MINUTES OF THE MEETING OF THE HVDC CONVERTER TRANSFORMERS & SMOOTHING REACTORS S.C. IN MILWAUKEE, WISCONSIN, OCTOBER 22, 2012

On October 22, 2012, the HVDC Converter Transformers and Smoothing Reactors S.C. met at 3:15 p.m., in the Oak Meeting Room of the Hilton Milwaukee City center Hotel, in Milwaukee, Wisconsin. There were 9 members and 31 guests present. One of the guests requested membership. The following are the highlights of the meeting:

1. Introductions were made and the attendance list circulated.

2. The total membership of the SC is 23, but currently that includes 5 corresponding members. If a corresponding member is not present at the meeting, then he/she is not included in the evaluation for the quorum. No corresponding members were present at this meeting. That means that at least 9 members (50% of 18) should have been present in order to get quorum and that was precisely met. The chairman, Mike Sharp, will go through the membership list again to see if it should be reduced further in order to facilitate quorum in coming meetings.

   The minutes from the Nashville meeting (Spring 2012) were approved.

   There was not quorum at the Nashville meeting so the minutes from the Boston meeting (Fall 2011) could not be approved. However, these minutes have been approved later via e-mail.

3. The converter transformer standard IEEE C57.129 will expire 2018 and the Smoothing reactor standard IEEE 1277 will expire 2020.

4. Harmonization with IEC.

   Paul Jarman explained the present situation for IEC standards, which are related to converter transformers.

   - IEC 60067-3 “Power transformers – Part 3: Insulation levels, dielectric tests and external clearances in air” is in the final process for revision. Some controversial issue from Cigré regarding Polarity Reversal test (with considerably longer times for design tests) and oil conductivity are being discussed.

   - IEC 61378-2 “Convertor transformers – Part 2: Transformers for HVDC applications”, the revision process will start soon. Anders Lindroth is the convener.

   Jodi Haasz (Standards Strategist at IEEE) gave a presentation regarding IEC/IEEE Dual Logo Agreement, which allows for the joint development of documents between both organizations. For a joint standard, there are two parallel processes (one for IEC and one for IEEE) but with a lot of cooperation. The cooperation can be done via joint meetings and/or correspondence. During the process both organizations can decide whether to proceed for a dual logo standard or to go for separate (but more harmonized) standards. Dual logo standards are under development for transformers

for nuclear power applications, phase shifting transformers and DC bushings. It may be less difficult to develop dual logo standards for special applications versus for the general transformer standards. Converter transformers can be considered to be a special application. The IEC-IEEE Joint Development Agreement is available at: http://standards.ieee.org/develop/intl/iec_admin22.pdf, A Guide to IEC/IEEE Cooperation – Clause 4 is available at: http://standards.ieee.org/develop/intl/iec_ieee_coop.pdf

Should we go for a joint standard and by that join IEEE C57.129 and IEC 61378-2 into a dual logo standard? One big advantage is that converter transformers then would be specified in the same way independent of to where in the world they will be delivered. One problem is that the different documents are parts of a series of standards which are arranged in different ways for IEC and IEEE. This can be solved by creating completely new document numbers. Another problem is that the two converter transformer standards refer to many other standards in IEC and IEEE respectively. Considerable discussion will likely be required to obtain consensus regarding the preferred cross references.

It may be too difficult to create a dual logo standard but all agreed we should, in any event, do as much harmonization as possible. That work can eventually lead to a joint standard.

IEC and IEEE do now have different definitions of rated current and rated power. IEC does not include harmonics but IEEE does. IEC do plan to revise that to include harmonics.

We voted among the SC members at the meeting if we should try to form a joint TF with IEC to evaluate the interest to create a joint WG (for a joint standard) or to go for harmonization. The result was 9 for and 0 against. Volunteers to participate were Paul Jarman, Eric Davis, Fred Elliott and Ulf Radbrandt.

5. Klaus Pointner gave a good presentation regarding converter reactors for different topologies for voltage source converters (VSC). This presentation showed that converter reactors are more similar to series reactors (IEEE C57.16) than to smoothing reactors (IEEE 1277).

   However, during the discussion afterwards it was decided that text regarding converter reactors should be incorporated in IEEE 1277 which should get a new title in order to include both smoothing reactors and converter reactors. The converter reactor section in this standard will then refer where applicable to IEEE C57.16. This is also in line with IEC 70076-6 (Power transformers – Part 6: Reactors), which also includes both smoothing reactors and converter reactors. Mike Sharp and Klaus Pointner will start the work to create a first new draft of IEEE 1277.

6. Ulf Radbrandt showed the changes that he had done in the Annex regarding insulation coordination. The changes were mainly due to comments from Les Recksiedler prior to the Nashville meeting and an added clause on dc grids. All changes were accepted and no further modifications were proposed.

7. Les Recksiedler has checked if the Cigré guide 406 covers life assessment and life extension for converter transformers. It does not, but Peter Heinzig advised by e-mail that the Cigré Brochures: 227 (Life Management Techniques for Power Transformers), 342 (Mechanical Condition Assessment of Transformer Windings) and 291 (Guidelines for Meteorological Icing Models, Statistical Methods and Topographical Effects) do. Also IEC 62622 contains relevant information. The SC will consider this regarding creation of a guide on life assessment and life extension for converter transformers.

8. The meeting was adjourned at 4:30 p.m.

Mike Sharp, Chairman Ulf Radbrandt, Secretary