PES/NPEC SC-4: Working Group 4.6 - Preferred Power Supply
Meeting Minutes for S20-01

Charlotte, NC
January, 27th, 2020

1. **Welcome and Introduction**
   Chair Tamatha Womack called the meeting to order at 8:00 AM, January 27th, 2020.

   IEEE Patent slides and copyright slides were reviewed and are included in Attachment 3.

2. **Review of Membership/Attendance**
   The membership roster was reviewed and updated. Michael Sykes was added as a working group member.

   See Attachment 1 for an updated list of members and guests who were in attendance. 20 of the 30 working group members were present to establish a quorum.

3. **Review of Meeting Minutes and Agenda**
   The 20-01 agenda was reviewed and unanimously approved with no changes. The agenda is attached as Attachment 2.

   Motion to approve 20-01 Agenda: Ken Miller
   Second: John Minley

   The Meeting Minutes for 19-02 were reviewed and unanimously approved as written. The meeting minutes of 19-02 will be uploaded to iMeet.

   Motion to approve 19-02 Minutes: Ken Miller
   Second: Neal Simmons

   Reminder that the meeting minutes are providing the written record for IEEE SA to document work during the meeting. Every member is expected to review the meeting minutes to ensure accuracy and completeness. The vote is documented record of these actions.

PES/NPEC SC-4: Working Group 4.6 - Preferred Power Supply
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4. Action Items

Item #	Assigned to	Action	Due	Status
16-1	Working Group Members	Review 1792 for possible impacts to frequency descriptions due to effects of NPIRs.	17-02	Retain for future discussion
17-3	Group Leads	Sub Groups evaluate impact of topics to 765.	19-02	Completed. Draft markups of standard reviewed during 20-01 meeting.
19-1	Singh Matharu	Provide international stations that have two immediately available sources to be used as input for Sub-group 1.	20-02	
19-2	Working Group Leads	Each Sub Group lead to provide draft markups of sections of 765 to be reviewed during 20-01. Markups to be sent to Jason Bellamy.	10/30/19	Completed: Group 1, figures provided Group 4, no change this revision Group 5, updated wording Section 5.3.4
19-3	Tamatha Womack	Resend comment spreadsheet from previous ballot and editable standard.	8/7/19	Completed: Documents located in iMeet, "drafts in progress" folder.

5. **Specific Items Related to Standard 765**
IEEE 765-2012 proposed revisions were presented. See Attachment 3 for full description of revisions.

Figures 1-4 were reproduced in AutoCAD with no technical changes, only the inclusion of the note. Figure 5 was added as an additional enhanced design example. This example was provided for connections to unit generators with generator circuit breakers, and connections are similar to Figure 2. During the preview of changes for section 5.3.4, working group members had questions/comments on the proposed change. It was determined that in order to provide beneficial comments, a complete mark-up of the standard with the proposed wording would be needed. Working group members encouraged the focus group to compare wording presented to the newly issued IEEE 308 as well as proposed wording/existing wording for IEEE 741. Mark-up will be uploaded to iMeet once completed and comments should be made early to allow for discussion. All comments should be uploaded to iMeet for viewing by the entire working group. Final wording will be provided $\geq$ 30 days prior to 20-02 meeting to enable all members to vote on moving to preview.

As part of the drafting team update, the references will be reviewed and revised as required during the drafting of the document. The specific change for the drafting team was included in Attachment 3, under updated content for PAR scope.

Singh's action to provide international stations that have two immediately available sources to sub-group 1 was moved to 20-02 meeting.

IEEE 765-2012 future revision items to consider were presented and discussed. See Attachment 3. Working group members shall review and make any additions or changes necessary on iMeet, any changes will require complete technical justification (e.g., ballot resolution stated possible consideration in future revision, documented industry OE that needs further research to determine applicability, etc.)

6. **Specific Items Related to Standard 1792**

As with Standard 765, Standard 1792 will have further evaluation for changes associated with relaxing the frequency requirements.

No new work is currently planned

7. **General Items/New Business**

It is the intent of the working group to produce white papers or written documents that will be written to document the background and/or the basis of the changes or existing requirements in associated with this and/or previous revisions of IEEE 765. The goal is for these white papers are ultimately to be published in IEEE transactions.

The chair informed the group that a whitepaper had been written and uploaded to iMeet under WG 4.6 workspace and included information concerning SC-4 and specifics associated with IEEE 765. Due to the content and recommendations, the review and resolution to the paper has been determined to be under the scope of SC-4. Further details would be given at the SC-4 meeting. Each working member was encouraged to review the whitepaper if they had not already done so. At the time of this meeting there were no comments or discussions in iMeet.

