U.S. NUCLEAR REGULATORY COMMISSION

REGULATORY GUIDE 1.128, REVISION 3

Issue Date: April 2024
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INSTALLATION DESIGN AND INSTALLATION OF VENTED LEAD-ACID STORAGE BATTERIES FOR PRODUCTION AND UTILIZATION FACILITIES

A. INTRODUCTION

Purpose

This regulatory guide (RG) describes an approach that is acceptable to the staff of the U.S. Nuclear Regulatory Commission (NRC) to meet regulatory requirements for the installation design and installation of vented lead-acid storage batteries in production and utilization facilities. It endorses, with clarifications, Institute of Electrical and Electronics Engineers (IEEE) Standard (Std.) 484-2019, "IEEE Recommended Practice for Installation Design and Installation of Vented Lead-Acid Batteries for Stationary Applications" (Ref. 1).

Applicability

This RG applies to licensees and applicants subject to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities" (Ref. 2), and 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants" (Ref. 3). Under 10 CFR Part 50, this RG applies to licensees of, or applicants for, production and utilization facilities. Under 10 CFR Part 52, this RG applies to applicants and holders of combined licenses, standard design certifications, standard design approvals, and manufacturing licenses.

Applicable Regulations

- 10 CFR Part 50 provides regulations for licensing production and utilization facilities.
    - o 10 CFR 50.55a, "Codes and standards," requires, in part, that structures, systems, and components (SSCs) be designed, fabricated, erected, constructed, tested, and inspected to quality standards commensurate with the importance of the safety function to be performed.
    - o 10 CFR Part 50, Appendix A, "General Design Criteria for Nuclear Power Plants," General Design Criterion (GDC) 1, "Quality standards and records," requires, in part, that SSCs

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Electronic copies of this RG, previous versions of RGs, and other recently issued guides are also available through the NRC's public web site in the NRC Library at https://www.nrc.gov/reading-rm/doc-collections/reg-guides/index.html/under Document Collections, in Regulatory Guides. This RG is also available through the NRC's Agencywide Documents Access and Management System (ADAMS) at http://www.nrc.gov/reading-rm/adams.html, under ADAMS Accession Number (No.) ML24052A077. The regulatory analysis may be found in ADAMS under Accession No. ML23277A279. The associated draft guide DG-1421 may be found in ADAMS under Accession No. ML23277A276, and the staff responses to the public comments on DG-1421 may be found under ADAMS Accession No. ML24052A078.

important to safety be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed.

- GDC 17, "Electric power systems," requires, in part, that an onsite electric power system and an offsite electric power system be provided to permit functioning of SSCs important to safety.

- GDC 18, "Inspection and testing of electric power systems," requires, in part, that electric power systems important to safety be designed to permit appropriate periodic inspection and testing of important areas and features, such as wiring, insulation, connections, and switchboards, to assess the continuity of the systems and the condition of their components.

- As stated in the introduction to Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to 10 CFR Part 50, nuclear power include SSCs that prevent or mitigate the consequences of postulated accidents that could cause undue risk to the health and safety of the public. Appendix B to 10 CFR Part 50 establishes quality assurance requirements for the design, manufacture, construction, and operation of those SSCs. Criterion III, "Design Control," of Appendix B sets forth, among other things, the following requirements:

  - Measures shall be established to assure that applicable regulatory requirements and the design basis, as defined in 10 CFR 50.2 and as specified in the license application, for those SSCs to which Appendix B applies are correctly translated into specifications, drawings, procedures, and instructions.

  - These measures shall include provisions to ensure that appropriate quality standards are specified and included in design documents and that deviations from such standards are controlled.

  - The design control measures shall provide for verifying or checking the adequacy of design, such as by performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program.

- 10 CFR Part 52 governs the issuance of early site permits, standard design certifications, combined licenses, standard design approvals, and manufacturing licenses for nuclear power facilities. The regulations specify, among other things, that contents of some applications must satisfy the requirements of 10 CFR 50.55a and 10 CFR Part 50, Appendices A and B.

