



UNITED STATES
NUCLEAR REGULATORY COMMISSION
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February 26, 2019

MEMORANDUM TO: Ronaldo Jenkins, Chief
Instrumentation, Controls and Electrical Engineering Branch
Division of Engineering
Office of Nuclear Regulatory Research

FROM: Kenn Miller, Senior Electrical Engineer (Team Leader) */RA/*
Instrumentation, Controls and Electrical Engineering Branch
Division of Engineering
Office of Nuclear Regulatory Research

SUBJECT: REPORT ON TRIP TO IEEE/NPEC, SC-4 (AUXILIARY POWER)
MEETING 19-01, CHARLOTTE, NC.

DATE OF VISIT: Jan 27-30, 2019

PURPOSE: Participate in the development and use of Institute of Electrical
and Electronics Engineers (IEEE) Nuclear Power Engineering
Committee (NPEC) Consensus Standards in accordance with
NRC Management Directive 6.5

PARTICIPATING
ICEEB/EET STAFF: Tom Koshy – Past IEEE/NPEC Chairman, SC-4 Member
Kenn Miller – IEEE/NPEC/SC-4 Chairman (Auxiliary Power)

The Power and Energy Society's Nuclear Power Engineering Committee (NPEC) of the Institute of Electrical and Electronics Engineers (IEEE) hosted its winter meeting in Charlotte, North Carolina from January 27 through January 30, 2019. The NRC/RES/DE/ICEEB staff attended the meeting to collectively work with Committee participants to advance IEEE Standards applicable to the auxiliary power and safety related systems of nuclear power plants. Specifically, the staff assisted with the development of revisions to the following IEEE standards: IEEE Standard (Std.) 308, "**Criteria for Class 1E Power Systems**," IEEE Std. 765, "**Preferred Power Supply**," IEEE Std. 741, "**Criteria for the Protection of Class 1E Power Systems and Equipment**," and IEEE Std. 497, "Criteria for Accident Monitoring Instrumentation for Nuclear Power Generating Stations." NRC staff also participated in the IEEE NPEC meeting.

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Highlights:

1. On January 29, 2019, the SC-4 (Kenn Miller, Tom Koshy) meeting was held and there were two technical presentations; “Emergency Diesel Generator Performance Operating Experience” by EPRI, and “Nuclear Power Plant Islanding Mode Issues” by Tom Koshy. In addition, IEEE Standard P2420, “Standard Criteria for Combustion Turbine Generator Units Applied as Standby Power Supplies for Nuclear Power Generating Stations,” was previewed and approved to be forwarded to NPEC, the sponsoring standards committee, for its approval for balloting.
2. On January 30, 2019, the NPEC (Tom Koshy, Kenn Miller) meeting was held and three standards were previewed and approved for balloting. The standards approved were: IEEE Standard P2420, “Standard Criteria for Combustion Turbine Generator Units Applied as Standby Power Supplies for Nuclear Power Generating Stations”, IEEE Standard 382, “IEEE Standard for Qualification of Safety-Related Actuators for Nuclear Power Generating Stations,” and joint IEC/IEEE Standard P60980-344 “Nuclear Facilities – Equipment Important to Safety – Seismic Qualification.” There were four technical presentations: Military Nuclear Power Plants from 1958-1978 by C. Harmon, a presentation by Duke Energy on Integration of Digital Control Systems in Safety Related Applications, Emergency Diesel Generator Performance Trends by EPRI, and Start up Testing Experiences from AP1000 Commercial Operation in China by Westinghouse.
3. January 28, 2019 - IEEE Std. 308 Working Group WG (Kenn Miller) meeting. The WG sent the previous published version out for ballot in November 2018 and received 121 comments. The intent was to collect industry comments to be considered along with potential changes based on the open phase vulnerability identified in the event at the Byron Nuclear Power Generating Station in 2012 (See IN 2012-03 and Bulletin 2012-01). Changes are being considered to the parent Std. 308 (1E Power System), addressing the open phase vulnerability to the 1E power system, and also on the daughter Standards 741 (1E Protection) and 765 (Preferred Power Supply / Offsite) to ensure that any known vulnerabilities identified are fully addressed. The active Project Authorization Request (PAR) expires at the end of 2022, and the document expires in 2022. The plan is to complete comment resolution by the end of the next meeting (July 2019) and complete a draft standard for balloting in late 2019. IEEE Std. 308 is endorsed by the NRC’s Regulatory Guide (RG) 1.32, “Criteria for Power Systems for Nuclear Power Plants.”
4. January 27-28, 2019 – IEEE Std. 765 WG (Kenn Miller, Thom Koshy) meeting. The WG has an active PAR which expires in 2022 (as does the standard). This standard revision is to address outstanding comments from the last revision, shifting towards a best engineering practice in terms of offsite power system design, addressing capacity and capability, additional detail addressing passive designs as well as potential changes to address the open phase issue, as defined by power quality (IEEE standard 308), as a potential vulnerability to the offsite circuits. IEEE Std. 765 is not currently endorsed by an NRC RG.
5. January 28, 2019 - IEEE Std. 741 WG (Kenn Miller) meeting. The WG has an active PAR which expires in 2023 (the standard expires in 2027). This standard revision is to address outstanding comments from the last revision as well as potential changes to address the open phase issue, as defined by power quality (IEEE standard 308), from a detection/protection perspective. IEEE Std. 741 is not currently endorsed but a draft RG addressing degraded/loss of voltage protection design is in progress and should be out for public comment in the next few months.

6. January 28, 2019 - IEEE Stds. 387/P2420 WG (Kenn Miller) meeting. The WG is considering a new PAR for an IEC/IEEE joint Standard 387 for emergency diesel generators. In addition, there was a discussion about addressing power quality and FLEX diesel criteria. The most current version IEEE Std. 387 was issued January 2018 and a revision to RG 1.9 is in progress with a draft RG out for public comments before the end of the year. IEEE Std. P2420 (Combustion Turbine Generators) was approved for balloting by NPEC with plans to ballot in early 2019 and issue by the end of 2019.

No regulatory commitments or decisions were made by the NRC staff at this meeting.

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19-01, CHARLOTTE, NC.

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