IEEE Power and Energy Society
Switchgear Committee
Switchgear Assemblies Subcommittee
C37.20.8 Working Group Report
1-May, 2012

The Working Group Meeting was called to order on Tuesday, May 01, 2012, at 2:10PM.

Attendance included 5 members (of 28) and 5 guests. Attendance is as shown below:

Members	Guests
T. Burse	C. Carne
K. Flowers	L. Cox
A. Jivanani	D. Dunne
H. Josten	B. Gerzeny
J. Shullaw	M. Glinkowski

A quorum was not present.

The Minutes of the meeting held October 12. 2012 were approved as submitted.

The PAR was approved March 2009 and expires December 31, 2013.

T. Burse attended the TPSSC meeting held in Philadelphia. PA in April, 2012. The PowerPoint presentation given at the April 2012 TPSSC meeting was presented. The recommendation to reconsider segregating dc equipment used for traction power from C37.20.1 due to the possible orphaning of similar equipment used in other industries and the preponderance of common requirements that would remain in both documents was discussed. A compromise was presented at the meeting. The following is an excerpt from the minutes of the meeting.

"**C37.20.8 DC Switchgear Standard**, Ted Burse discussed the status of reviewed issues of removing DC Switchgear from C37.20.1.
David Groves suggested:

1. We change the title and scope to include all dc switchgear above 600V and address all standard construction and testing requirements in the standard.

2. Create an Appendix/Annex as an Application Guide for Traction Power Applications

This approach should be acceptable since we will have a dc switchgear standard, application guide for traction and other industries with 600 + V dc switchgear will not be orphaned.

Gary Touryan encouraged all interested to become active members of VTS and PES to be able to contribute to the development off dc switchgear standards."

The proposal was discussed and will be presented to the Switchgear Assemblies Subcommittee. Alternate approaches were also discussed including segregating all dc assemblies from 20.1, or revising 20.1 to better address all dc equipment.

The Ad Hoc group addressing dc shunts consisting of T. Burse, K. Flowers, M. Lafond, B. Gerzeny, J. Shullaw, M. Zeedyk, D. Groves and H. Josten completed its work. The report was briefly presented and follows these minutes.

The possibility of concurrent meetings with TPSSC was discussed. This will be investigated.

The meeting adjourned at 3:30PM.

Respectfully Submitted: T. Burse, WG Co-Chair

IEEE PES Switchgear Committee

Switchgear Assemblies Subcommittee

C37.20.8 Working Group

DC Shunt Task Force Report

Members:

T. Burse, (Chair) B. Gerzeny, D. Groves, T. Burse, K. Flowers, H. Josten, M. LaFond, J. Shullaw, M. Zeedyk

Status:

A document for discussion was circulated via e-mail among the Task Force (TF) in February. Comments were also solicited from industry experts. All comments received were compiled. A conference call was held March 6, 2012 to discuss all comments and achieve TF consensus. The recommendations of the TF follow.

Perceived Problem: Standard requirements for dc shunt application and rating during design testing is not clearly addressed in the current edition of the standard.

1. Description: There are clarifications needed within C37.20.1 regarding shunts and design testing of DC Switchgear.

    a. **Roughly 99% of all High Speed, Semi-High Speed and Rectifier DC Breakers include a shunt installed within the same vertical section of each breaker. With that being the case in the real world, the TF concluded that additional information should be considered for inclusion in the creation of C27.20.8 and the future revision of C37.20.1**.

    b. **C37.20.1, 6.2.1, Test Arrangements, does not address shunts. It does mention "Voltage transformers, control power transformers, and associated disconnecting means and fuses are not required for the tests specified in 6.2.3 through 6.2.5." However, shunts are contained in Table 4, Temperature Limits, with the note "No specified limit except to avoid damaging adjacent parts."**

    In order to promote consistency during tests, the TF recommends that the Test Arrangement for Continuous Current tests should include shunts. The current rating of the shunt for each frame size of circuit breaker tested should be chosen in accordance with the guidance provided in IEEE 316 – 1971, 6.2. The selection of current ratings should be based upon a test current value that is 2/3 the rated value of the shunt. The voltage output of the shunts should be rated for 50 millivolts at rated current.

    The TF also recommends that a clarification should be added to include a requirement that the heating effect of the shunt does not cause series-connected

bus connections directly adjacent to the shunt terminal connections to exceed specified limits.

c. **Short Circuit Current Withstand Tests - The standard currently allows the tests to be performed with prospective current or through current. In order to obtain worst-case through current and thereby worst-case mechanical and thermal stresses, the TF recommends that shunts be specifically excluded from these tests.**

Perceived Problem: Shunt ratings are sometimes specified incorrectly, lack of application information in 8.7 of C37.20.1.

1. Description: IEEE 316 Sections 3.6 and 6.2 both discuss ratings of shunts, specifically the current ratings. While IEEE 316 is specified by most end users it's very often disregarded when sizing the shunt for a particular application.

    a. Consider the instance where a traction power substation has a 3000kW rectifier on a 750VDC nominal system. Full load current will be 4000A. Most users assume that if the full load current is 4000A then they will need a 4000A shunt. This is incorrect. If the full load current is 4000A then a 6000A shunt should be used according to IEEE 316 or else the accuracy of the shunt will not be to the manufacturer's stated tolerance. This is a major issue because these shunts are used for both metering and protective relaying (overcurrent) and therefore must be as accurate as possible for proper coordination of protection.

    b. Many times the shunt is also linked to the circuit breaker that is in series with it. Very often a 6000A DC breaker will be suggested and then a 6000A shunt specified. Again this is misapplication of the shunt. If the breaker chosen is 6000A then the assumption must be made that the shunt will need to be rated for 6000A continuously. A shunt rated for 6000A continuous current is a 9000A shunt. Again using the 2/3 rule from IEEE 316.

    c. The reverse of this is when a customer has a 6000A breaker and then specifies a 15kA shunt (instead of the correct 9000A shunt) to accommodate for overload conditions. In this case accuracy still suffers.

The TF recommends that additional guidance regarding shunt selection and application be provided for the user in the form of an informative Annex. IEEE 316-1971 has been withdrawn by the IEEE. The TF discussed the possibility of reprinting all or portions of that document as an Annex to C37.20.8 and C37.20.1. T. Burse will discuss possible options with the IEEE SA.

Respectfully Submitted,

Ted A. Burse

March 7, 2012