Related Guidance

- NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: (LWR Edition)" (Ref. 4), provides guidance to the NRC staff for performing safety reviews under 10 CFR Part 50 and 10 CFR Part 52. Specifically, Section 8.3.2, "DC Power Systems (Onsite)," contains review guidance related to direct current systems, including batteries. Section 9.5.3, "Lighting Systems," discusses acceptance criteria for the lighting systems.

- RG 1.75, "Criteria for Independence of Electrical Safety Systems" (Ref. 5), describes methods for the physical independence of the circuits and electrical equipment that comprise or are associated with safety systems.

- RG 1.100, "Seismic Qualification of Electrical and Active Mechanical Equipment and Functional Qualification of Active Mechanical Equipment for Nuclear Power Plants" (Ref. 6), describes methods that the NRC staff considers acceptable for use in the seismic qualification of electrical and active mechanical equipment and the functional qualification of active mechanical equipment for nuclear power plants.

- RG 1.129, "Maintenance, Testing, and Replacement of Vented Lead-Acid Storage Batteries for Production and Utilization Facilities" (Ref. 7), describes methods for the maintenance, testing, and replacement of vented lead-acid storage batteries.

- RG 1.158, "Qualification of Safety-Related Vented Lead-Acid Storage Batteries for Nuclear Power Plants" (Ref. 8), provides a qualification method for safety-related lead-acid storage batteries.

- RG 1.189, "Fire Protection for Nuclear Power Plants" (Ref. 9), provides comprehensive fire protection guidance to applicants and licensees that identifies the scope and depth of fire protection that the staff would consider acceptable for nuclear power plants to meet fire protection regulations.

- RG 1.212, "Sizing of Large Lead-Acid Storage Batteries" (Ref. 10), provides guidance on the sizing for large lead-acid batteries for production and utilization facilities.

- NUREG-1537, Parts 1 and 2, "Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors," issued February 1996 (Ref. 11), contains format and content guidance for non-power reactor applicants and licensees, as well as a standard review plan and acceptance criteria for the NRC staff.

- "Final Interim Staff Guidance Augmenting NUREG-1537, 'Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors,' Parts 1 and 2, for Licensing Radioisotope Production Facilities and Aqueous Homogeneous Reactors," issued October 2012 (Ref. 12), provides format and content guidance for non-power aqueous homogeneous reactor and radioisotope production facility applicants and licensees, as well as a standard review plan and acceptance criteria for the NRC staff.

- "Endorsement of Appendix A to Oak Ridge National Laboratory Report, 'Proposed Guidance for Preparing and Reviewing a Molten Salt Non-Power Reactor Application,' as Guidance for Preparing Applications for the Licensing of Non-Power Liquid Fueled Molten Salt Reactors," dated November 18, 2020 (Ref. 13), endorses, with clarifications, Appendix A to ORNL/TM-2020/1478, "Proposed Guidance for Preparing and Reviewing a Molten Salt Non-Power Reactor Application," issued July 2020 (Ref. 14), to support the review of non-power molten salt reactors.

Purpose of Regulatory Guides

The NRC issues RGs to describe methods that are acceptable to the staff for implementing specific parts of the agency's regulations, to explain techniques that the staff uses in evaluating specific issues or postulated events, and to describe information that the staff needs in its review of applications for permits and licenses. Regulatory guides are not NRC regulations and compliance with them is not required. Methods and solutions that differ from those set forth in RGs are acceptable if supported by a basis for the issuance or continuance of a permit or license by the Commission.

Paperwork Reduction Act

This RG provides voluntary guidance for implementing the mandatory information collections in 10 CFR Parts 50 and 52 that are subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.). These information collections were approved by the Office of Management and Budget (OMB), under control numbers 3150-0011 and 3150-0151, respectively. Send comments regarding this information collection to the FOIA, Library, and Information Collections Branch, Office of the Chief Information Officer, Mail Stop: T6-A10M, U.S. Nuclear Regulatory Commission, Washington, DC, 20555-0001, or to the OMB reviewer at: OMB Office of Information and Regulatory Affairs, (3150-0011 and 3150-0151), Attn: Desk Officer for the Nuclear Regulatory Commission, 725 17th Street, NW, Washington, DC, 20503.

