10.4 C57.13 Instrument Transformers – R. McTaggart – Unapproved Minutes

Chair's Remarks & Announcements

- The Instrument Transformer Subcommittee met on Wed April 13 at 8:00 AM.
- 9 of the 16 members plus 18 guests attended.
- The Patent Issue slides were presented and no issues were reported
- The previous meeting's minutes were approved as written
- The next meeting is scheduled for Oct 30 – Nov 3, 2011 in Boston
- The status of all C57.13 standards was reviewed

10.4.1 Task Force Report: PARTIAL DISCHARGE IN BUSHINGS AND VTs/CTs

The task force on Partial Discharge in Bushings and VTs/CTs met on Monday April 11th, 2011, at 3:15pm with 45 attendees. Of those, 10 were members and 35 were guests with 7 guests requesting membership.

- The meeting was opened with a request for patent disclosures and introductions.
- The minutes for the F10 Toronto meeting were presented.
- The next item in the agenda was a presentation by Alex Kraetge: De-noising and pulse separation approaches based on synchronous multi-terminal frequency measurements.
- A request was made to have all the presentations delivered to date in the TF meetings posted on the Transformer Committee webpage; the request was accepted since the material is considered public domain.
- After the presentation by Mr Kraetge, the TF Chair presented a preliminary scope and a proposed outline for the guide.
- Among the comments to the preliminary scope presented by the Chair were:
  - The scope limits the guide to wide band detection, whereas narrow band could also be suitable considering the simpler propagation patterns found in the equipment under test.
  - Both wide band and narrow band detection are presently being used in laboratory settings by manufacturers.
  - The scope should be limited to laboratory settings for now and consider field PD measurements for future work.
  - The scope needs to be re-worded to address the above comments.

- Regarding the proposed outline, the following comments were made:
  - What instrumentation is appropriate for PD testing needs to be addressed.
  - The proposed outline includes a separate sections for CTs, PTs and bushings. Is it really necessary as CTs and bushings are very similar regarding PD testing?
  - Most of the material that it is currently part of the annexes such as calibration, test procedures and PD pattern recognition should be moved to the main body of the guide and decide later if an annex is needed for additional information.
- TF Chair Thang Hochanh requested volunteers to start drafting the different sections of the guide. Additional volunteers willing to contribute to the guide can contact Mr. Hochang:

10.4.2 Working Group on Current Transformers with mA range (PE/TR/PE/TR/Instrument-WG C57.13.7) - Henry Alton

The WG met on April 12 at 11 AM. There were 16 in attendance and there are now twelve members.

The agenda was as follows;

1. *Introduction*
2. *Patent Issues*
3. *Personnel*
   a. *Vuong Nguyen has retired*
   b. *Adnan Rashid is not Attending*
4. *Acceptance of the Agenda*
5. *House Keeping Henry Alton of Triacta Inc.*
   a. *Henry Alton* to get a copy of C57.13.6
      - completed
   b. *Henry Alton* distributes latest Measurement Canada spec.
      - completed
   c. *Henry Alton* Generate a Draft framework of C57.13.7 - completed

6. *Presentations*.
   a. Brief Discussion CT type suitable for this standard by *Dave Wallace ABB Inc.*
   b. Draft Review Comments
      i. Proposal to remove the parallelogram *Randy Mullikin MERAMEC Electrical*
      ii. Paul Millward wanted to test the CT samples provided by Triacta
      iii. Entertain Transducers?

7. *Next Steps*
    a. Look for other values of CT under 250mA secondary or expression thereof
    b. Close any further testing
        i. Express results
        ii. Express methodology
    c. Timelines for a draft availability for formal reviewing
    d. Submit for formal reviewing before the next meeting
    e. open

Old Business

The Housekeeping of the previous meeting actions were reviewed.

- A copy of C57.13.6 was acquired
- The Draft of C57.13.7 included the latest version of the Measurement Canada requirement and was distributed to the team, two weeks prior to this meeting for comments from within the working group.

New Business

The topic of seeking coverage of a wider range of CT with 250mA secondary current and below was introduced and Dave Wallace spoke about a component that ABB makes that would be accurate and usable below 250mA secondary. There was some debate about the fact that this device was still a 5A nominal output design. More investigation is required to look for CTs that have secondary output below 250mA. If no more applicable CTs can be found in this category, the first formal reviewable draft of C57.13.7 would be offered up for review with the present content.

Randy Mullikin raised the question of being able to express the limits of the parallelogram in a different form. This was discussed. Paul Millward stated that the present parallelogram most completely expressed the limits. This will be kept open to see whether it should be changed.

Standard burdens were also discussed and a point was made about specifying impedance based on VA instead of these standard burdens. There is a need to investigate the test fixtures being developed by the National Research Council of Canada (NRC) to see whether there would be any impact in using this alternative *(any considerations of standard burdens that may have been designed into the fixture)*. The burden rating numbers in the table should be clarified. This will be dealt with in the actions.

There were comments made with respect to the classes of accuracy given in the draft document that would potentially be very hard to meet. It was further mentioned that cable length could significantly influence the measurement accuracy of a metering device with CTs presenting such low secondary currents. Concerns about the operating environment being included in the test set-up was mentioned. The Measurement Canada regulatory requirement addresses some of this and will be re-iterated. There was also a question about what kind of

materials were used in these CTs. There was some feedback that there were typical materials used. Some information on this will be provided.