A discussion was held to clarify the requirements of standards, recommended practices and guidelines. The summary of actions taken, Focus Groups Goals/Due Dates, and Whitepaper Idea(s) from Focus Group Topic Information were reviewed.

8. **Next Working Group Meeting**

Next formal working group meeting will be held in conjunction with SC-4 20-02 meeting. Meeting length for formal business will be 30 minutes, with an additional 30 minutes to discuss whitepaper topics and direction.

PES/NPEC SC-4: Working Group 4.6 - Preferred Power Supply
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9. Meeting Closing Remarks/Adjournment

Meeting adjourned at 09:58 AM.

Motion to Adjourn: Neal Simmons
Second: Ken Miller

Attachments

Attachment 1 – Membership/Attendance

Attachment 2 – Final Agenda

Attachment 3 – IEEE Legal and Copyright Slides, IEEE 765-2012 proposed revision slides, IEEE 765-2012 future revision items to consider

ATTACHMENT 1
Attendance/Membership

Member #	Member Name	Affiliation	In Attendance
1	Audrey Baricko	PSEG Nuclear	Y
2	Jason Bellamy	Enercon	N
3	Mark Bowman	TVA	N
4	John Disosway	Independent	N
5	Ken Fleischer	Independent	Y
6	Evan Heacock	DP Engineering	N
7	Ayodele Ishola-Salawu	Nextera Energy/FPL	Y
8	Shinji Kawanago	MHI	Y
9	Edvin Kozo	APS/Palo Verde	Y
10	Harvey Leake	APS/Palo Verde	N
11	Tim Lensmire	Nextera Energy/Point Beach	Y
12	Hector Leon	South Texas Project	N
13	Roy Lyon	Independent	N
14	Singh Matharu	US NRC	Y
15	Kenn Miller	US NRC	Y
16	John Minley	Southern Company	Y
17	Gene Poletto	Peformance Power Services	Y
18	Sheila Ray	US NRC	Y
19	James Reddy	Framatome	N
20	Gregg Reimers	Independent	N
21	Shawn Simon	INPO	Y
22	Neal Simmons	Zachry Nuclear	Y
23	Tom Solinsky	Zachry Nuclear	Y
24	Masashi Sugiyama	Hitachi	N
25	Scott Sweat	Westinghouse	Y
26	Hideki Tanaka	Westinghouse	Y
27	Sudhir Thakur	Exelon Nuclear	Y
28	Jeff Weibelt	Southern Company	Y
29	Tamatha Womack	TVA	Y
30	Michael Sykes	Southern Nuclear	Y
Guests in Attendance			
Rachel Flanigan		Westinghouse	
Nadim Khan		US NRC	
Jim Sharkey		EPRI	
Malia Zaman		IEEE-SA	
Courtney Revie		Duke Energy	

ATTACHMENT 2
Agenda

AGENDA

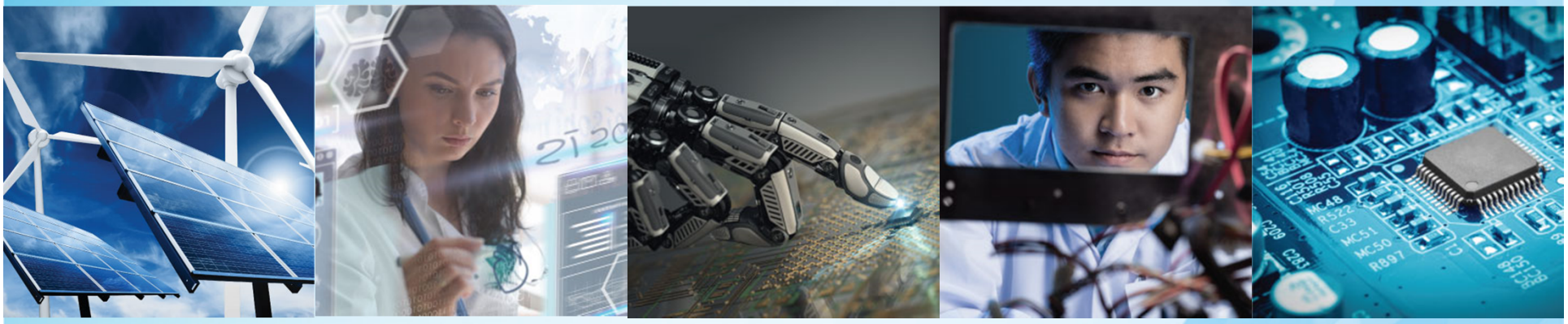
Working Group 4.6 - Preferred Power Supply
IEEE Stds. 765 and 1792
MEETING: Charlotte, NC (20-01)
Monday January 27, 2020

