

**From:** [Nick Smith \(He/Him/His\)](#)  
**To:** [\[licensee\] Mascitelli, Francis](#); [Rickey, Ashley:\(Constellation Nuclear\)](#)  
**Cc:** [Michael Marshall](#); [Hipo Gonzalez](#); [Carla Roque-Cruz](#)  
**Subject:** RAIs for Limerick Generation Station, Units 1 and 2 - LAR and Exemption Request for Digital I&C Installation Support (EPID L-2023-LLA-0025 and L-2023-LLE-0005)  
**Date:** Tuesday, June 20, 2023 6:17:00 PM

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Hello Frank and Ashley,

By letter dated February 17, 2023 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML23052A022), Constellation Energy Generation, LLC (Constellation) submitted to the U.S. Nuclear Regulatory Commission (NRC) a license amendment request (LAR) to revise technical specifications and request an exemption from requirements of Sections 50.62(c)(3), (4) and (5) of Title 10 of the *Code of Federal Regulation* (10 CFR) to support a digital modernization project installation. The proposed amendment would revise the technical specifications to adopt features from NUREG-1433, Revision 5, "Standard Technical Specifications for General Electric BWR/4 Plants," and revise instrumentation requirements to support the installation of a digital modification during upcoming refueling outages. The proposed amendment is not a risk-informed amendment submitted in accordance with Regulatory Guide 1.174. Therefore, the NRC staff does not review the licensee's probabilistic risk assessment models to determine their technical acceptability. However, the NRC staff considers the licensee-provided qualitative risk insights and associated compensatory measures in its decision on the proposed change.

The NRC staff has determined that additional information is needed to complete its review of the requests. Please note that there are changes to RAI 1, RAI 2, RAI 3, RAI 4, and RAI 6 from the draft RAIs provided to document the guidance to support the methodology used in any staff analyses conducted for the proposed modifications.

Please provide your responses to these information requests within 35 calendar days. Additional RAIs will be provided in separate correspondence.

### **Requests for Additional Information**

#### Regulatory Basis for RAIs 1 to 7

Paragraph 50.62(c)(4) of 10 CFR requires, in part, that each boiling water reactor must have a standby liquid control system (SLCS) with the capability of injecting into the reactor pressure vessel a borated water solution at such a flow rate, level of boron concentration and boron-10 isotope enrichment, and accounting for reactor pressure vessel volume, that the resulting reactivity control is at least equivalent to that resulting from injection of 86 gallons per minute of 13 weight percent sodium pentaborate decahydrate solution at the natural boron-10 isotope abundance into a 251-inch inside diameter reactor pressure vessel for a given core design; the SLCS and its injection location must be designed to perform its function in a reliable manner; and the SLCS initiation must be automatic and must be designed to perform its function in a reliable manner.

Paragraph 50.62(c)(5) of 10 CFR requires that each boiling water reactor must have

equipment to trip the reactor coolant recirculating pumps (RRCS) automatically under conditions indicative of an Anticipated Transient Without SCRAM (ATWS) and this equipment must be designed to perform its function in a reliable manner.

In the Section 3.5 of the LAR and Section D of the exemption request, Constellation describes operator actions needed to replace the automatic initiation of SLCS and RRCS.

In conducting reviews of the Human Factors Engineering (HFE) aspects of licensing submittals for light water reactor facilities, the NRC staff apply the guidance of NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR [Light-Water Reactor] Edition" (the SRP). Chapter 18 of the SRP, Revision 3, "Human Factors Engineering," provides guidance for the review of HFE considerations of plant modifications and important human actions.

For circumstances involving both changes resulting from plant modifications and the evaluation of important human actions, SRP Chapter 18 provides guidance regarding the use of NUREG-1764, "Guidance for the Review of Changes to Human Actions," Revision 1. This document provides guidance for reviewing changes in human actions, such as those that are credited in nuclear power plant safety analyses.

## **RAI 1**

### Technical Basis

NUREG-1764 Section 4.2 provides criteria regarding the conduct of task analysis, including analyses regarding how personnel will both know when action is necessary and that it is performed correctly. However, the LAR does not provide any discussion of the results of any task analysis for the proposed change.

