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MEMORANDUM TO: Kevin Hsueh, Chief
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Office of Nuclear Reactor Regulation

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SUBJECT: SUMMARY OF FEBRUARY 8 AND 9, 2017, MEETING TO DISCUSS
GUIDANCE TO ADDRESS COMMON CAUSE FAILURE AND TITLE 10
OF THE *CODE OF FEDERAL REGULATIONS* SECTION 50.59
EVALUATION QUESTIONS

On February 8 and 9, 2017, U.S. Nuclear Regulatory Commission (NRC) staff met with representatives from the Nuclear Energy Institute (NEI). The purpose of the meeting was to continue discussions on topics and issues related to digital instrumentation and control (DI&C) common cause failure (CCF) and acceptable processes for performing DI&C modifications or replacements using Title 10 of the *Code of Federal Regulations* Section 50.59 (10 CFR 50.59). Information related to the meeting can be found in the Agencywide Documents Access and Management System (ADAMS) package accession number ML17004A259 or the ADAMS accession numbers cited.

Initially, the NRC staff made a presentation on the status of its Modernization Plan #1 (MP#1) of the DI&C Integrated Action Plan (ADAMS Package Accession No. ML16126A137) to address CCF. The NRC staff explained that the NRC Steering Committee decided to allocate resources to begin reviewing NEI 16-16, "Guidance for Addressing Digital Common Cause Failure" (ADAMS Accession No. ML17033B139), and the relationship of NEI 16-16 to NEI 96-07, Appendix D, "Supplemental Guidance for Application of 10 CFR 50.59 to Digital Modifications" (ADAMS Accession No. ML16126A197), and the evaluation of the NRC staff current position on CCF. These would be in parallel with the NRC staff's ongoing efforts to identify acceptable guidance for using the results of bounding and coping analyses to support the evaluation of proposed modifications to safety system auxiliary and support systems. Consequently, the NRC staff reported that the MP #1 scope was divided to cover the following objectives:

- MP #1A – Develop guidance to perform and use coping analysis to address CCF when replacing or modifying safety system auxiliary and/or support DI&C systems (e.g., chiller control systems).
- MP #1B – Evaluate NEI's proposed guidance in NEI 16-16 for applying defensive measures to reduce the credibility of a CCF.

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- MP #1C – Evaluate any impacts to the current NRC position on CCF, as described in SRM-SECY 93-087 (ADAMS Package Accession No. ML17004A259), and if needed, prepare appropriate commission level communications identifying these potential impacts.

The NRC staff reported that the working group for activity MP #1A is developing interim staff guidance (ISG) to address CCF by applying and performing appropriate coping and bounding analyses to enable evaluation of the proposed modification under 10 CFR 50.59. During the NRC staff presentation several questions arose focusing on what the ISG scope was and if it would cover 10 CFR 50.59. The NRC staff responded that the initial draft of the ISG would cover safety systems for which the loss of DI&C has limited consequences, such as the controls for plant chillers. The NRC staff also stated that the ISG would not cover reactor protection system or engineered safety features-related systems. Further the NRC staff said the ISG will be revised to cover an expanded scope of systems or include portions of NEI 16-16, as they are reviewed by the staff.

The NRC staff noted that its goal with the ISG was to issue guidance on a fairly quick schedule then look to revise and expand it in the future. The schedule was to issue something in July 2017 to use and then see what benefits came from the guidance. It was agreed that an action from this discussion would be to schedule a meeting to discuss the technical aspects included in the ISG. The NRC staff acknowledged that ISGs are usually intended for staff guidance rather than for industry guidance. Notwithstanding the normal use of an ISG, this format has been selected (tentatively) as an expedited approach and the guidance would be explicitly endorsed for industry use.

A second topic discussed was the term diversity and defense-in-depth (D3) analysis. NEI noted that there were several documents that address this issue, including NUREG/CR-6303, "Method for Performing Diversity and Defense-in-Depth Analyses of Reactor Protection Systems" (ADAMS Accession No. ML071790509); Branch Technical Position (BTP) 7-19 of the Standard Review Plan (NUREG-0800. "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR [Light-Water Reactor] Edition") (ADAMS Accession No. ML052340534); and now the proposed ISG. NEI expressed that there was a need to develop a common understanding of what the different documents meant, how to perform a D3 analysis and whether the process described in NUREG/CR-6303 can be used for non-protection systems.

Next, the NRC staff briefly explained the work planned to be covered within MP #1B and #1C activities. The NRC staff presented the proposed schedule for these activities.

NEI then presented a walkthrough of the NEI 16-16, draft. NEI asked the NRC staff to provide its comments as soon as possible so it can continue working on NEI 16-16. Additionally, NEI noted that it would not be able to submit the remaining portions of NEI 16-16 in March 2017, as identified in previous correspondence. NEI stated it would like to use the staff's comments to propose a new schedule. An action raised during this discussion was the NRC staff commitment to provide its comments on NEI 16-16 a week before the next scheduled meeting.

The NRC staff offered to have a public meeting to discuss comments on the December 2016 NEI 16-16 draft. NEI stated that this may be possible but that if it receives NRC staff comments on March 9, 2017, it may not be able to submit the final NEI 16-16 by the end of March as proposed by NRC staff on February 8, 2017. The NRC staff stated it planned to send written initial comments concerning NEI 16-16 to NEI within two weeks.

The NRC staff stated that it planned to use a review process for NEI 16-16 similar to the one that is used to evaluate topical reports. Continuing the NRC staff explained that it meant the NEI 16-16 review would follow the structure of a topical report review.

