Meeting Notes
IEEE VTS Traction Power Substation Standards Sub-committee Meeting (TPSSC)
October 18 and 19, 2017
at One PATH Plaza, Journal Square, Jersey City, NJ 07306
Hosted by Port Authority of New York and New Jersey (PANYNJ)/Port Authority Trans-Hudson (PATH)

INTRODUCTION
The Traction Power Substations Standards Subcommittee (TPSSS) is in its fifteenth year of operation since it was formed in 2002. The TPSSS is working on developing new standards, recommended practices, and guides; coordinating with other organizations such as APTA and AREMA and within IEEE; providing up-to-date information on professional activities of interest to the electrified rail and transit industry; and soliciting recommendations, ideas and suggestions that would improve industry practices. The TPSSS is a subcommittee of the Rail Transportation Standards Committee (RTSC) within the IEEE Vehicular Technology Society (VTS). The TPSSS meets bi-annually at various transit properties in the United States and Canada. The TPSSS consist of electrified transit and railway industry leaders in the 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.

PURPOSE
The purpose of this meeting was to update the TPSSS membership on status of TPSSS activities including Working Groups (WG) and Task Forces (TF), to share the progress of their work, to conduct working sessions, and to outline future plans for continuing their work on standards, recommended practices and guides.

The following are brief notes of October 18 and 19, 2017 meeting
- Mr. Gary Touryan called the meeting to order
- Mr. Michael Marino, Director/General Manager PATH welcomed all participants to PATH/PANYNJ.
- Mr. Greg Gadomski, Superintendent – Power, Signal and Communication made a very informative presentation describing PATH system as a critical link between NJ and NY, and the level of effort it takes to maintain and operate a 100 year old commuter railroad.
- Dr. Bi-Yuan Ku, VTS Vice President, Land Transportation gave a summary of VTS Board activities. He encouraged everyone to join VTS. He encouraged those eligible to apply for Senior Member status in the IEEE. He encouraged everyone to participate in the Joint Rail Conference.
- Mr. Louis Sanders, APTA Director, Technical Services gave a briefing on APTA activities. APTA is working on standards updates - Safety Standards and High Speed Rail Standards. APTA has received more federal funding.
- Mr. Gary Touryan and John Schlik informed that the next meeting will be hosted by Trans Link Vancouver, Canada for OCS on May 7 and 8, 2018 and May 9 and 10, 2018 for TPSSC.
- Mr. Paul Forquer stressed the importance of participating in balloting.
- Meeting Notes of the previous meeting were approved.
- Mr. Paul Forquer went over PatCom information prior to starting the WG/TF session.

1653.1 – 2016 – IEEE Standard for Traction Power Transformers for Substation Application up to 1500 Volts dc Nominal Output
Ethan Kim
Mr. Ethan Kim provided status of the standard. There was a discussion on the appendix containing the “Ping Test”. Mr. Paul Soleyn, former NYCT Engineer, gave a briefing on NYCT experience. Mr. Gus Orphanides reported that LIRR puts snubbers on all transformers above 15KV. It was agreed the appendix needs more work perhaps also including some directions on how to interpret the results.

All interested in taking part in this Working Group contact Ethan Kim ekim@ltk.com

1653.2 – 2009 – IEEE Standard for Uncontrolled Traction Power Rectifiers for Substation Application up to 1500 Volts dc Nominal Output

Mr. Stell provided the following update on the status of 1653.2.

- This standard will expire in 2019 unless it is revised.
- The revision process makes the entire standard open to comments, not just the proposed changes. “All comments must be addressed” (IEEE policy quote). Therefore, adequate time must be allocated for balloting.
- A Project Authorization Request (PAR) for the revision must be approved by the IEEE prior to revision of the standard (An approved “Revision PAR” establishes the project number, which permits the revision work to start).
- A Revision PAR request has been submitted to the IEEE and has been approved for the December 5, 2017 New Standards Committee (NesCom) meeting.
- The published version of the 1653.2 standard is posted to IEEE TPSSC iMeet Central site in the 1653.2 “workspace” (The “precursor” ANSI C34.2 and NEMA RI-9 standards have been posted there as well for reference). A mark-up for discussion will be posted there within the next two months.
- We need interested Working Group member names and email addresses for invitations to the iMeet Central 1653.2 workspace; please email them benjamin.stell@stvinc.com.

