



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

June 4, 2019

MEMORANDUM TO: Tara Inverso, Branch Chief  
ROP Support and Generic Communication Branch  
Division of Inspection and Regional Support  
Office of Nuclear Reactor Regulation

Michael D. Waters, Branch Chief  
Instrumentation and Controls Branch  
Division of Engineering  
Office of Nuclear Reactor Regulation

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 REGULATORY ISSUE SUMMARY 2002-22,  
SUPPLEMENT 1, IMPLEMENTATION CONCEPTS PUBLIC MEETING  
HELD WITH PUBLIC SERVICE ENTERPRISE GROUP, LLC ON  
MAY 9, 2019

On May 9, 2019, the U.S. Nuclear Regulatory Commission (NRC) staff held a Category 1 public meeting with Public Service Enterprise Group (PSEG), LLC to discuss the implementation of Regulatory Issue Summary (RIS) 2002-22, Supplement 1, "Clarification on Endorsement of Nuclear Energy Institute Guidance in Designing Digital Upgrades in Instrumentation and Control Systems" (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18143B633), regarding the licensee's proposed installation of a Class 1E digital technology-based uninterruptible power supply (UPS) system at Hope Creek Generating Station (Hope Creek). The feedback provided in this meeting by the NRC staff should not be considered requirements and can be used to assist a licensee in developing a complete and comprehensive qualitative assessment under 10 Code of Federal Regulations (CFR) 50.59.

**Meeting Summary**

The NRC and industry management made brief opening remarks, and introductions were made by all in attendance. PSEG provided an overview of their planned digital UPS upgrade intended to solve obsolescence problems. Using RIS 2002-22, Supplement 1, PSEG discussed their draft qualitative assessment that was developed to demonstrate that common cause failure for this digital modification is sufficiently low. The NRC staff asked technical questions on various

CONTACT: Tekia V. Govan, NRR/DIRS  
(301) 415-6197

issues, and provided the following feedback for PSEG/Hope Creek and other licensees to consider when developing a qualitative assessment as recommended in the RIS 2002-22, Supplement 1, for digital technology-based modifications performed under 10 CFR 50.59:

1. When performing digital modifications under the 10 CFR 50.59 process, using RIS 2002-22, Supplement 1, the NRC staff recommended that PSEG identify the specific functional aspects of the proposed new design where digital equipment has replaced analog equipment and identify whether there are any new or different failure modes for the new equipment, in its new configuration. If there are any new potential hazards that are introduced through the introduction of digital technology, such as potential for common cause failure (due to combining several design functions into one device or through digital communications among systems performing different functions), design features that were incorporated to address such hazards leading to the triggering of potential adverse failure modes should be identified.
2. The NRC staff recommended that PSEG address in their modification documentation the reasons for any differences in design features between the old design and the new design. For example, the proposed new inverter design does not have a provision for protection of the loads from overvoltage conditions ("crowbar" circuit), whereas the existing design did have this provision. The rationale used to justify this design change should be documented as part of the modification package. The staff noted that the rationale should describe whether the new design provides the same level of defense-in-depth protection as offered by the existing design (and how), or whether there are compensating measures that accomplish the same level of overvoltage protections.
3. Hope Creek explained that a digital design defect in all four channels of inverters could result in a common cause failure concurrent with a loss of offsite power event. The NRC staff suggested that the licensee explain what the means would be to cope with such an event. The licensee stated that manual operator actions would be required. The NRC staff recommended that the licensees describe the results of their analyses identifying whether there was sufficient time available to respond to this event, and sufficient independent controls and display instruments that would enable plant operators to initiate appropriate protective functions (e.g., at the system level) to cope with this event.
4. The NRC staff suggested that Hope Creek review NRC Information Notice (IN) 2006-18, Supplement 1, "Significant Loss of Safety-Related Electrical Power at Forsmark Unit 1, in Sweden" (ADAMS Accession No. ML071900368), for addressing common cause failure that can affect multiple trains of a UPS system providing vital power to safety related loads. IN 2006-18 describes how an electrical fault in the switchyard resulted in significant voltage reduction to redundant trains of alternating current (AC) power for a short period.

The presentation from this meeting can be found under ADAMS Accession No. ML19127A170. The NRC staff made no decisions or took any agency positions during this meeting.

