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IEEE Standard Criteria for Diesel-Generator Units Applied as Standby Power Supplies for Nuclear Power Generating Stations

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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 387-1977, Criteria for Diesel-Generator Units Applied as Standby Power Supplies for Nuclear Power Generating Stations.)

This document is supplementary to IEEE Std 308-1974, Standard Criteria for Class 1E Power Systems for Nuclear Power Generating Stations, and specifically amplifies paragraph 5.2.4, "Standby Power Supplies," of that document with respect to the application of diesel-generator units.

The IEEE has developed this document to provide the principal design criteria, design features, qualification considerations, and testing requirements for individual diesel-generator units including auxiliary equipment and controls within the scope of this document used in the standby power supply of a nuclear facility, which comply with the Nuclear Regulatory Commission's code of Federal Regulations (10 CFR 50). This document presents specific procedures and criteria applicable to qualifying the diesel-generator unit and supplements the criteria described in IEEE Std 323-1974, "Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations."

Operating experience is generally available on diesel-generator units similar to those covered by this document to support the position that when rated in accordance with this document the equipment should provide many years of continuous operating life. However, it should be noted that the application of these standby diesel-generator units for nuclear service is such that the actual operating time under loaded conditions may only be equivalent to one year continuous service in the 40 year life expectancy of the plant.

The principal concerns are the ability of the diesel-generator unit to operate at design loads whenever necessary during the life of the plant, and the ongoing maintenance procedures which should be followed to maintain this equipment in a "ready state." These concerns may be met by following the manufacturer's recommendations and performing periodic tests in accordance with this document and site testing programs.

Components that may deteriorate primarily with age, such as seals, hoses, gaskets, etc, can be replaced long before failure of these components is expected. Such components should be identified and documented, and the required action included as part of the maintenance program.

Engine auxiliaries, including electric motors, may be selected on a conservative basis, with recommendations for replacement periodically during the life of the plant. Replacement interval should be based on conservative judgement of component life supported by operating experience as described in IEEE Std 232-1974. The Generator excitation system, and other electrical equipment should be periodically inspected and tested, including insulation megger or leakage current tests, or both, where practical according to manufacturer's recommendations, and this information should be recorded and compared with previously recorded results to determine if there is any sign of degradation.

It is the intent of the IEEE to add a Section 5.6.4 entitled "Protection" at some future date. In the interim, users of this document are referred to IEEE Std 308-1974 for general requirements covering the area of protection.

Additional work is in progress to expand on the following sections of this document:

- (a) Section 5.1.2 (3) and Section 6.4.2 — Light Load or No Load Operation.
- (b) Section 5.5 — Design and Application Consideration. (Work is in progress to include interface considerations with associated systems outside the scope of this document.)
- (c) Section 6.2 — Factory Production Tests.
- (d) Section 6.7 — Preventive Maintenance, Inspection, and Testing.

NOTE: ANS59 is preparing a series of standards applicable to the fuel oil, combustion air, starting, coolant, and lube oil systems of the diesel-generator units, and these standards will be referenced, as appropriate, in future revisions of this document.

Adherence to these criteria may not suffice for assuring the public health and safety because it is the integrated performance of the structures, the fluid systems, the instrumentation systems, and

the electrical systems of the station that establishes the consequences of accidents. Each applicant has the responsibility to assure himself and others that this integrated performance is adequate.

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