

August 22, 2016

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

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SUBJECT: SUMMARY OF JUNE 7, 2016, MEETING ON THE NUCLEAR
REGULATORY COMMISSION'S EFFORT TO REVIEW ITS POSITION
AND REGULATIONS ON COMMON CAUSE FAILURE

On June 7, 2016, U.S. Nuclear Regulatory Commission (NRC) staff met with representatives from the Nuclear Energy Institute (NEI) and other external stakeholders. This was the second meeting on common cause failure (CCF) in digital systems. The purpose of the meeting was to discuss several key technical issues associated with addressing CCF. Information related to the meeting including presentations and the attendees list can be found in the Agencywide Documents Access and Management System (ADAMS) package accession number ML16082A134.

Opening Discussions

In its opening remarks, the NRC staff stated that they are evaluating the current CCF policy and the review will be focused on revolutionary not evolutionary potential changes, because this was an area where the NRC staff wanted resolution. Specifically, the NRC staff explained that they are evaluating the science for addressing CCF. The NRC staff continued by stating that it was looking at a number of different sources and technical bases, as well as evaluating regulations and operational experience in the US, abroad, and in other industries. The NRC staff also clarified that the information in the presentation resulted from brainstorming ideas, and they did not represent the final NRC position on the key technical issues. This information was issued to continue the discussions started at the first meeting in March 21, 2016.

The staff noted that the first meeting held on March 21, 2016 (ADAMS package accession number ML16068A072) was to gather information on key technical and policy issues to support development of a technical basis. The information gathered in the first meeting was used for this meeting with the expectation that this meeting and the next meeting will be more focused. As a Category 3 public meeting, the NRC staff sought open discussions and wanted to hear what ideas were good, which were not good, as well as possible alternatives.

In NEI's opening remarks, the NEI representatives stated that there had been good interactions and discussions on the CCF topic. Also, the NEI representative said that the openness and dialogue on the CCF topic was appreciated and NEI was looking forward to working on a

resolution. It was emphasized that addressing CCF was the number one priority for modernizing operating plants to digital instrumentation and control (DI&C).

The NRC staff presentation is available in the ADAMS package referenced earlier. The NRC staff focused discussion on the following key technical issues:

- Scope of consideration
- Possible methods for analysis in CCF evaluations (including bounding analysis)
- Design attributes sufficient to address CCF

Before starting the discussion on these key technical issues, the NRC staff clarified that the technical basis being developed is to support its recommendation to confirm or modify the current policy on CCF.

During the discussions a question was asked about what documents will be used by the NRC staff to develop its technical basis document and policy recommendation to the Commission. The NRC staff responded that a variety of different documents will be used. These will include technical papers published in the open literature, research and analysis developed by the NRC staff, studies conducted by the Oak Ridge National Laboratory (ORNL), and work done by the Electric Power Research Institute (EPRI).

A request was made for the NRC staff to make available the ORNL reports and the information used to develop the policy recommendation. The NRC staff said it would consider the request and consider certain issues, such as the proprietary nature of some of information. The NRC staff agreed to examine the means to release this information. This was an action from the meeting.

The NEI representatives asked when the final version of SECY 16-0070, "Integrated Strategy to Modernize the Nuclear Regulatory Commission's Digital Instrumentation and Control Regulatory Infrastructure," would be made publicly available. The NRC staff informed them that it is scheduled to be made public on June 17, 2016, unless directed otherwise by the Commission.

Scope Consideration

The purpose of this part of the meeting was to discuss how best to determine the scope that the NRC policy should consider.

During this part of the discussion, the participants agreed that safety significance plays an important role, in scoping and therefore modifications to a system that will have an impact on safety should be consider for inclusion in the policy. Any modifications to the NRC position needs to be consistent with the General Design Criteria.

Participants also discussed that defining the scope for this effort would be difficult if the staff only focused on the traditional safety and non-safety classification, since this classification would not considered non-safety systems important to safety, like those systems that are considered in the analysis of potential anticipated operational occurrences (AOOs) and accidents in Chapter 15 of the Final Safety Analysis Report. The industry representatives expressed concern that the CCF scope expansion would be detrimental to the DI&C integrated

action plan (IAP) objectives. In addition, attendants stated that the scope should consider what is needed to meet the needs of new reactors, operating reactors, research facilities, and fuel facilities.

Industry representatives expressed that they did not think any simple systematic way to grade systems and components was feasible to identify the CCF scope or affect associated analysis. Rather, industry appeared inclined to promote a case-by-case approach that would consider the application of DI&C within the plant. Additionally, facilities other than nuclear power generating stations should be addressed in the policy to ensure it is useful to non-power generating facilities.

Bounding Analysis

The purpose of this part of the meeting was to discuss possible methods for evaluating the use of a bounding analysis or other analysis for addressing CCF.

