

**IEEE/PES SWITCHGEAR & TRANSFORMERS COMMITTEE  
CONFERENCE CALL 10/03/06 12:00 PM EDT**

**PC57.142**

Chairperson: Robert C. Degeneff

Secretary: Peter M. Balma

**DRAFT CONFERENCE CALL MINUTES**

A joint Transformer Committee and Switchgear Committee conference call was held Tuesday October 3, 2006 at 12:00 PM EST. Participants identified during the conference call were:

Kirk Smith	Tom Tobin
Mel Smith	Bill Long
Pierre Riffon	Steve Lambert
Bill Bergman	Roy Alexander
Marcel Fortin	Nigel McQuin
Peter Balma	Denis DuFournet
Bob Degeneff	Roy Alexander
Ramsis Girgis	Ted Olson
Jeff Nelson	Georges Montillet

Other members of Switchgear Committee

There was active participation by everyone on the call, and an open exchange of thoughts and concepts to facilitate the re-writing of the previously balloted document. The following bullets briefly capture the salient points covered during the call.

Bill Bergman identified seven key areas for discussion on this call they were:

1. Current Chopping
2. Multiple Re-ignitions
3. Transformers are considered as pure inductance, losses need to be added
4. Description of winding resonance
5. Practical guidance to situation
6. Snubber design
7. Expand explanation on aspects of system design that could contribute to this problem

An attempt was made to identify the commenter in several cases; as the discussion was free-flowing the primary intent is to note the concepts, questions, and concerns discussed.

- Kirk Smith indicated he would prepare a discussion and send to the working group a description on current chopping.
- Mel Smith indicated we are dealing with multiple re-ignitions rather than restrikes. The difference has to do with timing, if it occurs after a ½ cycle or longer it is a restrike, if occurs before a ½ cycle it is a re-ignition.

- Kirk Smith indicated it seems that the only source for internal resonance is repetitive re-ignitions of the switchgear.
- Is it possible that a single pulse step function could be a source? The guide needs to identify if there are several possible sources.
- Bill Bergman indicated a few cases or examples are of UPS systems or drives. Should they be included as potential sources?
- Bob Degeneff asked if anyone had identified events from other sources, there was no response. Bob furthered that you would have to look at much smaller transformers if electronic devices were to be considered.
- Tom Tobin added its electronic load not electronic switching of the high side.
- Nigel McQuin explained that some UPS systems now have active filtering on the high side, even though the UPS is not carrying load the active filter is still on.
- It was suggested that Phil Hopkinson's papers on this issue be reviewed.
- Ramsis Girgis indicated this was a major expansion of the current document, and that the exploration of electronic loads would be a future issue for consideration.
- Kirk Smith and Tom Tobin indicated it would be a mistake to not consider switching of electronic devices. Bob Degeneff indicated that Phil Hopkinson's data could be interpreted several different ways and may not be presenting the same issue. He furthered, that when talking of electronic load, the effects are of a much lower frequency than the resonances of the transformers.
- Guide needs to discuss cable travel time and how this could excite internal resonant response.
- There are not many failures relative to the number of transformers in service. How do you give guidance when there is or is not an issue, so that the engineer does not put in a snubber when it is not needed? One has to keep in mind that the number of transformers in service is very large compared to the number of instance where resonance is a problem. Ramsis Girgis supported that point by adding that there had been approximately 48 failures due to back-fed resonance issues of GSU's in 25 years, about two per year in the whole world.
- Nigel McQuin indicated that switching interaction is not a new problem, and that the historical aspect is not new to switching technology.
- The introduction of document has to put this problem in its proper prospective. When asked for volunteers to rewrite the introduction none came forward.
- The scope of this guide was briefly discussed and Bob Degeneff indicated that the PAR for this guide was intended to deal with transformers greater than 1 MVA and less than 50 MVA, with voltage greater then 4 kV and less than 115 kV. Nigel McQuin said gas

turbine start up transformers should be excluded. After further discussion it was agreed to keep the scope as is.

- Bill Bergman moved the discussion to the disposition of the existing PAR, and some possible options. Several representatives from IEEE were present on the call and added to this discussion. In summary, the existing PAR could be worked to completion, but may require an extension; or withdrawal of the PAR could be requested and then be granted by IEEE. If the document were to be jointly sponsored, the current PAR would have to be cancelled. A jointly sponsored PAR could be done, however Letters of Acceptance of this PAR would be required to be submitted to IEEE from the chair of both the Transformer's Committee and the Switchgear Committee.
- Transformers were modeled only as inductance in this guide. Losses in transformers should also be included in the document.
- The discussion on how to include practical guidance in this guide, generated several comments.
  - Roy Alexander indicated he would get Peter Balma or Bob Degeneff copy of related CIGRE Technical report which may provide some of the guidance needed. The CIGRE report was prepared by CIGRE groups A2, A3 and B3.21, published in January or February 2005 and is titled "Electrical Environment of Transformers."
  - Nigel iterated the problem is people are aware of short circuit and protective relaying challenges, but pay little attention to transient and switching events when designing electric facilities. It would be helpful for less experienced or new engineers to be able to do this.
  - The question was asked does anyone have any reference suitable for snubber design or considerations. There was no response. Bob Degeneff indicated the difficulty is that the cost of a study to determine the need for a snubber can far exceed the cost of installing a snubber.
  - If we can identify a system that would be a candidate for a problem we have gone a long way. If there is a problem, this guide can indicate where to look for additional information and references that would be of assistance. How do we make this useable and practicable?
- Tom Tobin asked what revision of the guide we were working on. It was indicated that the latest draft will be dated and relabeled revision 2.0 and that any future versions will be dated and continue numbering as 3.0, 4.0, 5.0, etc.
- As a next step this material will be reviewed at the upcoming Transformer's Committee meeting.
- Jeff Nelson thanked everyone for their help and participation in this call.

The call was concluded at 1:00 PM EST.