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**To:** [Andrew Brenner](#)  
**Cc:** [Greg Cranston](#); [Manny Sayoc](#); [Michelle Hayes](#); [Clark Shurtleff](#)  
**Subject:** NRC Staff Responses to Questions re: Guidance for Multi-unit Probabilistic Safety Analysis (Project 99902049)  
**Date:** Tuesday, September 5, 2023 3:54:00 PM

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Hi Andrew –

Below is the NRC staff response to the questions regarding guidance for multi-unit probabilistic safety analysis (PSA).

If you have questions or need additional information, please let us know.

Thanks,  
Carolyn

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**Context for Questions:**

The PSA Standard that is endorsed by RG 1.200 is written for developing a PSA associated with a single reactor.

The ALWR PSA Standard that is in development and is also anticipated to be endorsed by the NRC is also being written for developing a PSA associated with a single reactor.

NUREG-0800 Chapter 19.0 contains the following review requirements: For small, modular integral pressurized water reactor designs, the staff reviews the results and description of the applicant's risk assessment for a single reactor module; and, if the applicant is seeking approval of an application for a plant containing multiple modules, the staff reviews the applicant's assessment of risk from accidents that could affect multiple modules to ensure appropriate treatment of important insights related to multi-module design and operation. The staff will verify that the applicant has:

1. Used a systematic process to identify accident sequences, including significant human errors, that lead to multiple module core damages or large releases and described them in the application.
2. Selected alternative features, operational strategies, and design options to prevent these sequences from occurring and demonstrated that these accident sequences are not significant contributors to risk. These operational strategies should also provide reasonable assurance that there is sufficient ability to mitigate multiple core damages accidents.

**Questions:**

1. Based on our understanding of this requirement, a multi-unit PSA model is not required, but a documented and repeatable systematic review of the accident sequences to identify those that can impact multiple units is required?
2. If this understanding is not correct, is there regulatory guidance available on the requirements for the multi-unit PSA?

## **NRC Staff Response:**

1. Yes. A multi-unit PSA model is not required for 10 CFR Part 52 and for 10 CFR Part 50 PRA applications. However, the PSA model should explicitly account for any identified impact of shared SSCs, human actions, and initiators in addition to the documented and repeatable systematic review of the accident sequences to identify those that can impact multiple units. As described in 10 CFR Part 52, an applicant must describe and analyze the possible operating configurations of the reactor modules with common systems, interface requirements, and system interactions. The currently endorsed Level 1/LERF PRA Standard includes specific supporting requirements for shared systems in multi-unit sites (e.g., IE-A10, IE-B5). In SRP 19.0, the staff verifies that applicants for plants with multiple modules use a systematic process to identify accident sequences, including significant human errors that could lead to core damage or large release from multiple modules to ensure that risk insights regarding the design are complete, which is consistent with the Commission Severe Accident Policy Statement.
2. See response to item 1.

## **References:**

1. U.S. NRC, Regulatory Guide 1.200, "Acceptability of Probabilistic Risk Assessment Results for Risk-Informed Activities," Revision 3, December 2020. <https://www.nrc.gov/docs/ML2023/ML20238B871.pdf>
2. U.S. NRC, NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition," Chapter 19.0, "Probabilistic Risk Assessment and Severe Accident Evaluation for New Reactors," Revision 3, December 2015. <https://www.nrc.gov/docs/ML1508/ML15089A068.pdf>