	8:00 AM – 10:00 PM **Location: *Room Location To Be Determined***	**Lead**
1.	Welcome and Introductions	Chair
2.	Required IEEE Announcements	Chair
3.	New Members	Chair
4.	Roll Call and Quorum	Vice Chair
5.	Opening Remarks and Agenda (Motion to Approve)	Chair
6.	Review Previous Meeting Minutes (Motion to Approve)	Vice Chair
7.	Status of Action Items	Vice Chair
8.	Overview of IEEE Std. P765 (Current Revision)	Chair / Ayodele S. Ishola-Salawu
9.	Overview of IEEE Std 765 (Future Considerations)	Chair
10.	New Action Items	Vice Chair
11.	Next Working Group Meeting	Chair
12.	Closing Remarks	Chair
	ADJOURN	

ATTACHMENT 3

IEEE Legal Slides, IEEE 765-2012 proposed revision slides, IEEE 765-2012 future revision items to consider

Slides Attachment Follows



Working Group 4.6

Preferred Power Supply

20-01 Meeting

Welcome, Introductions, and IEEE Patent Information

- Officer Introduction
- Meeting Attendee Introductions
  - Name
  - Affiliation
  - Working Group Member or Guest
- Sign-in Sheets/Meeting Registration
- IEEE Patent Slides

Participants have a duty to inform the IEEE

- **Participants shall inform the IEEE (or cause the IEEE to be informed) of the identity of each holder of any potential Essential Patent Claims of which they are personally aware if the claims are owned or controlled by the participant or the entity the participant is from, employed by, or otherwise represents**

- **Participants should inform the IEEE (or cause the IEEE to be informed) of the identity of any other holders of potential Essential Patent Claims**

Early identification of holders of potential Essential Patent Claims is encouraged

Slide #1

Ways to inform IEEE

- **Cause an LOA to be submitted to the IEEE-SA (patcom@ieee.org); or**

- **Provide the chair of this group with the identity of the holder(s) of any and all such claims as soon as possible; or**

- **Speak up now and respond to this Call for Potentially Essential Patents**

If anyone in this meeting is personally aware of the holder of any patent claims that are potentially essential to implementation of the proposed standard(s) under consideration by this group and that are not already the subject of an Accepted Letter of Assurance, please respond at this time by providing relevant information to the WG Chair

Slide #2

Other guidelines for IEEE WG meetings

- **All IEEE-SA standards meetings shall be conducted in compliance with all applicable laws, including antitrust and competition laws.**
- **Don't discuss the interpretation, validity, or essentiality of patents/patent claims.**
- **Don't discuss specific license rates, terms, or conditions.**
- Relative costs of different technical approaches that include relative costs of patent licensing terms may be discussed in standards development meetings.
- **Technical considerations remain the primary focus**
- **Don't discuss or engage in the fixing of product prices, allocation of customers, or division of sales markets.**
- **Don't discuss the status or substance of ongoing or threatened litigation.**
- **Don't be silent if inappropriate topics are discussed … do formally object.**

For more details, see *IEEE-SA Standards Board Operations Manual*, clause 5.3.10 and *Antitrust and Competition Policy: What You Need to Know* at http://standards.ieee.org/develop/policies/antitrust.pdf

Slide #3

Patent-related information

The patent policy and the procedures used to execute that policy are documented in the:

- ***IEEE-SA Standards Board Bylaws***
  (http://standards.ieee.org/develop/policies/bylaws/sect6-7.html#6)
- ***IEEE-SA Standards Board Operations Manual***
  (http://standards.ieee.org/develop/policies/opman/sect6.html#6.3)

Material about the patent policy is available at *http://standards.ieee.org/about/sasb/patcom/materials.html*

If you have questions, contact the IEEE-SA Standards Board Patent Committee Administrator at patcom@ieee.org

Slide #4

By participating in this activity, you agree to comply with the IEEE Code of Ethics, all applicable laws, and all IEEE policies and procedures including, but not limited to, the IEEE SA Copyright Policy.

