RAIO-0518-60048

May 17, 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 Response to NRC Request for Additional Information No. 399 (eRAI No. 9399) on the NuScale Design Certification Application

REFERENCE: U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 399 (eRAI No. 9399)," dated March 23, 2018

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

The Enclosures to this letter contain NuScale's response to the following RAI Question from NRC eRAI No. 9399:

- 18-35

Enclosure 1 is the proprietary version of the NuScale Response to NRC RAI No. 399 (eRAI No. 9399). NuScale requests that the proprietary version be withheld from public disclosure in accordance with the requirements of 10 CFR § 2.390. The enclosed affidavit (Enclosure 3) supports this request. Enclosure 2 is the nonproprietary version of the NuScale response.

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

If you have any questions on this response, please contact Steven Mirsky at 240-833-3001 or at smirsky@nuscalepower.com.

Sincerely,

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

Distribution: Samuel Lee, NRC, OWFN-8G9A
Gregory Cranston, NRC, OWFN-8G9A

Enclosure 1: NuScale Response to NRC Request for Additional Information eRAI No. 9399, proprietary

Enclosure 2: NuScale Response to NRC Request for Additional Information eRAI No. 9399, nonproprietary

Enclosure 3: Affidavit of Zackary W. Rad, AF-0518-60054

NuScale Power, LLC
1100 NE Circle Blvd., Suite 200 Corvalis, Oregon 97330, Office: 541.360.0500, Fax: 541.207.3928
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Enclosure 1:

NuScale Response to NRC Request for Additional Information eRAI No. 9399, proprietary

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Enclosure 2:

NuScale Response to NRC Request for Additional Information eRAI No. 9399, nonproprietary

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

eRAI No.: 9399
Date of RAI Issue: 03/23/2018

NRC Question No.: 18-35

Title 10 of the *Code of Federal Regulations* (10 CFR) Section 52.47(a)(8) requires an applicant for a design certification to provide a final safety analysis report (FSAR) that must include the information necessary to demonstrate compliance with any technically relevant portions of the Three Mile Island requirements set forth in 10 CFR 50.34(f), except paragraphs (f)(1)(xii), (f)(2)(ix), and (f)(3)(v). Section 10 CFR 50.34(f)(2)(iii) requires an applicant to "Provide, for Commission review, a control room design that reflects state-of-the-art human factor principles prior to committing to fabrication or revision of fabricated control room panels and layouts." Chapter 18, "Human Factors Engineering," of NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition," and NUREG- 0711, "Human Factors Engineering Program Review Model," identify criteria the staff uses to evaluate whether an applicant meets the regulation. The applicant stated in the FSAR, Tier 2, Section 18.0, "Human Factors Engineering - Overview," that its human factors engineering (HFE) program incorporates accepted HFE standards and guidelines including the applicable guidance provided in NUREG-0711, Revision 3.

Criteria in Section 11.4.3.7 (1-7), of NUREG-0711 addresses "Data Analysis and HED Identification." The staff requests that NuScale provide clarification in the following areas:

1. Criterion 2 states that, "The applicant should discuss the method by which data is analyzed across trials, and include the criteria used to determine successful performance for a given scenario." In Section 4.7 of the V&V IP, the applicant states, "Data are analyzed for each scenario across multiple trials. The method of analysis, consistency of measure assessing performance, and criteria used to determine successful performance for a given scenario is determined by the HFE Design Team." While the applicant commits to analyzing data across trials, no information regarding the methodology is provided. Please describe the method(s) that will be used to analyze data across trials and the criteria that will be used to determine successful performance.

2. Criterion 4 states, "When interpreting test results, the applicant should allow a margin of error to reflect the fact that actual performance may be slightly more variable than observed validation-test performance." In the FSAR, Section 18.10.2.3.7, the applicant states, "Expert judgment is employed to infer a margin of error from the observed

performance or data analysis. This allows for the possibility that actual performance may be slightly more variable than ISV test results." Please clarify the following:

- Identify the qualifications of the personnel who will be providing the expert judgment
- Discuss the process by which the expert judgment is derived (e.g. what information is considered) and how it is used in interpreting test results

3. Criterion 5 states, "The applicant should verify the correctness of the analyses of the data. This verification should be done by individuals or groups other than those who performed the original analysis, but may be from the same organization." In the FSAR, Section 18.10.2.3.7, the applicant states, "Integrated system validation data analysis is reviewed to verify the correctness of the analyses of the data. Data and data-analysis tools (e.g., equations, measures, spreadsheets, expert opinions, resulting HEDs) are documented and available for review and subsequent audit and application during HFE program elements design integration or human performance monitoring."

