

IEEE Product Safety Engineering Society

Minutes of the IEEE PSES TSTC teleconference held Wednesday, December 2, 2015 at 11:00 AM EST, for one hour.

1. Attendance/Introductions

Members present: Don Gies (Alcatel-Lucent), Philip Havens (Littelfuse), Al Martin (retired), Maytum (MJMaytum), Paul Ng (GE Energy), Dan Roman (Colgate Palmolive), Anne Venetta-Richard (Alcatel-Lucent), Jim Wiese (Adtran).

Members absent: Peter Lim (Alpha Technology), Joe Randolph (Randolph Telecom), Gary Schrempp (Dell), Tom Smith (TJS Technical Services Inc), Svetlana Ulemek (Burndy), Steve Zugay (Cree).

.

Interested parties

Tim Ardley (Adtran), Doug Parker (Adtran), Peter Tarver (Enphase Energy)

2. Meeting arrangements

Desktops were shared using Lync/Skype for Business provided by Don Gies:

Click on the link below to view presentation in your browser or Skype App.

Join Skype Meeting

<https://meet.lync.com/alugroup-alcatel-lucent/don.gies/4PCVH1HA>

This call and all future calls will use Don Gies' Alcatel-Lucent bridge numbers below, until further notice.

Bridge No. (Toll Free): 1-800-771-8734

International Access: +1-647-723-3953

Access Code: 5825978

Next month we'll have a new system

3. Previous meeting minutes (attached)

The minutes of the September meeting were reviewed.

The minutes of the October meeting were reviewed.

4. New business?

a. GR-487-CORE, Issue 5 TTF started

Jim: There is a sudden push to require all cabinets to be DCI bonded. This requirement only allows bonding the battery return at the battery itself.

Don: Won't work – we put fusing in the ground return. If the ground is at the battery plant you'll never catch a fault. To catch mid-stream fault you need to have a fuse in the return.

Jim: We don't do it that way. Generally we see a direct connection to the ground bar.

Don: The fuse needs to be at bottom of string, not at the top.

IEEE Product Safety Engineering Society

Jim: Most cabinets bond to the earth bus bar. Most lightning damage is the result of floating the battery connection. SLIC cards are especially vulnerable. Don McMenamin is presenting a proposal at the next PEG meeting to ground at battery only. Apparently the proposal comes from central office practice. There are 2 ILRs are supporting the proposal.

Paul: What do you do with +/- 48 V?

Don: The majority of our cell-site equipment is 24 V

Paul: Cell sites are not battery backed up – use a converter.

Don: I don't think the proposal will get out of the committee – it won't work.

Jim: I think a service provider is pushing this. If it goes through, there will be a lot of equipment blown up.

Don: Now there is a requirement to have a GFI outlet. This requirement doesn't consider wireless equipment. But don't need the GFI.

Don: We don't put a heat exchanger in wireless equipment – they leak water. But service providers think you need them. This one being worked. Fresh air filters are like an open window.

b. Don: GR47 TTF well under way. Briefly discussed the submittals.

c. Dan: Product Safety Conference proposals due Dec 6th. I'm not submitting a paper

Don: I've submitted 2 proposals – one on corona testing, one on human body impedance models for radio frequencies. Does the human body have inductance? Does it have a resonant frequency (apparently it does)?

Don: Peter Southerland has a good book on product safety. In the electronic (Kindle) version you can't read the equations. Some of last year's presentations may have been taken from the book. Anyone else submitting a paper?

Don: Treat RF like a mismatched impedance.

5. Protection of DC feeds to radio equipment at the top of towers

a. What protection is typically installed on equipment that will be located at the top of towers, and is any consideration given to the height of the tower?

b. What lightning waveshape is considered when designing protection for equipment to be located at tower tops?

c. Is there any information about the failure of installed protection to protect equipment located at tower tops?

Mick: ITU-T received a proposal from China Telecom on POE cameras on a pole. This installation is similar to DC feeds. Following the IEC requires grounding the camera, but then lightning will go through the camera. I spoke to the Chinese guy and explained that his proposal was relevant to last generation of cameras. Now cameras use the LAN system, and use POE. All kinds of stuff – thermostats, door locks, light bulbs *etc.* are now on the LAN. Look to see if AI's DC feed discussion applies to this.

Don: We had similar situation with some of our folks who wanted to use a very long ground cable. We said no. If you have a metallic object that needs to be grounded, use a short lead

Mick: There was a presentation at the ITU-T meeting about a box which was on a pole. The pole was concrete, but had rebar. If the box was not isolated, lightning caused flashover to rebar.

Jim: Has seen a flashover problem at cell sites due to a long lead between the cabinet and ground. GR1089 took out the lightning test for outside cabinets. Problem with that approach is that there is inductance in the return, which causes voltage buildup when lightning strikes.

Philip: AI's *In Compliance* article noted that the height of tower influences the magnitude of the lightning (here's the quote)

In the previous discussion, the terms "low" and "tall" towers have been used. How do we know which type we have? One way to look at this is to calculate the percentage of downward and upward flashes as a function of tower height. The type of lightning to be expected as a function of tower height comes from the relation [5]

$$P_u = 52.8 \times \ln(H_s) - 230$$

where P_u is the percentage of upward flashes and H_s is the structure height in meters. This equation is valid only for heights ranging from 78 to 518 m, since $P_u = 0$ for $H_s \leq 78$ m and $P_u = 100$ percent for $H_s \geq 518$ m. Structures with heights less than 78 m (250 feet) are expected to be struck by downward flashes only, and structures with a height of greater than 518 m (1700 feet – there are some!) are expected to experience upward flashes only. There are no specific values for "low" and "tall," but the equation for P_u might suggest how robust the protection needs to be.

5. Additional agenda items

None

6. Old Business

None

Next meeting

Proposed Wednesday, 27 January 2016.

Respectfully submitted

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Al Martin, Secretary