



**UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, DC 20555 - 0001**

MEMORANDUM TO: Walter Kirchner, Lead
NuScale Subcommittee
Advisory Committee on Reactor Safeguards

FROM: David Petti, Member
Advisory Committee on Reactor Safeguards

SUBJECT: INPUT FOR ACRS REVIEW OF THE NUSCALE STANDARD
DESIGN APPROVAL (SDA) APPLICATION – SAFETY
EVALUATION REPORT FOR CHAPTER 11, “RADIOACTIVE
WASTE MANAGEMENT”

In response to the Subcommittee’s request, I have reviewed the NRC staff’s safety evaluation report (SER) provided to support ACRS review of the SDA application, and the associated section of the applicant’s submittal for Chapter 11, “Radioactive Waste Management.” The following is my recommended course of action concerning further review of this chapter and the staff’s associated safety evaluation.

Background

The NuScale US460 standard design uses a shared system for managing radioactive waste from the six modules. The NuScale radioactive waste management systems include the liquid radioactive waste system, gaseous radioactive waste system, solid radioactive waste system, and process and effluent radiation monitoring instrumentation and sampling system. These systems are designed for normal operations, including refueling outages, routine maintenance, and anticipated operational occurrences.

The source term for the system is calculated as one module at the design basis failed fuel fraction and five modules running at a realistic failed fuel fraction. The design basis has 10 times the fuel failure fraction of a realistic failed fuel fraction. Some secondary coolant becomes activated by primary to secondary leakage. The source term also includes tritium and Ar-41, radionuclides that tend to dominate chronic releases. NuScale uses the same methodology as used in the certified design and SDA application, but the numerical values have changed because of changes in power level of the modules, the number of modules, the fuel cycle length and burnup.

The staff’s review of these systems found that the designs meet all regulatory requirements including those related to Three Mile Island post-accident monitoring from Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.34(f) that raised concerns in our review of the certified design. Source term calculations for these systems were performed by the staff to confirm the applicant’s results. A number of site-specific combined license items were identified for these systems.

SER Summary

The SER documents the staff's evaluation of the applicant's design for compliance with applicable regulations and standards, including 10 CFR Part 52, Subpart E, "Standard Design Approvals." The NRC staff evaluated the descriptions and discussions of NuScale's proposed radioactive waste management system. The NRC staff found that the descriptions and discussions of NuScale's radioactive waste management system are sufficient and meet the applicable regulatory requirements and guidance, and acceptance criteria, for the issuance of a standard design approval.

Concerns

I did not identify any specific deficiencies or concerns in my review. The application was well documented, and the staff's evaluation thorough.

Recommendation

As lead reviewer for NuScale SDA application, Chapter 11, I recommend no further review at this time.

References

1. U. S. Nuclear Regulatory Commission, "Safety Evaluation of NuScale SDAA Chapter 11, 'Radioactive Waste Management'," February 24, 2024 (ML24016A033).
2. NuScale Power, LLC, "Standard Design Approval Application, Part 2, Chapter 11, 'Radioactive Waste Management'," Revision 1, October 31, 2023 (ML23304A358).

SUBJECT: INPUT FOR ACRS REVIEW OF THE NUSCALE STANDARD DESIGN APPROVAL (SDA) APPLICATION – SAFETY EVALUATION REPORT FOR CHAPTER 11, “RADIOACTIVE WASTE MANAGEMENT”

Package Accession No: ML24124A166

Accession No: ML24124A174 Publicly Available (Y/N): Y Sensitive (Y/N): N

If Sensitive, which category?

Viewing Rights: NRC Users or ACRS only or See restricted distribution

OFFICE	ACRS	SUNSI Review	ACRS	ACRS
NAME	MSnodderly	MSnodderly	LBurkhart	DPetti
DATE	5/06/24	5/06/24	5/06/24	5/07/24

OFFICIAL RECORD COPY