Public Protection Notification

The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

B. DISCUSSION

Reason for Revision

This revision of the guide (Revision 3) endorses, with clarifications, IEEE Std. 484-2019 and applies to production and utilization facilities licensed under 10 CFR Part 50 and 10 CFR Part 52 within the scope of this RG. The previous version of this RG endorsed, with certain clarifications, IEEE Std. 484-2002 (Ref. 15). In 2019, the IEEE revised IEEE Std. 484 to add information on thermal factors of influence (exposure temperature, ambient temperature, temperature gradient, and rate of temperature change) and safety provisions (e.g., electrical hazards, shock hazards, ground fault hazards, arc flash hazards, chemical hazards), modifications to the personal protective equipment section, major changes to mounting and ventilation sections, new provisions on connection to direct current systems and spare cells, and new provisions for material handling and hazard assessment, as well as many other updates, corrections, and clarifications to various sections. The revised IEEE standard provides two new normative annexes. The NRC staff determined that, based on the revised IEEE standard, a revision to this RG is needed.

Background

This RG provides guidance to applicants and licensees to meet regulatory requirements for the installation design and installation of vented lead-acid storage batteries in production and utilization facilities. IEEE Std. 484-2019 provides recommended design practices and procedures for storage, location, mounting, ventilation, instrumentation, preassembly, assembly, and charging of vented lead-acid batteries.

IEEE Std. 484-2019 is an updated consensus standard that adds new recommendations and guidance, as well as informative annexes, for vented lead-acid batteries for stationary applications. The standard was developed by the IEEE Power Engineering Society Energy Storage and Stationary Battery Committee and approved by the IEEE Standards Association Standards Board on November 7, 2019. The standard is applicable to vented lead-acid batteries only and does not pertain to valve-regulated lead-acid batteries. Consideration of battery types other than vented lead-acid is beyond the scope of this RG. Additionally, sizing, maintenance, capacity testing, charging equipment, and dry-charged units are beyond the scope of the IEEE standard and this RG.

Portions of IEEE Std. 484-2019 continue to be directed toward recommendations in the area of battery room cleanliness and ventilation, temperature control, ground fault detection, and fire prevention. Battery room cleanliness and ventilation are important because the battery chemistry for lead-acid storage batteries is sensitive to contaminants and temperatures above and below the manufacturer's rating. In addition, the batteries release hydrogen (a potential fire hazard) to the battery room during charging. The NRC also has regulatory guidance for preventing fires in battery rooms; however, some of its elements (such as the value for the hydrogen accumulated limits, air flow sensors and alarms in the control room, and fire detection design features) are not included in this IEEE standard.

The staff notes that IEEE Std. 1635/American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) Guideline 21, "Guide for the Ventilation and Thermal Management of Batteries for Stationary Applications" (Ref. 16), provides helpful ventilation calculations that are associated with IEEE Std. 484.

IEEE Std 484-2019 discusses mounting arrangements that allow for inspection of battery cell plates. It is common practice to inspect battery cell plates for conditions that are known to result in degradation of battery performance, including excessive accumulation of lead sulfate, growth of the positive plates against the container, and evidence of excessive cell plate corrosion.

Consideration of International Standards

The International Atomic Energy Agency (IAEA) works with member states and other partners to promote the safe, secure, and peaceful use of nuclear technologies. The IAEA develops Safety Requirements and Safety Guides for protecting people and the environment from harmful effects of ionizing radiation. This system of safety fundamentals, safety requirements, safety guides, and other relevant reports, reflects an international perspective on what constitutes a high level of safety. To inform its development of this RG, the NRC considered IAEA Safety Requirements and Safety Guides pursuant to the Commission's International Policy Statement (Ref. 17) and Management Directive and Handbook 6.6, "Regulatory Guides" (Ref. 18). The following IAEA Safety Requirements and Guides were considered in the update of the RG:

- IAEA Safety Guide NS-G-1.8, "Design of Emergency Power Systems for Nuclear Power Plants," issued 2004 (Ref. 19)

- IAEA Safety Standards Series No. SSG-34, "Design of Electrical Power Systems for Nuclear Power Plants," issued 2016 (Ref. 20)

Although the NRC has an interest in facilitating the harmonization of standards used domestically and internationally, the agency does not specifically endorse the IAEA documents listed above and is only acknowledging that such documents may be a useful reference for general information.