Previously Published material (copyright assertion indicated) shall not be presented/submitted to the Working Group nor incorporated into a Working Group draft unless permission is granted.
Prior to presentation or submission, you shall notify the Working Group Chair of previously Published material and should assist the Chair in obtaining copyright permission acceptable to IEEE SA.
For material that is not previously Published, IEEE is automatically granted a license to use any material that is presented or submitted.

IEEE SA Copyright Policy

The IEEE SA Copyright Policy is described in the IEEE SA Standards Board Bylaws and IEEE SA Standards Board Operations Manual

- IEEE SA Copyright Policy, see
  Clause 7 of the IEEE SA Standards Board Bylaws
  https://standards.ieee.org/about/policies/bylaws/sect6-7.html#7
  Clause 6.1 of the IEEE SA Standards Board Operations Manual
  https://standards.ieee.org/about/policies/opman/sect6.html

IEEE SA Copyright Permission
- https://standards.ieee.org/content/dam/ieee-standards/standards/web/documents/other/permissionltrs.zip

IEEE SA Copyright FAQs
- http://standards.ieee.org/faqs/copyrights.html/

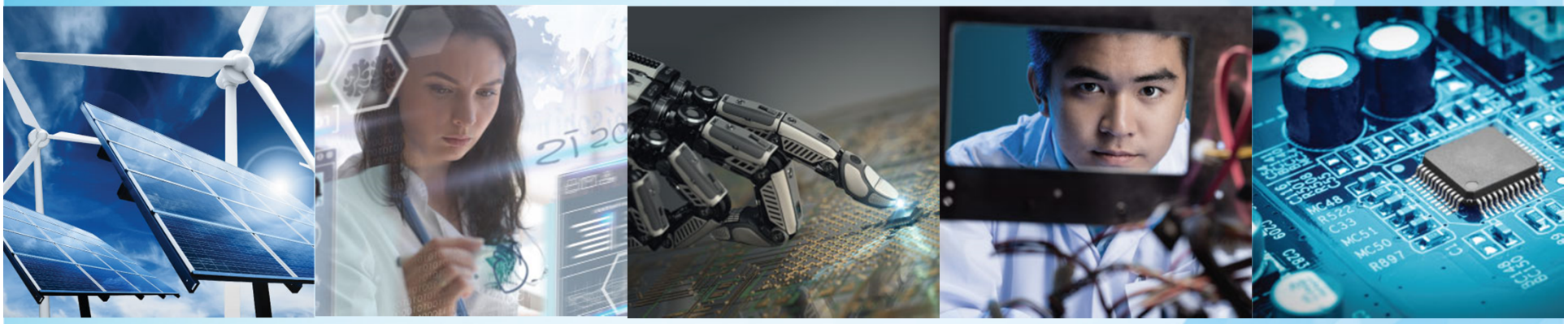
IEEE SA Best Practices for IEEE Standards Development
- http://standards.ieee.org/develop/policies/best_practices_for_ieee_standards_development_051215.pdf

Distribution of Draft Standards (see 6.1.3 of the SASB Operations Manual)
- https://standards.ieee.org/about/policies/opman/sect6.html

20-01 Meeting

Roll Call, Agenda, Previous Meeting Minutes

- Roll Call and Establish Quorum
- 20-01 Agenda
- 19-02 Meeting Minutes
- Status of Action Items



IEEE Std P765™ (Current Revision)

IEEE Standard for Preferred Power Supply (PPS) for Nuclear Power Generating Stations (NPGS)

IEEE
Advancing Technology for Humanity

IEEE 765-2012 Proposed Revision

Active PAR Information

- Approval: 08-Mar-2018
- Expiration: 31-Dec-2022
- Need for the project: The purpose for this revision is to update PPS design figures and graphics for typical station designs and consider adding clarification for general and specific design criteria. Also, due to recent industry experience, the working group needs to consider incorporation of PPS design considerations and/or the effects for open phase events. References will be reviewed and revised as required. Technical content will be reviewed and brought up to date with current industry experience, as applicable.
- Additional Notes: This revision will evaluate and update figures as necessary. Current industry events will be evaluated for consideration for appropriate updates to this revision.

