UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

October 3, 2019

MEMORANDUM TO: Nancy L. Salgado, Chief
Instrumentation and Controls Branch (A)
Division of Engineering
Office of Nuclear Reactor Regulation

Wendell Morton, Acting Chief
Instrumentation and Controls Branch (B)
Division of Engineering
Office of Nuclear Reactor Regulation

Ronaldo V. Jenkins, Chief
Instrumentation, Controls and Electrical Engineering Branch
Division of Engineering
Office of Nuclear Regulatory Research

FROM: Tekia V. Govan, Project Manager ***/RA/***
ROP Support and Generic Communication Branch
Division of Inspection and Regional Support
Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF THE PUBLIC MEETING ON THE INTEGRATED ACTION PLAN TO MODERNIZE INSTRUMENTATION AND CONTROLS REGULATORY INFRASTRUCTURE: MODERNIZATION PLAN #1D, REVISION TO BRANCH TECHNICAL POSITION 7-19 HELD ON AUGUST 29, 2019

On August 29, 2019, the U.S. Nuclear Regulatory Commission (NRC) staff held a Category 2 public teleconference with the Nuclear Energy Institute (NEI) and the nuclear industry to discuss Modernization Plan #1D, to the draft Branch Technical Position (BTP) 7-19, "Guidance for Evaluation of Diversity and Defense-In-Depth in Digital Computer-Based Instrumentation and Control Systems," Revision 8 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML19231A332). This topic was discussed in the NRC's "Integrated Action Plan to Modernize Digital Instrumentation and Controls Regulatory Infrastructure," Revision 3, updated January 2019 (ADAMS Accession No. ML19025A312).

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Prior to this meeting, NEI provided the NRC staff with comments on the draft BTP 7-19, Revision 8 (ADAMS Accession No. ML19240A317). The staff reviewed this information and developed questions regarding the document to be discussed during the meeting.

In addition to NEI's comments, the NRC staff also received comments from an anonymous member of the public (ADAMS Accession Nos. ML19241A422 and ML19269B699).

Meeting Summary

NRC and industry management made brief opening remarks, and all attendees introduced themselves.

The NRC staff presented an overview of changes proposed for BTP 7-19, Revision 8 (ADAMS Accession No. ML19240A327). The staff indicated that the document will be reorganized to align all review criteria with corresponding acceptance criteria such that the same topical material will not appear in multiple places within the guidance. The scope and purpose of BTP 7-19, Revision 8, will be more focused and precisely indicate the aspects of common cause failure (CCF) that are to be addressed within the document. The document will include a categorization scheme that will identify and describe classes of proposed digital systems based on safety significance and describe how the categorization scheme may be used to develop a graded approach to addressing CCF. The section regarding spurious operations resulting from CCFs will be enhanced and clarified. Sections in BTP 7-19, Revision 8, referring to manual operations and manual systems-level actuation will contain enhanced review and acceptance criteria. Provisions for eliminating a postulated CCF from further consideration will be enhanced. The NRC staff provided a draft process flow chart to accompany the revised BTP 7-19, Revision 8, to enable users to identify the steps within the document for assessing the vulnerability of proposed digital instrumentation and control (I&C) systems to CCF, and for assessing and mitigating the consequences of CCFs, whose vulnerability cannot be prevented (ADAMS Accession No. ML19231A338).

The staff continued their presentation by describing the proposed content within draft BTP 7-19, Revision 8, regarding how to address CCFs that can result in spurious operations. The staff also discussed its plans for incorporating acceptance criteria for how licensees and applicants should credit manual system-level actuation controls and available independent displays when describing how CCFs can be mitigated.

Additionally, the staff described how they were seeking clarification from NEI and stakeholders regarding a previous comment provided by NEI on the possible crediting of "Leak-before-Break" philosophy for excluding the need to address digital safety system CCF with a simultaneous large break loss-of-coolant accident (LOCA) event or a main steamline break event.

Following the NRC staff's presentation, NEI provided clarification and identified points worth noting in their submitted comments. There were also some comments provided by members of the public as a result of the clarification discussion with NEI. The following concepts of BTP 7-19 were discussed:

Quality versus Qualification

An industry representative pointed out that within the draft BTP 7-19, Revision 8, it appeared that the NRC staff had identified a characteristic of an existing installed system as being of high quality because it was shown to be sufficient reliable to achieve the safety functions under the

plant conditions needed. The representative believes that the language in the draft BTP 7-19 appears to conflate high "quality" with equipment "qualification."

Leak before Break

An industry representative explained that the NRC staff should take into consideration that licensees are required to have multiple diverse methods of detecting an increase in reactor coolant pressure boundary (RCPB) leakage of 1 gallon per minute within 1 hour, referencing the guidance in a previous version of Regulatory Guide 1.45. This ability to detect RCPB leakage enhances the opportunity for plant operators to respond to incipient line ruptures before they can become significant design-basis large break LOCAs. Since this capability exists, and since large bore piping systems designed to American Society of Mechanical Engineers (ASME) Section III requirements are not likely to incur sudden double-ended guillotine breaks concurrently with the occurrence of a beyond-design-basis CCF of a digital system designed to protect against such breaks, licensees believe it is reasonable to not require licensees to demonstrate how digital protection systems are sufficiently diverse so as to protect against two concurrent beyond-design-basis conditions.

Single Random Failures vs. Latent Software Defects

NEI requested that the NRC staff make it very clear that single random hardware failures occurring with proposed digital I&C systems, which are treated as being "within design basis" considerations, need to be treated very differently from latent software defects, which are considered as "beyond-design-basis" events.