Documents Discussed in Staff Regulatory Guidance

This RG endorses, in part, the use of one or more codes or standards developed by external organizations, and other third-party guidance documents. These codes, standards, and third-party guidance documents may contain references to other codes, standards, or third-party guidance documents ("secondary references"). If a secondary reference has itself been incorporated by reference into NRC regulations as a requirement, then licensees and applicants must comply with that standard as set forth in the regulation. If the secondary reference has been endorsed in a RG as an acceptable approach for meeting an NRC requirement, then the standard constitutes a method acceptable to the NRC staff for meeting that regulatory requirement as described in the specific RG. If the secondary reference has neither been incorporated by reference into NRC regulations nor endorsed in a RG, then the secondary reference is neither a legally-binding requirement nor a "generic" NRC approved acceptable approach for meeting an NRC requirement. However, licensees and applicants may consider and use the information in the secondary reference, if appropriately justified, consistent with current regulatory practice, and consistent with applicable NRC requirements.

C. STAFF REGULATORY GUIDANCE

The staff finds that IEEE Std. 484-2019 provides methods acceptable to the NRC staff for meeting the regulatory requirements for the installation design and installation of vented lead-acid storage batteries in production and utilization facilities with the following clarifications:

1. This RG does not endorse Section 2, "Normative References," of IEEE Std. 484-2019. The following RGs contain additional information on lead-acid batteries:

   RG 1.129, "Maintenance, Testing, and Replacement of Vented Lead-Acid Storage Batteries for Nuclear Power Plants and Utilization Facilities," which endorses IEEE Std. 450, with clarifications.

   RG 1.212, "Sizing of Large Lead-Acid Storage Batteries," which endorses IEEE Std. 485, with clarifications.

2. Replace Section 5.2, "Location," item (e), with the following:

   e) The battery should be protected against natural phenomena, such as earthquakes, winds, and flooding, as well as induced phenomena, such as fire, explosion, missiles, pipe whips, discharging fluids, CO2 discharge, and radiation. For nuclear power plants, the general requirement that the battery should be protected against earthquakes and fires should be supplemented with the applicable recommendations for battery rooms in RG 1.189 and RG 1.100.

3. Replace Section 5.2, "Location," item (j), with the following:

   j) Adequate area lighting should be provided. Reference NUREG-0800, Section 9.5.3, "Lighting Systems."

4. Supplement Section 5.2, "Location," with the following :

   m) For nuclear power plants' Class 1E batteries, where batteries are required in redundant systems, the batteries should be separated as specified by RG 1.75 and as recommended for battery rooms in RG 1.189.

5. Replace Section 5.3, "Mounting," item (c), with the following:

   c) Units in clear containers with flat plates should be mounted so that one edge of each plate is plainly visible for inspection and so that the electrolyte withdrawal tubes, or vent plugs are easily accessible. Battery cells should be arranged on racks to provide for the ability for cell plates to be inspected.

6. Supplement Section 5.4, "Seismic," with the following:

   d) For nuclear power plants' Class 1E batteries, the racks, anchors, and installation thereof should be able to withstand the force calculated for a safe shutdown earthquake to allow continuous battery service during and following the event in accordance with RG 1.100.

7. Replace Section 5.5, “Ventilation,” with the following:

> The battery area should be ventilated, either by a natural or mechanical ventilation system, to help prevent dangerous concentrations of hydrogen. Battery room ventilation systems should be capable of maintaining the hydrogen concentration well below 2 percent, by volume and should be separated from each other and from other areas of the plant by barriers having a minimum fire rating of 3 hours inclusive of all penetrations and openings, as recommended in RG 1.189. The NRC staff reviewed IEEE Std. 1635/ASHRAE Guideline 21 and found that the guide contained additional technical information and criteria useful for ventilation and thermal management of batteries for stationary applications.

