jacobsen, Manitoba Hydro | - ABB     |
| - Atef Morched                   | - Others? |
| - Roger Dugan                    |           |

#### Discussion:

Going around the table, there were many useful suggestions made as to the scope of the topics, level to present them at, etc. Summarizing:

- ◆ Focus on practical issues in power companies.
- ◆ Suggested operational procedures and constraints would be very useful.
- ◆ Targeted reader/recipient: BSEE power engineer who has practical understanding of power system, knowledgeable about phasor calculations (like fault studies and loadflow) but is maybe not so knowledgeable about time-domain simulations and nonlinearities.
- ◆ Parameter sensitivities vs. responses.
- ◆ Concern that EMTP-like programs "not easy enough" to use for ferroresonance "prediction."
- ◆ Piecewise linear vs. continuous  $\lambda$ -i characteristic.
- ◆ Establish clear boundary/guideline between practical approach and need for more advanced help.
- ◆ Advice on parameters to change/investigate with respect to sensitivities.
- ◆ Hysteresis in ferroresonant behaviors - "turn-on" vs. "turn off" vs. risks involved.
- ◆ Back-feed, safety, arresters.
- ◆ 3-phase switching vs. phase-by-phase. What is danger of failure/explosion. Can it be single-phased for a short time?

- ◆ Waveform pictures - educate them on waveforms, subharmonics, chaos.
- ◆ Transformer connections that are most and least prone.
- ◆ Key: Convey insights to operators. Catalog the scenarios (system configuration and switching sequence) identify participant L-C elements.
- ◆ Working Group presentation? Invited informal presentations for next meeting.
- ◆ It would be nice to document some known failures, include in paper.

January meeting objectives:

- Begin developing Reference List
- Informal presentation of scenarios for FR. Possible presenters:
  - Bruce Mork - FR intro, background
  - Atef Morched - Case study, failure documentation
  - Dan Durback ?
  - David Jacobson - scenarios for FR
- Agree on focus and level of material to be presented.
- Discuss possible panel for near future.
- Discuss papers, special publication