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LO-0519-65534

May 9, 2019

Docket No. 52-048

U.S. Nuclear Regulatory Commission
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SUBJECT: NuScale Power, LLC Submittal of Presentation Materials Entitled "ACRS Subcommittee Presentation: NuScale FSAR Chapter 21, Multi-Module Design Considerations," PM-0519-65533, Revision 0

The purpose of this submittal is to provide presentation materials for use during the upcoming Advisory Committee on Reactor Safeguards (ACRS) NuScale Subcommittee meeting on May 15, 2019. The materials support NuScale's presentation of Chapter 21, "Multi-Module Design Considerations," of the NuScale Design Certification Application.

Enclosure 1 is the nonproprietary presentation entitled "ACRS Subcommittee Presentation: NuScale FSAR Chapter 21, Multi-Module Design Considerations," PM-0519-65533, Revision 0.

This letter makes no regulatory commitments and no revisions to any existing regulatory commitments.

If you have any questions, please contact Nadja Joergensen at 541-452-7338 or at njoergensen@nuscalepower.com.

Sincerely,

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Enclosure 1: "ACRS Subcommittee Presentation: NuScale FSAR Chapter 21, Multi-Module Design Considerations," PM-0519-65533, Revision 0

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Enclosure 1:

"ACRS Subcommittee Presentation: NuScale FSAR Chapter 21, Multi-Module Design Considerations," PM-0519-65533, Revision 0

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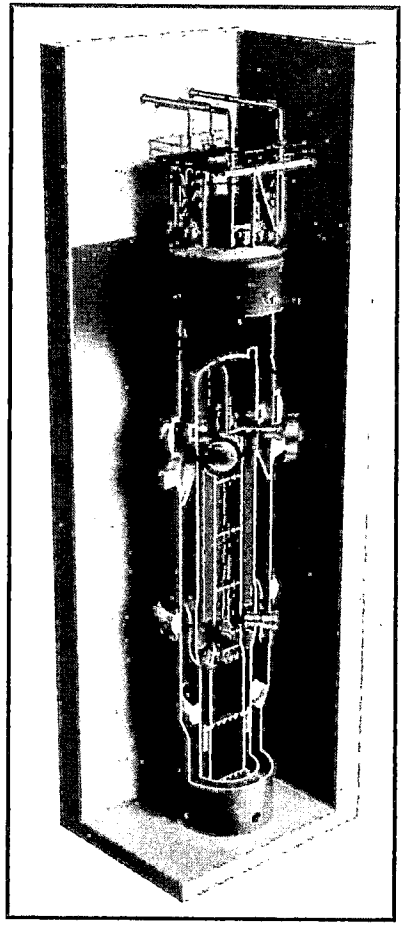
ACRS Subcommittee Presentation



NuScale FSAR

Chapter 21

Multi-Module Design Considerations

May 15, 2019

PM-0519-65533
Revision: 0

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Template #: 0000-21727-F01 R5

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Modular Designs

- Per 10 CFR 52.1, modular design means

  A nuclear power station that consists of two or more essentially identical nuclear reactors (modules) and each module is a separate nuclear reactor capable of being operated independent of the state of completion or operating condition of any other module co-located on the same site, even though the nuclear power station may have some shared or common systems.

- The NuScale Power Plant design is consistent with this definition.

Modular Designs

- 10 CFR 52.47(c)(3) requires evaluation of module operating configurations, considering:
  - Common (shared) systems
  - Interface requirements
  - System interactions
  - Restrictions during construction and startup

Shared Systems

- The NuScale Power Plant is designed such that each NPM can be safely operated independent of other NPMs.
- With the exception of the ultimate heat sink (UHS), safety-related systems are module-specific and functionally independent of shared systems and other NPMs.
  - Emergency core cooling system
  - Containment system
  - Decay heat removal system
  - Module protection system
  - Demineralized water isolation valves

Shared Systems

- The UHS has sufficient capacity to remove heat from one NPM experiencing a DBA, while simultaneously removing heat from 11 NPMs in shutdown and cooldown.
- Long-term heat removal is provided by the UHS and the module-specific safety-related systems without reliance on other shared systems or operator action.

