

Periodic Review

Regulatory Guide Number: 1.137, Revision 2
Title: Fuel Oil System for Emergency Power Supplies
Office/division/branch: NRR/DEX/EMIB
Technical Lead: Gurjendra Bedi
Staff Action Decided: Revise

1. What are the known technical or regulatory issues with the current version of the Regulatory Guide (RG)?

RG 1.137, Revision 2, "Fuel Oil System for Emergency Power Supplies," issued in June 2013, establishes the NRC's guidance on acceptable requirements regarding fuel oil systems for safety-related diesel-powered generators and diesel oil-fueled gas turbine generators, including assurance of adequate fuel oil quality. The guidance may also be applied to the fuel oil systems for nonsafety-related standby power supplies to the extent deemed appropriate to the safety significance of the power supplies.

The current RG discusses conformance with requirements in Institute of Electrical and Electronics Engineers (IEEE) Standard (Std.) 603-1991, "IEEE Standard Criteria for Safety Systems for Nuclear Power Generating Stations" (including a correction sheet dated January 30, 1995) (Ref. 2), or in IEEE Std. 279-1971, "Criteria for Protection Systems for Nuclear Power Generating Stations," (Ref. 3). The criteria in these IEEE standards requires, in part, that: "Safety system equipment shall be designed, manufactured, inspected, installed, tested, operated, and maintained in accordance with a prescribed quality assurance program (ANSI/ASME NQA1-1989)."

This RG also discusses, in part, the sampling plan in American National Standards Institute (ANSI), American Nuclear Society (ANS) (ANSI/ANS) Standard 59.51-1997, "Fuel Oil Systems for Safety-Related Emergency Diesel Generators," (reaffirmed in October 2007) (Ref. 4), and American Society for Testing and Materials (ASTM) standard D975-13, "Standard Specification for Diesel Fuel Oils" (Ref. 5) as acceptable methods of verifying the quality of the fuel oil and fuel oil systems used in these safety-related applications at nuclear power plants.

The current 10 CFR 50.55a(a)(2) endorsed the following *Institute of Electrical and Electronics Engineers (IEEE) Standards*:

(i) **IEEE standard 279-1968.** (IEEE Std 279-1968), "Proposed IEEE Criteria for Nuclear Power Plant Protection Systems" (Approval Date: August 30, 1968), referenced in paragraph 10 CFR 50.55a(h)(2).

(ii) **IEEE standard 279-1971.** (IEEE Std 279-1971), "Criteria for Protection Systems for Nuclear Power Generating Stations" (Approval Date: June 3, 1971), referenced in paragraph 10 CFR 50.55a(h)(2).

(iii) **IEEE standard 603-1991.** (IEEE Std 603-1991), “Standard Criteria for Safety Systems for Nuclear Power Generating Stations” (Approval Date: June 27, 1991), referenced in paragraphs 10 CFR 50.55a(h)(2) and (h)(3).

(iv) **IEEE standard 603-1991, correction sheet.** (IEEE Std 603-1991 correction sheet), “Standard Criteria for Safety Systems for Nuclear Power Generating Stations, Correction Sheet, Issued January 30, 1995,” referenced in paragraphs 10 CFR 50.55a(h)(2) and (h)(3).

This RG needs to be revised due to the following issues:

- 1) Updating the RG to reference the 2013 revision of the IEEE standard, among other minor items.
- 2) Performing a detailed line by line review of ASTM Std. D975-13 vs ASTM Std. D975-22a, “Standard Specification for Diesel Fuel,” or later as incorporated by 10 CFR 50.55a and revising the RG accordingly.

2. What is the impact on internal and external stakeholders of not updating the RG for the known issues in terms of anticipated numbers of licensing and inspection activities over the next several years?

For the existing U.S. fleet of operating light-water power reactors, the staff concludes that there would be no significant impact for not updating the RG and there are no known significant issues with the operating fleet that would require updating the RG. Not updating the RG will also have no significant impact on compliance with their current design basis. However, updating the guidance to have updated references would be beneficial for all stakeholders.

3. What is an estimate of the level of effort needed to address identified issues in terms of full-time equivalent (FTE) and contractor resources?

The estimated level of effort to revise this RG is 200 hours (approximately 0.1 FTE). No contractor support is needed. No significant coordination with other NRC offices (other than the Office of Research) is necessary.

4. Based on the answers to the questions above, what is the staff action for this guide (Reviewed with no issues identified, Reviewed with issues identified for future consideration, Revise, or Withdraw)?

Revise

5. Provide a conceptual plan and timeframe to address the issues identified during the review.

A detailed review and line by line evaluation of ASTM Std. D975-13 vs ASTM Std. D975-22a will further inform an update to the RG. The staff plans to develop a draft guide and issue for public comment in CY 2024.

References:

1. *U. S. Code of Federal Regulations (CFR)* "Domestic Licensing of Production and Utilization Facilities," Part 50, Chapter 1, Title 10, "Energy."
2. Institute of Electrical and Electronic Engineers (IEEE), Standard 603-1991, "IEEE Standard Criteria for Safety Systems for Nuclear Generating Stations," Piscataway, NJ.
3. IEEE, Std. 279-1971, "Criteria for Protection Systems for Nuclear Power Generating Stations," Piscataway, NJ.
4. American National Standards Institute (ANSI), American Nuclear Society (ANS), ANSI/ANS-59.51-1997, "Fuel Oil Systems for Safety-Related Emergency Diesel Generators," with reaffirmation in October 2007, La Grange Park, IL.
5. American Society for Testing and Materials (ASTM), Std. D975-13, "Standard Specification for Diesel Fuel Oils," West Conshohocken, PA. superseded by ASTM Std. D975-22a, "Standard Specification for Diesel Fuel."
6. CFR, "Licenses, Certifications, and Approvals for Nuclear Power Plants," Part 52, Chapter 1, Title 10, "Energy."
7. ANS Standard N195-1976, "Fuel Oil Systems for Standby Diesel-Generators," La Grange Park, IL.
8. ANSI/ANS-51.1, "Fuel Oil Systems for Safety-Related Emergency Diesel Generators," (withdrawn) ANS, La Grange Park, IL.
9. ANSI/ANS-52.1, "Nuclear Safety Criteria for the Design of Stationary Boiling Water Reactor Plants," (withdrawn), ANS, La Grange Park, IL.
10. International Atomic Energy Agency (IAEA), Safety Guide NS-G-1.8, "Design of Emergency Power System for Nuclear Power Plants," issued August 2004, Vienna, Austria
11. IAEA, Safety Guide NS-G-1.8, "Design of Emergency Power System for Nuclear Power Plants," issued August, Vienna, Austria.

NOTE: This review was conducted in September 2023 and reflects the staff's plans as of that date. These plans are tentative and are subject to change.