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MEMORANDUM TO: Kevin Hsueh, Chief
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Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

FROM: Joseph J. Holonich, Senior Project Manager /RA/
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SUBJECT: SUMMARY OF DECEMBER 1, 2016, MEETING TO DISCUSS
COMMON CAUSE FAILURE

On December 1, 2016, 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). All information related to the meeting and discussed in this summary can be found in the Agencywide Documents Access and Management System (ADAMS) package accession number ML16314A113.

The first meeting agendum to discuss the NRC staff open-item list (OIL) was removed. NEI requested the removal so that its markups of the OIL could be provided. The NEI representatives committed to providing the marked-up version of the OIL the week of December 5, 2016.

During the NRC staff presentation, the NEI representatives emphasized the need for a revision to Branch Technical Position (BTP) 7-19, "Guidance for Evaluation of Defense-in-Depth Computer-Based Instrumentation and Control Systems." In response to NEI, the NRC staff stated that revising BTP 7-19 was not something identified for the current activities described in the Integrated Action Plan (IAP). The NRC staff explained the internal process to update sections of the Standard Review Plan (NUREG-0800). Instead, the staff's current activities call for plans to provide guidance for addressing the potential for CCF in non-RPS and non-ESFAS plant upgrades using a shorter communications process, such as an Interim Staff Guidance (ISG) or a Regulatory Issue Summary (RIS). During the meeting, the NEI representatives said that NEI 16-16, identified as NEI 16-XX at the meeting, was intended to address all digital implementations, large and small for all systems. Also, NEI agreed with the NRC suggestion that while NEI 16-16 is being developed, the NRC staff should provide independent guidance focused on smaller/simpler modifications.

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The NEI representatives stated that there was a short-term need to address some of their concerns regarding BTP 7-19. Therefore, NEI recommended that if a BTP 7-19 revision was not imminent, consideration be given to an alternate form or guidance in the near term. The NRC staff agreed to consider alternate, near-term guidance for some of the issues that would eventually be included in a revision to BTP 7-19. In addition, the NRC staff confirmed that revision of BTP 7-19 is part of the strategic activities to be described in the revised IAP, which are expected to occur after the tactical issues are near resolution.

Another topic raised during the NRC staff presentation was a suggestion from NEI for it and the NRC staff to work together on the finalization of NEI 16-16, "Guidance for Assessing Digital Common Cause Failure." The NRC staff stated that it could engage with NEI on the development of NEI 16-16 but that the NRC staff needed to make sure any engagement was within its regulatory role.

The NRC staff stated that a revised IAP for comment was expected in the first quarter of calendar year 2017. In addition, the NRC staff said that the update to the IAP would reflect the need to revise BTP 7-19. It was recommended that a meeting be scheduled for the week of January 9, 2017, to discuss the revisions to the IAP. In addition, the NEI representatives agreed to provide mark ups for the IAP on December 2, 2016. The mark ups would identify the status and schedule for NEI 16-16.

Another question asked during the NRC staff presentation was whether the technical-basis document in the last bullet on slide 8 was still needed if the NRC staff was engaged in the development of NEI 16-16. The NRC staff explained that the technical-basis document was not related to preparing near-term guidance but rather supported developing a Commission paper on long-term CCF policy. The NRC staff also stated that NEI 16-16 and the reports prepared by Oak Ridge National Lab will be considered as inputs to the technical basis document.

Because of the considerable length of time needed to prepare a Commission paper and revise BTP 7-19, the NEI representatives asked if the NRC staff could interpret the existing policy to exempt some systems from CCF concerns. As noted earlier, the NRC staff agreed to consider other guidance, but that they need to be consistent with our current policy on CCF.

In the discussion about CCF, two interpretations of the term CCF were identified. The NRC staff uses the term to identify an error in software regardless of the consequences of that error. NEI uses the term to identify an error in software that has been triggered to affect multiple instances of the software, and it then focuses attention on the plant effect rather than on the software error itself. The NRC staff indicated that they understood and saw merit in the NEI usage, and would take it into consideration in their further efforts. The NEI representatives and the NRC staff agreed to work together in resolving this issue. This was identified in the action items for this meeting.

The NRC staff said that it believed that the different interpretation of CCF by industry and NRC staff may be leading to confusion regarding BTP 7-19.

There was considerable discussion on the scope concept presented by the staff. The NRC approach related to the scope criteria was to initially categorize digital I&C equipment into three groups that may apply more tailored methods to treat the CCF issue.

