

Regulatory Guide Periodic Review

Regulatory Guide Number: 1.153, Revision 1

Title: Criteria for Safety Systems

Office/division/branch: RES/DE/ICEEB
Technical Lead: Paul Rebstock

Staff Action Decided: Reviewed with issues identified for future consideration

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

Revision 1 of RG 1.153 endorses IEEE Std. 603-1991, "Criteria for Safety Systems for Nuclear Power Generating Stations" (including the correction sheet dated January 30, 1995), as a method acceptable for satisfying the Commission's regulations with respect to the design, reliability, qualification, and testability of the power, instrumentation, and control portions of the safety systems of nuclear power plants. The guide is effectively endorsing that which is covered by 10 CFR 50.55a(h)(2), "Protection systems," and 10 CFR 50.55a(h)(3), "Safety systems."

The IEEE has revised the above referenced standard, most recently in 2009. The 2009 version is not addressed in 10 CFR 50.55a(h). The revised IEEE standard does the following:

- addresses potential safety issues that might arise from incorporating components that use advanced technologies in safety systems;
- provides additional and updated references and exclude references that are no longer in effect;
- provides guidance to address electromagnetic compatibility issues;
- adds new criteria for common cause failure;
- classifies requirements for equipment not credited to perform a safety function but connected to safety-related equipment;
- removes the requirement in section 6.7, "Maintenance bypass," for conforming to IEEE Std 603-2009 section 5.1, "Single failure," and section 6.3, "Interaction between the sense and command features and other systems;" and
- requires electrical isolation and digital communication independence between safety systems and non-safety systems.

The staff proposed changes to 10 CFR 50.55a(h) to endorse the revised standard. The Commission disapproved staff's proposed rule on February 25, 2016 in Staff Requirements Memorandum SECY-15-0106 (ADAMS Accession No. ML16056A614). The SECY directed the staff to: "...develop an integrated strategy to modernize the

NRC's digital instrumentation and control (I&C) regulatory infrastructure..." In developing the plan the staff are to meet with the relevant IEEE standards setting committee, digital I&C vendors, licensees, and any other external stakeholders to reach a common understanding of the digital I&C regulatory challenges, priorities, and potential solutions to address them. Revision 1 of RG 1.153 remains acceptable for use pending revision of the associated aspects of the Code of Federal Regulations.

- 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?**

The RG is consistent with the present rule, and should not be changed until and unless the rule is changed.

- 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?**

If 10 CFR 50.55a(h) is revised then RG 1.153 would be needed to provide the implementing guidance. The level of effort for RG revision is estimated to be 0.2 FTE.

- 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)?**

Reviewed with issues identified for future consideration.

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

After developing an integrated strategy to modernize the NRC's digital instrumentation and control (I&C) regulatory infrastructure the plan, the staff will present to the Commission any policy issues that require Commission consideration, especially when there is significant disagreement on an optimal approach.

References

NRC Commission Staff Requirements Memorandum to SECY-15-0106 – Proposed Rule: Incorporation by Reference of Institute of Electrical And Electronics Engineers Standard 603-2009, "IEEE Standard Criteria For Safety Systems For Nuclear Power Generating Stations" (ADAMS Accession No. ML16056A614)

NOTE: This review was conducted in March 2017 and reflects the staff's plans as of that date. These plans are tentative and are subject to change.