Georgia Tech NEETRAC
National Electric Energy Testing, Research and Applications Center

NEETRAC NEWS

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In This Issue...

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End-of-Year Message from Director, Rick Hartlein

The entire NEETRAC team joins me in thanking our Members for another great year. Over the years, our membership has grown and our engagement with Members is expanding, allowing us to provide you with an increasingly broad range of services. NEETRAC is built on a unique collaboration – we are thankful for the role each and every one of you play in its success. On behalf of my NEETRAC colleagues, I hope all of you have a safe, happy, and peaceful holiday season.

IEEE Entity Standards: We All Need to Pay Attention

Traditionally, IEEE PES (Power & Energy Society) Standards were developed under the Individual Participant Model where:

- Participants are individual technical experts
- Individuals represent themselves
- **Each individual participant has 1 vote**
  - ◊ Ballot groups are made up of a minimum of 10 individuals
  - ◊ Ballot group participants must be IEEE-Standards Association (SA) individual members

The Corporate (Entity) Model has been used by other Societies, in areas such as telecommunications, but is now being used to develop PES Standards. In this model:

- Participants are “entities,” i.e., companies, universities, government bodies, etc.
- A designated representative and alternate represent the entity
- Requires a minimum of three entities to commit to participation at project initiation
- Entity sends representatives to meetings
- **Each entity has 1 vote**

One of the first Entity PARs (Project Authorization Requests) for PES was P1863, “IEEE Draft Guide for Overhead AC Transmission Line Design”. This guide will cover “methods for designing 110kV-1000kV AC overhead transmission lines and may also be used as reference for the design of lower voltage overhead transmission lines. The principles and procedures for designing of meteorology, conductor, ground wire, insulator, structural, and foundation of AC transmission overhead lines are specified.” P1863 has been balloted and approved for publication in spite of several appeals from the IEEE PES Overhead Lines Subcommittee and the T&D Committee. This Standard is in direct conflict with an existing IEEE standard and in direct conflict with the National Electric Safety Code. All of these appeals have been rejected because the Entity WG followed the IEEE SA process. Objections on content were not considered.

There are a number of other Entity PARs approved and under development as shown in the table on the next page.

IEEE Entity Standards - Cont'd

PAR	Title	Technical Committee
P2775	Technical Guide for Smart Hydropower Plant SGCC	PES/ED&PG
P2426	Guide for Field Measurement of Fast-Front and Very Fast-Front Overvoltages in Electric Power System SGCC	PE/PSIM
P2771	Guide for Parameter Configuration of Arcing Horns of DC Earth Electrode Lines SGCC	PE/SPDHV
P2745.1	Standard for technology of unified power flow controller Part 1 Functions SGCC	PES/T&D
P2745.2	Standard for technology of unified power flow controller Part 2 Terminology SGCC	PES/T&D
P2745.3	Standard for technology of unified power flow controller Part 3 Thyristor bypass switch SGCC	PES/T&D
P2781	Guide for Load Modeling and Simulation CSG	PE/SBLC
PC57.12.200	Guide for the Frequency Domain Spectroscopy Measurement of Oil-Paper Insulated Power Apparatus CSG	PE/TR
P2800.1	Guidelines for Test and Verification Procedures for Inverter-Based Resources Interconnecting with Associated Transmission Electric Power Systems SGCC	PE/ED&PG
P2772	Standard of test method for energy loss of overhead conductors SGCC	PES/T&D
PC57.32.10	Guide for the Selection of Neutral-point Insulation Grade and Grounding Reactor of Converter Transformers in HVDC Transmission SGCC	PES/TR
P2783	Recommended Practice on the Application of Quick Response System for Customer-Side Load in Modern Power Grids CSG	PE/SBLC
P2749	Recommended Practice for Risk Identification and Evaluation of Smart Power Distribution System CEDA SGCC	PE/T&D
P2748	Fault Diagnosis and Protection PAR proposal CEDA SGCC	PE/T&D
P2797	Guide for Forecast and Early Warning of Icing on Overhead Transmission Lines in Micro-topographic Areas SGCC	PE/T&D
P2747	Guide for Energy Efficiency Technology Evaluation of Electric Power Fittings SGCC	PES/T&D
P2810	Guide for Field Dielectric Enhancement of Polyethylene and Cross-linked Polyethylene Power Cables SGCC	PE/IC
P2819	Recommended Practice for Measuring method of Electromagnetic Environment for the Corridor of High-voltage Overhead Power Transmission Lines in Parallel Mixed with Alternating Current and Direct Current SGCC	PE/T&D
P2821	Guide for Unmanned Aerial Vehicle-based Patrol Inspection System for Transmission Line SGCC	PE/T&D
PC37.252	PC37.252Guide for Testing Automatic Voltage Control Systems in Regional Power Grids SGCC	PE/PSRCC

