



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

June 24, 2022

Mr. David P. Rhoades
Senior Vice President
Constellation Energy Generation, LLC
President and Chief Nuclear Officer
Constellation Nuclear
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: LIMERICK GENERATING STATION, UNITS 1 AND 2 – SUMMARY OF
MAY 3, 2022, PUBLIC OBSERVATION MEETING WITH CONSTELLATION
ENERGY GENERATION, LLC RE. PROPOSED LICENSE AMENDMENT
REQUEST TO MODIFY 10 CFR 50.69 LICENSE CONDITIONS
(EPID L-2021-LLA-0042)

Dear Mr. Rhoades:

On May 3, 2022, the U.S. Nuclear Regulatory Commission (NRC) staff held a virtual public meeting with representatives from Constellation Energy Generation, LLC (the licensee).¹ The purpose of the meeting was to discuss the NRC's draft requests for additional information (RAI)² relating to Constellation's license amendment request (LAR)³ Limerick Generating Station, Units 1 and 2. The licensee requested in its LAR to modify the existing Limerick license conditions for Title 10 of the *Code of Federal Regulations*, Section 50.69 (10 CFR 50.69), "Risk-informed categorization and treatment of structures, systems and components for nuclear power reactors." The amendments would allow the licensee to use alternative defense-in-depth (DID), pressure boundary, and seismic categorization processes for treatment of systems, structures, and components per 10 CFR 50.69. Enclosure 1 of this summary contains a list of attendees. Enclosure 2 of this summary contains the NRC's key messages discussed during the meeting. The NRC conducted a regulatory audit in November 2022 to support its review of the LAR.

The meeting discussion focused on the licensee's proposed alternative DID categorization process documented in PWROG-20015, "Alternate 10 CFR 50.69 Defense-in-Depth Categorization Process."⁴ In January 2022, the licensee posted a revision of the methodology (PWROG-20015, Revision 3B) to the view-only web-based audit portal. The staff requested the licensee submit a publicly available copy of the latest version of PWROG-20015 to the NRC for the staff's review.

¹ The meeting notice and agenda, dated April 20, 2022, are available in Agencywide Documents Access and Management System (ADAMS) under Accession No. ML22110A168.

² The RAI, dated April 19, 2022, is available in ADAMS under ML22103A254.

³ ML21070A412, dated March 11, 2021

⁴ ML21084A099, dated March 2021

The NRC staff noted that after the audit discussions, the licensee made significant changes to the proposed DID methodology regarding the way the probabilistic risk assessment (PRA) accident sequences would be filtered to identify structures, systems, and components (SSCs) for categorization as high safety significant. The staff informed the licensee that its RAI is asking for further justification of the revised methodology's basis.

The staff questioned how solely using the results of the PRA for assessing DID would meet the guidance in NRC Regulatory Guide 1.174,⁵ which identifies maintaining DID as one of five independent key principles of risk-informed decisionmaking. The staff also discussed the role of the integrated decisionmaking panel (IDP) in the overall 10 CFR 50.69 categorization process and, because of the increased number of SSCs that would be categorized as low safety significant per the proposed alternative DID categorization process, expressed concern over the apparent increased reliance on the IDP.

The NRC staff informed the licensee that its RAI is asking for the basis of the licensee's approach to assessing common cause failures (CCFs) for DID. The staff requested explanation of how excluding CCF of three or more components would map to the existing methodology in the Nuclear Energy Institute (NEI) report NEI 00-04,⁶ given that the NEI guidance appears to be at the system train level, while the CCF groups may not necessarily map to the system train level and do not capture any inter-system CCF.

Because the initiating event frequency for a containment bypass event is expected to be below the frequency proposed for high safety significant screening in the proposed DID methodology, the NRC staff informed the licensee that its RAI is asking for further clarification of whether the licensee expects containment bypass events to identify any high safety significant SSCs. The staff also asked whether and how the proposed passive categorization methodology would address containment bypass concerns. The staff provided additional clarifying information and considerations for the licensee, which are included in Enclosure 2 of this summary. The licensee requested clarification of the staff's questions and expectations for the RAI response.

