



**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

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 DATED

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**ADAMS Accession No.: ML19268C262**

\*via e-mail

<b>OFFIC E</b>	NRR/DIRS/IRGB/PM	NRR/DE/EICA/TR*	NRR/DIRS/IRGB/OLA*	NRR/DE/EICB/TR*
<b>NAME</b>	TGovan	DRahn	IBetts	WMorton
<b>DATE</b>	09/24/2019	09/24/2019	09/30/2019	10/03/2019

**OFFICIAL RECORD COPY**

## 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

1. Paul Rebstock
2. Deanna Zhang
3. Nancy Salgado
4. Paul Kallan
5. Steven Arndt
6. David Desaulniers
7. Robert Beaton
8. Eric Benner
9. Wendell Morton
10. Tekia Govan
11. Maxine Segarnick
12. Robert Beaton
13. Rossnyev Alvarado
14. David Rahn
15. Steve Vaughn
16. Jana Bergman
17. Ronaldo Jenkins
18. Pareez Golub
19. Raymond Herb
20. Warren Odess-Gillett
21. Jack Zhao

#### ORGANIZATION

NRC  
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NEI  
Curtiss-Wright  
NRC  
Excel Services  
Southern Nuclear  
Westinghouse  
NRC

#### Participated via conference line

22. Steve Burd
  23. Alvin Hinson
  24. David Blanchard
  25. David Herrell
  26. Mark Burzynski
  27. Don Chase
  28. Ken Thomas
  29. Gordon Clepton
  30. Bernie Dittman
  31. Matt Mascio
  32. Thomas Thorton
  33. Ismael Garcia
  34. William Sotos
  35. Dan Cronin
  36. Wes Frewin
  37. Rob Burg
- Entergy  
Entergy  
Applied Reliability Engineering  
MPR Associates  
Rolls Royce  
Curtiss-Wright  
Nuclear Science and Technology  
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Enclosure