

June 9, 2014

MEMORANDUM TO: Anthony J. Mendiola, Chief
Licensing Processes Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

FROM: Joseph J. Holonich, Senior Project Manager /RA/
Licensing Processes Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF MAY 21, 2014, MEETING ON NUCLEAR
ENERGY INSTITUTE (NEI) GUIDANCE DOCUMENT NEI-01-01,
"GUIDELINE ON LICENSING DIGITAL UPGRADES: EPRI TR-
102348, REVISION 1, NEI 01-01: A REVISION OF EPRI TR-
102348 TO REFLECT CHANGES TO THE 10 CFR 50.59 RULE"

On May 21, 2014, staff from the U.S. Nuclear Regulatory Commission (NRC) met with representatives from the Nuclear Energy Institute (NEI) and industry. The meeting was another in a series of meetings to discuss NEI 01-01, "Guideline on Licensing Digital Upgrades: EPRI [Electric Power Research Institute] TR [Technical Report]-102348, Revision 1, NEI 01-01: A Revision of EPRI TR-102348 To Reflect Changes To The 10 CFR 50.59 Rule" (Agencywide Documents Access and Management System (ADAMS) Accession No. ML020860169). Regulatory Information Summary (RIS) 2002-22, "Use of EPRI/NEI Joint Task Force Report, 'Guideline on Licensing Digital Upgrades: EPRI TR-102348, Revision 1, NEI01-01: a Revision of EPRI TR-102348 to Reflect Changes to the 10 CFR 50.59 Rule'" (ADAMS Accession No. ML023160044), conditionally endorsed NEI 01-01.

The following meeting information and the ADAMS Accession Nos. are listed below:

- Meeting Attendees (ADAMS Accession No. MLML14143A020)
- NEI Presentation (ADAMS Accession No. ML14142A058)
- Abstract of proposed EPRI document on Common Cause Failure (CCF) Susceptibility (ADAMS Accession No. 14142A053).

CONTACT: Joseph J. Holonich, DPR/PLPB
(301) 415-7297

The meeting centered on the NEI presentation items 1, 2, and 6 from the NRC staff letter dated November 5, 2013 (ADAMS Accession No. ML13298A787).

1. Some definitions have changed since NEI 01-01 was endorsed.
2. There are new revisions to many of the referenced documents.
6. New examples should be added to NEI 01-01 to address embedded digital devices.

In opening the discussions, NEI stated that, in its opinion, recent experience suggests that there are continuing obstacles to the application of digital technology. NEI also suggested that perceived barriers to the implementation of digital technology are placing industry at a substantial disadvantage in managing aging systems. The initial topic covered in the NEI presentation was changes to definitions in NEI-01-01. During that discussion, the NRC staff asked how the revisions to definitions were selected. NEI responded that definitions endorsed in Institute of Electrical and Electronics Engineers (IEEE) standards were used. If there was no definition in an IEEE standard, then international standards were researched.

No changes to the definition of computer program were made because a definition that was different could not be found. Thus, the definition in NEI-01-01 was kept. It was noted that the definition was related to field programmable gate arrays and was consistent with the NRC staff view was on software.

For the definition of diversity, NRC stated that it needed to consider a revision to Branch Technical Position (BTP) 7-19, "Guidance for Evaluation of Diversity and Defense-in-Depth in Digital Computer-Based Instrumentation and Control Systems (ADAMS Accession No. ML110550791)." Industry stated that it had looked at BTP 7-19 for a definition of diversity but none was in BTP 7-19.

For the definition of software tools, NEI indicated that IEEE 7-4.3.2, "Standard Criteria for Digital Computers in Safety Systems of Nuclear Power Generating Stations," was being revised but the definition of software tools used in NEI-01-01 was not affected. For the definition of programmable logic device, it was noted that NEI was considering whether "user" should remain in the definition but was not prepared to answer that now.

To help clarify the definition of CCF, it was presented that adding a definition of common mode failure (CMF) would help define CCF. CMF refers to failures having the same result, whereas CCF refers to failures having the same cause. It was noted that in the past, the two terms (CMF & CCF) were used interchangeably at times.¹ Discussions on the term "CCF precluded" centered on replacing the word "precluded." The inclusion of a "CCF precluded" was to establish a shorthand phrase to cover the phrase "malfunctions that are no more likely to

1 (Not stated in the meeting): For example BTP 7-19 begins by stating, "Digital instrumentation and control (DI&C) systems can be vulnerable to **common-cause failure (CCF)** caused by software errors or software developed logic, which could defeat the redundancy achieved by hardware architecture." In addition BTP 7-19 states, "The foundation of BTP 7-19 is the "NRC position on D3" from the SRM on SECY-93-087, Item 18, II.Q. The four points (i.e., SRM on SECY-93-087 items) are quoted below: Point 1 'The applicant shall assess the defense-in-depth and diversity of the proposed instrumentation and control system to demonstrate that vulnerabilities to **common-mode failures** have adequately been addressed.'... "

happen than those described in the FSAR [final safety analysis report].” A general consensus was reached that “CCF sufficiently unlikely” would be a better term.

As part of the presentation of the simplicity definition, the NRC staff indicated it was in fundamental agreement with industry that the examples cited on slide 20 of the presentation were a place to start to look at a revision. The next topic in the NEI presentation was for concern number 2 in the NRC staff letter. The presentation and subsequent discussion centered on the use of a new EPRI document in preparation regarding CCF that could be referenced in NEI-01-01.

The NRC staff had a question of whether the EPRI documents were for plant-level or for systems. The answer was that the new EPRI document covered both. A question asked by industry was if the EPRI document was incorporated into NEI-01-01 as an appendix, would NRC staff have to review it. NRC staff answered that yes, it would have to review the EPRI document because NEI-01-01 would provide guidance on how to meet Title 10 of the *Code of Regulations*, Part 50.59 (10 CFR 50.59). If the NRC staff was accepting the NEI-01-01 revision for use in meeting 10 CFR 50.59, then it would be saying the use of the EPRI document was also acceptable for meeting 10 CFR 50.59. Thus a review of the EPRI document in the appendix would have to be done.

Industry asked if incorporating the EPRI report into a new appendix to NEI 96-07, Revision 1, “Guidelines for 10 CFR 50.59 Implementation,” could be an alternative. The NRC staff indicated that could be an alternative way to referencing the EPRI report. It was agreed that this approach could be further discussed at an upcoming meeting on digital instrumentation and control which was tentatively being planned for July.

Overall, the NRC staff indicated it found the approach outlined by NEI for Item 2 acceptable.

The presentation ended with a discussion on the NRC staff issuance of: Regulatory Issue Summary (RIS) 2014-XX, “Draft Revised EMBEDDED DIGITAL DEVICES IN SAFETY-RELATED SYSTEMS.” The NRC staff indicated that it was near issuing the RIS and anticipated having a *Federal Register* Notice issued within the next couple of weeks. It was further stated that the original version of the RIS was too complicated because it was drafted to cover both reactors and fuel-cycle facilities.

The revised RIS covers safety-related systems for nuclear reactors and fuel cycle facilities in separate sectors. Independent of the RIS, a workshop is being planned by the NRC staff in September to discuss the topic and potential guidance. The NRC staff is hoping to include other industries like transportation in the workshop.

One topic of discussion during the meeting was the open item from earlier meetings where the NRC staff committed to provide guidance on how digital modifications could be done without the need for license-amendment requests. The NRC staff agreed to include this as an action item for this meeting.

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