Several technical items in P1653.2 were discussed which are summarized as follows.

- The rectifier circuit diagrams in 1653.2 show a 25/26 circuit as having an interphase transformer (IPT). NYCT does not use an IPT for their 25/26 rectifier transformers, so an exception to this configuration may be noted in the application guide section.
- It was agreed that “pulse” should be used instead of “phase” in the rectifier circuit diagrams.
- The definitions for light traction service and heavy traction service should be clarified, since they currently overlap. Also, the time at which the overloads are applied is not clear.
- The following proposed definition for a “closely coupled” rectifier transformer was agreed upon: “Closely coupled: A rectifier transformer with $K_s \geq 0.75$”.
- An Extended Extra Heavy Traction service rating was agreed to, consisting of a 3-hour 150% overload period with three 300% overloads periods per hour superimposed on it. The duration of the 300% overload pulses is one minute. The root-mean-square equivalent of this waveform will be provided.

All interested in taking part in this Working Group contact Ben Stell Benjamin.stell@stvinc.com


Mr. Heatherington provided the following update:

- There have been a couple of meetings to discuss the updates to this Guide, but there has been limited involvement.
We encourage anyone who has said they are interested in contributing to the updates to join the next meetings. The plan is to hold the next meeting before Xmas 2017.

Several proposed updates to P1653.3 were discussed which are summarized as follows.

- Providing guidance on when regenerative braking should be used to size a traction power system rather than recommending to always ignoring its contribution.
- Adding a section in the Guide to provide guidance on validation vs verification.
- Provide a section making clear the difference between “current limiting” and “forced performance limitation” and the effect on train performance.
- Added a section to cross reference the Wayside Energy Storage Guide.
- We would like to discuss the effect of rail to ground resistance on rail voltages. Both Mike Natzenzon (Systra) and David Hetherington (Mott MacDonald) have undertaken test simulations on their respective (independent) load flow software and both agree that rail to ground resistance appears to have little effect on touch voltage.

All interested in taking part in this Working Group contact David Hetherington david.hetherington@mottmac.com

1653.4 - 2011 – IEEE Standard for dc Traction Power System Field Testing and Acceptance Criteria for System Applications up to 1500 Volts dc Nominal

Tom Young

Mr. Young reported on the rewrite of the train start and short circuit portion. The participants agreed on the changes. Mr. Young also reviewed mark ups (mostly clerical) of the document and asked that everyone respond and suggest additional changes.

All interested in taking part in this Working Group contact Tom Young tytp38@gmail.com

P1653.5 Recommended Practice for Controlled Rectifiers for Traction Power Substation Applications

Vitaly Gelman

Mr. Gilman made a technical presentation on the subject and promised that they will be able to complete their work prior to expiration of the PAR in 2018.

All interested in taking part in this Working Group contact Vitaly Gelman vgelman@vgcontrols.com

1653.6 - 2013 – IEEE Trial-Use Recommended Practice for Grounding of dc Equipment Enclosures in Traction Power Distribution Facilities

Ethan Kim

Mr. Kim stated that the “Trial use” designation of this Recommended Practice required a renewal for the document to remain as a valid IEEE document. The ballot for the “Full Use” document will be out to the committee in 2018. Looking beyond that, the task force was working on a revision to address concerns that had surfaced last spring in Cincinnati:

1. While the Recommended Practice limited itself to discussion of equipment grounding, experience had shown that attempting to discuss equipment grounding without defining system grounding was creating confusion. Accordingly, edits were made to address this. Discussion ensued, and further work is clearly necessary.
2. Consideration of the following systems needs to be added:
   a. Fourth rail (i.e., London Underground)
3. Trolley bus and rubber-tired trains, where the guideway is not used for the return circuit. The definitions offered for “ground” and “earth” was not satisfactory and need further work.