The PES Governing Board will be considering a motion at its January meeting to Appeal P1863 to the IEEE Board of Directors based on content. NEETRAC members are encouraged to be diligent about the standards they use/reference. There is a chance that Entity standards will not provide for the same rigor and engineering norms that are contained in IEEE PES standards produced under the individual standards development model.

Baseline Projects Recently Launched

NEETRAC launched the following Baseline project proposals presented during the September 2019 Management Board Meeting based on input from the Management Board. If you would like to serve as a Technical Advisor for any of these projects, please email suzanne.schmidle@neetrac.gatech.edu and indicate which project interests you.

Fire Initiation - OH Distribution Systems Inc. Covered Conductors

Baseline Project Number 19-152

Arcing faults that result from bare energized overhead line contact with the earth or objects such as other conductors or trees can potentially cause ground fires. Replacing bare overhead conductors with covered conductors is frequently considered a means of minimizing arcing faults and therefore, believed to minimize the risk that an overhead conductor will cause a fire. However, fire initiation is a complicated process where many potential ignition and fuel sources interact. This project will use a *Fault Tree Methodology* to define the interaction pathways and to parameterize the likelihood of any particular pathway becoming dominant in the fire initiation process. The project Technical Advisors will be key collaborators in validating the path elements and their interconnectability. They will be asked to provide basic information for fire occurrences and to provide feedback on project interim deliverables. The final report will provide Members with an up-to-date resource on critical pathways and probabilities for fire initiation from overhead lines.

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Power Cable System Design Evolution

Baseline Project Number 19-149

In 2014, NEETRAC conducted a baseline project (14-214) to gather benchmark information on utility cable and accessory specifications, usage, and maintenance practices. The information gathered was compared to previously obtained benchmark data. The work done in this project will extend the 10-year technical specification trend developed by Dudas, et al. to a 20-year trend using the newly obtained data. As cable system technology evolves and utility practices change, the information gathered will help utilities and manufacturers understand current trends in the use of different insulation types, cable designs, and installation practices. To gather the required information, NEETRAC will use established approaches to reach out to NEETRAC Member contacts and relevant industry entities to provide data for this 2019-2020 benchmarking project on MV cable and accessories. For the first time, this work will also investigate benchmarking information on high voltage cable systems.

Testing of Fire Proofing Materials / Techniques in Cable System Vaults

Baseline Project Number 19-150

Until recently, a test protocol specifically designed to evaluate the effectiveness of fire proofing materials / techniques applied to cable systems within the confines of electric utility cable vaults, manholes, and tunnels was not available. To address this issue, two protocols were developed in NEETRAC Baseline project #18-032. This project will evaluate those new test protocols by conducting both the direct flame impingement and indirect flame (furnace) tests on available fire proofing materials as suggested by the project Technical Advisors. By performing these tests, NEETRAC Members will have an understanding of the efficacy of the test protocols and the fire proofing techniques / materials tested. If found to be effective, both utilities and manufacturers will have an increased knowledge of the level of effectiveness of selected fire proofing techniques / materials that can be used to mitigate / minimize collateral fire damage when a cable system fault causes a cable fire. Additionally, utilities will gain the ability to specify a “standard” test procedure and manufacturers will be able to report “standard” test results for products designed for cable system fire protection.

