Tuesday, March 29, 2011
The meeting was called to order by Gary Touryan, the Chairperson of the Traction Power Substation Standards Subcommittee (TPSSC). Gary stated that the subcommittee meets at regular intervals during the year at various transit properties in United States and Canada. He also pointed out that the subcommittees consist of transit and rail industry leaders in public and private sectors dedicated to writing national consensus standards, recommended practices, and guides which will govern manufacturing, supply, installation, testing, commissioning, and operation of traction power substation equipment.

Mr. Richard A. Davey, MBTA General Manager, welcomed the committee and briefly described the ongoing work required to maintain and improve services.

Gary expressed our subcommittee’s appreciation to Sean Carney, MBTA Director of Power and Transit Facilities for all the hard work accomplished to host our Subcommittee.

VTS Vice President, Land Transportation Harvey Glickenstein explained expense reimbursement for Transit Agency personnel (please remember to receive reimbursement you must be a member of IEEE and VTS). He requested to send expenses to Paul Forquer, who will forward them on to Harvey.

Gary thanked Alan Blatchford for organizing our next meeting in Edmonton, AB, CA on September 12 and 13, 2011 for TPSSC and on September 14 and 15, 2011 for OCS.

Gary reminded everyone of our RTSC Web site http://www.rtvisc.org and the password transitrailway, and thanked Mr. Steve Bezner for maintaining the web site.

Paul Forquer moved to have the minutes of the previous meeting approved. The minutes were approved by all attendees.

Prior to starting WG sessions Gary reviewed IEEE PatCom info/Balloting rules for meeting.

- **P1653.1 Standard Practices and Requirements for Traction Power Rectifier Transformers** Ben Stell reported.
  A ballot group has been re-assembled for this standard (the previous one had lapsed due to inactivity). The number of people in the new ballot group is 47. Subsequent to the meeting the IEEE notified us that the standard has not yet been through the Mandatory Editorial Coordination (MEC) review that is required before a standard is balloted. MEC review will be requested shortly.

- **P1653.2 Standard for Uncontrolled Traction Power Rectifiers for Substation Applications Up to 1500 Volts Nominal Output** Ben Stell WG Chair reported.
  We have at least 3 years before we have to re-affirm or modify P1653. However, there is no requirement that we have to wait until then. Ben requested that the Subcommittee consider modifications/additions to enhance the current standard, and email them to him at Benjamin.Stell@STVinc.com. One possible item would be to develop and illustrate a 3 hour
service rating ("overload cycle"), since at least one heavy rail transit agency has standardized on a 3 hour service rating, and others are expected to follow suit.

- **P1653.4 Standard for DC Traction Power System Field Testing and Acceptance Criteria for System Applications up to 1500 Volts dc Nominal** Ben Stell reported. This standard has been successfully balloted. The next step is to move to publication (RevCom submission).

- **C37.20.8 Standard for Metal-Enclosed Low-Voltage (3200V and below) Direct Current Power Circuit Breaker Switchgear for Traction Power Applications** David Groves reported that they are continuing coordinating with PES.

- **C37.14 Standard for Low Voltage dc Power Circuit Breaker Used in Enclosure** Chuck Ross briefly explained that the ANSI C37.14 was being redone to include dc circuit breakers only. The PAR had been previously submitted but has been since deleted and the chair person is waiting for the VTA committee to get together with PES chair person Keith to develop a PAR and plan to proceed with the rewrite of the standard. Brian Gerzeny has been appointed by our subcommittee to work with the PES chairperson to proceed with the development of the new PAR and develop a plan for the rewrite of the standard. The rewrite will exclude ac breakers and include the required information from existing standards 37.16 and 37.17. Brian Gerzeny will provide follow-up on the progress in Edmonton.

- **P1653.3 Use Guide for Traction Power Systems Modeling** Mike Dinolfo WG Chair and Mark Pfeiffer WG Vice Chair reported.
  1. Draft 41 was reviewed by the group.
  2. Any references to "catenary" will need to be changed to "OCS". Apparently there are a few remaining references to "catenary" that have not yet been corrected.
  3. A table of train voltages vs. system design voltages for various transit properties was presented by Mike Dinolfo. This will be added as an annex, with a disclaimer that any reader should verify actual voltage requirements with appropriate transit property before use.
  4. A table of rail-to-ground limits and criteria from various transit properties was presented by Mike Dinolfo. This will be added as an annex, for information.
  5. A preliminary (incomplete) document describing “how to build a vehicle model” was briefly discussed. If this document can be expanded it might be valuable for incorporation into the Modeling guide, but it would require considerably more work. Volunteers are welcome; otherwise this document will be abandoned.
  6. Annex C was revised and reformatted since the last meeting and was reviewed by the group.
  7. All WG members are encouraged to contact Mike Dinolfo, Mark Pfeiffer, or other WG members if they have further suggestions or contributions to the Modeling guide.

- **P1653.5 Recommended Practice for Controlled Traction Power Rectifiers for Traction Power Substation Applications** Ray Strittmatter WG Chair reported. The IEEE-SA Standards Board approved the Project Authorization Request (PAR) until December 31, 2013 and that the balloting process should begin in January 2013 in order to meet the PAR deadline. If the balloting process takes longer, than a PAR extension can easily be submitted. Discussed the Displacement Power Factor (DPF) table and equation from Louie Lou.
Per Vitaly Gelman stated that the DPF equation is only valid when a controlled rectifier does not have large output capacitors. There is no one equation that can be used to determine Displacement Power Factor (DPF) for controlled rectifiers when the rectifier has large output capacitors.

Andy Jones commented on the actual need for this DPF table since the alpha angle is constantly changing to keep the output dc voltage constant due to changes in ac input voltage and constant variations in the dc load current.

Maybe a statement should be written that “in customer supplied specifications, DPF shall not decrease below 0.75, or customer supplied value of X, at highest rated dc overload current and minimum rated ac input voltage. At 100% rated load current and rated ac input voltage, DPF shall be 0.95 or higher. At 25% to 50% of rated load current and rated ac input voltage, DPF shall be 0.90 or higher. Controlled rectifier design calculations shall show calculation method and all input variables used to determine how all power factors are calculated”.

Jian G. Yu (Gordon Yu) submitted IEC 146-1-2 excerpt showing a voltage regulation calculation / equation for voltage controlled rectifiers. Similar information can be found for waveforms, harmonics and power factor. Further discussion needs to occur on applicability to the recommended practice and if the information should be copied or just referred to in the recommended practice; regardless, it is useful information; as per file “TCR-Calc-Ref_IEC146-1-2excerpt.pdf”. IEC 146-1-2 was renamed IEC TR 60146-1-2, dated 2011.01.01, and has Active Status, with title, “Semiconductor converters – General requirements and line commutated converters – Part 1-2: Application guide - Edition 4.0”.

Vitaly Gelman discussed controlled rectifier output filters and interphase transformers.

**Wednesday, March 30, 2010**

Meeting called to order by Gary.

- **P1653.6 Recommended Practice for Grounding in Systems Supplying Direct Current Traction Power** Paul Forquer WG Vice Chair lead the discussion.

The standard was reviewed. High vs. Low Resistance grounding was discussed with no resolution as to a recommendation.

The meeting attendees thanked the sponsors of breakfast, lunch and the dinner GE, HNTB, MTC Transformer, PGH Wong, Powell Electrical Systems, QEI, STV, and Virginia Transformer.

Before adjourning the meeting Gary thanked Sean for arranging a site visit to MBTA Control Center and two representative traction power substations. Also, a special thanks to 80 attendees that made the meeting very successful and productive.