

NOTE:

The availability of this preliminary draft proposed rule language is intended to support the public meeting to be held by the U.S. Nuclear Regulatory Commission (NRC) on August 4, 2015.

The meeting will focus on the significant provisions of the preliminary draft proposed rule language so that interested stakeholders and members of the public are aware of the staff's current views on the technical issues which the staff is currently considering with respect to this rulemaking, as reflected in the preliminary draft proposed rule language. There will be an opportunity for informal questions and answers about the preliminary rule language and the staff's presentation. **The meeting is not intended to be an opportunity for submission of formal comments on the preliminary draft proposed rule, and the NRC will not be providing formal responses on any informal comments received during or following the public meeting.**

Following the meeting, the NRC staff intends to seek Commission approval to publish a proposed rule on Institute of Electrical and Electronics Engineers Standard (IEEE Std) 603-2009 in the *Federal Register*. If the Commission approves the publication of the proposed rule, then the *Federal Register* notice of proposed rulemaking will provide an opportunity for the public to submit formal comments. The NRC will provide formal comment responses to timely-filed comments on the proposed rule.

1 **§ 50.55a Codes and standards.**

2 (a) * * *

3 (2) * * *

4 (iii) *IEEE standard 603-1991*. (IEEE Std 603-1991), "Standard Criteria for Safety
5 Systems for Nuclear Power Generating Stations" (Approval Date: June 27, 1991), referenced in
6 paragraph (h)(2) of this section. All other standards that are referenced in IEEE Std 603-1991
7 are not approved for incorporation by reference.

8 (iv) *IEEE standard 603-1991, correction sheet*. (IEEE Std 603-1991 correction sheet),
9 "Standard Criteria for Safety Systems for Nuclear Power Generating Stations, Correction Sheet,
10 Issued January 30, 1995, " referenced in paragraph (h)(2) of this section. (This correction sheet
11 is available from IEEE at <http://standards.ieee.org/findstds/errata/>.)

12 (v) *IEEE standard 603-2009*. (IEEE Std 603-2009), "IEEE Standard Criteria for Safety
13 Systems for Nuclear Power Generating Stations" (Approval Date: November 5, 2009),
14 referenced in paragraphs (h)(2) and (3) of this section. All other standards that are referenced
15 in IEEE Std 603-2009 are not approved for incorporation by reference.

16 (vi) *IEEE standard 603-2009, correction sheet*. (IEEE Std 603-2009 correction sheet),
17 "Errata to IEEE Standard Criteria for Safety Systems for Nuclear Power Generating Stations"
18 (Issued: March 10, 2015), referenced in paragraphs (h)(2) and (3) of this section.

19 * * * * *

20 (h) *Protection and safety systems*. Protection systems and safety systems of nuclear
21 power plants must meet the requirements in this paragraph.

22 (1) *Definitions*. As used in paragraph (h) of this section,
23 *Current reactors* means nuclear power plants whose construction permits were issued
24 before May 13, 1999.

25 *New reactors* means design certifications; standard design approvals; manufacturing
26 licenses; and combined licenses not referencing a design certification, standard design

1 approval, or manufacturing license under 10 CFR part 52 issued on or after the effective date of
2 the final rule; construction permits and operating licenses under 10 CFR part 50 issued on or
3 after the effective date of the final rule, except for an applicant for an operating license who
4 received a construction permit for that facility before the effective date of the final rule; and
5 holders of combined licenses issued under 10 CFR part 52 before the effective date of the final
6 rule, but only if the combined license holder voluntarily modifies its data communication
7 independence strategy.

8 (2)(i) *Nuclear power plant construction permits issued before January 1, 1971.* The
9 protection system of a nuclear power plant whose construction permit was issued before
10 January 1, 1971, must be either consistent with the plant's licensing basis; or meet the
11 requirements in IEEE Std 603-1991, "IEEE Standard Criteria for Safety Systems for Nuclear
12 Power Generating Stations," and the correction sheet dated January 30, 1995, "IEEE Standard
13 Criteria for Safety Systems for Nuclear Power Generating Stations Correction Sheet Issued
14 January 30, 1995."

