

Subsurface Transformers and Network Protectors Subcommittee Task Force Report

Document #: n/a

Document Title: Corrosion Effects on Subsurface Transformers

Chair: Will Elliott Vice-Chair: Justin Minikel

Secretary: Audrey Siebert-Timmer Per Cent Complete: 0

Current Draft Being Worked On: Draft 5 Dated: Nov 2021

Meeting Date: Nov 16, 2021 Time: 2:20 PM CST

Attendance:	Members	<u>33</u>
	Guests	<u>34</u>
	Total*	<u>67</u>

* For details of attendance, please refer to AMS system of the Transformers Committee

Attending Members:

Nabi Almeida, Prolec GE	Tyler Morgan, Duke Energy
Martin Bachand, Cloverdale Paint Inc.	Daniel Mulkey, Mulkey Engineering Inc.
Paul Chisholm, IFD Corporation	George Payerle, Carte International Inc.
Juan Carlos Cruz Valdez, Prolec GE	James Ratty, Electronic Technology Inc.
Thomas Dausat, Prolec GE	Pedro Salgado, Electronic Technology Inc.
William Elliott, Prolec GE	Dan Schwartz, Quality Switch, Inc.
Benjamin Garcia, Southern California Edison	Adam Sewell, Quality Switch, Inc.
Zoran Goncin, Partner Technologies Inc.	Avijit Shingari, Pepco Holdings Inc.
Chris Guertin, Cloverdale Paint Inc.	Audrey Siebert-Timmer, IFD Corporation
Said Hachichi, Hydro-Quebec	Igor Simonov, Toronto Hydro
Jane Hall, Cloverdale Paint Inc.	Paul Su, FM Global
Ramadan Issack, American Electric Power	Alan Traut, Howard Industries
Brad Kittrell, Consolidated Edison Co. of NY	John Vartanian, National Grid
Brian Klaponski, Carte International Inc.	Mike Waldrop, Memphis Light, Gas & Water
Tiffany Lucas, SPX Transformer Solutions, Inc.	Shelby Walters, Howard Industries
Alejandro Macias, Centerpoint Energy	Michael Zarnowski, Carte International Inc.
Justin Minikel, EATON Corporation	

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Attending Guests:

Greg Ante, Southern California Edison	Tim Peterson, N. American Substation Services
Thomas Callsen, Weldy-Lamont Associates	Chris Pitts, Howard Industries
Antonio Ceballos, Georgia Transformer	Adam Polson, Arizona Public Service Co.
Solomon Chiang, The Gund Company	Jarrod Prince, ERMCO
Rhett Chrysler, ERMCO	Tony Reiss, Custom Materials, Inc.
Michael Dahlke, Central Moloney, Inc.	Leopoldo Rodriguez, Transformer Testing Services LLC
Eric Davis, Burns & McDonnell	Samraghi Dutta Roy, Siemens Energy
Jose Gamboa, H-J Family of Companies	Mahesh Sampat, EMS Consulting Inc.
Carlos Gaytan, Prolec GE	Anil Sawant, Virginia Transformer
Michael Gonzales, Southern California Edison	Jeff Schneider, Spire Power Solutions
Ken Hampton, Baltimore Gas & Electric	Jeremy Sewell, Quality Switch, Inc.
Andrew Larison, Hitachi ABB Power Grids	Stephen Shull, BBC Electrical Services, Inc.
Olivier Lejay, Huaming USA Corp.	Adrian Silgado, IFD Corporation
Ryan Musgrove, Oklahoma Gas & Electric	Neil Strongosky, Memphis Light, Gas & Water
Livia Neeson, Entergy	Reinaldo Valentin, Duke Energy
Joe Nims, Allen & Hoshall, Inc.	Jeremy Van Horn, IFD Corporation
Vinay Patel, Consolidated Edison Co. of NY	Drew Welton, Intellirent

Meeting Minutes:

1. Will Elliott called the meeting to order at 2:24 PM CST.
2. Opening remarks and announcements.
 - i. None made.
3. Will Elliott reviewed IEEE Essential Patent Claims and SA Copyright Policy. No issues were raised.
4. Membership changes were noted (since 3rd summer meeting on September 9th 2021):
 - i. Added: Tiffany Lucas, Shelby Walters, Michael Zarnowski
 - ii. Removed: none
5. Quorum was verified. The working group consisted of **40** members, requiring **21** for quorum. **25** members were confirmed through the WebEx poll. **33** members were confirmed afterwards through the roster.
6. Will Elliott requested approval of the agenda. Hearing no requests for changes, the agenda was approved as written.

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7. Will Elliot requested approval of the previous minutes for the S21 and the three interim meetings. Tom Dauzat made a motion, second by George Payerle for approval of the minutes. All meeting minutes were unanimously approved.
 - i. Interim meetings were held on June 8th, August 11th, and September 9th 2021

8. Old Business:
 - i. Review of Electronic Ballot Results
 - a. Will Elliot reviewed results of electronic ballot that we performed. Only 16 members provided feedback. The majority wanted the taskforce to pursue a PAR.

 - ii. Review of 1991 GE / Con Ed Corrosion Resistant Submersible Network Transformer Study
 - a. The report was released by GE and is available on Collabratec TF file repository.
 - b. Will Elliot reviewed high level findings
 1. Copper-bearing steel and 409 failed all tests
 2. 302 and 304L passed 4/7 tests and 316L passed 6/7 tests
 3. 255 (duplex) and AL-6XN (duplex) were the only materials that passed all 7 tests
 - c. A question was asked if salts were from road salts or sea water in the New York City field study. Group discussed that it is likely a combination of both.

 - iii. Will Elliot reviewed of comments and changes to draft 5
 - a. Correction in Section 5.1.2 passivate (good) vs sensitize (bad).
 - b. Received suggestion that recommendations should be performance-based rather than recommendations on specific alloys.
 1. C57.12.00 references transformer life to be a minimum of 20.5 years.
 2. Dan Mulkey made the comment that asset life is assumed to be 30 years (from the accounting side) though in reality transformers live anywhere from 1 to 80 years.
 3. Brad Kittrell commented that their expected age due to heavy corrosion in 33.72 years.
 - c. Bob Kinner provided a draft procedure for determining chloride concentration in a water sample which was added to the Collabratec TF file repository.
 - d. Dan Mulkey commented that there are two enclosures: the metal tank enclosure and the concrete box enclosure that the transformer is set in.
 1. Group discussed terminology for the concrete box enclosure could be vault or structure.
 2. A comment was made that structure is not used in 12.80 however it is used in overhead standards.

9. New Business:
 - i. Discussion for PAR Submission
 - a. Group drafted a title and scope for PAR submittal as follows:
 1. Title: Guide for Mitigating Corrosion on Subsurface Transformers and Network Protectors
 2. Scope: Provide guidance and technical references for users of transformers and network protectors in subsurface structures. This includes testing, measurements, and classifications to define corrosive environments, as well as strategies to mitigate corrosion in subsurface environments, guidance on equipment enclosure specifications, and cathodic protection.

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- b. Tom Dauzat made a motion to request PAR using the drafted title and scope. Second by Ben Garcia. A poll was taken, and 25 members approved. Motion passed.**

10. The meeting was adjourned at 3:34 PM CST.

11. After the task-force meeting, in the STNP subcommittee meeting the PAR was reviewed. After some discussion it was decided to ask the members to grant conditional approval for the proposed scope to give the task-force leadership additional time to consider the wording. A poll was taken, and the motion was passed. The PAR request will be submitted to PES so it can be reviewed by NesCom at the Dec 16, 2021 meeting.

- i. Subsequent to the subcommittee meeting, it was decided that no changes would be made to the wording of the PAR request.

Submitted by: Audrey Siebert-Timmer

Date: 11/16/2021