IEEE 765-2012 Proposed Revision

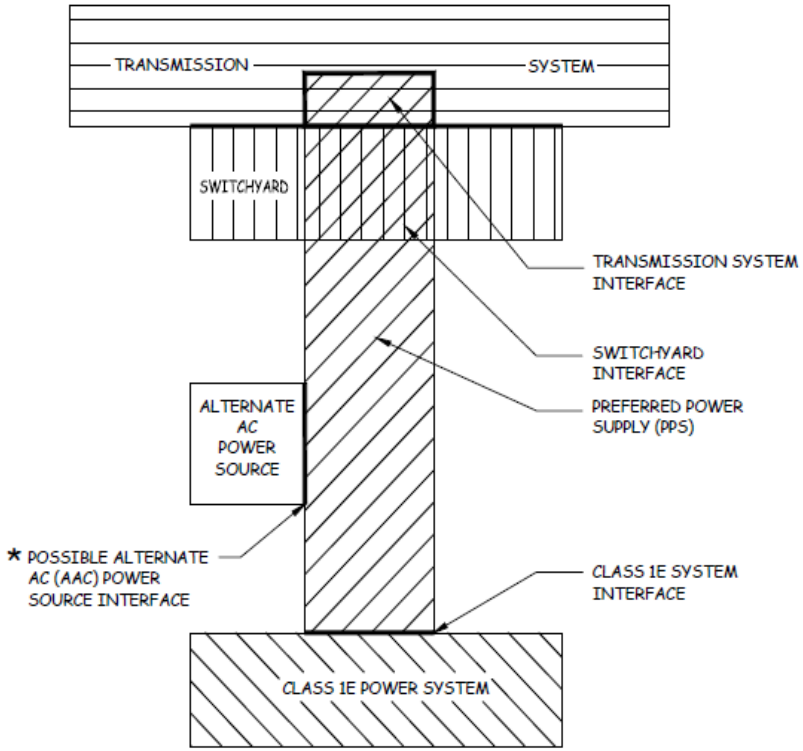
2012 Ballot administrative comment resolved in this revision

Comment: Updated in a medium such as AutoCAD, Visio, or other drawing program.

Solution: Updated figures in AutoCAD

IEEE 765-2012 Proposed Revision

Figure 1



* AAC source interfaces with entities other than the PPS are outside the scope of this standard.

Figure 1 - PPS interface diagram

- *No technical changes were made, reproduced in AutoCAD*
- *Included the * note which was previously left of the figure in 765-2012*
- *PAR Authorization: "update PPS design figures and graphics for typical station designs and consider adding clarification for general and specific design criteria"*

