

IEEE 'Lightning Performance of Overhead Lines' WG

Tuesday, July 28, 2015

8:19 AM

Minutes of 2015 WG Meeting at the PES General Meeting in Denver, Co

Chair: Emanuel Petrache

Vice-Chair: Jens Schoene

Emanuel opened the meeting at 8:15am with an overview of the Agenda

1. Bill Chisholm reported on CIGRE WG activities and other news.
 - a. B2.54: Guidelines for mgmt of risks associated with extreme climate on overhead lines. Brian showed batting average data ATC measured. 2012: 137 outages, 1999: 87 outages, 2012 had drought (low lightning), but higher outages anyway.
 - b. B2.56: Emanuel brought up problem that safety studies are only done thoroughly for substations, but not for the transmission lines outside the substation. Bill and Emanuel see value in statistical approach for step-and-touch potential.
 - c. B2.AG06_TF007: Arrester placement relative to vibration damper. Don't put close together. WG investigate specific scenario - two arresters and vibration damper installations.
 - d. C4.23: Brian gave update:, Mark Hanning submitted paper on dynamic EGM, Imre/Chris presented paper on insulation coordination. TEPCO data exhibits strong correlations with peak current and maximum steepness / weak correlation between peak current and front duration.
Unexplained outage: line equipped with arresters on every pole, lightning strikes at the same time an outage occurs (within 10 ms), BUT lightning location (predicted by three different location algorithms) far away (1/2? Mile) and arresters are not damaged => outage cause may not have been lightning
 - e. C4.33: Frequency dependency of soil resistivity (decreases as a function of frequency), not much progress.
 - f. C4.36: Surge arrester selection for winter lightning. Large positive flashes (unique to West coast of Japan).
 - g. New IEEE report format that allows for faster processing (no balloting). Tom Short asked if it would make sense to change the lightning standards to the new format. However, can't be accessed easily by people outside IEEE.
2. John McDaniel provided updates
 - a. Lighting WG remains within T&D SC for now. Discussion if it should move to another group.
 - b. FACTS move to substation SC
 - c. Integration of renewables SC moved power generation SC.
 - d. Emanuel: Do we have to be under a SC? Bill: Probably not. John: Not sure
 - e. John approved PAR extension for 1243. One more step to get approved.
3. Bill Chisholm "Update to Panel Paper 2010TD0683: Grounding of Overhead Transmission Lines"
 - a. Paper is posted on WG website (<http://ewh.ieee.org/soc/pes/lpdl/>) under 'References'.
 - b. Shielding model review (OHGW)
 - c. OHGW effectiveness depends on dry arc distance and footing resistance. TL >69kV typically do not use OHGW

- d. Calculation of footing resistance gets complicated for multi-grounding scenarios. Split into "geometric" and "contact" resistance.
 - e. Updated paper in 2015.
 - f. Traditional Row formula works well for small number of ground rods, but not with large number. E.g., 9 rod is predicted to have higher resistance than 10 rod.
 - g. Rise time maps ground resistivity. Bias in map due to lightning location system dependency on soil resistivity.
 - h. FCC needs to file report on attenuation of systems => FCC created soil conductivity map.
 - i. Soil suitability for ground penetrating radar give insight on clay content of soil => high clay content, low resistivity. USDA website has information for many states:
http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/use/maps/?cid=nrcs142p2_053622
 - j. USDA map indicates that resistivity varies on a finer scale than FCC indicates
 - k. Footing resistance statistics: TVA carried out 10,600 measurements in early 90s. Analyzed with Pearson classifications. TVA data fits in Pearson Type 1. Log-normal distribution fits normalized data. Standard deviation of log of resistance is about 0.9.
 - l. Conductivity map for Portugal. Extreme changes in conductivities in a short distance.
 - m. TVA and REN data have similar log-normal distributions for footing resistance.
4. Bryan Beske presents survey results on grounding design practices, which are included in the latest revision of IEEE Std. 80.
 5. Tom McDermott is trying to gather funding from CEATI to further development of OpenEtran.
 6. IEEE Std. 1243 update effort
 - a. John McDaniel put PAR in 2011. Nothing was done
 - b. Requested two-year extension. Motivation: (1) CIGRE WG coordination (2) IEEE Flash / OpenEtran updates. If approve, draft would be due 2017.
 - c. Question: Winter meeting and/or teleconference
 - d. Main sections:
 - i. Use distribution guide to update transmission
 - ii. Section on surge arresters. Tom McDermott created a paragraph. Need to be elevated to separate section.
 - iii. Include resistivity.
 - e. Follow up via email regarding specific tasks. Webex every two months.
 - f. IEEE Central desktop could be a good tool for Webex-type meetings. Need to be compatible with utility security protocols.
 7. Meeting sojourned at 11:15am