15 (ii) *Nuclear power plant construction permits issued after January 1, 1971, but before*
16 *May 13, 1999.* The protection system of a nuclear power plant whose construction permit was
17 issued after January 1, 1971, but before May 13, 1999, must meet the requirements in
18 IEEE Std 279-1968, "Proposed IEEE Criteria for Nuclear Power Plant Protection Systems," or
19 the requirements in IEEE Std 279-1971, "IEEE Standard: Criteria for Protection Systems for
20 Nuclear Power Generating Stations," or the requirements in IEEE Std 603-1991, "Standard
21 Criteria for Safety Systems for Nuclear Power Generating Stations," and the correction sheet
22 dated January 30, 1995, "Standard Criteria for Safety Systems for Nuclear Power Generating
23 Stations Correction Sheet Issued January 30, 1995."

24 (iii) *Standard design certifications issued before May 13, 1999.* The protection system of
25 a standard design certification issued before May 13, 1999, must meet the requirements in IEEE
26 Std 279-1971, "Criteria for Protection Systems for Nuclear Power Generating Stations."

1 (iv) *Standard design certifications issued after May 13, 1999, but before [EFFECTIVE*
2 *DATE OF THIS RULE]*. Safety systems in standard design certifications issued after
3 May 13, 1999, but before **[EFFECTIVE DATE OF THIS RULE]**, must meet the requirements in
4 IEEE Std 603-1991, "Standard Criteria for Safety Systems for Nuclear Power Generating
5 Stations," and the correction sheet dated January 30, 1995, "Standard Criteria for Safety
6 Systems for Nuclear Power Generating Stations Correction Sheet Issued January 30, 1995." If
7 a combined license or manufacturing license references a standard design certification, then the
8 safety system for the licensed facility must comply with those applicable regulations stated in
9 the referenced standard design certification.

10 (v) *Standard design certifications issued after [EFFECTIVE DATE OF THIS RULE].*
11 Safety systems in standard design certifications under 10 CFR part 52 issued after
12 **[EFFECTIVE DATE OF THIS RULE]** must meet the requirements in IEEE Std 603-2009 and
13 the correction sheet dated March 10, 2015, subject to the conditions in paragraph (h)(4) through
14 paragraph (8).

15 (vi) *Applications for nuclear power plant construction permits submitted after*
16 *[EFFECTIVE DATE OF THIS RULE] under 10 CFR part 50.* Safety systems in construction
17 permits under 10 CFR part 50 for applications submitted after **[EFFECTIVE DATE OF THIS**
18 **RULE]** must meet the requirements in IEEE Std 603-2009 and the correction sheet dated
19 March 10, 2015, subject to the conditions in (h)(4) through paragraph (8).

20 (vii) *Nuclear power plant combined licenses and manufacturing licenses under 10 CFR*
21 *part 52 issued after [EFFECTIVE DATE OF THIS RULE].* Safety systems in combined licenses
22 and manufacturing licenses issued after **[EFFECTIVE DATE OF THIS RULE]** must meet the
23 requirements in IEEE Std 603-2009 and the correction sheet dated March 10, 2015, subject to
24 the conditions in (h)(4) through paragraph (8) of this section, *provided, however,* that if the
25 combined licenses or manufacturing license reference an approved standard design
26 certification, then the safety system must comply with those applicable regulations stated in the

1 referenced standard design certification.

2 *(3) Modifications and replacements of protection systems and safety systems.*

3 Modifications to and replacements of protection systems and safety systems must meet the
4 requirements stated in this section. If a modification or replacement changes the functionality,
5 technology (including changes to equipment qualification characteristics), independence
6 strategy, or diversity strategy in a protection system or safety system, then the changed or
7 replaced components, functions, or systems must meet the requirements in IEEE Std 603-2009
8 and the correction sheet dated March 10, 2015, subject to the conditions in paragraph (h)(4)
9 through paragraph (8) of this section. If this modification or replacement does not cause these
10 changes in a protection system or safety system, then the changed or replaced components,
11 functions, or systems may meet the requirements in the existing licensing basis.

