RAIO-0917-55953

September 18, 2017

Docket No. 52-048

U.S. Nuclear Regulatory Commission
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SUBJECT: NuScale Power, LLC Response to NRC Request for Additional Information No. 127 (eRAI No. 8909) on the NuScale Design Certification Application

REFERENCE: U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 127 (eRAI No. 8909)," dated August 03, 2017

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

The Enclosure to this letter contains NuScale's response to the following RAI Question from NRC eRAI No. 8909:

- 17.04-3

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 Response to NRC Request for Additional Information eRAI No. 8909

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NuScale Response to NRC Request for Additional Information eRAI No. 8909

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

eRAI No.: 8909
Date of RAI Issue: 08/03/2017

NRC Question No.: 17.04-3

Section II.A.5 of Standard Review Plan (SRP) Section 17.4, "Reliability Assurance Program" lists the following acceptance criterion for an application:

"The application should contain a comprehensive list of RAP [structures, systems and components]*SSCs, within the scope of the [*design certification] *DC application, based on the methodology that meets acceptance criterion A.3 of this SRP section."*

The staff has reviewed the list of risk signifiacnt SSCs provided in Table 17.4-1 of the final safety analysis report (FSAR). The staff has compared the information in Table 17.4-1 of the FSAR with the list of risk significant SSCs contained in Table 19.1-20 of the FSAR, "Listing of Candidate Risk Significant Structures, Systems, and Components - (Full Power, Single Module) Level 1 Probabilistic Risk Assessment", and observed that although the combustion turbine generator (CTG) is identified as a candidate risk significant SSC in Table 19.1-20 of the FSAR. It is not included as a risk significant SSC in Table 17.4-1 in the FSAR. In addition, the following statement, indicating that the combustion gas turbine should be considered risk significant, is made in section 19.1.7 of the FSAR.

"There are no additional module-specific components that are found to be risk significant in the multiple module PRA than are identified as risk significant in the single module PRA. The site AC power sources, i.e., the shared backup diesel and CTG, are risk significant because of the importance of the site-wide LOOP initiator".

In light of the inconsistencies described above, please explain why the CTG is not included as a risk significant SSC in Table 17.4-1 of the FSAR.

NuScale Response:

The auxiliary AC power source (AAPS) is modeled in the NuScale probabilistic risk assessment (PRA) as a combustion turbine generator (CTG) and is identified as a candidate for risk significance in the internal events PRA, where the core damage frequency (CDF) is 3.0E-10 per module critical year, as shown in FSAR Table 19.1-80. The AAPS meets the candidate risk

significance criterion based on its Fussell-Vesely (FV) importance metric being marginally over 0.2. As described in FSAR Section 19.1.4.1.1.9, SSCs found to be “risk significant” by use of the importance measures are identified as candidate SSCs for inclusion in the Design Reliability Assurance Program (DRAP). Several tables in the FSAR identify these candidates. For example, FSAR Table 19.1-20 identifies the candidate risk-significant SSCs based on the Level 1 PRA and Table 19.1-27 identifies the candidate risk-significant SSCs based on the Level 2 PRA. The final determination of risk significance for SSC classification is made by the expert panel under the DRAP process described in FSAR Section 17.4.

As described in FSAR Section 8.3.1.1.2, the specific AAPS implemented at a NuScale plant will be determined by a future licensee on a site-specific basis in accordance with Combined Operating License (COL) Item 8.3-1. This power source is modeled in the PRA as providing an alternate power source in the event of a loss of offsite power (LOOP) initiating event similar to the manner in which the backup diesel generators (BDGs) are modeled.

The modeling assumptions for the electric power systems in the PRA are conservative (e.g., automatic cross-ties are not modeled). Also, the NuScale plant design has the two BDGs available as additional backup power sources that can provide power when both normal AC power supplies are not available (i.e., during a LOOP concurrent with all turbine trips).

Note that if a more reliable power source is assumed for the AAPS in the PRA, the AAPS would likely not meet the candidate risk significance criterion of 0.2. That is, the failure probability for the CTG modeled in the PRA is very high as compared to other potential alternate power supplies such as diesel generators with failure to run probabilities being approximately five times higher. Considering the FV risk metric represents a percentage of CDF, if a CTG would be as reliable as a BDG, the CTG would not be a candidate for risk significance based on the current PRA models.

Considering the available information on conservative PRA modeling and plant design, the expert panel concurred with the classification of the AAPS as not risk significant. A future licensee developing a reliability assurance program based on the as-built, as-operated plant will assess the significance of the AAPS in accordance with COL Items 17.4-1, 17.4-2, and 17.4-3.

Impact on DCA:
There are no impacts to the DCA as a result of this response.