RAIO-0118-57980

January 02, 2018

Docket No. 52-048

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

SUBJECT: NuScale Power, LLC Supplemental Response to NRC Request for Additional Information No. 101 (eRAI No. 8940) on the NuScale Design Certification Application

REFERENCES:
1. U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 101 (eRAI No. 8940)," dated July 21, 2017
2. NuScale Power, LLC Response to NRC "Request for Additional Information No. 101 (eRAI No.8940)," dated September 19, 2017

The purpose of this letter is to provide the NuScale Power, LLC (NuScale) supplemental response to the referenced NRC Request for Additional Information (RAI).

The Enclosure to this letter contains NuScale's supplemental response to the following RAI Question from NRC eRAI No. 8940:

- 19-17

This letter and the enclosed response make no new regulatory commitments and no revisions to any existing regulatory commitments.

If you have any questions on this response, please contact Darrell Gardner at 980-349-4829 or at dgardner@nuscalepower.com.

Sincerely,

Zackary W. Rad
Director, Regulatory Affairs
NuScale Power, LLC

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Enclosure 1: NuScale Supplemental Response to NRC Request for Additional Information eRAI No. 8940

Enclosure 1:

NuScale Supplemental Response to NRC Request for Additional Information eRAI No. 8940

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Response to Request for Additional Information
Docket No. 52-048

eRAI No.: 8940
Date of RAI Issue: 07/21/2017

NRC Question No.: 19-17

It is stated in Section 19.0 of the Standard Review Plan (SRP), Revision 3, "Probabilistic Risk Assessment (PRA) and Severe Accident Evaluation," that if an 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:

i. 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.
ii. Selected alternative features, operational strategies, and design options to prevent these sequences from occurring and demonstrates 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.

NuScale has addressed the risk from accidents that could affect multiple modules in section 19.1.7. The staff has reviewed the information in section 19.1.7 and also reviewed non-docketed supporting material as part of its ongoing audit of the NuScale PRA. Based on its review the staff believes that section 19.1.7 of the Final Safety Analysis Report (FSAR) does not provide an adequate description of those design features and/or operational strategies to prevent the sequences described in the FSAR from occurring or reduce the likelihood of occurring. Therefore, please provide a description of such features and/or operational strategies that can prevent or reduce the likelihood of occurrence for the following events that can affect multiple modules:

- Loss of Offsite Power
- Station Blackout
- Complete Loss of a support system or support subsystem, as appropriate, including
  - reactor closed cooling water system
  - circulating water system

- instrument air system
- common DC power systems
- plant control system

· Fire induced events

- loss of offsite power
- transient
- emergency core cooling demand
- loss of coolant accident inside containment

· Internal flooding

If an adequate description is provided in a parts of the FSAR other than chapter 19, simply reference the section of the FSAR it is provided in. If the description does not exist elsewhere in the FSAR, please provide it in response to the above request and include the description in an update to the FSAR.

NuScale Response:

NuScale provided its response to RAI 8940, Question 19-17 in letter RAIO-0917-56055, dated September 19, 2017. NuScale is modifying its response with regard to the FSAR markup, as follows:

The following text in FSAR Table 19.1-76

"Although not modeled in the PRA the system includes cross ties that automatically transfer supply power following a fault. The PRA models a combustion turbine generator as the auxiliary AC power source that can supply power to the EHVS"

is replaced with

"The auxiliary AC power source can also supply power to the EHVS"

Impact on DCA:

FSAR Table 19.1-76 has been revised as described in the response above and as shown in the markup provided in this response.

Table 19.1-78: Shared System Hazard Analysis (Continued)

System	Modules Served	Multiple module function	Accident Mitigation Implication	Credited in model for single module
Instrument and Control Air System	12	Air compression and distribution system to provide compressed air for pneumatically actuated valves and instruments. Also supplies service air system.	The loss of instrument air ~~represents~~will cause closure of the secondary main steam isolation valves and is considered an initiating event with a trip on all modules. ~~Following this, decay heat removal should be provided offered by the DHRS and the ECCS. The CVCS makeup provision following an incomplete actuation of ECCS would align to a supply from the boron addition system when each module's CVCS makeup isolation valve fails to the open position and~~In addition, because each module's makeup combining valve fails to the ~~boron addition system position~~BAS following a loss of instrument air, CVCS is not considered for accident mitigation following the loss of support system initiator.	Yes[1]
Turbine Building HVAC System	6 x 2	Provides heating, ventilation, and air conditioning for turbine building.	There is insufficient information at the design stage to evaluate the ability of equipment to continue operation under conditions beyond their environmental qualifications.	No
Diesel Generator Building HVAC System	12	Provides heating, ventilation, and air conditioning for the diesel generator building.	The effect of elevated ambient conditions on equipment performance is not established at the design stage. A complete loss of the diesel generator building would affect the plant response to only a LOOP.	No
Annex Building HVAC System	12	Provides heating, ventilation, and air conditioning for the annex building.	This system does not serve a function related to the avoidance of core damage.	No
Fire Protection System	12	Prevents fires and minimizes the damage caused by fires.	The fire protection system is the means for preventing fire propagation. A fire has the potential to affect key safety functions depending on where it occurs.	No
Balance-of-Plant Drain System	6 x 2	Provides drainage for non-radioactive waste from balance-of-plant floor drains and non-radiological controlled locations.	This system does not serve a function related to the avoidance of core damage.	No
13.8 KV and Switchyard System (EHVS)	12	This electrical system begins at the circuit breakers which connect the switching station to the off-site transmission system and ends at the terminals of the plant main generator and at the high voltage terminals of the unit auxiliary transformers.	The plant is designed to cope with a station blackout beyond 72 hours through a combination of engineered safety features that actuate on loss of control power and passive cooling to the reactor pool. The auxiliary AC power source can also supply power to the EHVS.	Yes
Medium Voltage AC Electrical Distribution System (EMVS)	12	Provides power at 4160 VAC to busses servicing medium voltage loads.	The plant is designed to cope with a station blackout beyond 72 hours through a combination of engineered safety features that actuate on loss of control power and passive cooling to the reactor pool.	Yes