12 *(4) System Integrity.* When addressing the requirements in section 5.5 of IEEE Std
13 603-2009, safety system functions must be demonstrated to be both repeatable and predictable.

14 *(5) Independence.* The following requirements must be met when addressing the
15 requirements in section 5.6 of IEEE Std 603-2009:

16 *(i) Independence between redundant portions of a safety system.* The safety system
17 architecture must incorporate independence between redundant portions of a safety system.
18 Independence in the safety system architecture must be analyzed to address: safety system
19 internal and external hazards, the extent of interconnectivity between redundant portions of the
20 safety system, and the impact of failures or degradation in one portion of a safety system on the
21 ability of redundant safety system portions to accomplish the safety functions.

22 *(ii) Independence between safety systems and other systems.* When applying IEEE Std
23 603-2009 section 5.6.3.1.a.2.ii and section 5.6.3.1.b, independence must exist between safety
24 systems and other systems for all signal technologies. Independence between safety systems
25 and other systems shall be analyzed to address: hazards posed by other systems on the safety
26 system, the extent of interconnectivity between the safety system and other systems, and the

1 impact of failures or degradation in other systems on the ability of the safety system to
2 accomplish the safety functions.

3 (iii) *Detailed criteria.* The following conditions apply to section 5.6 of IEEE Std 603-2009.

4 (A) Signals between redundant safety divisions and signals from a non-safety-related
5 system to a safety division must be processed in a manner that does not impair the safety
6 functions of any safety system division.

7 (B) Safety system divisions must detect and mitigate signal faults and failures received
8 from outside the safety system division in a manner that does not impair the safety system
9 safety functions of the division.

10 (C) For current reactors, communications or signals from outside the safety division
11 during operation must support safety or provide a safety benefit.

12 (D) For new reactors:

13 (1) Data communications between safety and non-safety systems must be one-way,
14 accomplished by a physical mechanism, from safety to non-safety systems while the affected
15 portion of the safety system is in operation.

16 (2) Signals may be shared between redundant portions of safety systems only if the
17 signals are required to perform a safety function.

18 (3) A safety system may receive signals from non-safety systems while the safety
19 system is in operation only if the received signal supports diversity or automatic anticipatory
20 reactor trip functions. These signals must be transmitted over a hardwired connection using
21 means other than data communication.

22 (4) Applicants for design certifications, standard design approvals, or manufacturing
23 licenses who propose an alternative under paragraph (z) of this section for complying with the
24 requirement in paragraph (h)(5) of this section with respect to data communications
25 independence shall identify both direct and indirect communication pathways to safety systems
26 from other systems.

(6) *Retaining safety function capability during maintenance bypass.* The constraints referenced in IEEE Std 603-2009 section 6.5.1.b are the constraints described in section 6.7, “Maintenance Bypass.”

(7) *Maintenance bypass.* The maintenance bypass requirements in section 6.7 of IEEE Std 603-1991 must be met instead of the requirements in section 6.7 of IEEE Std 603-2009.

(8) *Documentation supporting compliance.* Applicants and licensees shall develop and maintain documentation, analyses, and design details demonstrating compliance with paragraphs (h)(2) through (7) of this section.

* * * * *

3. In § 50.69, revise paragraph (b)(1)(v) to read as follows:

§ 50.69 Risk-informed categorization and treatment of structures, systems and components for nuclear power reactors.

* * * * *

(b) * * *

(1) * * *

(v) The inservice testing requirements in § 50.55a(f); the inservice inspection, and repair and replacement (with the exception of fracture toughness), requirements for the American Society of Mechanical Engineers Class 2 and Class 3 SSCs in § 50.55a(g); and the electrical component quality and qualification requirements in sections 4.3 and 4.4 of IEEE Std 279-1971, sections 5.3 and 5.4 of IEEE Std 603-1991, and sections 5.3 and 5.4 of IEEE Std 603-2009, as incorporated by reference in § 50.55a(a).

* * * * *

1 **Appendix E to Part 50 -- [Amended]**
2

- 3 4. In appendix E to part 50, revise footnote 7 to remove the words "Protection Systems"
4 and add, in its place, the words "Protection and safety systems."