NEI also presented the scoping definition in their slides. The NRC staff and NEI representatives agreed that the definitions were conceptually similar, and that alignment on the scope of CCF would be a point to be discussed in future meetings.

In the discussion of bounding and coping analysis, the NEI representatives stated that how component, system, and plant-level responses are handled was a significant issue. NEI and the NRC staff agreed to work together in resolving this issue.

During the discussion of bounding and coping analysis, NEI noted that the concepts presented were similar to those to be included in NEI 16-16, but NEI pointed out that they used a different naming convention. NEI agreed that the definitions proposed by staff are very similar to the NEI definitions. NEI clarified that there are not separate bounding and coping analyses, but rather a single analysis and that these terms describe conclusions that might result from that analysis.

One question asked about the scope of CCF was whether the NRC staff would consider a risk-based solution. The NRC staff responded that it did not want to take any option off the table but considering a risk-informed approach would be a long-term activity.

During the presentation of the NEI 16-16 decision tree workflow diagram, the NEI representatives reported that it planned to provide a draft of the main body of document by mid-December or early January 2017. The NEI representatives said that although the appendices would not be part of the submittal, the information in the appendices will be similar to related material in the Electric Research Power Institute (EPRI) 3002005326 technical report, "Methods for Assuring Safety and Dependability when Applying Digital Instrumentation and Control Systems." NEI will submit the appendices at a later date.

NEI described the flow chart submitted in the presentation material and noted that the process described in the flowchart, as well as in NEI 16-16, will cover all processes, not only 10 CFR 50.59 licensing process. The NRC staff provided verbal feedback on the process illustrated in the flow chart, in particular in the middle section (identified as 4.1 in the flow chart) regarding defensive measures. At the end of this presentation, NEI representatives identified the sections in which there was alignment between NEI and NRC. The NEI representatives and NRC staff agreed that the alignment seems to be in the ideas presented for the top (identified as 3.0) and bottom section (identified as 4.2), but we couldn't reconcile the differences and confusions resulting from the middle section (Section 4.1). The NRC staff proposed a segmentation approach, in which the NRC and NEI would start working on the areas of agreement, and then work on the other.

The NEI representatives indicated that "defensive measures" (to be included in Section 3.1) constitute an important part of the approach to dealing with potential CCF. The NRC staff indicated that they cannot address "defensive measures" at a conceptual level, other than to agree that in the longer-term, it would need to review each of these measures individually and some measures might be determined to adequate. The NRC staff indicated that enough information about "defensive measures" has not been submitted yet, and therefore NEI should provide such information so the subject can be discussed.

During the open discussion, the NRC staff and the NEI agreed on several key points:

- The NRC staff thinking on the CCF issue and the NEI CCF evaluation process seem to be in general alignment. The differences relate to the use of terminology within the

definition of CCF, scoping criteria, and the discussion of bounding and coping analyses. Both groups acknowledged that these differences in terminology need to be clarified to avoid misunderstandings.

- The next steps on this topic will be to ensure CCF evaluation guidance dovetails with the Title 10 of the *Code of Federal Regulations* 50.59 evaluation questions.

It was agreed that a meeting would be scheduled in January or February 2017 to discuss NEI 16-16. This meeting will be scheduled after the draft NEI 16-16 is submitted, and another meeting will be scheduled after the entire NEI 16-16 (including appendices) is submitted.

During the stakeholder interaction time, the NRC staff was provided an email from a member of the public who attended the meeting but was unavailable when this agenda was covered. The comment from the member of the public was:

Does the proposal made right before the break for lunch (to not conduct certain analyses) run counter to the NRC's mission to protect public health and safety?

The NRC staff responded that it did not.

Actions from the meeting were:

- 1) NEI will provide its marked-up OIL the week of December 5, 2016.
- 2) The NRC staff and NEI representatives, including stakeholder participation, will work to develop a consistent set of definitions pertaining to the topic of CCF.
- 3) NEI will provide the main body of NEI 16-16 in mid-December or early January.
- 4) The NRC and NEI will schedule a meeting in January or February 2017 to discuss NEI 16-16. This meeting will be scheduled after the draft NEI 16-16 is sent to the NRC staff.

K. Hsueh

- 5 -

SUBJECT: SUMMARY OF DECEMBER 1, 2016, MEETING TO DISCUSS
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