



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
WASHINGTON, DC 20555 - 0001

ACRSR-2269

October 16, 2007

The Honorable Dale E. Klein  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

SUBJECT: DIGITAL INSTRUMENTATION AND CONTROL SYSTEMS  
PROJECT PLAN AND INTERIM STAFF GUIDANCE

Dear Chairman Klein:

During the 546<sup>th</sup> meeting of the Advisory Committee on Reactor Safeguards, October 4-5, 2007, we reviewed the Digital Instrumentation and Control (I&C) Systems Project Plan, and Interim Staff Guidance (ISG) prepared by the NRC staff. Our Digital I&C Systems Subcommittee reviewed this matter during a meeting on September 13, 2007. During our review, we had the benefit of discussions with representatives of the NRC staff and Nuclear Energy Institute. We also had the benefit of the documents referenced.

#### CONCLUSION AND RECOMMENDATIONS

1. The staff's three interim guidance reports on diversity and defense-in-depth, communications, and human factors will help with the review of anticipated near-term licensing actions related to digital I&C.
2. In the longer term, an alternative process to the 30-minute criterion should be developed to determine the conditions under which operator manual actions can be credited as a diverse protective function.
3. The issue of spurious actuations needs to be examined further.

#### DISCUSSION

The Digital I&C Project Plan includes a process for developing interim guidance to support the review of anticipated near-term licensing actions. The long-term objective is to develop recommendations that will be used to update the Standard Review Plan and other relevant regulatory documents.

Three ISGs were issued recently. They address the issues of diversity and defense-in-depth, communications, and human factors. The guidance contained in these documents is appropriate to support the review of near-term licensing actions related to digital I&C.

One critical issue addressed by the ISG on diversity and defense-in-depth is the acceptability of manual actions to address the need for diversity. The ISG states that when protective action is required within 30 minutes, it is difficult to demonstrate the feasibility and reliability of manual actions. Therefore, in situations where the protective action is required in less than 30 minutes, the ISG identifies the installation of an independent and diverse automated backup system as an acceptable approach. When protective action is not required for at least 30 minutes, the ISG identifies manual actions as acceptable.

The industry argues that each case where manual actions are to be credited should be evaluated on its own merits. A process is needed to determine, on a case-by-case basis, whether an automated backup system should be installed or manual actions could be credited. We believe that a similar process defined in NUREG-1852, "Demonstrating the Feasibility and Reliability of Operator Manual Actions in Response to Fire," could be used for the digital I&C systems.

Although in principle we agree with the industry's viewpoint, we recognize the value of the staff's 30-minute criterion. In response to our suggestion, the staff added the following statements to the ISG: "The methods described in this interim staff guidance are not the only methods that the staff may find acceptable. The staff may also find other methods acceptable, but other methods may warrant more in-depth staff review."

The ISG on diversity and defense-in-depth states that potential spurious trips and actuations are of a lesser safety concern than failures to trip or actuate. This assertion may not be justified for spurious signals that automatically reconfigure systems or initiate unintended functions during the progression of a plant transient or accident. Although these actuations should be annunciated in the main control room, they may cause unanticipated conditions that require operator intervention to restore the required safety functions. Further attention is needed to evaluate potential spurious signals that may alter the normal progression of automatic plant response.

We commend the staff for developing ISGs that will help with the review of anticipated near-term licensing actions related to digital I&C. We are also encouraged by the progress and the degree of collaboration between the staff and the industry in addressing the many challenging issues that need to be resolved before updating the Standard Review Plan and other relevant regulatory documents.

Sincerely,

**/RA/**

William J. Shack  
Chairman

## **REFERENCES**

1. Memorandum dated October 3, 2007, from Patricia Silva, Director, Task Working Groups Digital Instrumentation and Controls Project, Office of Nuclear Reactor Regulation, to Cayetano Santos, Chief, Reactor Safety Branch, Advisory Committee on Reactor Safeguards, transmitting:
  - Digital I & C Project Plan, July 12, 2007 (ML071900253).
  - Digital I & C - ISG-02, Diversity and Defense-in-depth, September 26, 2007 (ML072540118).
  - Digital I & C - ISG-04, Highly-Integrated Control Room Digital Communications Systems, September 28, 2007 (ML072540138).
  - Digital I & C - ISG-05, Highly-Integrated Control Room Human Factors, September 28, 2007 (ML072540140).
  - Draft Digital I & C - ISG-XX, Cyber Security Associated with Digital Instrumentation and Controls (ML072260584).
2. U.S. Nuclear Regulatory Commission, Regulatory Guide 1.152 Rev. 2, "Criteria for Use of Computers in Safety Systems of Nuclear Power Plants," January 2006.
3. U.S. Nuclear Regulatory Commission, NUREG-1852, "Demonstrating the Feasibility and Reliability of Operator Manual Actions in Response to Fire," September 2006.

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1. Memorandum dated October 3, 2007, from Patricia Silva, Director, Task Working Groups Digital Instrumentation and Controls Project, Office of Nuclear Reactor Regulation, to Cayetano Santos, Chief, Reactor Safety Branch, Advisory Committee on Reactor Safeguards, transmitting:
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2. U.S. Nuclear Regulatory Commission, Regulatory Guide 1.152 Rev. 2, "Criteria for Use of Computers in Safety Systems of Nuclear Power Plants," January 2006.
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