

REGULATORY ANALYSIS

DRAFT REGULATORY GUIDE DG-1323 COMPREHENSIVE VIBRATION ASSESSMENT PROGRAM FOR REACTOR INTERNALS DURING PREOPERATIONAL AND STARTUP TESTING

(Proposed Revision 4 of Regulatory Guide 1.20, dated February 2015)

Purpose

The purpose of Revision 4 of the regulatory guide (RG) is to incorporate lessons learned from recent reviews of new reactor and extended power uprate (EPU) applications related to reactor internals flow-induced vibration analysis and testing. This update also expands the reactor design to include small modular reactors (SMRs). Specifically, RG 1.20 requires revision to expand the guidance related to flow-induced vibration, acoustic resonance, acoustic-induced vibration, and mechanical-induced vibration for boiling water reactors, pressurized water reactors, and small modular reactors nuclear power plants. For SMRs, this includes guidance for the control rod drive system and mechanisms which might be contained in an integral reactor vessel module. In addition, the revision would re-define and clarify the prototype, limited prototype, and non-prototype classifications of reactor internal configurations. Finally, this update aligns the format and content of the guide with the current program guidance for RGs.

1. Statement of the Problem

The U.S. Nuclear Regulatory Commission (NRC) is considering revising RG 1.20 to incorporate lessons learned from recent reviews of new reactor and EPU applications related vibration analysis and testing of reactor internals.

The NRC published Revision 3 of RG 1.20, in March 2007 to provide licensees and applicants with agency-approved guidance for complying with the General Design Criterion (GDC) 1, "Quality Standards and Records," as set forth in Appendix A, "General Design Criteria for Nuclear Power Plants," to Title 10, Part 50, of the *Code of Federal Regulations* (10 CFR Part 50), "Licensing of Production and Utilization Facilities," for designing and testing reactor internals to quality standards commensurate with the importance of the safety function to be performed.

Since 2007, the staff has reviewed several large light-water reactor designs and much has been learned. The current version of RG 1.20 (Revision 3) does not provide the lessons learned from recent application reviews, such as a specific list of provisions for the boiling water reactor steam dryer monitoring during initial power ascension and does not include guidance for small modular reactors.

2. Objective

The objective of this regulatory action is to update NRC guidance and provide applicants with a method to demonstrate compliance with the 10 CFR Part 50 requirements.

3. Alternative Approaches

The NRC staff considered the following alternative approaches:

1. Do not revise RG 1.20
2. Withdraw RG 1.20
3. Revise RG 1.20 to incorporate lessons learned from reviews and guidance on SMRs.

Alternative 1: Do Not Revise Regulatory Guide 1.20

Under this alternative, the NRC would not revise or issue additional guidance, and the current guidance would be retained. This alternative is considered the “no-action” alternative and provides a baseline condition from which any other alternatives will be assessed. If NRC does not take action, there would not be any changes in costs or benefit to the public, licensees or NRC. However, the “no-action” alternative would not share the NRC’s lessons learned from the recent application review with the public. The applicants and licensees would continue to submit the reactor internals comprehensive vibration assessment program without the benefits of the recent NRC insights, and might result in unnecessary request for additional information from the NRC and review delays. The applicants also would not have the NRC guidance on vibration analysis for small modular reactors.

Alternative 2: Withdraw Regulatory Guide 1.20

Under this alternative the NRC would withdraw this RG. It would eliminate the only readily available description of the methods the NRC staff considers acceptable for demonstrating compliance with 10 CFR Part 50. Although this alternative would be less costly than the proposed alternative, it would impede the public’s accessibility to the most current regulatory guidance and would not provide the public with guidance on SMRs.

Alternative 3: Revise Regulatory Guide 1.20

Under this alternative, the NRC would revise RG 1.20. This revision would incorporate the latest information and review practices. By doing so, the NRC would ensure that the RG guidance available in this area is current and accurately reflects the staff’s position.

The impact to the NRC would be the costs associated with preparing and issuing the RG revision. The impact to the public would be the voluntary costs associated with reviewing and providing comments to the NRC during the public comment period. The value to NRC staff and its applicants would be the benefits associated with enhanced efficiency and effectiveness in using a common guidance document as the technical basis for license applications and other interactions between the NRC and its regulated entities including SMRs for which this guidance would not otherwise be available.

Conclusion

Based on this regulatory analysis, the NRC staff concludes that revision of RG 1.20 is warranted. The action will enhance the assurance of reactor safety by ensuring that appropriate guidance is available for all categories of licensees. It could also lead to cost savings for the industry, especially with regard to support of new, near term reactor licensing activities.