   Please clarify the individual(s) or group(s) that will carry out this verification and how they are independent from those who conducted the original analysis.

NuScale Response:

Response to Question 1:

The Human Factors Verification and Validation Implementation Plan (V&V IP) is a high level planning document intended to provide the rules and conditions that must be followed in order to meet the guidance of NUREG-0711. Detailed test plans and procedures were developed that are used by NuScale and are consistent with the V&V IP but provide the working level detail.

Regarding data collection and analysis, the following is provided:

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}}2(a),(c)

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}}2(a),(c)

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}}[2(a),(c)]

Additionally, the following acceptance criteria is used to determine successful ISV test performance:

- Tasks identified in the scenario guide evaluation criteria that directly support mitigating core damage or large radiological releases are completed with a time completion ratio less than or equal to 0.75.

- Tasks identified in the scenario guide evaluation criteria determined to be primary or dependent are completed within the time allowed.
- No crew actions result in violations of technical specifications, nuclear safety limits, or equipment operating limits during the scenario. The scenario may contain faults which purposely place the unit outside of these limits, but operator action did not.
- Scenario acceptance criteria are met.

Response to Question #2, bullet 1:

FSAR section 18.10.2.3.7 summarizes RP-0914-8543, Human Factors Verification and Validation Implementation, Section 5.2 which states: "{{

}}2(a),(c)

The "HFE design team" will be expected to use expert judgment, specifically the Operators and Human Factor Engineers who administer the ISV exams, provide observations, and analyze the resulting data. RP-0914-8534, Human Factors Engineering Program Management Plan, Table 3-1. Human Factors Engineering team member qualifications, indicates that Human Factors Engineers have the following qualifications:

- Bachelor's degree in HFE, engineering psychology, or related science
- 4 years of cumulative experience related to the human factors aspects of human-computer interfaces. Qualifying experience should include at least the following activities within the context of large-scale human-machine systems (e.g., process control): design, development, and test and evaluation
- 4 years of cumulative experience related to the human factors aspects of workplace design. Qualifying experience should include at least two of the following activities: design, development, and test and evaluation.

The same table indicates that Operators have the following qualifications:

- Has, or has held, an SRO license
- 2 years of experience in relevant nuclear power plant operations

In addition, as identified in RP-0914-8543, Section 4.1, "The observers are trained and qualified using the NuScale training program."

Response to Question #2, bullet 2:

Expert judgment is used to some degree by the HFE design team during every aspect of the ISV process from deciding what observations to record, how observations are dispositioned, and while analyzing the resulting data. Per NUREG-0711, "Expert-judgment-referenced performance criteria" is defined as "Performance is compared with criteria established by expert judgment." HFE and Operations personnel compare the actual performance with the expected performance as documented in the respective ISV scenario guide which is validated during pilot

testing per RP-0914-8543, section 4.6.5. Deviations from expected performance are recorded as comments which are discussed by the HFE team. Comments may be categorized as HEDs based on actual or potential safety significance.

Response to Question 3:

The review and approval process will be performed by NuScale employees that are functionally within the Plant Operations organization.

Assembly of the test data and analysis will be performed by the ISV test lead. The completed analysis will be compiled into an ISV test report. The test report will be reviewed by at least one peer from the observation group that was not directly involved in the original data analysis. The reviewer(s) will not be segregated or otherwise separate from the observation group other than they will not be involved in the initial analysis of the data. The test report will be reviewed and approved by a manager that was not directly involved with the original analysis of the data.