This revision of RG 1.128 does not endorse IEEE Std. 1635/ASHRAE Guideline 21.

8. Supplement Section 5.6, “Instrumentations and Alarms,” with the following:

> e) Ventilation flow sensor(s) and alarm(s) in the control room.
> f) Fire detection sensor(s), instrumentation, and alarm(s) in the control room and locally, as recommended by RG 1.189.

9. Supplement Section 6.4.1, “Freshening charge sequence,” item b, with the following:

> Consistent with RG 1.129, where reference is made to the pilot cell, when using float current monitoring to indicate a fully charged condition, the pilot cell should be based on the lowest voltage cell(s) in the battery, and the frequency of specific gravity measurements should be reduced so as to not over-sample the cell(s). When using specific gravity measurements to indicate a fully charged condition, the pilot cell(s) should have an individual cell voltage (ICV) equal to the average of all ICVs of the battery to allow for rotating pilot cells annually so that no one cell is over-sampled.

10. In Section 6.4.1, “Freshening charge sequence,” items b and d, replace “pilot unit” with “pilot cell.” A pilot cell is defined as “A cell chosen to represent the operating parameters of the entire battery or a subset of the battery. NOTE— Multiple pilot cells may be used.”

11. Supplement Section 6.4.2, “Data collection,” with the following, as data to be recorded after the freshening charge:

> e) A hydrogen survey should be performed to verify that the design criteria required by Section 5.5, ‘Ventilation,’ are met (see Section 7.1, “General”).

12. Replace Section 6.4.4, “Acceptance test,” with the following:

> Upon initial installation, the battery’s capability should be demonstrated by completing a service test or modified performance test in accordance with RG 1.129. If factory tests did not include capacity tests, the battery’s capacity should also be demonstrated by completing a performance test or modified performance test in accordance with RG 1.129.

13. Supplement Section 7.1, “General,” with the following:

> - Initial hydrogen survey data

14. Supplement IEEE Std. 484-2019 by adding section 8.0, as follows:

> 8.0 Quality Assurance Program
>
> Nuclear power plants, where the battery performs a Class 1E function, shall have a quality assurance program that meets the requirement of 10 CFR Part 50, Appendix B., to control and document all activities related to such functions.

D. IMPLEMENTATION

The NRC staff may use this regulatory guide (RG) as a reference in its regulatory processes, such as licensing, inspection, or enforcement. However, the NRC staff does not intend to use the guidance in this RG to support NRC staff actions in a manner that would constitute backfitting as that term is defined in 10 CFR 50.109, "Backfitting," and as described in NRC Management Directive 8.4, "Management of Backfitting, Forward Fitting, Issue Finality, and Information Requests" (Ref. 21), nor does the NRC staff intend to use the guidance to affect the issue finality of an approval under 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants." The staff also does not intend to use the guidance to support NRC staff actions in a manner that constitutes forward fitting as that term is defined and described in Management Directive 8.4. If a licensee believes that the NRC is using this RG in a manner inconsistent with the discussion in this Implementation section, then the licensee may file a backfitting or forward fitting appeal with the NRC in accordance with the process in Management Directive 8.4.

REFERENCES [1]

The References section applies to versions of the documents available at the time of this RG's issuance. Licensees or applicants using this RG should check all referenced documents to ensure no change has occurred since issuance of the RG.

1. Institute of Electrical and Electronics Engineers (IEEE) Standard 484-2019, "IEEE Recommended Practice for Installation Design and Installation of Vented Lead-Acid Batteries for Stationary Applications," Piscataway, New Jersey, November 2019.[2]

2. *U.S. Code of Federal Regulations* (CFR), "Domestic Licensing of Production and Utilization Facilities," Part 50, Chapter I, Title 10, "Energy."

3. CFR, "Licenses, Certifications, and Approvals for Nuclear Power Plants," Part 52, Chapter I, Title 10, "Energy."

4. U.S. Nuclear Regulatory Commission (NRC), NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition" Washington, DC.