IEEE 765-2012 Proposed Revision

Figure 2

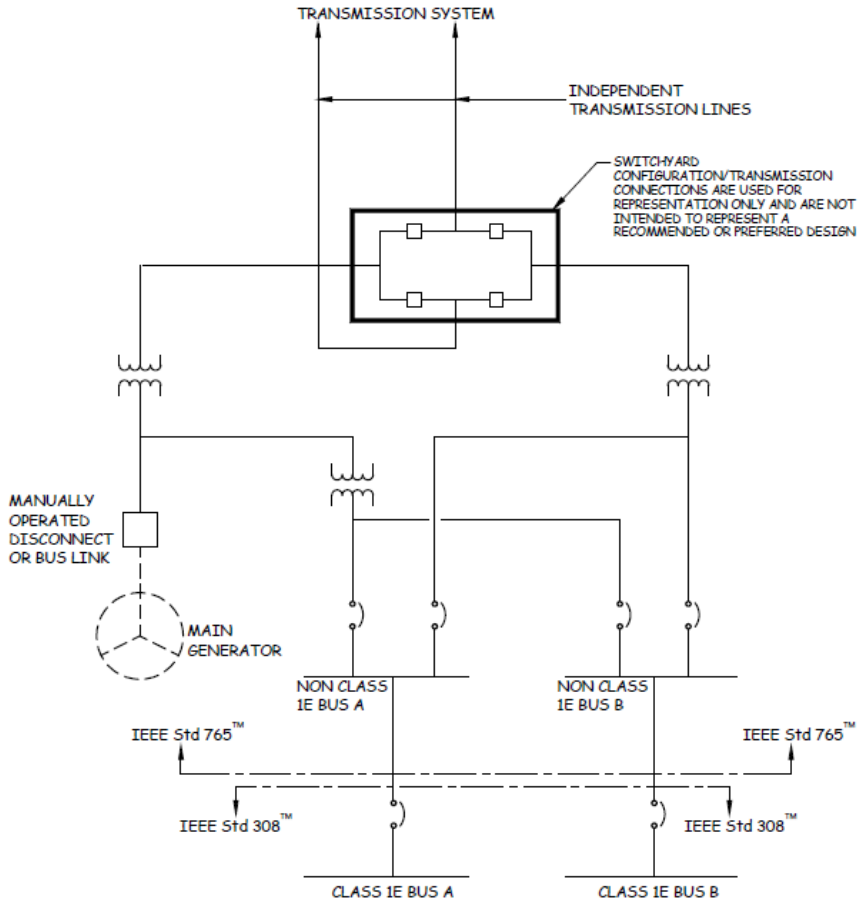


Figure 2 - An example of an acceptable PPS design

- *No technical changes were made, reproduced in AutoCAD*
- *Included the note for switchyard configuration "Switchyard configuration/transmission connections are used for representation only and are not intended to represent a recommended or preferred design"*
- *PAR Authorization: "update PPS design figures and graphics for typical station designs and consider adding clarification for general and specific design criteria"*

IEEE 765-2012 Proposed Revision

Figure 3

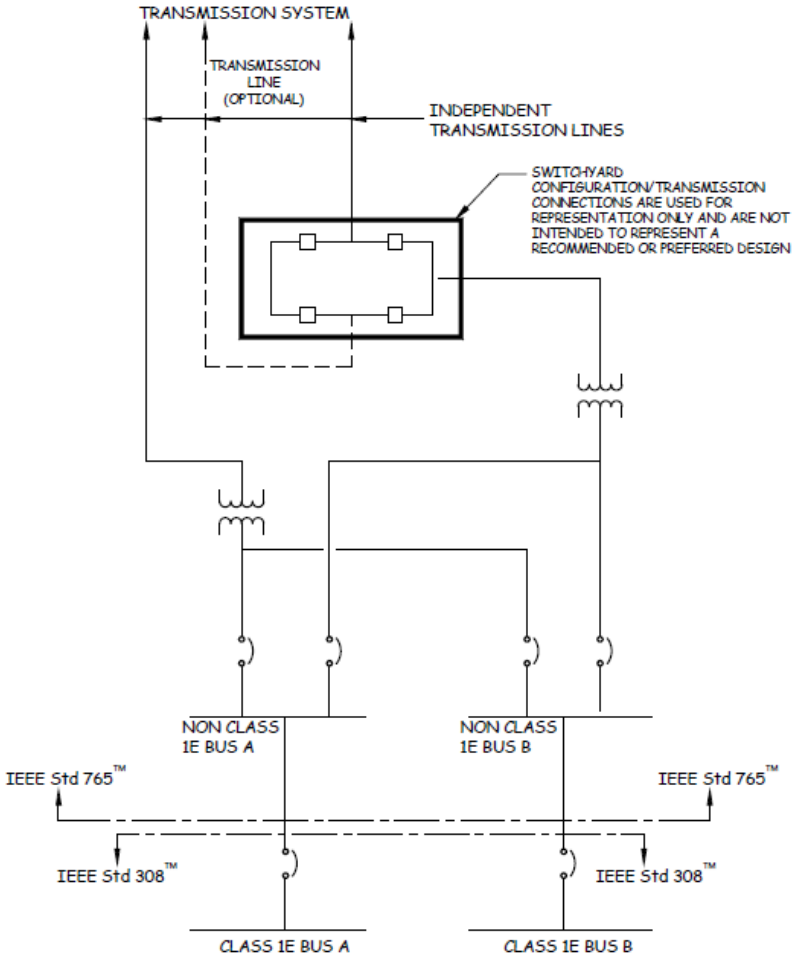


Figure 3 - A second example of an acceptable PPS design

- *No technical changes were made, reproduced in AutoCAD*
- *Included the note for switchyard configuration "Switchyard configuration/transmission connections are used for representation only and are not intended to represent a recommended or preferred design"*
- *PAR Authorization: "update PPS design figures and graphics for typical station designs and consider adding clarification for general and specific design criteria"*

