August 29, 2013

Dr. J. Sam Armijo, Chairman
Advisory Committee on Reactor Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

SUBJECT: DRAFT FINAL REVISIONS OF REGULATORY GUIDES 1.168 THROUGH 1.173, SOFTWARE PROCESSES FOR DIGITAL COMPUTERS IN SAFETY SYSTEMS OF NUCLEAR POWER PLANTS

Dear Dr. Armijo:

I am responding to your letter dated June 18, 2013, in which you summarized the views of the Advisory Committee on Reactor Safeguards (ACRS) regarding draft final regulatory guides (RGs) 1.168 ("Verification, Validation, Reviews, and Audits for Digital Computer Software Used in Safety Systems of Nuclear Power Plants") through 1.173 ("Developing Software Life Cycle Processes for Digital Computer Software Used in Safety Systems of Nuclear Power Plants"). The U.S. Nuclear Regulatory Commission (NRC) staff thanks ACRS for its review of the RGs and for providing the two recommendations. The NRC staff agrees with the committee's recommendations stated in your letter, as discussed below.

ACRS Recommendation 1

Draft final revisions to RG 1.168, Rev 2, Verification, Validation, Review, and Audits; RG 1.169 Rev 1, Configuration Management; RG 1.170 Rev 1, Test Documentation; RG 1.171 Rev 1, Unit Testing; RG 1.172 Rev 1, Software Requirements Specifications; and RG 1.173 Rev 1, Developing Software Life-Cycle Processes should be issued.

NRC Response:

The staff agrees, and it has issued the RGs.

ACRS Recommendation 2

The staff should expedite the development of consistent regulatory guidance for enhanced design, development, operation, and maintenance of digital hardware and software which controls non-safety-related equipment that is "important to safety."

NRC Response

The staff agrees with ACRS's recommendation for providing guidance to evaluate digital hardware and software that controls nonsafety-related equipment that is important to safety. ACRS noted that a footnote in each of the RG's stated:

> The term “safety systems” is synonymous with “safety-related systems.” The scope of the GDC [general design criteria] includes structures, systems, and components “important to safety.” However, the scope of this regulatory guide is limited to “safety systems,” which are a subset of “systems important to safety.”

ACRS pointed out that the current regulatory framework for operating reactors licensed under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, “Domestic Licensing of Production and Utilization Facilities,” and for new plants licensed under 10 CFR Part 52, “Licenses, Certifications, and Approvals for Nuclear Power Plants,” contains provisions for enhanced design, quality, reliability, and regulatory oversight for nonsafety-related structures, systems, and components (SSCs) that are important to safety. Additionally, ACRS commented that nonsafety-related digital hardware and software systems may actuate, control, and monitor the operation of associated nonsafety-related pumps, valves, etc., that are important to safety and that such digital systems are explicitly excluded from the scope of the RGs by the footnote. Such treatment is incongruous with consistent regulatory oversight of SSCs that are important to safety.

The staff agrees that the footnote was overly restrictive and has revised it in the issued RGs to read:

> The term “safety systems” is synonymous with “safety-related systems.” The scope of the GDC includes systems, structures, and components “important to safety.” However, the scope of this regulatory guide is limited to “safety systems,” which are a subset of “systems important to safety.” Although not specifically scoped to include non-safety-related but “important to safety systems” this regulatory guide provides methods that the staff finds appropriate for the design, development and implementation of all important to safety systems. The NRC may apply this guidance in licensing reviews of non-safety but important to safety digital software and may tailor it to account for the safety significance of the system software.

The staff believes that the revised footnote aligns well with the existing regulatory guidance in NUREG-0800, “Standard Review Plan [SRP] for the Review of Safety Analysis Reports for Nuclear Power Plants.” SRP Chapter 7, “Instrumentation and Controls [I&C],” provides review guidance for safety-related, as well as nonsafety-related but important to safety systems. SRP Chapter 7, Table 7-1, Section II, lists the regulatory requirements applicable to I&C systems important to safety. Table 7-1 specifies that RGs 1.168 through 1.173 acceptance criteria are applicable for all systems and components important to safety, as well as applicable to Section 7.7, “Control Systems.” New reactor reviews also use the SRP sections highlighted above, but additionally apply the criteria for Regulatory Treatment of Nonsafety Systems as described in RG 1.206, “Combined License Applications for Nuclear Power Plants.” In the new proposed “mPower Design Specific Review Standard”, Chapter 17, includes provisions for determining that the applicants quality assurance program is adequate for important to safety systems.

The NRC staff and I appreciate the comments and recommendations provided by ACRS. We look forward to continuing discussions with the committee as the staff evaluates future updates to RGs.

Sincerely,

/RA/

Mark A. Satorius
Executive Director
for Operations

cc: Chairman Macfarlane
Commissioner Svinicki
Commissioner Apostolakis
Commissioner Magwood
Commissioner Ostendorff
SECY

The NRC staff and I appreciate the comments and recommendations provided by the ACRS. We look forward to continuing discussions with the Committee as the staff evaluates future updates to RGs.

Sincerely,

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