U.S. NUCLEAR REGULATORY COMMISSION

REGULATORY GUIDE 1.220, Revision 0

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ACCEPTABILITY OF ASME OM-2 CODE, *COMPONENT TESTING REQUIREMENTS AT NUCLEAR 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) for the development and implementation of an Inservice Testing (IST) Program for nuclear facilities not subject to the requirements in 10 CFR 50.55a(f). It endorses, with a regulatory position, the American Society of Mechanical Engineers (ASME) Operation and Maintenance OM-2 Code, *Component Testing Requirements at Nuclear Facilities,* 2024 Edition (Ref. 1). With the application of the regulatory position included in this RG, the NRC staff has determined that the ASME OM-2 Code describes an acceptable method that nuclear reactor applicants can use to incorporate their IST Programs into a licensing basis.

Applicability

This RG applies to applicants for and holders of operating licenses (OLs) and combined construction and operating licenses (COLs) 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), but not subject to the requirements in 10 CFR 50.55a(f).

Applicable Regulations

- 10 CFR Part 50 provides regulations for licensing production and utilization facilities.
    - 10 CFR 50.34(b)(6)(iii) requires an application for an OL to include, in the final safety analysis report, plans for preoperational testing and initial operations.
    - 10 CFR 50.34(b)(6)(iv) requires an application for an OL to include, in the final safety analysis report, plans for conducting normal operations, including maintenance, surveillance, and periodic testing of structures, systems, and components (SSCs).

Written suggestions regarding this guide may be submitted through the NRC's public website in the NRC Library at https://www.nrc.gov/reading-rm/doc-collections/reg-guides/index.html, under Document Collections, in Regulatory Guides, at https://www.nrc.gov/reading-rm/doc-collections/reg-guides/contactus.html, and will be considered in future updates and enhancements to the "Regulatory Guide" series. During the development process of new guides suggestions should be submitted within the comment period for immediate consideration. Suggestions received outside of the comment period will be considered if practical to do so or may be considered for future updates.

Electronic copies of this RG, previous versions of RGs, and other recently issued guides are also available through the NRC's public website 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 https://www.nrc.gov/reading-rm/adams.html, under ADAMS Accession Number (No.) ML25329A088. The regulatory analysis is associated with non-rulemaking and may be found in ADAMS under Accession No. ML25329A089.

- 10 CFR 50.90, "Application of amendment of license, construction permit, or early site permit," specifies requirements to obtain an amendment to the license, construction permit, or early site permit.

- 10 CFR Part 50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," establishes quality assurance (QA) requirements for the design, manufacture, construction, and operation of those SSCs that prevent or mitigate the consequences of postulated accidents that could cause undue risk to public health and safety.

- 10 CFR Part 50, Appendix A, "General Design Criteria for Nuclear Power Plants," contains the General Design Criteria (GDC) that establish the minimum requirements for the principal design criteria for water-cooled nuclear power plants. Appendix A also states that the GDC are considered to be generally applicable to other types of nuclear power units and are intended to provide guidance in determining the principal design criteria (PDCs) for such other units.

    - 10 CFR Part 50, Appendix A, Criterion 1, "Quality Standards and Records," requires, in part, that SSCs important to safety be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety function to be performed. Where generally recognized codes and standards are used, Criterion 1 requires that they be identified and evaluated to determine their applicability, adequacy, and sufficiency and be supplemented or modified as necessary to assure a quality product in keeping with the required safety function.

- 10 CFR Part 52 governs the issuance of early site permits, standard design certifications, COLs, standard design approvals, and manufacturing licenses for nuclear power facilities, and references applicable requirements in 10 CFR Part 50.

    - 10 CFR 52.79(a)(28) requires an application for a COL to include, in the final safety analysis report, plans for preoperational testing and initial operations.

    - 10 CFR 52.79(a)(29)(i) requires an application for a COL to include, in the final safety analysis report, plans for conduct of normal operations, including maintenance, surveillance, and periodic testing of SSCs.

Related Guidance

- RG 1.232, "Guidance for Developing Principal Design Criteria for Non-Light-Water Reactors" (Ref. 4), describes the NRC's proposed guidance on how the GDC in 10 CFR Part 50, Appendix A, may be adapted for non-light-water reactor (non-LWR) designs.

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 the applicant provides sufficient basis and information for the NRC staff to verify that the alternative methods comply with the applicable NRC regulations.

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 by email to Infocollects.Resource@nrc.gov, and 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 Issuance

The NRC regulations require nuclear power plant applicants to develop and implement plans for testing of nuclear power plant components. As a result, the NRC staff must review the testing programs described by nuclear power plant applicants in support of NRC issuance of licenses for operation under 10 CFR Part 50 and Part 52. ASME issued the OM-2 Code in October 2024 with provisions for IST Programs to provide reasonable assurance of the operational readiness of applicable components in all types of nuclear facilities. The NRC staff understands that many nuclear power plant applicants are planning to propose the implementation of the ASME OM-2 Code as part of their IST Programs. If the NRC did not generically accept the ASME OM-2 Code in this RG, then each applicant would need to separately justify its use of the ASME OM-2 Code, and the NRC would need to review each justification. Therefore, the NRC is issuing this RG to provide a more efficient and effective application and review process for IST Programs during the licensing of nuclear facilities not subject to the requirements of 10 CFR 50.55a(f).