### Information Needed

- a. Please describe or provide a list of the guidance document(s) or standard(s) that describe the methods Constellation followed to conduct task analyses of the operator actions mentioned in the amendment request or exemption request.
- b. Please provide a description of any task analysis conducted for operator actions affected by the proposed change, including whether the results of any such analysis was that operator tasks would remain unchanged.

## **RAI 2**

### Technical Basis

NUREG-1764 Section 4.2 provides criteria regarding staffing, including analyses of effects of the changes in human actions upon the number, qualifications, and staffing levels of operations personnel. However, the LAR does not provide any discussion of the results of

any staffing-related analysis for the proposed change.

Information Needed

- a. Please describe or provide a list of the guidance document(s) or standard(s) that describe the methods Constellation followed to conduct staffing-related analyses of the operator actions mentioned in the amendment request or exemption request.
- b. Please provide a description of any staffing-related analysis conducted in support of the proposed change, including whether the results of any such analysis was that operator staffing levels would remain unchanged.

**RAI 3**

Technical Basis

NUREG-1764 Section 4.3 provides criteria regarding modifications to human-system interfaces (HSIs) as they relate to changes in operator task requirements. However, the LAR does not provide any discussion of modifications to HSIs.

Information Needed

- a. For any modification to HSIs, please describe or provide a list of the guidance document(s) or standard(s) that describe the methods Constellation used to assess modifications to HSIs.
- b. Please provide a description of any modifications to HSIs (e.g., indications and controls located in the main control room) that will be made in conjunction with the proposed change, including whether no modifications to HSIs will occur in conjunction with the proposed change.

**RAI 4**

Technical Basis

NUREG-1764 Section 4.3 provides criteria regarding modifications to plant procedures as they relate to changes in operator task requirements. Section 3.5.4 of Attachment 1 of the LAR states that both LGS Emergency Operating Procedures (EOPs) T-101, "RPV Control," and T-117, "ATWS RPV Control," contain ATWS response actions that operators would be expected to take to mitigate an ATWS event. However, the LAR does not discuss whether modifications will occur to these procedures as part of the proposed change.

Information Needed

- a. For any modification to facility EOPs, please describe or provide a list of the guidance document(s) or standard(s) that describe the methods Constellation used to assess modifications to facility EOPs.

- b. Please provide a description of any modifications to facility EOPs (e.g., T-101 and T-117) that will be made in conjunction with the proposed change, including whether no modifications to facility EOPs will occur in conjunction with the proposed change.

## **RAI 5**

### Technical Basis

NUREG-1764 Section 4.3 provides criteria regarding modifications to operator training as it relates to operator task requirements. In Section 3.5.4 of Attachment 1 of the LAR, the licensee states that operators are trained to manually initiate the SLCS during initial and continuing training per the EOPs. However, the LAR does not discuss whether the other manual operator actions besides SLCS initiation that are described in the LAR (e.g., lowering RPV water level, running back recirculation pumps, and isolating reactor water cleanup) are trained on or whether modifications to operator training will occur as part of the proposed change.

### Information Needed

- a. Please provide a description of the operator training that is conducted for the manual operator actions, besides manual SLCS initiation, that are discussed in the LAR, as well as whether any modifications to the operator training program will occur in conjunction with the proposed change.

## **RAI 6**

### Technical Basis

NUREG-1764 Section 4.4 provides criteria regarding the availability and accessibility of all required components. However, the LAR does not discuss whether the availability and accessibility of those indications and controls needed to support operator actions will be affected by the proposed change.

### Information Needed

- a. For any changes in indications and controls, please describe or provide a list of the guidance document(s) or standard(s) that describe the methods Constellation used to assess availability and accessibility of affected indications and controls.
- b. Please provide a description of any effects on the availability and accessibility of required indications and controls that will occur in conjunction with the proposed change, including whether no such components will be affected.

