

From: [Richard Guzman](#)
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Cc: [Hipo Gonzalez](#)
Subject: Millstone Power Station, Unit 3 - REQUEST FOR ADDITIONAL INFORMATION Re: LAR to Use Framatome Small Break and Realistic Large Break LOCA Methodologies (EPID L-2023-LLA-0065)
Date: Tuesday, March 5, 2024 2:43:13 PM
Attachments: [MPS3 FRM LOCA Methodology RAI \(PUBLIC\) 2-29-2024 Redacted.pdf](#)

Mr. Sinha,

On February 22, 2024, the U.S. Nuclear Regulatory Commission (NRC) staff sent Dominion Energy Nuclear Connecticut, Inc. (DENC, the licensee) the subject Request for Additional Information (RAI) as a draft e-mail. This RAI is regarding the licensee's May 2, 2023 (ADAMS Accession No. ML23123A279), license amendment request (LAR) to revise the technical specifications (TSs) for Millstone Power Station, Unit No. 3 (MPS3). The LAR proposes to update the list of approved methodologies in MPS3 TS 6.9.1.6.b applicable for use in establishing core operating limits. As stated in the LAR, the proposed TS changes are needed to support the transition of Framatome GAIA fuel with M5TM fuel cladding at MPS3.

The NRC staff and DENC held a conference call on February 29, 2024, to discuss clarifications on the draft RAI. As discussed on the call, please provide a response to these questions no later than April 5, 2024 (approximately 30 days from the date of this communication). The RAI contains proprietary information pursuant to Title 10 of the *Code of Federal Regulations* Section 2.390, "Public inspections, exemptions, request for withholding." The proprietary information is indicated by bold text enclosed with **[[double brackets]]**. The proprietary version of the file will be transmitted via the NRC Box Enterprise File Sync and Share (EFSS) application. The nonproprietary, redacted version of the RAI is attached and will be placed in ADAMS as a publicly available official agency record.

Please contact me if you have any questions concerning this request.



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REQUEST FOR ADDITIONAL INFORMATION (RAI) REGARDING
LICENSE AMENDMENT REQUEST TO USE FRAMATOME SMALL BREAK AND
REALISTIC LARGE BREAK LOSS OF COOLANT ACCIDENT EVALUATION
METHODOLOGIES FOR ESTABLISHING CORE OPERATING LIMITS
DOMINION ENERGY NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 3

DOCKET NO. 50-423

EPID L-2023-LLA-0065

By letter dated May 2, 2023 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML23123A277 (proprietary version) and ML23123A279 (non-proprietary version), Dominion Energy Nuclear Connecticut, Inc. (DENC) submitted a license amendment request (LAR) to change the Technical Specifications (TSs) for Millstone Power Station Unit 3 (MPS3). The proposed amendment would update the list of approved methodologies in MPS3 TS 6.9.1.6.b to establish the core operating limits included in the Core Operating Limits Report (COLR) for Framatome (FRM) GAIA fuel with M5 cladding.

The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed the information provided in the submittal and has determined that additional information as requested in the below is needed to complete its review.

Applicable Regulatory Requirements and Guidance

The regulatory requirements and guidance on which the U.S. Nuclear Regulatory Commission (NRC) staff based its acceptance are:

- 10 CFR 50.36, "Technical specifications," provides regulatory requirements regarding the content of TSs. Specifically, Paragraph 50.36(c)(5), "Administrative control," states, in part, that Administrative controls are the provisions relating to organization and management, procedures, recordkeeping, review and audit, and reporting necessary to assure operation of the facility in safe manner."
- 10 CFR 50.46, "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactor," insofar as it requires the emergency core cooling system (ECCS) be designed with sufficient margin to assure that the design safety limits specified in 10 CFR 50.46(b) are during design-basis LOCAs.
- Appendix K to 10 CFR 50 sets forth the documentation requirements for each evaluation model (EM) and establishes required and acceptable features of EMs for heat removal by the ECCS.

- General Design Criterion (GDC) 35 in Appendix A to 10 CFR 50 requires abundant core cooling sufficient to (1) prevent fuel and cladding damage that could interfere with effective core cooling and (2) limit the metal-water reaction on the fuel cladding to negligible amount. GDC 35 also requires suitable redundancy of the ECCS, such that it can accomplish its design functions, assuming a single failure, irrespective of whether its electrical power is supplied from offsite or onsite sources.
- Generic Letter (GL) 88-16, "Removal of Cycle-Specific Parameter Limits from Technical Specifications," provides guidance by which the values of certain parameters could be determined and modified on a cycle-specific basis without NRC prior NRC review and approval. In order to implement this guidance, licensees are required to do the following: (use NRC approved methodology to determine operating limits; (2) include a list in the TS Administrative Controls section of the references used to determine the operating limits; and (3) maintain the limits in a CORL, which must be submitted to NRC for information.