Background

The NRC regulations in 10 CFR 50.34(b)(6)(iii) and (iv) or 52.79(a)(28) and (a)(29)(i) require applicants for OLs or COLs, respectively, to include plans for conducting normal operations, including maintenance, surveillance, and periodic testing of SSCs. Further, all applicants for and holders of licenses under 10 CFR Parts 50 and 52 must establish principal design criteria for the facility.

The GDC in Appendix A to 10 CFR Part 50 establish minimum requirements for principal design criteria for water-cooled nuclear power plants similar in design and location to the plants for which construction permits have previously been issued by the Commission, and provide guidance to applicants for construction permits in establishing principal design criteria for other types of nuclear power units. RG 1.232 provides guidance for adapting the GDC in 10 CFR Part 50, Appendix A, to non-LWR designs. Appendix A to RG 1.232 contains the advanced reactor design criteria (ARDC). Criterion 1 of GDC and Criterion 1 of ARDC both state, in part, that SSCs important to safety are to be tested to quality standards commensurate with the importance of the safety functions to be performed.

ASME specifies provisions for IST Programs to assess the operational readiness of pumps, valves, and snubbers in water-cooled reactors in the ASME OM Code, which is incorporated by reference in 10 CFR 50.55a(f). However, ASME did not have a similar code for the implementation of IST Programs for components in non-water-cooled reactors. As a result, ASME established a working group to develop a new OM code for IST Programs based on lessons learned from the implementation of the ASME OM Code, reactor operating experience, design differences between water-cooled and non-water-cooled reactors, and consideration of the initial design and construction of nuclear power plants. The NRC staff participated in the ASME OM working group and as part of the ASME OM Code committee ballot process. In October 2024, ASME issued the OM-2 Code for the development and implementation of IST Programs for applicable components to perform specified functions at all types of nuclear facilities, regardless of the design of the components.

The NRC staff is issuing this RG to provide guidance for an acceptable method for developing and implementing an IST Program to assess the operational readiness of pumps, valves, and snubbers (or devices that perform similar functions) in all types of nuclear facilities not subject to the requirements of 10 CFR 50.55a(f). This RG endorses, with a regulatory position, the ASME OM-2-2024 Code for use by applicants for OLs and COLs for all types of nuclear facilities not subject to the requirements of 10 CFR 50.55a(f) and subsequent licensees of those reactors.

Discussion of NRC Staff Regulatory Guidance Positions

The ASME OM-2-2024 Code provides guidance for applicants (and subsequent licensees) to develop and implement their IST Programs at all types of nuclear facilities not subject to the requirements of 10 CFR 50.55a(f). The ASME OM-2-2024 Code allows the application of risk insights in establishing the scope and activities of the IST Program. The ASME OM-2-2024 Code specifies the qualification of applicable components within the scope of the IST Program to be used, and the determination of whether modification, repair, maintenance, or performance experience of a component results in the need for its re-qualification. The ASME OM-2-2024 Code allows condition monitoring of pumps and valves within the scope of the IST Program. The ASME OM-2-2024 Code includes diagnostic testing of power-operated valves (POVs) to assess their operational readiness to perform the applicable safety functions over the established test interval.

As part of a proposed IST Program to be submitted for NRC review and approval for a nuclear facility not subject to 10 CFR 50.55a(f) under 10 CFR 50.34(b) or 10 CFR 52.79(a), the NRC endorses the application of the ASME OM-2-2024 Code in developing and implementing an IST Program (which includes preservice testing) to assess the operational readiness of pumps, valves, and snubbers (or other devices with similar functions) for all types of nuclear facilities not subject to the requirements of 10 CFR 50.55a(f).

Regulatory Position 1 in Section C of this RG specifies that an applicant for an OL or a COL using this RG should propose a license condition to implement the IST Program for the applicable components (such as pumps, valves, and dynamic restraints). The license conditions should be similar to the following with any appropriate modifications:

> [LICENSEE] must implement and maintain in effect all provisions of the Inservice Testing (IST) Program that satisfy the requirements of ASME OM-2-2024 Code, as endorsed in Regulatory Guide (RG) 1.220, Revision 0, "Acceptability of ASME OM-2 Code, *Component Testing Requirements at Nuclear Facilities*." Any departure from the IST Program, as accepted by the NRC for implementing the ASME OM-2-2024 Code as accepted in RG 1.220 for [PLANT NAME], must be submitted to the NRC for review and approval in accordance with 10 CFR 50.90, "Application of amendment of license, construction permit, or early site permit."

