



February 07, 2018

Docket: PROJ0769

U.S. Nuclear Regulatory Commission  
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Rockville, MD 20852-2738

**SUBJECT:** NuScale Power, LLC Response to NRC Request for Additional Information No. 9190 (eRAI No. 9190) on the NuScale Topical Report, "Loss-of-Coolant Accident Evaluation Model," TR-0516-49422, Revision 0

**REFERENCES:** 1. U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 9190 (eRAI No. 9190)," dated January 29, 2018  
2. NuScale Topical Report, "Loss-of-Coolant Accident Evaluation Model," TR-0516-49422, Revision 0, dated December 2016

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. 9190:

- 15.06.05-11

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](mailto:dgardner@nuscalepower.com).

Sincerely,

A handwritten signature in black ink, appearing to read 'Zackary W. Rad'.

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. 9190



**Enclosure 1:**

NuScale Response to NRC Request for Additional Information eRAI No. 9190

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## **Response to Request for Additional Information Docket: PROJ0769**

**eRAI No.:** 9190

**Date of RAI Issue:** 01/29/2018

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**NRC Question No.:** 15.06.05-11

Title 10, Part 50, of the Code of Federal Regulations (10 CFR Part 50), “Domestic Licensing of Production and Utilization Facilities,” Section 50.34, “Contents of Applications; Technical Information” (10 CFR 50.34), specifies the safety analysis reports must analyze the design and performance of structures, systems, and components, and their adequacy for the prevention of accidents and mitigation of the consequences of accidents. Regulatory Guide 1.203 describes a process that the staff of the U.S. Nuclear Regulatory Commission (NRC) considers acceptable for use in developing and assessing evaluation models (EMs) that may be used to analyze transient and accident behavior that is within the design basis of a nuclear power plant.

As stated in RG 1.203, an EM is the calculational framework for evaluating the behavior of the reactor system during a postulated transient or design-basis accident. As such, the EM may include one or more computer programs, special models, and all other information needed to apply the calculational framework to a specific event, as illustrated by the following examples:

1. Procedures for treating the input and output information (particularly the code input arising from the plant geometry and the assumed plant state at transient initiation)
2. Specification of those portions of the analysis not included in the computer programs for which alternative approaches are used
3. All other information needed to specify the calculational procedure

The entirety of an EM ultimately determines whether the results are in compliance with applicable regulations. Therefore, the development, assessment, and review processes must consider the entire EM.

The applicant performed two types of tests to assess the new Helical Coil Steam Generator (HCSG) model added to NRELAP5: (1) NCI-0315-12869, Add Helical Coil Component (May 2015), documents the new HCOIL component added to NRELAP5 for calculating heat transfer to the secondary coolant inside the HCSG tubes and compares this new component to the SIET TF-1 tests, and (2) EC-T050-3638, Assessment of NRELAP5 using SIET Fluid Heated Facility (TF-2) data (November 2015) documents the comparison of the HCOIL component against heated tube bundle tests. NCI-0916-51421, Correct Heat Transfer Coefficient for HCSG (November 2016) documents the correction for an error identified by the applicant in equations 14 and 15 for calculating the laminar HTC as shown in NCI-0315-12869. The incorrect HTC

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equation was corrected in the NRELAP5 code. However, the applicant did not provide an assessment of the impact of this error on the analyses and data comparisons shown in NCI-0315- 12869 or EC-T050-3638 and the initial coolant stored energy.

Provide a comparison between the heat transfer coefficients for the HCSG calculated with the incorrect equations 14 and 15 of NCI-0315-12869 versus the corrected HTC equations as shown in NCI-0916-51421. Justify how the in-vessel initial coolant stored energy predicted by NRELAP-5 code remains conservative.

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### **NuScale Response:**

NuScale clarified that the error described in this Request for Additional Information was not present in the NRELAP5 code used in the assessments used in Reference 1 during discussions with the NRC staff on January 11, 2018.

NCI-0315-12869 contains an error in equations that calculate the laminar heat transfer coefficient. NCI-0916-51421 documents that this error was present in NRELAP5 version 1.2, and corrected in NRELAP5 version 1.3. NRELAP5 Version 1.3 was used in the Loss-of-Coolant Accident Evaluation Model and the associated assessments as referenced in Section 6 of Reference 1. Therefore, the error referenced in this Request for Additional Information is not present in the NRELAP5 code used for the assessments in Reference 1. Further evaluation and comparison analysis with a prior code version that included an error is not warranted since the code version used for licensing calculations did not contain the error.

Reference:

1. TR-0516-49422, "Loss-of-Coolant Accident Evaluation Model," Revision 0.

### **Impact on Topical Report:**

There are no impacts to the Topical Report TR-0516-49422, Loss-of-Coolant Accident Evaluation Model, as a result of this response.