The NRC staff did not make any regulatory decisions or commitments at the meeting. Enclosure 1 of this summary lists members from the public that attended the meeting. The NRC staff did not receive any public meeting feedback forms.

5 NRC Regulatory Guide 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," Revision 3, January 2018 (ML17317A256)

6 NEI 00-04, "10 CFR 50.69 SSC Categorization Guideline," Revision 0, July 2005 (ML052910035)

Please direct any inquiries to me at 301-415-0489 or by e-mail to Audrey.Klett@nrc.gov.

Sincerely,

/RA/

Audrey L. Klett, Senior Project Manager
Plant Licensing Branch I
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-352 and 50-353

Enclosures:

1. List of Attendees
2. NRC Key Messages

cc: Listserv

Enclosure 1

List of Attendees

LIST OF ATTENDEES
MAY 3, 2022, VIRTUAL PUBLIC MEETING
WITH CONSTELLATION ENERGY GENERATION, LLC
LIMERICK GENERATING STATION, UNITS 1 AND 2

U.S. Nuclear Regulatory Commission

Mihaela Biro, NRR¹/DRA²/APLA³

Jeff Circle, NRR/DRA/APLA

Jim Danna, NRR/DORL⁴/LPL⁵

Fred Forsaty, NRR/DSS⁶/SNSB⁷

John Hughey, NRR/DRA/APOB⁸

Audrey Klett, NRR/DORL/LPL1

Ed Miller, NRR/DORL/LPL2-1⁹

Bob Pascarelli, NRR/DRA/APLA

V Sreenivas, NRR/DORL/LPL1

Keith Tetter, NRR/DRA/APLC¹⁰

Shilp Vasavada, NRR/DRA/APLC

Steve Short, PNNL¹¹

Mark Wilk, PNNL

Constellation Energy Generation, LLC

Stephen Flickinger

Roy R. Linthicum

Suzanne Loyd

Ashley Rickey

Zachary Roads

Glenn Stewart

Jeffrey Stone

Philip Tarpinian

Jeremy Thoryk

Electric Power Research Institute

Jim Chapman

Doug Kull

Patrick O'Regan

Enercon

Howard Brodt

Patrick J. Clay

Garrett Godbey

Tim Sande

Justin Wheat,

Jensen Hughes

Brian Albinson

David Bidwell

Brian Nolan

David Passehl

Charles Young

Westinghouse

Heather Detar

Ryan Griffin

Richard W. Rolland, III

Members of the Public

Rob Burg, Engineering Planning and Management, Inc.

Clayton Crouch, Dominion Energy

Christopher De Rego, Duke Energy

Bradley Dolan, Tennessee Valley Authority

Andrew Lipetzky, Duke Energy

Heather Szews, Duke Energy

Jennifer Varnedoe, Duke Energy

¹ Office of Nuclear Reactor Regulation

² Division of Risk Assessment

³ Probabilistic Risk Assessment Branch A

⁴ Division of Operating Reactor Licensing

⁵ Plant Licensing Branch I

⁶ Division of Safety Systems

⁷ Nuclear Systems Performance Branch

⁸ Probabilistic Risk Assessment Oversight Branch

⁹ Plant Licensing Branch II-1

¹⁰ Probabilistic Risk Assessment Branch C

¹¹ Pacific Northwest National Laboratory (NRC contractor)

Enclosure 2

NRC Key Messages

**LIMERICK 50.69 ALTERNATE METHOD LAR
NRC DISCUSSION
PROPOSED DEFENSE-IN-DEPTH METHODOLOGY**

In review of the proposed methodology for defense-in-depth and the licensee portal responses to the second audit questions, APLA has the following concerns:

1. General Points

- 1.1. The staff requests a publicly available copy of the latest PWROG-20015 Rev 3B guidance for review.
- 1.2. The proposed methodology requires further discussion on its basis in that it has low safety significance (LSS) screening criteria based on cutset elements.
 - The licensee proposed to further detail the guidance on how to select and address various types of cutset elements in making a screening determination.
 - The staff needs to understand the detailed technical basis for increasing the screening criterion in the revised guidance from one to two cutset elements (excluding the initiating event) for specific initiator frequencies without basis or proof.
- 1.3. The 50.69 regulation was written referring to the tenets of RG 1.174 R3 with respect to the principles of risk-informed integrated decision-making being independent.
 - 1.3.1. The proposed methodology uses the results of the licensee's PRA to demonstrate maintaining defense-in-depth. Any modeling and completeness uncertainty of the PRA will propagate through this alternate defense-in-depth assessment. How will this be addressed?
 - 1.3.2. RG 1.174 R3 cautions against PRA results as the only basis for defense-in-depth determination. Are there other considerations which need to be made to ensure that adequate defense-in-depth is maintained?
- 1.4. To categorize as LSS, the existing guidance requires the success of three or more diverse trains, or two redundant trains of equipment for high initiating event scenarios. That would mean, at a minimum, three basic events in addition to the IE. Why wasn't the methodology expanded to that?
- 1.5. The alternate methodology is conducted for the entire plant at the SSC level. However, it is unclear how the associated functions are assessed along with HSS SSCs.
- 1.6. In several areas, the licensee referred to the IDP as "catching" any mis-categorization from the alternate DID method. The description of the role of the IDP in 50.69 (c).2 is, "***[t]he SSCs must be categorized by an Integrated Decision-Making Panel (IDP) staffed with expert, plant-knowledgeable members whose expertise includes, at a minimum, PRA, safety analysis, plant operation, design engineering, and system engineering***". However, the staff believes that the IDP was not intended to be a substitute for the DID methodology. NEI 00-04 Section 9.2 does state, "*The IDP review of the categorization of the functions/SSCs does not need to include the verification that all of the SSCs mapped to that function are appropriate.*" The staff feels that the alternate DID methodology might place too much reliance on the IDP.
- 1.7. The revised alternate guidance, section 2.2.3.2. refers to NEI 00-04 Chapter 6 in that the table in Figure 6-1 is based on the success criterion used in the PRA.

**LIMERICK 50.69 ALTERNATE METHOD LAR
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However, it departs from the PRA modeling since the top row of the table represents remaining system capability assuming that the SSC being categorized, and its associated function, are not considered available. The alternate methodology using base model cutsets seems to imply that remaining capability of other systems/functions is addressed but, the licensee needs to demonstrate that.

2. Specific RAIs

2.1. RAI 10 - Core Damage Defense in Depth Cutset Filtering

2.1.1. RAI 10.F.vi. Asked how the licensee will address the accumulated impact of several IEs below the 1E-4 frequency threshold. This was seen for several flooding scenarios with identical consequences but, would screen out on IEF. The licensee response failed to address this.

2.1.2. RAI 10.G ii. Asked for non-modeled SSC and how they will be considered. The licensee responded that they would be categorized as LSS. However, it is unclear how they would be categorized if the SSC is part of a supporting function of a HSS system or function.

2.1.3. RAI 10.H. Asked for a sensitivity of increasing the cutset element limit from two to three, etc. Licensee did not directly respond to the request.

2.2. RAI 11 - Defense-in-Depth First Order Core Damage Cutset Approach

2.2.1. RAI 11.A. Asked if the intent of the single cutset element method was to assign HSS to those SSC that had only one layer of DID. The licensee responded with references to the revised alternate guidance without a direct explanation.

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RidsNrrDraApla Resource	KTetter, NRR
RidsNrrDraAplc Resource	SVasavada, NRR
RidsNrrDraApob Resource	JGrieves, Region 1
RidsOpa Resource	CNolan, OEDO

ADAMS Accession No.: ML22168A192

OFFICE	NRR/DORL/LPL1/PM	NRR/DORL/LPL1/LA	NRR/DRA/APLA/BC
NAME	AKlett	KZelenock	RPascarelli
DATE	06/17/2022	06/21/2022	06/23/2022
OFFICE	NRR/DORL/LPL1/BC	DORL/LPL1/PM	
NAME	JDanna	AKlett	
DATE	06/24/2022	06/24/2022	

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