Use of Probabilistic Risk Assessment (PRA) Results and other Methodologies for Categorizing Digital I&C Systems

NEI commented that the NRC staff should consider including language within the BTP 7-19 revision allowing licensees to be able to apply risk information based on PRA results in their methodologies for classifying/categorizing the systems within the A1, A2, and B1 categories. Similarly, they should be able to use risk information from their "Maintenance Rule" programs (Title 10 of the *Code of Federal* Regulations (CFR) Section 50.65) and "Risk-Informed Categorization and Treatment of SSCs" (10 CFR 50.69) in determining how a proposed digital I&C system should be appropriately categorized and evaluated for CCF vulnerabilities and consequences.

Use of Absolutes in Review Guidance Language

NEI requested the NRC staff to consider removing all language in the draft BTP 7-19 that implies absolutes. An example was provided where a statement in the proposed draft stated that it is difficult to prove that digital I&C systems are "error-free." NEI stated that such language needs to be revised to indicate that systems need to be shown to have "reasonable assurance of performing in a highly reliable manner" to achieve their required safety functions. Also, language should not be mixed when referring to design-basis versus beyond-design-basis CCFs. For example, one statement in the draft BTP 7-19 indicated that "DI&C systems development errors are a credible source of CCF." However, the term "credible" is typically reserved for descriptions of "within design basis" considerations.

Extensive Testing to Eliminate Postulated CCFs from Further Consideration

An industry representative identified that the proposed language, regarding the use of extensive testing to demonstrate that a postulated CCF can be removed from further consideration, was lacking in both direction and clarity. It was stated that licensees need flexibility in the methodology that needs to be applied based on the specific technology they are using. It was also added that the proposed language seemed applicable to only one type technology and it was recommended that the NRC staff consider revising the BTP to include more performance-based language rather than technology-specific language.

Applicability of the BTP to Non-Production and Utilization Facilities

A member of the public requested that the NRC staff consider adding language within the draft BTP 7-19 that indicates whether the NRC staff can use the guidance within BTP 7-19 when reviewing applications or amendments received from non-production and utilization facilities, such as research and test reactors.

Software Testability

A member of the public pointed out that the Department of Energy is currently studying advanced methods of conducting software testing to determine whether there are consistent ways to determine whether a proposed set of operating and application software is sufficiently reliable to perform in highly safety-significant applications. And perhaps the NRC staff would consider including language within the draft BTP revision concerning testability of software, as well as, integrated hardware and software systems.

The NRC staff engaged in discussion to understand the comments provided for each of the above topics. However, the NRC staff made no decisions or took no agency positions during this meeting.

Action Items:

- By September 6, 2019, NEI will provide further clarification of their Comment #13, Comment # 23 and how the leak before break criteria can be credited in excluding large break LOCAs and main steamline break events from evaluation.

- NRC staff will consider comments received from NEI and stakeholders as they continue to prepare a final draft BTP 7-19, Revision 8, which is scheduled to be ready for public comments in November 2019.

Conclusion

At the end of the meeting, NRC and industry management gave closing remarks. NEI expressed appreciation for the open dialogue and willingness of the NRC staff to hear industry views.

The enclosure provides the attendance list for this meeting.

Enclosure:
As stated

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ADAMS Accession No.: ML19268C262 *via e-mail

OFFICE	NRR/DIRS/IRGB/PM	NRR/DE/EICA/TR*	NRR/DIRS/IRGB/OLA*	NRR/DE/EICB/TR*
NAME	TGovan	DRahn	IBetts	WMorton
DATE	09/24/2019	09/24/2019	09/30/2019	10/03/2019

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LIST OF ATTENDEES

INTEGRATED ACTION PLAN TO MODERNIZE INSTRUMENTATION AND CONTROLS REGULATORY INFRASTRUCTURE: MODERNIZATION PLAN #1D, REVISION TO BRANCH TECHNICAL POSITION 7-19

August 29, 2019, 9:30 AM to 12:00 PM

Teleconference

ATTENDEE	ORGANIZATION
1. Paul Rebstock	NRC
2. Deanna Zhang	NRC
3. Nancy Salgado	NRC
4. Paul Kallan	NRC
5. Steven Arndt	NRC
6. David Desaulniers	NRC
7. Robert Beaton	NRC
8. Eric Benner	NRC
9. Wendell Morton	NRC
10. Tekia Govan	NRC
11. Maxine Segarnick	NRC
12. Robert Beaton	NRC
13. Rossnyev Alvarado	NRC
14. David Rahn	NRC
15. Steve Vaughn	NEI
16. Jana Bergman	Curtiss-Wright
17. Ronaldo Jenkins	NRC
18. Pareez Golub	Excel Services
19. Raymond Herb	Southern Nuclear
20. Warren Odess-Gillett	Westinghouse
21. Jack Zhao	NRC
Participated via conference line	
22. Steve Burd	Entergy
23. Alvin Hinson	Entergy
24. David Blanchard	Applied Reliability Engineering
25. David Herrell	MPR Associates
26. Mark Burzynski	Rolls Royce
27. Don Chase	Curtiss-Wright
28. Ken Thomas	Nuclear Science and Technology
29. Gordon Clefton	Idaho National Laboratory
30. Bernie Dittman	NRC
31. Matt Mascio	Entergy
32. Thomas Thorton	Entergy
33. Ismael Garcia	NRC
34. William Sotos	Certrec
35. Dan Cronin	University of Florida
36. Wes Frewin	FPL
37. Rob Burg	Engineering Planning and Management

Enclosure