From:	Carolyn Lauron
To:	Justin Hawkins; Andrew Brenner
Cc:	Demetrius Murray; Greg Cranston; Jordan Glisan; Michael Dudek
Subject:	NRC Staff Responses for Some Questions Supporting the Oct 18 SFP Public Meeting
Date:	Monday, October 17, 2022 7:53:00 PM

Hi Justin –

The staff provides the following responses for some of the questions to be discussed tomorrow.

Thanks,
Carolyn

Background:

SRP 9.1.3 *Spent fuel pool cooling cleanup system* Section III. Review Procedures 1.F states:

> *A seismic Category I, Quality Group C makeup system and an appropriate backup method to add coolant to the spent fuel pool are provided. If the forced-circulation cooling system is designed to seismic Category I, Quality Group C standards, the backup system need not be a permanently installed system, or Category I, but should take water from a seismic Category I source. Otherwise, the backup system should also be permanently installed, physically separate and independent from the primary makeup system, and designed to seismic Category I, Quality Group C standards. The minimum makeup capacity for each system exceeds the larger of the pool leakage rate assuming spent fuel pool liner perforation resulting from a dropped fuel assembly or the evaporation rate necessary to remove 0.3 percent of the reactor rated thermal power. The design permits initiation of makeup water flow through either system from locations remote from the operating floor surrounding the pool surface. Engineering judgment and comparison with plants of similar design are used to determine that the time necessary to align systems and connect makeup systems not permanently installed is consistent with heatup times or expected leakage from structural damage.*

Regulatory Guide 1.13 Spent Fuel Storage Facility Design Basis [3] Regulatory Position 8, Makeup Water, states:

> *A Quality Group C, Seismic Category I makeup system should be provided to add coolant to the pool. Appropriate redundancy or a backup system for filling the pool from a reliable source, such as a lake, river, or onsite Seismic Category I water-storage facility, should be provided. If the spent fuel pool cooling system is designed to the requirements of Quality Group C, Seismic Category I, the backup to the makeup system need not be permanently installed or designed to Seismic Category I requirements; however, the backup system should still take water from a Seismic Category I source. The makeup system and its backup should have redundant flowpaths for providing water to the storage pool. The capacity of the makeup systems should exceed the larger of (1) the pool leakage rate, assuming spent fuel pool liner perforation resulting from a dropped fuel assembly, or (2) the evaporation rate necessary to remove 0.3 percent of the rated reactor thermal power.*

Questions:

1. What does the NRC mean by physically separate and independent in SRP 9.1.3? Context: Can the backup and makeup system take water from normally connected sources (e.g., two tanks with a balance line) and still be considered physically separate and independent?

2. What does the NRC mean by redundant flowpaths in RG 1.13? Context: Does a single inlet and outlet between a tank and the SFP with parallel isolation valves constitute redundant flow paths?

3. Is there any consideration to reduce the number of seismic Category I, Quality Group C makeup sources for plants that will not require makeup to the SFP for at least 72 hours based on bounding evaporation/leakage rates and the SFP volume?

NRC Staff Response:

The SRP was issued to establish criteria that the NRC staff intends to use in evaluating whether an applicant/licensee meets the Commission's regulations. The SRP is not a substitute for the regulations, and compliance is not a requirement. Applicants shall identify differences from the SRP acceptance criteria and evaluate how the proposed alternatives to the SRP criteria provide an acceptable method of complying with the Commission's regulations. SRP 9.1.3 Spent Fuel Pool Cooling Cleanup System, Section III, "Review Procedures" provides the reviewer with instructions on how to review the design of the Spent Fuel Pool Cooling Cleanup System in order to determine that the system meets the applicable requirements. The review procedures identified in Section III are based on the identified SRP acceptance criteria and the typical design of large water-cooled reactors, which relies on active systems to accomplish its safety functions. For deviations from these specific acceptance criteria, including review of unique designs, the staff shall review the applicant's evaluation of how the proposed alternatives provide an acceptable method of complying with the relevant NRC requirements identified in Subsection II. SRP 9.1.3, Section III.1.F discusses the recommendations for the SFP makeup water system that is credited to meet the requirements of GDC Criterion 61 – "Fuel storage and handling and radioactivity control," items 4 (*with a residual heat removal capability having reliability and testability that reflects the importance to safety of decay heat and other residual heat removal*), and item 5 (*to prevent significant reduction in fuel storage coolant inventory under accident conditions*).

Question 1. What does the NRC mean by physically separate and independent in SRP 9.1.3?

Physical separation (in the context of SRP 9.1.3) refers to the trains being provided with sufficient separation such that a single postulated failure in either system, or from other systems or components would not impact both trains.

Independence (in the context of SRP 9.1.3) refers to the trains being provided with adequate protection, such that a postulated failure in one of the trains would not impact the other train.

Question 2. What does the NRC mean by redundant flowpaths in RG 1.13?

Redundancy (in RG 1.13 the context of RG 1.13) refers to the makeup flowpaths being

provided with adequate protection, such that a postulated failure would not impact both flowpaths.

Question 3. Is there any consideration to reduce the number of seismic Category I, Quality Group C makeup sources for plants that will not require makeup to the SFP for at least 72 hours based on bounding evaporation/leakage rates and the SFP volume?

The recommendations of the SRP are not requirements and may not be directly applicable to novel designs. For these novels designs (like NuScale) the staff reviews alternatives methods of complying with the relevant NRC requirements, as noted above.