

Nuclear Power Engineering Committee

Description of NPEC Sub-Committee 4 - Auxiliary Power

The Auxiliary Power Sub-Committee (SC-4) is one of the five sub-committees of the Nuclear Power Engineering Committee (NPEC). NPEC is the technical Committee within the Power Engineering Society responsible for all nuclear power related technical and standards-writing activities within the IEEE. It is the sponsor for approximately 35 standards, nine of which are in SC-4 and coordinates on about 65 standards that impact the nuclear power area, such as transformers, switchgear and batteries.

SC-4 is responsible for all matters relating to the electric systems that power the plant safety-related equipment and systems in nuclear generating stations. This responsibility includes the development of standards that address the design of these systems; development of examples of preferred design, application, evaluation and testing of these power systems; coordination of nuclear standards; sponsorship of technical sessions; preparation of and review of technical papers; dissemination of information to the industry on new developments; and the advancement of nuclear engineering with students and educational institutions.

SC-4 oversees the preparation of the following standards:

IEEE 308 – IEEE Standard Criteria for Class 1E Power Systems for Nuclear Power Generating Stations

IEEE 308 covers Class 1E portions of alternating current and direct current power systems and instrumentation and control power systems in single-unit and multi-unit nuclear power generating stations. The purpose is to provide criteria for the determination of Class 1E power system design features, criteria for sharing Class 1E power systems in multi-unit stations, the requirements for their testing and surveillance, and the requirements for documentation of the Class 1E power system. The major role of the Class 1E power system is to provide electric power to the reactor trip system, engineered safety features, and auxiliary supporting features; therefore, the Class 1E power system is an auxiliary supporting feature. This standard does not include the preferred power supply; unit generator(s) and their buses; generator breaker; step-up, auxiliary, and start-up transformers; connections to the station switchyard; transmission lines; and the transmission network.

IEEE 317 – IEEE Standard for Electrical Penetration Assemblies in Containment Structures for Nuclear Generating Stations

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IEEE 317 presents criteria relative to the electric penetration assemblies of primary containments of the nuclear facilities that comply with the United States Nuclear Regulatory Commission's Code of Federal Regulations (10CFR50). This standard prescribes the requirements for the design, construction, qualification, test, and installation of electric penetration assemblies in nuclear containment structures for stationary nuclear power generating stations. The requirements for external circuits which connect to penetration assemblies are beyond the scope of this standard. This standard does not include requirements for operation, maintenance, or periodic testing after installation.

IEEE 387 – IEEE Standard Criteria for Diesel-Generator Units Applied as Standby Power Supplies for Nuclear Power Generation Stations

IEEE 387 provides principle design criteria, design features, qualification considerations and testing requirements for individual diesel-generator units applied as Class 1E standby power supplies in nuclear power stations. The standard covers both factory production testing requirements, qualification testing requirements (initial type testing requirements) and periodic testing requirements.

IEEE 628 – IEEE Standard Criteria for the Design, Installation and Qualification of Raceway Systems for Class 1E Circuits for Nuclear Generating Stations

IEEE 628 contains requirements for the design, installation, and qualification of electrical cable raceway systems for safety circuits in nuclear power generating stations. Raceway systems are comprised of conduit, cable trays, wire ways and duct banks, and are used to provide physical protection and support for electrical wiring and cables. The standard provides guidance for raceway routing (layout and spacing), material selection, structural support, seismic qualification, grounding and documentation.

IEEE 690 – IEEE Standard Criteria for the Systems and Equipment in Nuclear Power Generating Stations

IEEE 690 establishes the requirements for design and installation of Class 1E Circuits and associated circuits. It provides the guidance for the design and installation of those non-safety related cable systems that may affect the function of safety related systems. It also provides solutions for areas of concerns such as fire protection, raceways,

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separation, cable performance requirements, and installation acceptance testing and documentation.

IEEE 741 – IEEE Standard Criteria for the Protection of Class 1E Power Systems and Equipment in Nuclear Power Generating Stations

IEEE 741 provides design criteria, design features, and testing requirements that are unique to Class 1E electrical protective equipment. Its scope includes AC and DC power distribution systems, instrumentation and controls, penetration protection, and valve actuator motors. It includes annexes on degraded voltage protection, valve operator overload protection, automatic bus transfer concerns, and settings for magnetic-only circuit breakers.

IEEE 765 – IEEE Standard for Preferred Power Supply (PPS) for Nuclear Power Generating Stations

IEEE 765 contains the design criteria for the preferred power supply (PPS) and its interfaces with the Class 1E power systems, switchyard, transmission system and alternate ac (AAC) source as described. This standard provides PPS requirements for nuclear power plants and guidance in the areas of AAC power source interfaces with PPS, physical separation of the PPS power and control circuits, and expanded PPS criteria for multi-unit stations. It includes annexes on transmission system interface agreements and transmission system studies.

IEEE 833 – IEEE Recommended Practice for the Protection of Electrical Equipment in Nuclear Power Stations from Water Hazards

IEEE 833 describes design, installation, and maintenance considerations to protect electric equipment against potential water intrusion hazards. This recommended practice is intended to define when a water hazard exists and provide useful practices as to how to deal with water hazards for operating plants, new plants, or during plant modifications. This document does not address the ability of the electric equipment to withstand a “loss-of-coolant” accident, high energy line break, or the physical forces resulting from jet impingement, or other line breaks that are covered by other analyses, standards, or requirements. Further, it may not be reasonable to provide protection for all possible flooding scenarios. Examples for such scenarios are multiple or simultaneous pipe breaks, valves leaks, or deliberate operations of fire hoses to extinguish fires in equipment.

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IEEE 1290 -IEEE Guide for Motor Operated Valve (MOV) Motor Application, Protection, Control, and Testing in Nuclear Power Generating Stations

IEEE 1290 provides guidelines to evaluate the adequacy of valve actuator motors (VAM) used to drive valve operators; to provide recommendations for motor application; and to provide methods for protection, control, and testing of motors used for valve operation. It specifically attempts to cover topics not found in existing IEEE or other easily accessible documents. This guidance is an accumulation of recommendations and suggested solutions to problems based on experience.