Shared Systems

- Module heatup system
- Boron addition system
- Containment flooding and drain system
- Reactor component cooling water system
- Process sampling system
- Circulating water system
- Auxiliary boiler system
- Site cooling water system
- Nitrogen distribution system
- Demineralized water system
- Fire protection system
- Fire detection system
- Fuel handling equipment
- Module assembly equipment
- Instrument air system
- Gaseous radioactive waste system
- Liquid radioactive waste system
- Normal control room HVAC system
- Reactor building HVAC system
- Control room habitability system

Shared Systems

- Chilled water system
- Ultimate heat sink
- Reactor pool cooling system
- Pool surge control system
- Pool cleanup system
- Pool leak detection system
- Spent fuel pool cooling system
- 13.8 kV and switchyard system
- Medium voltage AC electrical distribution system
- Low voltage AC electrical distribution system
- Highly reliable DC power system
- Normal DC power system
- Safety display and indication system
- Plant protection system
- Plant control system

System Interactions

- The shared systems that have potential for an adverse system interaction or an undesirable multi-module interaction were evaluated.
- The evaluations demonstrate that shared system operation does not result in adverse system interactions, such as
  - a loss of a safety-related function,
  - a DBE and a simultaneous degradation of a safety-related function,
  - a DBE and simultaneous degradation of critical operator information, or
  - a DBE and a requirement for operator actions outside the control room.

Interface Requirements

- Shared systems that serve one NPM at a time are equipped with isolation features that prevent a direct module-to-module interface during normal operation.

- For an adverse multi-module interaction to occur as a result of a failure associated with a shared system that serves one NPM at a time:
  - Abnormal lineups
  - Multiple concurrent failures

Interface Requirements

- The reactor component cooling water system (RCCWS) is the only shared system that directly interfaces with multiple NPMs and is also designed to simultaneously support more than one NPM at a time.

- The RCCWS is designed such that no single failure can cause the loss of RCCWS heat removal from more than one NPM.

Construction and Startup

- During the construction phase that occurs prior to the initial NPM fuel load, the shared and module-specific systems within the Reactor Building (RXB), Control Building (CRB), and Radioactive Waste Building (RWB) are substantially completed with the exception of the installation of additional NPMs.
- The construction method and the phased expansion of NPMs provide assurance that
  - the operating configuration is not materially different than that assumed in the safety analysis and
  - that the independence of NPM safety-related systems is maintained.

Construction and Startup

- In addition, the analysis of shared system interactions continues to apply to the operating NPMs during installation of subsequent NPMs.
- Consequently, restrictions in operating configurations or interface requirements are not necessary to ensure the safe operation of operating NPMs during installation, testing, or startup of subsequent NPMs.

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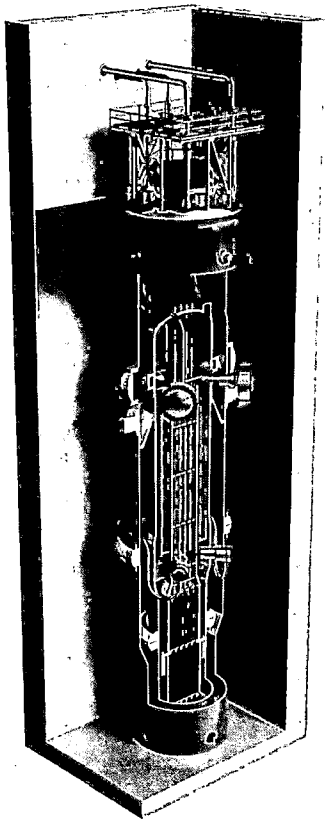

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