During the discussions, the NRC staff provided some of its high-level comments on the NEI 16-16, draft. For example, it commented that NEI 16-16 describes steps to take when evaluating CCF to determine if it was credible. The NRC staff stated this activity is not consistent with the NRC current position on CCF as described in SRM-SECY 93-087. Further the NRC staff stated it would need to evaluate NEI's proposed technical basis for making the determination that CCF is not always credible before it can find whether this process is acceptable.

Before this meeting, the NRC staff requested NEI provide a description of how the information in NEI 16-16 could be used to answer the first six question in 10 CFR 50.59(c)(2). During this meeting, NEI responded that it did not have any specifics to provide. NEI intends for NEI 16-16 to be used as any other technical information would be used; determine an outcome for the technical area in question and feed that outcome into the 10 CFR 50.59 review process.

In the portion of the NEI presentation dealing with 10 CFR 50.59, two questions were identified that affect 10 CFR 50.59 questions 2 and 6. For question 2, the discussion was raised as to how to interpret "malfunction of an SSC [structure, system and component]" and the term "previously evaluated in the FSAR [Final Safety Analysis Report]," at the component level versus the level of analysis previously evaluated in the FSAR.

For question 6, the discussion was how to interpret the "different result" portion in the 10 CFR 50.59 question. In particular, if the result means the system level or the end plant result. NEI also noted that due to this lack of clarity about the "plant-level" result, question 6 is the most difficult to answer for digital systems, and the question that poses more regulatory uncertainty. It was agreed that a meeting on 10 CFR 50.59 questions 2 and 6 was needed. This was an action from the meeting.

NEI also covered question 5 of 10 CFR 50.59(c)(2) in its presentation. The NRC staff agreed with the information provided by NEI on 10 CFR 50.59 question 5. NEI also mentioned that it would remove references to 10 CFR 50.59 currently included in the NEI 16-16 draft. The NRC staff asked where the ties between NEI 16-16 and NEI 96-07, Appendix D would reside.

NEI could not provide a specific location because NEI intends for NEI 16-16 to be used as any other technical information would be used; determine an outcome for the technical area in question and feed that outcome into the 10 CFR 50.59 review process.

Time was allotted for stakeholders to provide comments.

A representative from Palo Verde stated that he believed NEI 16-16 or the ISG needed to define what digital meant. He explained that the scope in NUREG/CR-6303 was written for software-based systems, and it did not consider other digital systems, such as field programmable gate array-based systems. Therefore, it was not clear if the staff is considering the guidance for software-based systems applicable to other digital technologies. He also mentioned that the NRC current position to assume a CCF and then show how to address it was not practical or appropriate for all digital equipment.

A second stakeholder comment was that with the issuance of NEI 16-16 draft, new guidance for a 10 CFR 50.59 evaluation using NEI 96-07, Appendix D, the creation of a new NRC staff ISG,

along with the existing documents BTP 7-19, "Interim Staff Guidance (ISG)-04: Aging Management Of Fire Protection Systems For License Renewal (ADAMS Accession No. ML023440137), and others, could lead to confusion by DI&C engineers on what is the right set of guidance to follow. The NRC staff emphasized that the ISG was identified as a way to quickly put guidance into place, but that it was not necessarily the final approach. However, before the ISG will be finalized, the NRC staff plans to evaluate how the ISG would work with other documents and then consider what additions or changes to any of these documents are needed before issuing the ISG as final.

The same stakeholder also raised a concern about using the topical report process to review NEI 16-16. The NRC staff responded that it did not plan to use the topical report process for NEI 16-16 but rather was looking at the topical report review structure to provide a framework that could be followed.

NEI performed a tabletop exercise on how to use NEI 16-16 and answer the evaluation questions in 10 CFR 50.59 for the replacement of the control system of the plant chillers. NEI used the information for the chillers upgrade provided during the July 11, 2016, meeting (ADAMS Package Accession No. ML16174A045). During this presentation, NEI used NEI 16-16 to show how a credible CCF was addressed using a best-estimate analysis, and the result was bounded because those directly credited systems are still capable of performing their credited safety function. Using this result, NEI proceeded to answer the questions in 10 CFR 50.59. At this point, NEI stated that one of the challenges is that assuming a CCF makes the evaluation in 10 CFR 50.59 complicated, in particular, to answer question 6.

At the end of the presentation, NEI stated that it is very interested in getting NEI 16-16 reviewed and approved. Further, NEI noted that if the ISG being developed does not help licensees address and answer the evaluation questions in 10 CFR 50.59, then it perceived the ISG would have not accomplished its intent. If that was found to be the case, then NEI would request that the NRC staff stop further work on the ISG, and instead focus on reviewing and approving NEI 16-16.

At the end of the meeting, the schedule for the next series of meetings was reviewed. It was agreed to tentatively schedule the meeting on the ISG and NEI 16-16 on March 7, 2016. This would allow it to be held adjacent to the already scheduled monthly NEI 96-07, Appendix D meeting. Also, it was reported that the following meetings were scheduled:

- 1) February 16, 2017, Modernization Plan 3, Commercial Grade Dedication,
- 2) February 22, 2017, Integrated Action Plan Update,
- 3) February 28, 2017, Modernization Plan 4, Regulatory Framework,
- 4) March 7, 2017, ISG and 10 CFR 50.59 Questions 2 and 6, and
- 5) March 8, 2017, April 19, 2017, and May 3, 2017 Monthly Meetings on NEI 96-07, Appendix D.

Actions from the meeting were:

- 1) Schedule a meeting on the technical aspects of the NRC staff ISG in March.
- 2) Schedule a meeting on 10 CFR 50.59 questions 2 and 6. Also, NRC has an action to get back with NEI to provide an update on resolution of question 2 and 6 before the scheduled meeting in March.
- 3) The NRC staff will provide its comments on NEI 16-16 a week before the scheduled meeting.

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