IEEE Draft P765

Figure 4

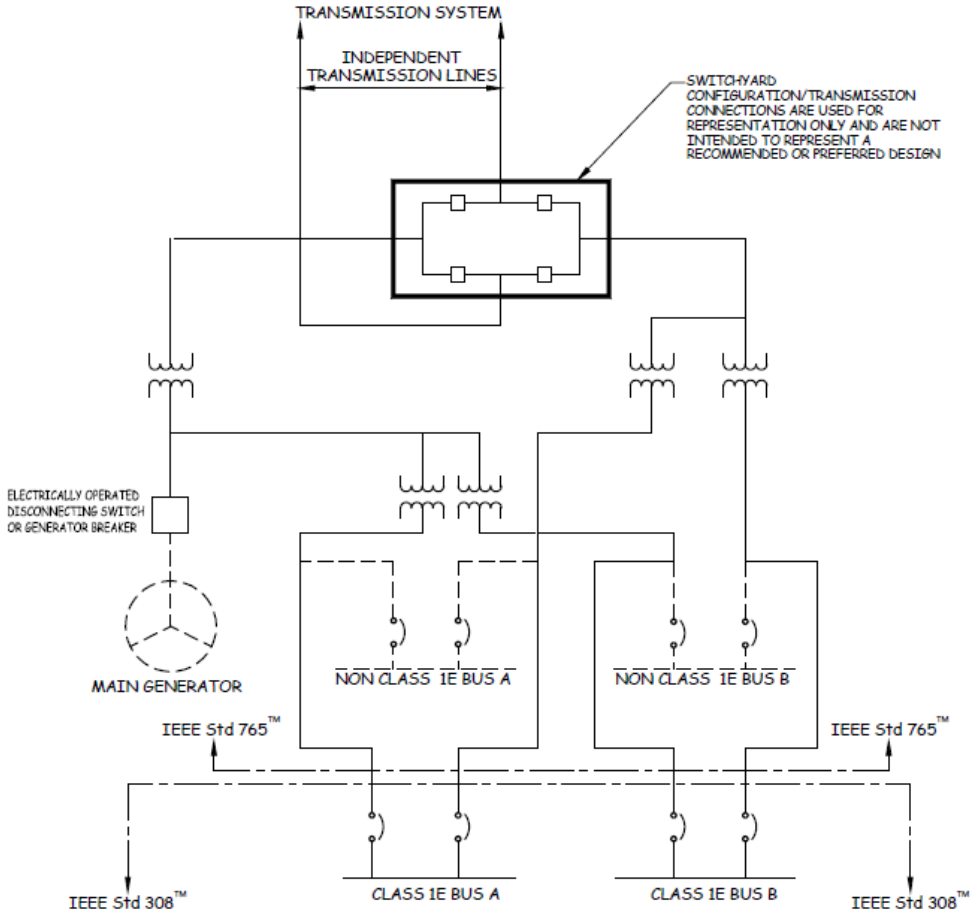


Figure 4 - Example of an enhanced PPS design

- *No technical changes were made, reproduced in AutoCAD*
- *Included the note for switchyard configuration "Switchyard configuration/transmission connections are used for representation only and are not intended to represent a recommended or preferred design"*
- *PAR Authorization: "update PPS design figures and graphics for typical station designs and consider adding clarification for general and specific design criteria"*

IEEE 765-2012 Proposed Revision

2012 Ballot technical comments resolved in this revision

Comment: Figures 2, 3, and 4 each show an acceptable configurations for the PPS. Each configuration has a ring bus implying that this is the only acceptable switchyard configuration. - Such configurations as main and transfer along with breaker and half schemes should also be acceptable. Address in the wording not necessarily the diagrams.

Solution: Updated figures with note (see above)

Comment: Open phase discussion (Detection and isolation) should be limited to offsite power source(s) to the offsite power transformer or the main transformer as the case may be. IEEE Std. 308 should be referred to for the class 1E protection against open phase condition.

Solution: Change to wording in section 5.3.4 to be consistent with top tier document 308.

IEEE 765-2012 Proposed Revision

Open phase resolved in this revision

- Modify section 5.3.4 from

> **5.3.4 PPS voltage degradation**
>
> PPS voltage degradation shall be detectable at the Class 1E bus to which the PPS source is connected. Selection of degraded voltage and time delay setpoints shall be in accordance with IEEE Std 741. A PPS voltage degradation condition shall be alarmed in the control room. The affected PPS circuits shall be automatically disconnected from the Class 1E buses on sensing PPS degradation to a low-voltage condition below the minimum value that will assure proper operation of all electrical loads required for mitigation of design basis events.

To:

PPS power quality degradation shall be detected at the Class 1E bus to which the PPS source is connected. PPS power quality degradation equipment protection shall be in accordance with IEEE Std 741.

IEEE 765-2012 Proposed Revision

Updated figure(s) for PAR scope

Comment: The purpose for this revision is to update PPS design figures and graphics for typical station designs and consider adding clarification for general and specific design criteria.