Survival Performance of New and Aged TPGs

Baseline Project Number 19-151

Temporary protective grounds (TPGs) are used by utility crews to ground transmission or distribution systems during maintenance activities. Should a fault occur during the maintenance period, they are required to carry the fault current without failure. This helps to maximize line crew safety by minimizing touch and step voltages over the duration of the fault. Qualification fault tests on temporary protective grounds (TPGs) are performed using new TPG assemblies. However, as utility crews regularly connect to and disconnect from transmission and distribution to perform maintenance activities, TPGs can experience wear and tear. Wear and tear can also occur during the time that they spend in storage on line trucks. Limited testing at NEETRAC indicates that TPG hardware can age / degrade over time, but it is unclear what effect this aging has on their current carrying capability should a fault occur during the time that they are attached to a utility system. In this project, NEETRAC will perform fault tests on various aged TPG assemblies to gather data on their performance. These results will be compared to results from new TPG assemblies tested in a previous NEETRAC Baseline project to establish whether or not their fault current carrying performance deteriorates as they are used in service.

NEETRAC Career Opportunities

NEETRAC is hiring for several engineering positions in both the electrical and mechanical areas. If you know of anyone who may be interested in conducting research, testing, and applications projects, please contact laquita.wright@neetrac.gatech.edu.

5G is Coming!

Our Management Board is asking NEETRAC to prepare a proposal to conduct a scoping study to review the impact of 5G telecommunications on electric utility infrastructure. The proposal will be presented at the January Board Meeting. If you would like to provide input on this activity, please contact rick.hartlein@NEETRAC.gatech.edu.

Looking Back - 2019 in Review

2019 has been a successful and busy year for NEETRAC! As seen below, we have initiated and completed a large number of projects, made improvements and expansions to our business capabilities, and maintained a high level of customer satisfaction.

Baseline Projects Closed: **14**
Baseline Reports Delivered: **13**
Baseline Projects Launched: **10**
Member/Non-Member Projects Initiated: **149**
Member/Non-Member Projects Completed: **114**
Enhancements to NEETRAC Capabilities: **11**
Industry Papers / Presentations: **10**
Member Visits: **26**
Average Customer Satisfaction Score: **8.23 out of 9**

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Management Board Meetings

The next three Management Board meetings have been scheduled for the following dates:

January 22 - 23, 2020
May 20 - 21, 2020
September 23 - 24, 2020

For details, please visit the Member Section of the NEETRAC website at www.neetrach.gatech.edu.

2019/2020 NEETRAC Member Management Board Representatives

1. 3M..... Mark Hoisington
2. ABB..... Gary Haynes
3. Alumaform..... Pete Landsgaard
4. Ameren..... James Huss
5. American Electric Power..... Jason Chowdhury
6. BC Hydro.....Fred Dennert
7. Borealis Compounds, Inc.....Susan Song
8. Consolidated Edison..... Frank Doherty
9. Dominion Energy..... Liz Sullivan
10. Dow Chemical Company.....Brent Richardson
11. DTE Energy.....Najwa Abouhassan
12. Duke Energy.....Chris Fletcher
13. Eaton..... Alan Yerges
14. Exelon..... Lisa Perrone
15. FirstEnergy.....Randy Coleman
16. Gresco Utility Supply.....Brad Schafer
17. Hubbell Power Systems.....Charles Worthington
18. LS Cable & System.....Tim West
19. Nova Scotia Power.....Jim McFadgen
20. NRECA.....Reed Cooper
21. Pacific Gas & Electric..... Rudy Movafagh
22. PacifiCorp.....Douglas Marx
23. PPL Corporation.....Jean Blanc
24. Prolec GE..... Carlos Gaytan
25. Prysmian Group.....Bill Temple
26. Public Service Electric & Gas..... Ed Gray
27. S&C Electric..... Salvador Palafox
28. San Diego Gas & Electric..... Christian Henderson
29. Smart Wires..... Haroon Inam
30. Southern California Edison.....Alan Kasanow
31. Southern Company.....Michael Pearman
32. Southern States, LLC..... Joe Rostron
33. Southwire Company..... Sherif Kamel
34. Tacoma Power.....Joe Rempe
35. TE Connectivity.....Brian Ayres
36. TVA..... Sam Delay
37. Viakable..... Raul Garcia
38. WEC Energy Group..... Michael Smalley