How accuracy calculations were performed was also raised. A specification TFDEX 27575 was mentioned as an accuracy calculation method.

Paul Millward asked about the Power Factor limits that the 80mA CTs had been tested against. This item will be dealt with in the actions later in this document.

Actions from this meeting

These are the actions from this meeting. The dates shown are targeted dates that the action item will be completed by.

- *Dave Wallace* to recover the CTs and forward them directly to Paul Millward.
    - Status/Date: As soon as possible. A definite date will be sought.
- *Dave Wallace* to provide some test data on the CTs previously tested by Vladimir Khalin.
    - Status/Date: TBD - a reasonable date needs to be fed back for this.
- *Henry Alton* to provide some information on the materials used.
    - Status/Date: Apr20/11
- *Working Group* to provide some more clarity on the burdens and make them more “Real World”.
- *Henry Alton* Some background clarifying the standard burden numbers will be given to support the previous action.
    - Status/Date: Apr28/11
- *Henry Alton* to provide the specification limits for signals immunity tests that would be present when an energy measurement is being made.
    - Status/Date: Apr28/11
- Paul Millward to provide some test results on the same CTs that were being evaluated by Dave and Vladimir.
    - Status/Date: TBD – Paul to provide a time frame based on receiving the CTs

Schedule Perspective for Completion

This perspective was provided on the time still needed to complete the first draft for formal review.

- Triacta will conduct formal testing against the Measurement Canada requirement for 200A – 80mA CTs.
    - Target Completion - June 30/11
    - This information can be summarized and shared with the working group
- The C57.13.7 document can be left open until the above date to look for other values of CTs that fit this category and demonstrate their results in the same time frame.
- The document will be ready for and begin it’s formal IEEE review process after this date.

10.4.3 Working Group for Revision of IEEE C57.13 Instrument Transformers – R. McTaggart

This working group met for the first time on April 12 with 24 people present, 18 of whom became WG members under the 1st meeting rule. Membership expectations were discussed and agreement reached that Survey responses etc would be due 6 weeks after being sent out. The first one, which is for each member to review a portion of the standard, was presented and explained. P. Riffon requested that the Standard be made available in WORD format to facilitate cutting and pasting for this exercise.

The general objectives for the revision, based on previous discussions were discussed:

- Improve format – separate VT & CT clauses.
  - This will be addressed after substantial agreement on content
- Resolve differences between C57.13 & C57.13.5
  - See below
- Add appendix on Bushing CT's
  - Draft available for comments
- Replace clauses 8.1.7 to 8.1.10
  - Draft available for comments
- Eliminate obsolete information
- Improve PD requirements section
- Clarify various clauses
  - 3 items above to be accomplished through review & discussion

The key issue of how to resolve the differences between C57.13 and C57.13.5, which has been a topic in the last couple of ITSC meetings, was discussed again.
The options appear to be:

- In C57.13, refer to C57.13.5 for all test requirements for units 115 kV & above
- Copy all requirements of C57.13.5 into C57.13
- Define 2 classes of test requirements within C57.13. One class would have test requirements defined in C57.13 and the other class would be compliant with the requirements of C57.13.5

This question will be resolved in a survey as part of the first assignment

Some suggestions for areas for improvements received prior to the meeting were discussed, including:

1) Adding the accuracy class designation 0.15
   - Should requirements of C57.13.6 be included?
2) Current transformers with capacitance tap
   - Cap tap requirements for HV CT's should possibly be added
3) Voltage transformer used for power supply (PVT's or SSVT's)

- There are requirements up to at least 300 kVA – some with metering or protection requirements as well. There was some debate about the use of a device to compensate for the power loading to maintain metering accuracy. These transformers are generally supplied by Instrument Transformer manufacturers but are in effect small power transformers so they could possibly be addressed in C57.13 or another existing standard or may be best addressed by a stand-alone standard – either under C57.13 or C57.12. D. Wagner & D Wallace will collect spec's etc for review.

4) Ground fault CT's
   - Requirements for GFCT's for insulation failure detection on HV CT's should possibly be added
5) It was noted that no wet tests (either AC or switching) are required for units of 362 kV or above (see Table 2)
6) Table 15, subsection c (Voltage transformer burdens) – needs clarification
   - Items 5 & 6 above to be accomplished through review & discussion

Other subjects discussed included Transient Performance requirements, which are seldom specified in the USA. A simple solution is to make reference to IEC 60044-6 as is done in C57.13.5.

The issue of sensors for distribution system control was discussed. These sensors may be conventional instrument transformers as covered by C57.13 or non-conventional instrument transformers. Typically they need to have 0.6% to 1% accuracy and sometimes need to have protection accuracy as well. A clause defining this dual performance could be added to our standard. Marcel Fortin mentioned that there is a WG in the Switchgear Committee which might include this. Following the meeting he looked into this and found that there is a draft for C37.68 being worked on. However it is for microprocessor based controls for distribution equipment and does not take in voltage and current sensors. The general question of non-conventional instrument transformers also came up but this cannot be addressed in this revision. A separate standard or adoption of IEC would be more appropriate - with deviations if necessary. If we want to proceed with this a TF should be created.

10.4.4 Adjournment