This license condition is necessary for a regulatory basis to ensure that the IST Program for a nuclear facility not subject to 10 CFR 50.55a(f) will be implemented to provide operational readiness of the applicable components within the scope of the IST Program throughout the life of the nuclear power plant. The license condition will support the NRC staff's finding that 10 CFR 50.34(b)(6)(iii) and (iv) or 52.79(a)(28) and (a)(29)(i), as applicable, are met when licensing a nuclear facility not subject to 10 CFR 50.55a(f).

The NRC staff will review the proposed IST Program, prior to implementation, as part of the OL or COL licensing review or in response to requests under 10 CFR 50.90.

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 has considered IAEA Safety Requirements and Safety Guides pursuant to the Commission's International Policy Statement (Ref. 5) and Management Directive 6.6, "Regulatory Guides" (Ref. 6).

The following IAEA Safety Guide was considered in the development of this RG:

- IAEA Safety Guide NS-G-2.6, "Maintenance, Surveillance and In-service Inspection in Nuclear Power Plants," issued 2002 (Ref. 7).

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 an 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 an 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

As part of an application for an OL or a COL for a nuclear facility not subject to the requirements of 10 CFR 50.55a(f), the NRC endorses the use of the ASME OM-2-2024 Code in developing and implementing an IST Program (which includes preservice testing) to assess the operational readiness of pumps, valves, and snubbers (or other devices with similar functions) for nuclear facilities not subject to the requirements of 10 CFR 50.55a(f), subject to the following regulatory position:

1. An applicant for an OL or a COL for a nuclear facility not subject to 10 CFR 50.55a(f) that requests the use of the ASME OM-2-2024 Code to develop and implement an IST Program should propose a license condition as follows:

   [LICENSEE] must implement and maintain in effect all provisions of the Inservice Testing (IST) Program that satisfy the requirements of ASME OM-2-2024 Code, as endorsed in Regulatory Guide (RG) 1.220, Revision 0, "Acceptability of ASME OM-2 Code, *Component Testing Requirements at Nuclear Facilities*." Any departure from the IST Program, as accepted by the NRC for implementing the ASME OM-2-2024 Code as accepted in RG 1.220 for [PLANT NAME], must be submitted to the NRC for review and approval in accordance with 10 CFR 50.90, "Application of amendment of license, construction permit, or early site permit."

D. IMPLEMENTATION

Licensees generally are not required to comply with the guidance in this regulatory guide. If the NRC proposes to use this regulatory guide in an action 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. 8); affect the issue finality of an approval issued under 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants"; or constitute forward fitting, as that term is defined in Management Directive 8.4, then the NRC staff will apply the applicable policy in Management Directive 8.4 to justify the action. If a licensee believes that the NRC is using this regulatory guide in a manner inconsistent with the discussion in this Implementation section, then the licensee may inform the NRC staff in accordance with Management Directive 8.4.

REFERENCES [1]

1. American Society of Mechanical Engineers (ASME), OM-2 Code, *Component Testing Requirements at Nuclear Facilities*, Revision 0, New York, NY, 2024. [2]

2. *U.S. Code of Federal Regulations* (CFR), "Domestic Licensing of Production and Utilization Facilities," Part 50, Chapter 1, Title 10, "Energy."

3. CFR, "Licenses, Certifications, and Approvals for Nuclear Power Plants," Part 52, Chapter 1, Title 10, "Energy."

4. U.S. Nuclear Regulatory Commission (NRC), Regulatory Guide (RG) 1.232, "Guidance for Developing Principal Design Criteria for Non-Light-Water Reactors," Revision 0, April 2018, Washington, DC.

5. NRC, "Nuclear Regulatory Commission International Policy Statement," *Federal Register*, Vol. 79, No. 132, July 10, 2014, pp. 39415-39418.

6. NRC, Management Directive (MD) 6.6, "Regulatory Guides," July 19, 2022, Washington, DC (ML22010A233).

7. International Atomic Energy Agency, Safety Guide NS-G-2.6, "Maintenance, Surveillance and In-service Inspection in Nuclear Power Plants," Vienna, Austria, 2002.[3]

8. NRC, MD 8.4, "Management of Backfitting, Forward Fitting, Issue Finality, and Information Requests," September 20, 2019, Washington, DC (ML18093B087).

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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 American Society of Mechanical Engineers (ASME) standards may be purchased from ASME, Two Park Avenue, New York, NY 10016-5990; telephone (800) 843-2763. Purchase information is available through the ASME Web-based store at http://www.asme.org/Codes/Publications/.

[3] Copies of International Atomic Energy Agency (IAEA) documents may be obtained through its Web site: www.iaea.org or by writing the International Atomic Energy Agency, P.O. Box 100, Wagramer Strasse 5, A-1400 Vienna, Austria.