Request for Additional Information (RAI)

RAI-1 Framatome SBLOCA Method

As stated in Section 3.1 of Attachment 1 to the LAR, the FRM Small Break Loss-of-Coolant Accident (SBLOCA) analysis supporting the GAIA fuel at MPS3 is based on the previously NRC-approved methods, including the methods documents in FRM Topical Report (TR) EMF-2328-P-A Revision 0, Supplement 1-P-A, Revision 0.

The NRC SE (ADAMS ML15210A257) for the FRM TR EMF-2328-P-A Revision 0, Supplement 1-P-A, Revision 0 imposed modelling requirements in the following area:

1. Spectrum of break sizes
2. Breaks in the attached piping
3. Delayed RCP trip
4. Maximum safety injection tank/refueling water tank fluid temperature
5. Core bypass-flow path in the reactor vessel
6. Reactivity feedback
7. Loop seal clearing and cross-over leg modelling
8. Core nodalization

Sections 4.1, 4.3, 4.4, and 4.5 of Attachment 3 (ANP-4031P) to the LAR have provided information addressing the modelling requirements in above items 1 through 4. Provide information addressing compliance with the modelling requirements in above item 5 through 8 for the SBLOCA analysis.

RAI-2 Delayed Reactor Coolant Pump (RCP) Trip Study

The SBLOCA analysis assumed that the RCP trip occurred at reactor trip. Section 4.4 of ANP-4031P in the LAR indicates that a delayed RCP trip study was performed to identify the delayed effect of RCP trip on the SBLOCA analysis. The study assumed the delayed RCP trip time of 5-minute after the specified trip criteria were met for operators to trip all four RCPs.

Justify that the assumed 5-minute RCP trip delayed time is adequate to identify the delayed effect on the peak cladding temperature (PCT) for the SBLOCA analysis, considering that the PCT (Table 4-2 of ANP-4031P) for break sizes from 5.0 to 8.7 inches would occur within 5 minutes from initiation of the LOCA and that for those break size LOCA, the RCP may not trip at the time when the PCT occurs. Also, justify from the human engineering consideration that the available operator action time for operators to trip all four RCPs is adequate.

RAI-3 LOCA Analyses for Mixed Core Configurations Including [REDACTED] [REDACTED]

On page 3-8 of ANP-4032P in the LAR, it states that “[REDACTED] [REDACTED]”. Also, it states that the realistic large break loss-of-coolant accident (RLBLOCA) analysis include considerations for the mixed core scenario and, that [REDACTED] [REDACTED]. In addition, Limitation 3 in Table 3-1 of ANP-4032P restricts that the RLBLOCA evaluation methodology (EM) in EMF-2103(P)(A), Revision 3 “is approved based on models that are specific to Framatome proprietary M5 fuel cladding. The application of the model to other cladding types has not been reviewed”.

Address the compliance with Limitation 3 above for the RLBLOCA analysis with consideration of mixed core configurations including [REDACTED]. Discuss how [REDACTED] is modeled in the RLBLOCA analyses for mixed core configurations and provide a diagram of core nodalization scheme used in the RLBLOCA analysis. Also, discuss the results of the RLBLOCA analysis for the mixed core conditions to show that the applicable acceptance criteria in 10 CFR 50.46(b) are met and the analysis is applicable to any core design that includes [REDACTED].

- (a) In regard to the FRM GAIA fuel with M5 cladding being calculated for PCT and MLO in the MPS3 RLBLOCA analysis, clarify whether an MPS3 RLBLOCA analysis simulating a mixed core, consisting of the [REDACTED], was performed. If the analysis was performed, confirm that the analysis results are included in ANP-4032P of the LAR. If the analysis was not performed, provide rationale supporting that the analysis is not needed.
- (b) In regard to the modeling approach that allows flow diversion from the hot assembly to the surrounding assemblies (i.e., the [REDACTED]), provide a diagram of core nodalization scheme showing the [REDACTED] used in the RLBLOCA analysis. Reference the NRC document approving the core nodalization scheme.

RAI-4 Initial Conditions for SBLOCA Analysis

Table 3-1 of ANP-4031P in the LAR lists the values of plant parameters used as input for the SBLOCA analysis. Provide additional information to justify the acceptance of the following values used in the SBLOCA analysis:

1. The SG secondary pressure is assumed at 937.4 psia.
2. The assumed auxiliary feedwater (AFW) temperature of 80°F is based on the average of the maximum and minimum operating temperatures.
3. The nominal main feedwater (MFW) temperature of 447.9°F is based on the measurement uncertainty recapture (MUR) conditions, and
4. The nominal pressurizer pressure of 2250 psia is assumed at the RCS operating pressure.