5. NRC, Regulatory Guide (RG) 1.75, "Criteria for Independence of Electrical Safety Systems," Washington, DC.

6. NRC, RG 1.100, "Seismic Qualification of Electrical and Active Mechanical Equipment and Functional Qualification of Active Mechanical Equipment for Nuclear Power Plants," Washington, DC.

7. NRC, RG 1.129, "Maintenance, Testing, and Replacement of Vented Lead-Acid Storage Batteries for Production and Utilization Facilities," Washington, DC.

8. NRC, RG 1.158, "Qualification of Safety-Related Vented Lead-Acid Storage Batteries for Nuclear Power Plants," Washington, DC.

9. NRC, RG 1.189, "Fire Protection for Nuclear Power Plants," Washington, DC.

10. NRC, RG 1.212, "Sizing of Large Lead-Acid Storage Batteries," Washington, DC.

11. NRC, NUREG-1537, "Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors," Washington, DC, February 1996.

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1 Publicly available NRC published documents are available electronically through the NRC Library on the NRC's public website at http://www.nrc.gov/reading-rm/doc-collections/ and through the NRC's Agencywide Documents Access and Management System (ADAMS) at http://www.nrc.gov/reading-rm/adams.html. For problems with ADAMS, contact the Public Document Room staff at 301-415-4737 or (800) 397-4209, or email PDR.resource@nrc.gov. The NRC Public Document Room (PDR), where you may also examine and order copies of publicly available documents, is open by appointment. To make an appointment to visit the PDR, please send an email to PDR.Resource@nrc.gov or call 1-800-397-4209 or 301-415-4737, between 8 a.m. and 4 p.m. eastern time (ET), Monday through Friday, except Federal holidays.

2 Copies of Institute of Electrical and Electronics Engineers (IEEE) documents may be purchased from the Institute of Electrical and Electronics Engineers Service Center, 445 Hoes Lane, P.O. Box 1331, Piscataway, New Jersey 08855 or through the IEEE's public website at http://www.ieee.org/publications_standards/index.html.

12. NRC, Final Interim Staff Guidance Augmenting NUREG-1537, "Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors," Part 1 and Part 2, Washington, DC, October 2012.

13. NRC, "Endorsement of Appendix A to Oak Ridge National Laboratory Report, 'Proposed Guidance for Preparing and Reviewing a Molten Salt Non-Power Reactor Application,' as Guidance for Preparing Applications for the Licensing of Non-Power Liquid Fueled Molten Salt Reactors," Washington, DC, November 2020 (ADAMS Accession No. ML20251A008).

14. Oak Ridge National Laboratory, ORNL/TM-2020/1478, "Proposed Guidance for Preparing and Reviewing a Molten Salt Non-Power Reactor Application," Oak Ridge, Tennessee, July 2020 (ML20219A771).

15. IEEE Std. 484-2002, "IEEE Recommended Practice for Installation Design and Installation of Vented Lead-Acid Batteries for Stationary Applications," Piscataway, New Jersey, February 2003.

16. IEEE Std. 1635/American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) Guideline 21, "Guide for the Ventilation and Thermal Management of Batteries for Stationary Applications," Piscataway, New Jersey.

17. NRC, "Nuclear Regulatory Commission International Policy Statement," *Federal Register*, Vol. 79, No. 132, pp. 39415–39418 (79 FR 39415), Washington, DC, July 10, 2014.

18. NRC, Management Directive (MD) 6.6, "Regulatory Guides," Washington, DC, July 2022.

19. International Atomic Energy Agency (IAEA) Safety Guide NS-G-1.8, "Design of Emergency Power Systems for Nuclear Power Plants," IAEA, Vienna, Austria, 2004.[3]

20. IAEA, Safety Standards Series No. SSG-34, "Design of Electrical Power Systems for Nuclear Power Plants," IAEA, Vienna, Austria, 2016.

21. NRC, MD 8.4, "Management of Backfitting, Forward Fitting, Issue Finality, and Information Requests," Washington, DC, September 2019.

3 Copies of International Atomic Energy Agency (IAEA) documents may be obtained through its website: WWW.IAEA.Org/ or by writing the International Atomic Energy Agency, P.O. Box 100 Wagramer Strasse 5, A-1400 Vienna, Austria.