All interested in taking part in this Working Group contact Ethan Kim ekim@ltk.com
Mr. Gerzeny reported that drafts D2 & D3, written by the Working Group, were reviewed with the Sub Committee. These drafts were accepted with no further comments. Work will begin on Draft D4 which will focus on applying the new overcurrent definitions to the tables in Annex B and agreeing on values for the table. All interested in taking part in this Working Group contact Brian Gerzeny brian.gerzeny@powellind.com

Mr. Wilson gave a brief status report. Vish Mawley has “retired” from being Chair of the Working Group and Ed Wetzel will be the Chair going forward. The WG was formed in 2012 and work has progressed slowly with the current draft being approximately 70% complete. As the PAR is expiring a two year extension has been applied for. With approval work will continue to refine the document. New members of the WG would be welcome. All interested in taking part in this Working Group contact Ed Wetzel Edwin.wetzel@stvinc.com

P1887 IEEE guide was published March 20, 2017 and is available. Suresh Shrimavle (Vice Chair) on behalf of Salwa Fouda (Chair) and Ken Nutt (Vice Chair) thanked the Sub- Committee and the Working Group for their invaluable support in achieving and completing this task.

Benjamin Stell and David Hetherington provided the following update on the status of P2720.
- The current draft guide document Rail Potential Management Guide for Direct Current Traction Electrification Systems (Draft 5) is in the iMeet Central P2720 Workspace.
- Scope: This guide provides a description of the concepts, applicable standards, and methods used for the calculation and management of rail potential on dc-electrified rail transit systems.
- Purpose: This guide describes existing methods, terminology, and additional references for the management of rail potential on dc-electrified rail transit systems.
- Current WG members have been invited to the iMeet Workspace (please contact David or Benjamin if you have not been “invited” and are interested in joining).
- Draft D5 has some areas that need work in particular:
  - 8.3.1 Impact of passenger platform de-icing materials on touch & step voltages (proper procedures)
  - 8.3.2 Impact of platform edge doors on touch voltages (proper design)
  - 9.8 Passenger platform electrical isolation guidelines
  - 9.9 Voltage Limiting Devices: update per recent European VLD application guide EN 50526-3 (Benjamin will research)
  - 9.10 Analysis of NGD impact on local and remote rail potentials (additional load flow simulations)

All interested in taking part in this Working Group contact Ben Stell Benjamin.stell@stvinc.com
The Smart Substation Committee reported for the foreseeable future, the committee would present relevant speakers and papers on Smart Substations and related topics while building the group. During the general Smart Substation approach overview it was brought to the Task Forces attention there is not a standard for a DC multipurpose relay. The works and papers of the TF will be maintained on iMeet. All interested in taking part in this Task Force contact Mark Curry mark.curry@powellind.com

**Working Group (WG) on Primary Power Distribution and Control Centers in Passenger Rail Car Maintenance Facilities**

TPSSC participants discussed proposed PAR for Primary Power Distribution and Control Centers in Passenger Rail Car Maintenance Facilities (commonly referred to as stinger systems to power and move vehicles in shops). The consensus was to proceed as a recommended practice instead of a standard, and to establish a WG with Lowell Goudge as the Chair. All interested to be part of the WG contact Lowell Goudge lowell.goudge@alstomgroup.com.

**Adjourn the second day of the meeting**

Prior to adjourning Mr. Touryan thanked Mr. Michael Marino for welcoming the participants, and Mr. Greg Gadomski and his staff for taking care of every detail to make the meeting successful. Mr. Touryan pointed out that this is second time IEEE holding meetings at PATH. The previous meeting was in May 2007 hosted by Mr. Radomir Bulayev, and conveyed IEEE’s appreciation for volunteering the new conference facility for second visit to PATH. Mr. Touryan stated that PANYNJ support to our volunteers is truly appreciated and what makes our meeting most successful is their participation in the discussions and sharing the wealth of their experience and knowledge obtained working for so many years at the PATH.

Mr. Touryan concluded that the meeting in Jersey City at Journal Square Transportation Center with over 100 participants was very successful and productive. In addition to a very strong representation from local NY/NJ agencies such as NJT, NYCT, MNR, and LIRR, we had West Coast agencies BART, Tri Met, LA MTA, and Denver RTD also very well represented.

**Site Visit to Caisson Substation the second day of the meeting**

Special thanks to Mr. Glen Smiley and his staff conducting the tour and comprehensive presentation of Caisson substation and supervisory control and monitoring system. The time PATH dedicated to the tour gave all participants an opportunity to exchange the best practices in our industry. It was so captivating that we had to remind our members not to miss their flights.

TPSSC thanks all meal sponsors for their continuous support Powell Electrical Systems, Hawker Siddeley, SYSTRA, Filnor, Inc., and PC&S.