Solution: Added additional Figure 5

IEEE 765-2012 Proposed Revision

Updated content for PAR scope

- References will be reviewed and revised as required during the drafting
  - Normative references do not have dates and are therefore applicable to the current revision. Updated revisions were reviewed to determine if still applicable.
    - 308 – Just revised and issued 2020. Confirm applicable power quality update incorporated into 765
    - 741 – Last update in 2017, under current PAR
    - 1792 – Last update in 2017

- Technical content will be reviewed to determine if any changes required to be brought up to date.

IEEE 765-2012 Proposed Revision

Path Forward

- Drafting team (Jason Bellamy and Ayodele Ishola-Salawu) complete D765 for vote to proceed at 20-02 meeting. Note: WG to review prior to the 20-02 meeting. Updates to the standard will include:
  - Update standard to current format
  - Update figures and open phase wording
  - Review normative references
- 20-02 meeting vote to proceed to preview. Poll for interest in forming concentrated whitepaper production groups.
- 21-01 Preview standard at both SC-4 and NPEC
- Ballot process
  - 21-01 to 21-02: Ballot Resolution Committee handles comments/dispositions
  - 21-02: WG reviews ballot comments/dispositions, vote to upload/respond*
  - 21-02 to 22-01: Finalize MEC review submittal to ADCOM for issuance*

  * Note if recirculation ballot required, then items shift one meeting for issuance at 22-02 (just prior to withdrawal time limit)

IEEE

IEEE 765-2012 Proposed Revision

Path Forward

QUESTIONS?

IEEE Std P765™ (Future Revision)

IEEE Standard for Preferred Power Supply (PPS) for Nuclear Power Generating Stations (NPGS)

IEEE

IEEE 765 Future Revision Holdover

2012 Ballot and working group technical comments for consideration in a future revision, no current resolution

- Addition of solar activity, possibly to section 4.7b
- "PPS does not need to meet Class 1E Independence" & "should not compromise PPS Independence requirements."- Difference between this statement and that in 4.5 needs to be clarified as to what the independence requirements are for the PPS.
- Definitions: Should consider individually defining “capacity” and “capability” in Section 3, Definitions a. Expand capacity / capability description of PPS to clearly identify it is meant to encompass loading and short circuit withstand, not the ability to ensure function of equipment which would be the function of the grid
- Independence 4.6: Needs more detail. The terms “minimize” and “likelihood” are too vague (i.e. do not expand/clarify regulatory requirements) . Should there be any distinction between design basis event active component operation to support PPS “capability” versus major equipment asset protection (i.e. loss of the PPS circuit).
- Review the independence requirements for 4.5 and 4.6, need further clarification. Possible review of NERC/FERC information

IEEE 765 Future Revision Holdover

Ballot and working group technical comments for consideration in a future revision, no current resolution (continued)

- AAC 5.4: Single failure is an undefined term for non-safety systems.
- Surveillance requirements 6.1:
  a) Does indication requirement apply to all/some switchyard breakers?
  b) Does DC alarm apply to switchyard batteries?
  c) What PPS voltage should be indicated, the source (i.e. switchyard), load side of regulating devices (e.g. LTC Xfmr), and/or point of delivery to Class 1E system?
  d) Can turbine speed satisfy frequency indication requirement?
  e) Split individual requirements in separate paragraphs.
  f) Reasons to indicate PPS/Transmission boundary in the figures. Is clearer definition of what a “PPS Circuit” is and where it’s boundaries are.
- Control requirements 6.2: Is this intended to be all series devices within each PPS circuit, or just the final device that connects the PPS to the Class 1E bus?
- Include the last paragraph of GDC 17 A failure in the offsite system should not cause a failure of the onsite system.
- Define explicitly what the PPS circuit start and end points are

IEEE 765 Whitepaper Needs

Not as part of current revision

- International usage consideration(s). Defining the building block for both technical and regulatory requirements of the PPS circuit.
- Applicability of Figures 2 and 3 based on evolution of 308 and current industry requirements
- Interface between IEEE 308 and IEEE 765 requirements
- Interface between IEEE 741 and IEEE 765 requirements
- Interface between IEEE 1792 and IEEE 765 requirements
- How to navigate/interface requirements between 308, 765, 1792, and 741
- Division of requirements between NRC/FERC when discussion offsite power capability and capacity.
- Physical design considerations based on OE for knowledge transfer and possible basis for requirement updates/clarifications
- Knowledge transfer of OE that can be utilized for PPS for both current and future design considerations