

December 23, 3005

Dr. Graham B. Wallis, Chairman
Advisory Committee on Reactor Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

SUBJECT: RESPONSE TO ACRS LETTER, DATED NOVEMBER 21, 2005, ON THE DRAFT
NRC DIGITAL SYSTEM RESEARCH PLAN FOR FY 2005 – FY 2009

Dear Dr. Wallis:

Thank you for your letter, dated November 21, 2005, in which the Advisory Committee on Reactor Safeguards (ACRS or the Committee) conveyed its views and recommendations regarding the “Draft NRC Digital System Research Plan for FY 2005 – FY 2009.” As noted in your letter, the U.S. Nuclear Regulatory Commission (NRC) faces a number of challenges in licensing digital technology for safety applications in nuclear facilities. The programs outlined within this Research Plan should help to address these challenges by providing important inputs to the agency’s regulatory process.

In response to the Committee’s recommendations regarding the Research Plan, the NRC staff provides the following comments:

Recommendation 1:

The plan should include a research project to develop an inventory and classification, e.g., by function, of these various types of digital systems that are used and are likely to be used in nuclear power plants in the future.

The staff agrees with this recommendation. The Draft NRC Digital System Research Plan includes ongoing projects to identify and investigate digital systems that are likely to be used in future applications (Section 3.5, “Emerging Digital Technology and Applications”), as well as projects to collect and review failure data associated with digital systems (Section 3.3.1, “Development and Analysis of Digital System Failure Data”). In addition, the staff will expand the project in Section 3.3.1, to include research to develop an inventory and classification of the various types of digital systems that are used or likely to be used in nuclear power plants in the future. The staff will then use this classification, along with a concurrent examination of the failures that have occurred in digital systems, as appropriate, to provide information regarding the types of tools that may be best-suited for different digital systems assessments.

Recommendation 2:

The research plan should include a more detailed identification of current and future regulatory needs and possible benefits of the planned research to the regulatory system.

The staff agrees with this recommendation and will make every effort to clearly identify regulatory needs and anticipated benefits across all research areas in the plan.

Recommendation 3:

The plan should acknowledge the existence of two different aspects of software safety. The overall thrust of the proposed research is "software-centric." The "system-centric" aspect should receive more consideration than is currently given.

As noted in the Committee's letter of November 21, 2005, the staff is aware of the two different approaches to modeling digital system reliability, and the NRC's research program in the area of digital system risk and reliability modeling has been actively investigating ways to include system-centric (as well as software-centric) methods in digital system reviews. Current staff research gives equal weight to the two aspects of modeling digital system reliability. Nonetheless, the staff will revise Section 3.3, "Risk Assessment of Digital System," to ensure that the system-centric approach and focus of the current and planned research is more apparent.

Recommendation 4:

Research in Section 3.6, "Advanced Nuclear Power Plant Digital Systems," should be given higher priority.

The staff agrees with this recommendation and will assign a high priority to all research programs to investigate advanced nuclear power plant digital systems (Section 3.6). Currently, there are no active advanced reactor designs undergoing design certification that require research in the digital systems area. This is primarily attributable to the lack of detailed instrumentation and control system design information from the reactor vendors. Nonetheless, the staff will conduct this research as a high priority as the design information becomes available.

Again, thank you for providing the Committee's recommendations and allowing us to discuss this important work with you. The staff will incorporate the Committee's recommendations into the Research Plan prior to its issuance, which is expected during the second quarter of Fiscal Year (FY) 2006. The staff looks forward to continuing discussions with the Committee on these programs as work progresses and new research initiatives are developed.

Sincerely,

/RA J. Silber Acting for/

Luis A. Reyes
Executive Director
for Operations

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