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fuel oil systems for safety-related emergency diesel generators

an American National Standard

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This standard does not necessarily reflect recent industry initiatives for risk informed decision-making or a graded approach to quality assurance. Users should consider the use of these industry initiatives in the application of this standard.



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**American National Standard
Fuel Oil Systems for Safety-Related
Emergency Diesel Generators**

**Secretariat
American Nuclear Society**

**Prepared by the
American Nuclear Society
Standards Committee
Working Group ANS-59.51**

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American National Standard

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Foreword

(This Foreword is not a part of American National Standard Fuel Oil Systems for Emergency Diesel Generators, ANSI/ANS-59.51-1997.)

This standard is applicable to light water reactor nuclear power plants and is one of a series sponsored by the LWR Criteria Management Subcommittee (MC-1) intended to cover the design of auxiliary systems that support the operation of emergency diesel generator units. Other standards in this series that have been or are being developed by this working group are listed below:

Proposed Standard	Subject
ANS-59.52	Lubricating Oil Systems
ANS-59.53	Starting Air Systems
ANS-59.54	Combustion Air Systems
ANS-59.55	Coolant Systems

This standard interfaces with American National Standard Criteria for Diesel Generator Units Applied as Standby Power Supplies for Nuclear Power Generating Stations, ANSI/IEEE 387-1995, the current version of which was revised by the Nuclear Power Engineering Committee (IEEE/NPEC). The scope of ANSI/IEEE 387-1995 includes "the fuel oil system from the fuel oil day tank to the engine, including filters and strainers between the day tank and the engine." However, no fluid system or component performance or design criteria are specified in that standard. To address these fluid system requirements, this revision to ANS-59.51 includes in its scope the pumps, tanks, piping and piping components, and instrumentation and control functions, as described herein. Based on discussions with the working group chairman for IEEE 387, it was agreed that the intent of that standard is to address only the overall qualifications and boundaries of the diesel generator auxiliary systems and not the specific performance or design criteria, which are addressed in ANS-59.51.

The purpose of this standard and the related standards is to provide guidance to nuclear plant owners, designers, manufacturers, regulatory authorities, and operators in the design of reliable, safety-related, onsite power systems for light water reactors. The reliability of the fuel oil system must be considered when one attempts to satisfy the overall reliability requirements of the diesel generator units. This is particularly important if fuel oil systems have components that are shared between reactor units, and if the single failure criterion is applied.

This standard can also be used for non-safety-related onsite power systems, with several changes to eliminate those requirements which would not normally apply to such equipment. For example, non-safety-related equipment would not normally have to meet American National Standard Single Failure Criteria for Light Water Reactor Safety-Related Fluid Systems, ANSI/ANS-58.9-1981 (R1987), the Class 1E Power Systems requirements of American National Standard Criteria for Class 1E Power Systems for Nuclear Power Generating Stations, ANSI/IEEE 308-1992, and several of the requirements described in American National Standard Nuclear Safety Criteria for Design of Stationary Pressurized Water Reactor Plants, ANSI/ANS-51.1-1983 (R1988) and American National Standard Nuclear Safety Criteria for Design of Stationary Boiling Water Reactor Plants, ANSI/ANS-52.1-1983 (R1988), for safety related equipment, such as Seismic Category I. Other requirements referenced herein—such as American National Standard ASME Boiler and Pressure Vessel Code—1995, Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components, and American National Standard Quality Assurance Program Requirements for Nuclear Facilities, ANSI/ASME NQA-1-1994—which normally apply to safety-related equipment but which are considered to enhance reliability, as well as the seven day fuel oil supply requirement, could be optional or modified to suit a particular application.

This standard was initially issued by the American Nuclear Society in April 1976. It was revised in 1989 to conform to the latest revisions of ANS-51.1 and ANS-52.1, and to resolve

comments from previous ballots issued in 1982 for reaffirmation, in 1985 for withdrawal, and in 1986 for reaffirmation. This revision agrees with the definitions and requirements of American National Standard Safety and Pressure Integrity Classification Criteria for Light Water Reactors, ANSI/ANS-58.14-1993; ANS-51.1; ANS-52.1; current technology and practices; and information available from industry reports.

U.S. Nuclear Regulatory Commission Regulatory Guide 1.137 endorsed ANSI N195-1976/ANS-59.51 as providing an acceptable method for complying with the pertinent requirements of Title 10, "Energy," Code of Federal Regulations, Part 50, Appendix A, General Design Criterion 17, subject to some clarifications and additional requirements. This revision has considered and incorporated these clarifications and requirements where appropriate.

This revision to the standard has been prepared by Working Group ANS-59.51 of the American Nuclear Society Standards Committee, which had the following membership:

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Contents	Section	Page
	1. Introduction	1
	1.1 Scope	1
	1.2 Purpose	1
	2. Definitions	1
	3. System Function	2
	4. System Description	2
	5. System Performance Requirements	2
	5.1 General	2
	5.2 Single Reactor Unit Nuclear Stations	2
	5.3 Multiple Reactor Unit Nuclear Stations	2
	5.4 Calculation of Fuel Oil Storage Requirements	3
	5.5 Component Performance Requirements	3
	6. Design Requirements	4
	6.1 Safety Class and Applicable Codes, Standards, or Regulations	4
	6.2 Design Conditions	4
	6.3 Interfaces	6
	6.4 Testing, Inspection, and Maintenance Requirements	6
	6.5 Quality Assurance	7
	7. References	7
	Appendices	
	Appendix A Typical Fuel Oil Subsystem Description	9
	Appendix B Alternate Calculation of Usable Fuel Oil Storage Capacity	11
	Appendix C Recommended Fuel Oil Practices	12
	Figures	
	Figure 1 Typical Fuel Oil Subsystem Flow Diagram	10