Periodic Review for Several Digital I&C Regulatory Guides (RGs)

Office/Division/Branch: **NRR/DEX/EICB**
RES/DE/ICEEB

Technical Leads: **William Roggenbrodt**
Derek Halverson

Staff Action Decided: **Reviewed with issues identified for future consideration**

This periodic review applies to the following regulatory guides:

Regulatory Guide	Title
RG 1.169 Revision 1	Configuration Management Plans for Digital Computer Software Used in Safety Systems of Nuclear Power Plants
RG 1.170 Revision 1	Test Documentation for Digital Computer Software Used in Safety Systems of Nuclear Power Plants
RG 1.171 Revision 1	Software Unit Testing for Digital Computer Software Used in Safety Systems of Nuclear Power Plants
RG 1.172 Revision 1	Software Requirement Specifications for Digital Computer Software and Complex Electronics Used in Safety Systems of Nuclear Power Plants
RG 1.173 Revision 1	Developing Software Life Cycle Processes for Digital Computer Software Used in Safety Systems of Nuclear Power Plants

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

These RGs were developed to address different attributes of the software development lifecycle for digital instrumentation and controls (DI&C) systems, and were last revised together in 2013. Two other RGs included in the DI&C RG suite are RG 1.152, "Criteria for Use of Computers in Safety Systems of Nuclear Power Plants" and RG 1.168 "Verification, Validation, Reviews, and Audits for Digital Computer Software Used in Safety Systems of Nuclear Power Plants". RG 1.152, Revision 4, "Criteria for Programmable Digital Devices in Safety-Related Systems of Nuclear Power Plants," recently underwent a revision in July 2023 and RG 1.168, Revision 2, "Verification, Validation, Reviews, and Audits for Digital Computer Software Used in Safety Systems of Nuclear Power Plants," is currently under revision as part of a separate effort.

A feasibility study to explore consolidating RGs 1.169 through 1.173 found that the idea may have merit. For example, it could harmonize positions on Institute of Electrical and Electronics Engineers Standards (IEEE Stds.) discussed in all six regulatory guides (RGs 1.168 through 1.173), reduce duplication of information, and generally aid the public by reducing the number of regulatory guides in this technical area.

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

As licensees' facilities and plants continue to age, their use of analog or more dated DI&C

systems continue to face multiple issues including obsolescence, reliability, and increased costs (when compared to more modern DI&C systems). One perceived obstacle by stakeholders to upgrade their older systems to DI&C systems is the supposed complexity of the Nuclear Regulatory Commission's (NRC's) regulatory guidance and potential regulatory uncertainty.

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 staff identified no technical issues during its review with the current revisions and a revision is not planned at this time. The staff will continue to investigate the feasibility of potentially consolidating these RGs.

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)?

The staff identified no technical issues during its review with the current revisions but recommends staff continue to investigate the potential for consolidation for future consideration.

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

The staff identified no issues warranting a revision at this time.

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