Impact on DCA:

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

Enclosure 3:

Affidavit of Zackary W. Rad, AF-0518-60054

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1100 NE Circle Blvd., Suite 200 Corvalis, Oregon 97330, Office: 541.360.0500, Fax: 541.207.3928
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NuScale Power, LLC

AFFIDAVIT of Zackary W. Rad

I, Zackary W. Rad, state as follows:

1. I am the Director, Regulatory Affairs of NuScale Power, LLC (NuScale), and as such, I have been specifically delegated the function of reviewing the information described in this Affidavit that NuScale seeks to have withheld from public disclosure, and am authorized to apply for its withholding on behalf of NuScale.
2. I am knowledgeable of the criteria and procedures used by NuScale in designating information as a trade secret, privileged, or as confidential commercial or financial information. This request to withhold information from public disclosure is driven by one or more of the following:
    a. The information requested to be withheld reveals distinguishing aspects of a process (or component, structure, tool, method, etc.) whose use by NuScale competitors, without a license from NuScale, would constitute a competitive economic disadvantage to NuScale.
    b. The information requested to be withheld consists of supporting data, including test data, relative to a process (or component, structure, tool, method, etc.), and the application of the data secures a competitive economic advantage, as described more fully in paragraph 3 of this Affidavit.
    c. Use by a competitor of the information requested to be withheld would reduce the competitor's expenditure of resources, or improve its competitive position, in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product.
    d. The information requested to be withheld reveals cost or price information, production capabilities, budget levels, or commercial strategies of NuScale.
    e. The information requested to be withheld consists of patentable ideas.
3. Public disclosure of the information sought to be withheld is likely to cause substantial harm to NuScale's competitive position and foreclose or reduce the availability of profit-making opportunities. The accompanying Request for Additional Information response reveals distinguishing aspects about the method by which NuScale develops its human factors verification and validation.

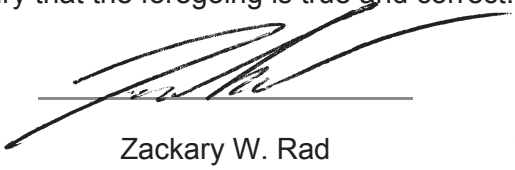
    NuScale has performed significant research and evaluation to develop a basis for this method and has invested significant resources, including the expenditure of a considerable sum of money.

    The precise financial value of the information is difficult to quantify, but it is a key element of the design basis for a NuScale plant and, therefore, has substantial value to NuScale.

    If the information were disclosed to the public, NuScale's competitors would have access to the information without purchasing the right to use it or having been required to undertake a similar expenditure of resources. Such disclosure would constitute a misappropriation of NuScale's intellectual property, and would deprive NuScale of the opportunity to exercise its competitive advantage to seek an adequate return on its investment.

4. The information sought to be withheld is in the enclosed response to NRC Request for Additional Information No. 299, eRAI 9399. The enclosure contains the designation "Proprietary" at the top of each page containing proprietary information. The information considered by NuScale to be proprietary is identified within double braces, "{{ }}" in the document.
5. The basis for proposing that the information be withheld is that NuScale treats the information as a trade secret, privileged, or as confidential commercial or financial information. NuScale relies upon the exemption from disclosure set forth in the Freedom of Information Act ("FOIA"), 5 USC § 552(b)(4), as well as exemptions applicable to the NRC under 10 CFR §§ 2.390(a)(4) and 9.17(a)(4).
6. Pursuant to the provisions set forth in 10 CFR § 2.390(b)(4), the following is provided for consideration by the Commission in determining whether the information sought to be withheld from public disclosure should be withheld:
    a. The information sought to be withheld is owned and has been held in confidence by NuScale.
    b. The information is of a sort customarily held in confidence by NuScale and, to the best of my knowledge and belief, consistently has been held in confidence by NuScale. The procedure for approval of external release of such information typically requires review by the staff manager, project manager, chief technology officer or other equivalent authority, or the manager of the cognizant marketing function (or his delegate), for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside NuScale are limited to regulatory bodies, customers and potential customers and their agents, suppliers, licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or contractual agreements to maintain confidentiality.
    c. The information is being transmitted to and received by the NRC in confidence.
    d. No public disclosure of the information has been made, and it is not available in public sources. All disclosures to third parties, including any required transmittals to NRC, have been made, or must be made, pursuant to regulatory provisions or contractual agreements that provide for maintenance of the information in confidence.
    e. Public disclosure of the information is likely to cause substantial harm to the competitive position of NuScale, taking into account the value of the information to NuScale, the amount of effort and money expended by NuScale in developing the information, and the difficulty others would have in acquiring or duplicating the information. The information sought to be withheld is part of NuScale's technology that provides NuScale with a competitive advantage over other firms in the industry. NuScale has invested significant human and financial capital in developing this technology and NuScale believes it would be difficult for others to duplicate the technology without access to the information sought to be withheld.

I declare under penalty of perjury that the foregoing is true and correct. Executed on 5/17/2018.



Zackary W. Rad