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IEEE Standard for Electric Penetration Assemblies in Containment Structures for Nuclear Power Generating Stations

Sponsor
Nuclear Power Engineering Committee
of the
IEEE Power Engineering Society

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Foreword

This Foreword is not a part of IEEE Std 317-1976, Electric Penetration Assemblies in Containment Structures for Nuclear Power Generating Stations.)

These criteria have been developed to facilitate the determination of the features of design, construction, and installation related to the electric penetration assemblies of the nuclear facilities that comply with the Atomic Energy Commission's Code of Federal Regulations (10 CFR 50).

Adherence to these criteria alone may not suffice for assuring the public health and safety because it is the integrated performance of the structures, the fluid systems, the instrumentation, and the electric systems of the stations that establishes the consequences of accidents. Each applicant has the responsibility to assure himself and others that this integrated performance is adequate.

The IEEE will maintain this document current with the state of the technology. Comments on this document and suggestions for the additional material that should be included are invited. These should be addressed to:

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IEEE Standard for Electric Penetration Assemblies in Containment Structures for Nuclear Power Generating Stations

1. Scope

This standard prescribes the requirements for the design, construction, 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.

2. Definitions

back-up overcurrent protective device or apparatus. A device or apparatus which performs the circuit interrupting function in the event the primary protective device or apparatus fails or is out of service.

design basis events (DBE). Postulated abnormal events used in the design to establish performance requirements of structures, systems, and components. (Refer to IEEE Std 308-1974, IEEE Standard Criteria for Class 1E Power Systems for Nuclear Power Generating Stations.)

Double aperture seal. Two single aperture seals in series.

double electric conductor seal. Two single electric conductor seals in series.

electric penetration assembly. An assembly of insulated electric conductors, conductor seals, and aperture seals that provides the passage of the electric conductors through a single aperture in the nuclear containment structure, while providing a pressure barrier between the inside and the outside of the containment structure.

environmental conditions. Physical conditions external to the electric penetration assembly including but not limited to ambient temperature, pressure, radiation, humidity, and chemi-

cal spray expected as a result of normal operating requirements, and postulated conditions appropriate for the design basis events of the station applicable to the electric penetration assembly.

installed life. The interval of time from installation to permanent removal from service, during which the electric penetration assembly will meet all design requirements for the specified service conditions.

NOTE: Components of the assembly may require periodic replacement; thus, the installed life of such components would be less than the installed life of the assembly.

margin. The difference between the most severe specified service conditions of the plant and the conditions used in type testing to account for normal variations in commercial production of equipment and reasonable errors in defining satisfactory performance.

primary overcurrent protective device or apparatus. A device or apparatus which normally performs the function of circuit interruption.

qualified life. The period of time that can be verified for which the electric penetration assembly will meet all design requirements for the specified service conditions.

service conditions. Environmental, power, and signal conditions expected as a result of normal operating requirements, expected extremes in operating requirements, and postulated conditions appropriate for the design basis events of the station applicable to the electric penetration assembly.

single aperture seal. A single seal between the containment aperture and the electric penetration assembly.

single electric conductor seal. A mechanical assembly arranged in such a way that there is a single pressure barrier seal between the inside