The enclosure provides the attendance list for this meeting.

**Conclusion**

PSEG expects implementation of this digital modification to occur at Hope Creek during the spring of 2020. PSEG expects that the draft 10 CFR 50.59 qualitative assessment described in this meeting may be utilized by other licensees considering similar plant modifications. The NRC staff noted that this proposed modification represents the first time the staff has had the opportunity to provide feedback on a licensee's use of the guidance in the RIS 2002-22, Supplement 1, for a proposed digital upgrade of a support function for the reactor protection system and engineered safety features actuation system functions. While the NRC staff made no judgements or decisions on the draft qualitative assessment presented by Hope Creek, the staff stated that it appeared that Hope Creek provided information to demonstrate several design measures, processes, and operating experience could justify their common cause failure determination of sufficiently low for the proposed modification. Because modifications made under 10 CFR 50.59 do not require prior NRC approval, the NRC staff would not review or approve this modification prior to implementation. The modification would be subject to NRC inspection. The staff noted that feedback provided by the NRC staff during the meeting should not be considered requirements for the implementation of 10 CFR 50.59, but the feedback can be considered by PSEG in developing a complete and comprehensive qualitative assessment under 10 CFR 50.59.

Enclosure:  
As stated

SUBJECT: SUMMARY OF THE REGULATORY ISSUE SUMMARY 2002-22,  
 SUPPLEMENT 1, IMPLEMENTATION CONCEPTS PUBLIC MEETING HELD  
 WITH PUBLIC SERVICE ENTERPRISE GROUP, LLC ON MAY 9, 2019 DATED

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**ADAMS Accession No.: ML19150A273**

**\*= via email**

<b>OFFICE</b>	NRR/DIRS/IRGB	NRR/DE/EICB/TR	NRR/DIRS/IRGB	NRR/DIRS/IRGB	NRR/DE/EICB
<b>NAME</b>	TGovan	DRahn*	PMcKenna*	IBetts*	MWaters*
<b>DATE</b>	05/28/2019	05/28/2019	05/29/2019	05/31/2019	06/03/2019
<b>OFFICE</b>	NRR/DIRS/IRGB				
<b>NAME</b>	TInverso*				
<b>DATE</b>	06/04/2019				

**OFFICIAL RECORD COPY**

**LIST OF ATTENDEES**

**REGULATORY ISSUE SUMMARY 2002-22, SUPPLEMENT 1,  
IMPLEMENTATION CONCEPTS**

**May 9, 2019, 9:30 AM to 12:00 PM**

**NRC One White Flint North  
11555 Rockville Pike  
O-8B04  
Rockville, MD**

**ATTENDEE**

**ORGANIZATION**

1. Michael Wiwel	PSEG Nuclear
2. Dave Heinig	Sargent and Lundy
3. Steve Vaughn	NEI
4. Michael Richers	PSEG Nuclear
5. Paul Duke	PSEG Nuclear
6. Dave Mannai	PSEG Nuclear
7. Shawn Madden	PSEG Nuclear
8. Jonathan Paes	PSEG Nuclear
9. Billy Dickson	NRC
10. Phil McKenna	NRC
11. Tara Inverso	NRC
12. Nancy Salgado	NRC
13. Thomas Koshy	NRC
14. David Rahn	NRC
15. Neil Archambo	Duke Energy
16. Norbert Carte	NRC
17. Eric Benner	NRC
18. Michael Waters	NRC

Enclosure

- 19. Dave Beaulieu NRC
- 20. Wendell Morton NRC
- 21. Tekia Govan NRC

Participated via conference line

- 22. Matthew Shakur Westinghouse
- 23. Rossnyev Alvarado NRC
- 24. Ismael Garcia NRC
- 25. Donald Chase Curtiss Wright
- 26. John Schrage Entergy
- 27. Ron Jarrett TVA
- 28. Gordon Cleifton Idaho National Lab
- 29. Jack Carey PSEG Nuclear
- 30. Raymond Herb Southern Nuclear
- 31. Louis Dumont NRC
- 32. David Herrell MPR Associates
- 33. Sandra Jannetty Sargent and Lundy
- 34. Warren Odess-Gillett Westinghouse
- 35. Brian Thomas NRC
- 36. Frank Mascitelli Exelon