## **RAI 7**

### Technical Basis

NUREG-1764 Section 4.4 provides criteria regarding walkthrough activities conducted for human actions to determine that procedures are accurate and usable, that the training program appropriately addressed the changes, and that the human actions can be completed within the required time. In Section 3.5.4 of Attachment 1 of the LAR, Constellation stated the following:

Initial validation with an operating crew in the simulator showed that operators can reliably initiate SLCS within 5 minutes of the occurrence of an ATWS condition. Full validation of this new time critical action will be completed per OP-AA-102-106 by May 31, 2023.

#### Information Needed

Please provide a description of the results of the full validation of the new time critical operator action for the initiation of SLCS. As part of this, please include details regarding the following:

- Measures included to create realistic scenario conditions;
- Any issues identified with procedural completeness, technical accuracy, and usability;
- Any training program issues identified;
- Whether the credited operator actions could be completed within the allowed time and whether adequate margin exists between the time required and time allowed;
- Whether any complicating factors that might be expected to affect the crews' ability to perform the credited operator actions were included; and
- How many complete crews of operators participated in the walkthrough scenarios.

#### **RAI 8**

#### Regulatory Basis

Paragraph 50.62(c)(3) of 10 CFR requires, in part, that each boiling water reactor must have an alternate rod injection (ARI) system that is diverse (from the reactor trip system) from sensor output to the final actuation device and the ARI system must be designed to perform its function in a reliable manner and be independent (from the existing reactor trip system) from sensor output to the final actuation device.

One of the special circumstances addressed in the exemption request is 10 CFR 50.12(a)(2) (ii). In Section D of the exemption request, Constellation states that the requirements in 10 CFR 50.62(c)(3) are not necessary because of the particular circumstances of the redundant reactivity control system (RRCS) demotion. The particular circumstances are described in both the exemption request and LAR.

#### Technical Basis

In Section 3.5, "One-Time LCO 3.3.4.1 Applicability Change for ATWS Recirculation Pump Trip Actuation Instrumentation," of the LAR, the licensee stated that it plans to remove both divisions of the RRCS from service 30 days prior to the digital modernization project installation. The licensee stated that the removal of the RRCS digital logic system will result in the loss of the RRCS-initiated automatic functions for SLCS injection and associated

reactor water cleanup (RWCU) isolation, ARI system actuation, ATWS recirculation pump trip (ATWS-RPT) actuation, and feedwater runback actuation. The licensee stated that the following automatic and manual functions will be available to supplant those functions that are lost while the RRCS is removed from service, and therefore will be available to mitigate an ATWS event:

- A non-safety-related automatic reactor recirculation pump (RRP) runback on low reactor water Level 3 with more than the minimum analyzed 12 operable main steam relief valves operable. This will supplant the ATWS-RPT trip function.
- The manual start of the SLCS pumps from the main control room no later than 5 minutes post-event. This will supplant the automatic SLCS initiation function.

#### Information Needed

Describe the surveillance testing performed to provide assurance that the non-safety-related RRP runback feature will work automatically during an ATWS condition and provide a summary of past surveillance test results.

#### **RAI 9**

#### Regulatory Basis

Paragraph 50.92(c) of 10 CFR states in part that a proposed amendment must meet three criteria to be considered as having no significant hazards. One of the relevant criteria to determine there is no significant hazard related to the proposed amendment and exemption is:

Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

RIS 2001-22 provides guidance on the evaluation of the change from an evaluated accident in the updated final safety analysis report to the conditions that would exist if the amendment or exemption is approved. Comparison of the probability and consequence values before and after the change to determine the significance.

#### Technical Basis

In Section 2.2, of the LAR, the licensee stated that the RRCS system automatically activates the ARI function. In Section 4.2, of the LAR, the licensee stated that the proposed changes do not impact any accident or event precursors and the probability of an ATWS event occurring does not increase due to this proposed change.

#### Information Needed

Please describe the measures taken to ensure that the removal of the RRCS system does not

cause or increase the probability of an inadvertent plant trip (e.g., via the ARI function) and resulting plant transient.

Best Regards,  
-Nick Smith-  
Project Manager

Licensing Projects Branch  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

301-415-2509