



This document is scheduled to be published in the Federal Register on 08/02/2013 and available online at <http://federalregister.gov/a/2013-18682>, and on FDsys.gov

[7590-01-P]

NUCLEAR REGULATORY COMMISSION

[NRC-2012-0195]

Software Unit Testing for Digital Computer Software Used in Safety Systems of Nuclear Power Plants

AGENCY: Nuclear Regulatory Commission.

ACTION: Revision to Regulatory Guide; Issuance.

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC) is issuing a revised regulatory guide (RG), revision 1 of RG 1.171, "Software Unit Testing for Digital Computer Software Used in Safety Systems of Nuclear Power Plants." This RG endorses American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE) Standard (Std.) 1008-1987, "IEEE Standard for Software Unit Testing" with the clarifications and exceptions stated in Section C, "Staff Regulatory Position" in the RG. ANSI/IEEE Std. 1008-1987, which was reaffirmed in 2002, describes a method acceptable to the NRC staff for complying with NRC regulations for promoting high functional reliability and design quality in the software used in safety systems of nuclear power plants.

ADDRESSES: Please refer to Docket ID **NRC-2012-0195** when contacting the NRC about the availability of information regarding this document. You may access information related to this document, which the NRC possesses and is publicly available, using the following methods:

- **Federal Rulemaking Web site:** Go to <http://www.regulations.gov> and search for Docket ID **NRC-2012-0195**. Address questions about NRC dockets to Carol Gallagher; telephone: 301-287-3422; e-mail: Carol.Gallagher@nrc.gov.

- **NRC's Agencywide Documents Access and Management System (ADAMS):** You may access publicly available documents online in the NRC Library at <http://www.nrc.gov/reading-rm/adams.html>. To begin the search, select "[ADAMS Public Documents](#)" and then select "[Begin Web-based ADAMS Search](#)." For problems with ADAMS, please contact the NRC's Public Document Room (PDR) reference staff at 1-800-397-4209, 301-415-4737, or by e-mail to pdr.resource@nrc.gov. The ADAMS accession number for each document referenced in this notice (if that document is available in ADAMS) is provided the first time that a document is referenced. Revision 1 of RG 1.171 is available in ADAMS under Accession No. ML13004A375. The regulatory analysis may be found in ADAMS under Accession No. ML103120752.

- **NRC's PDR:** You may examine for free or purchase copies of public documents at the NRC's PDR, Room O1-F21, One White Flint North, 11555 Rockville Pike, Rockville, Maryland 20852.

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SUPPLEMENTARY INFORMATION:

I. Introduction

The NRC is issuing a revision to an existing RG in the NRC's "Regulatory Guide" series. This series was developed to describe and make available to the public information such as methods that are acceptable to the NRC staff for implementing specific parts of the NRC's regulations, techniques that the staff uses in evaluating specific problems or postulated accidents, and data that the staff needs in its review of applications for permits and licenses.

II. Further Information

Revision 1 of RG 1.171 was issued with a temporary identification as Draft Regulatory Guide, DG-1208 on August 22, 2012 (77 FR 50722) for a 60-day public comment period. The public comment period closed on November 23, 2012. Multiple public comments were received and addressed by the NRC staff. These comments and the NRC staff responses are available in ADAMS under Accession number ML13004A370.

Revision 1 of RG 1.171 endorses ANSI/IEEE Std. 1008-1987, "IEEE Standard for Software Unit Testing" with the exceptions stated in Section C, "Staff Regulatory Position" in the RG. ANSI/IEEE Std. 1008-1987, which was reaffirmed in 2002, describes a method acceptable to the NRC staff for complying with NRC regulations for promoting high functional reliability and design quality in the software used in safety systems. In particular, the method is consistent with the previously cited GDC in Appendix A to part 50 of Title 10, of the *Code of Federal Regulations* (10 CFR), "Domestic Licensing of Production and Utilization Facilities" and the criteria for quality assurance programs in Appendix B to 10 CFR part 50 as they apply to software unit testing. The criteria in Appendices A and B of 10 CFR part 50 apply to systems and related quality assurance processes, and the requirements extend to the software elements if those systems include software.

This RG is one of six RG revisions addressing computer software development and use in safety related systems of nuclear power plants. These RGs were developed by the Office of Nuclear Regulatory Research, Division of Engineering (RES/DE) with the assistance of multiple individuals in the Office of New Reactors, Division of Engineering (NRO/DE); Office Nuclear Reactor Regulation, Division of Engineering (NRR/DE); and the Office of Nuclear Security and Incident Response, Division of Security Policy (NSIR/DSP). The six interrelated guides are:

1. Revision 2 of RG 1.168, "Verification, Validation, Reviews, and Audits for Digital Computer Software used in Safety Systems of Nuclear Power Plants," issued for public comment as DG-1267. The package for Rev. 2 of RG 1.168 is in ADAMS at Accession No. ML12236A132.
2. Revision 1 of RG 1.169, "Configuration Management Plans for Digital Computer Software used in Safety Systems of Nuclear Power Plants," issued for public comment as DG-1206. The package for Rev. 1 of RG 1.169 is in ADAMS at Accession No. ML12354A524.
3. Revision 1 of RG 1.170, "Test Documentation for Digital Computer Software used in Safety Systems of Nuclear Power Plants," issued for public comment as DG-1207. The package for Rev. 1 of RG 1.170 is in ADAMS at Accession No. ML12354A531.
4. Revision 1 of RG 1.171, "Software Unit Testing for Digital Computer Software Used in Safety Systems of Nuclear Power Plants," issued for public comment as DG-1208. The package for Rev. 1 of RG 1.171 is in ADAMS at Accession No. ML12354A534.
5. Revision 1 of RG 1.172, "Software Requirements Specifications for Digital Computer Software used in Safety Systems of Nuclear Power Plants," issued for public comment as DG-1209. The package for Rev. 1 of RG 1.172 is in ADAMS at Accession No. ML12354A538.

6. Revision 1 of RG 1.173, “Developing Software Life Cycle Processes for Digital Computer Software used in Safety Systems of Nuclear Power Plants,” issued for public comment as DG-1210. The package for Rev. 1 of RG 1.173 is in ADAMS at Accession No. ML13008A338.

III. Backfitting and Issue Finality

Issuance of this final RG does not constitute backfitting as defined in 10 CFR 50.109 (the Backfit Rule) and is not otherwise inconsistent with the issue finality provisions in 10 CFR part 52. As discussed in the “Implementation” section of this RG, the NRC has no current intention to impose this RG on holders of current operating licenses, early site permits or combined licenses, unless this final RG is part of the licensing basis for the facility. The NRC may apply this RG to applications for operating licenses, early site permits and combined licenses docketed by the NRC as of the date of issuance of the final RG, as well as to future applications for operating licenses, early site permits and combined licenses submitted after the issuance of the RG. Such action does not constitute backfitting as defined in 10 CFR 50.109(a)(1) and is not otherwise inconsistent with the applicable issue finality provision in 10 CFR part 52, inasmuch as such applicants or potential applicants are not within the scope of entities protected by the Backfit Rule or the relevant issue finality provisions in part 52.

Congressional Review Act

This RG is a rule as designated in the Congressional Review Act (5 U.S.C. 801-808). However, the Office of Management and Budget (OMB) has not found it to be a major rule as designated in the Congressional Review Act.

Dated at Rockville, Maryland, this 19th day of July, 2013.

For the Nuclear Regulatory Commission.

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[FR Doc. 2013-18682 Filed 08/01/2013 at 8:45 am; Publication Date: 08/02/2013]