During the discussion on bounding analysis, attendees asked what was meant by a bounding analysis. In response, the NRC staff stated that this part of the discussion was to focus on whether a new analysis was needed or existing analysis could be used. Should a new analysis be needed, then we need to define the acceptance criteria.

The NEI representatives stated that a bounding analysis could be as simple as an inspection, as an example. The NRC staff agreed. The industry representatives also expressed that there is a lack of clarity on when and which kind(s) of analyses should or would be required to be performed, and what acceptance criteria should be followed. The staff clarified that they would need to identify when an analysis can be used and how it could be based on performance-based criteria.

As the discussions continued, it was agreed that holding table-top evaluation discussions would be considered to help identify specific challenges or constraints. In particular, the attendees agreed to select key technical issues and evaluate the specific aspects or limitations of the policy to address CCF using application examples. The staff agreed to schedule meetings to perform this tabletop exercise during the summer of 2016. This was an action from the meeting.

The NEI representatives stated that the goal was to get the CCF topic done because operating plants were suffering by not moving to DI&C. Given the priority, NEI representatives suggested that a workshop also be considered later in the summer to discuss ongoing activities and technical basis document, so that chokepoints can be identified and addressed. This was an action from the meeting.

Design Attributes

The purpose of this session was to discuss what design attributes could be identified to address CCF or to reach a finding that further analysis is not necessary.

The NRC staff explained that the current policy only considers two design attributes, internal diversity and simplicity. The staff provided a brief background of why these two attributes were selected to be part of our guidance.

The NRC staff then discussed a possible method for developing and validating other design attributes that would be used to determine if further analysis is necessary to address CCF. The staff explained that this method would focus on the detailed description of what design attributes needed to include and what evidence needed to be provided to assure that they were effective. The NRC staff and participants discussed how these new design attributes could be developed by the industry and evaluated and approved for use by the NRC.

Industry representatives stated that the NRC policy should be technology-neutral and performance-based, and that the evaluation of such attributes should be based on their relative contribution to prevention and/or mitigation of failure. The NEI representatives also added that the approach described in the EPRI draft document No. 3002005326, "Ensuring Safety/ Dependability with Digital I&C," is the industry approach to this issue and proposed using it. This EPRI document is not yet publicly available and it has not been submitted to the NRC for its review and endorsement, therefore the staff could not use it or comment on it. In addition, the NEI representatives clarified that the defensive measures described in the EPRI document considered the mechanisms (source of the failure).

NEI CCF Technical Document

After the discussions on the key technical issues, the NEI representatives provided a discussion of a proposed industry-developed technical basis document on CCF. During this discussion, the NRC staff noted that the purpose of the staff's policy technical basis and industry's proposed basis document are different, as the NEI proposed document appears to be oriented more towards guidance. However, the staff agreed that both documents should align and that the contents of the industry document could help to inform the NRC technical basis document. The Industry's technical basis document is intended to provide guidance for licensees and applicants on how to address the NRC CCF policy. In addition, the industry representatives noted that this paper will draw from information within the EPRI draft document No. 3002005326. As mentioned above, this EPRI document is not yet publicly available and it has not been submitted to the NRC for its review and endorsement, therefore the staff could not use it or comment on it. The NRC staff noted that its technical basis document is intended to support the staff's recommended policy on the digital CCF issue to the Commission. Based on this discussion, the NRC staff recommended that NEI provide its basis document so the NRC staff can consider it in its preparation of the policy technical basis document. In addition, the NRC staff reiterated that all participants could provide information for the staff's consideration in developing the updated policy recommendation.

Closing Discussion

In closing, the NRC staff noted to the industry participants that in preparing its technical basis document, the NEI should ensure that definitions of terms are consistent with those already in use and should avoid creating new terms.

At the end of the meeting, the NEI and industry representatives asked the NRC staff what they thought were the most significant challenges in developing the technical basis document and how the industry could help with the effort. The NRC staff suggested industry provide answers or recommendations as well as technical references to the key technical issues included in the presentation. The NEI representatives agreed to provide suggestions on this topic in a letter. This was an action from the meeting.

Public Comments

Public comments were provided throughout the meeting.

Action Items

The following action items were identified at the meeting:

- 1) Where possible, the NRC staff will identify a means to make all information it used in developing the policy recommendation available.
- 2) Schedule tabletop meetings to discuss specific challenges to address CCF for the key technical issues discussed.
- 3) Schedule a workshop later in the summer to discuss ongoing activities and technical basis document.
- 4) NEI will determine if a smaller, non-proprietary document focused on the US nuclear industry could be prepared.
- 5) NEI will send a letter with its recommendations/suggestions to the key technical issues discussed during the meeting.

Project No. 689

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