RAIO-0418-59751

April 30, 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. 387 (eRAI No. 9398) on the NuScale Design Certification Application

REFERENCE: U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 387 (eRAI No. 9398)," dated March 14, 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. 9398:

- 18-21

Enclosure 1 is the proprietary version of the NuScale Response to NRC RAI No. 387 (eRAI No. 9398). 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
Prosanta Chowdhury NRC, OWFN-8G9A
Demetrius Murray, NRC, OWFN-8G9A

Enclosure 1: NuScale Response to NRC Request for Additional Information eRAI No. 9398, proprietary

Enclosure 2: NuScale Response to NRC Request for Additional Information eRAI No. 9398, nonproprietary

Enclosure 3: Affidavit of Zackary W. Rad, AF-0418-59752

NuScale Power, LLC
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Enclosure 1:

NuScale Response to NRC Request for Additional Information eRAI No. 9398, proprietary

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Enclosure 2:

NuScale Response to NRC Request for Additional Information eRAI No. 9398, nonproprietary

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

eRAI No.: 9398
Date of RAI Issue: 03/14/2018

NRC Question No.: 18-21

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.

NUREG–0711, Section 11.4.2.2, "HSI Task Support Verification," criterion 2 states, "The applicant should compare the human-system interface (**HSI**)s and their characteristics (as defined in the HSI inventory and characterization) to the needs of personnel identified in the task analysis for the defined sampling of operational conditions, noted in Section 11.4.1 of NUREG–0711." Section 3.2.2 of the verification and validation (V&V) IP describes the methodology used by the applicant for task support verification. The HFE Design Team conducts task support verification using the personnel task requirements identified by the most recent TA and compares them with the alarms, controls, indications, procedures, automation, and task support identified in the HSI inventory and characterization, the most recent version of HSI display pages and an active simulator. In addition, staff reviewed documents in NuScale's Electronic Reading Room as part of an audit including the "HSI Design Verification Test Plan". Section 2.2.1 of the HSI Design Verification Test Plan provides information regarding the verification process and the products that result from that process which helps the staff to understand how the comparison between the TA and HSI inventory and characterization is carried out. Please provide this information or a summary of the information in the V&V IP, as this information is necessary to for the staff to make it's finding.

NuScale Response:

RP-0914-8543, Human Factors Verification and Validation Implementation Plan, has been revised to describe the task support verification process and the products that result from comparison between the task analysis and human-system interface (HSI) inventory and characterization.

Impact on DCA:

RP-0914-8543, Human Factors Verification and Validation Implementation Plan, has been revised as described in the response above and as shown in the markup provided with this response.

(i.e., the planned attributes) with the alarms, controls, indications, procedures, automation, and task support in the HSI inventory and characterization (i.e., the actual attributes). The HFE Design Team follows a process that provides a Retest step if needed as shown in Figure 3-2.

Results of the task support verification are based on the criterion that the information, control, and functional characteristics to support the task requirements identified during TA are present in the HSI that is being verified for the task. Results are documented for each task in the V&V RSR (see Section 6.0) once the V&V activities are complete.

3.2.3 Task Support Verification

The verification process is conducted using internal procedures and is based on

- the most recently completed TA.
- the personnel task requirements identified by the TA with the available alarms, controls, indications, and procedures in the HSI inventory.
- guidelines for determining whether the HSI is "acceptable" or "discrepant" based on the associated HFE design criteria.
- completed Inventory and Characterization forms used to verify that the elements on the pages have the appropriate design characteristics, including dynamic behavior.
- completed HFE Design Verification forms used to verify that the elements on the pages were consistent both on the page being tested and with other pages in the inventory.
- the most recent version of HSI display pages.
- an active simulator.

3.2.4 Human-System Interface Acceptability Criteria

Internal procedures are used for determining whether the HSI is "acceptable" or "discrepant." This procedural guidance includes:

1. A judgment that an HSI is “acceptable” should be made only if compliance is total (i.e., only if every instance of the item is fully consistent with the criteria established by the HFE guidelines).
2. If there is any noncompliance, full or partial, then an evaluation of “discrepant” should be given, and a notation made as to where it occurs.
3. If discrepant, it should be designated as an HED, tracked, and evaluated.

3.2.5 Task Support Verification Documentation

The verification produces

- a documented list of each test team member's findings used to develop a team consensus.
- a completed task support verification form used to verify the tasks can be performed using the display pages.
- a description of the means of comparing HFE design criteria to HSI components in the context of the various environmental conditions or locations of those HSIs (e.g., noise, lighting). This piece of the task support verification will be performed in the simulator during operator training or testing.

3.3 Human Factors Engineering Design Verification

The HFE design verification is conducted to confirm that HSI characteristics conform to HFE guidelines as represented in the style guide. The style guide consists of procedures for use, general considerations, and system-specific guidance for screen-based HSIs (the term system-specific applies to plant systems as well as HSI systems). The HFE design verification process is shown in Figure 3-2.

3.3.1 Verification Criteria

The criteria for HFE design verification is provided by the HSI style guide. The style guide includes procedural guidance for determining appropriate design criteria when the style guide does not apply to the characteristics of the HSI component being designed.

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3.3.2 Design Verification Evaluation Methodology

HFE design verification is conducted in accordance with a written process to assure consistency of results and to control bias. The design verification phase for all selected HSI follows a process that provides a Retest step if needed as shown in Figure 3-2.

Procedures describing HFE design verification include

- checklists and guidelines for comparison of the HFE design criteria (style guide) to HSI components (e.g., alarms, controls, indications, procedures, navigation aids)
- a description of the means of comparing HFE design criteria to HSI components in the context of the various environmental conditions or locations of those HSIs (e.g., noise, lighting, ambient temperature and humidity)
- guidelines for determining whether the HSI is acceptable or discrepant based on the associated HFE design criteria

Enclosure 3:

Affidavit of Zackary W. Rad, AF-0418-59752

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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 engineering.

    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 RAI No. 387, eRAI No. 9398. 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 4/30/2018.

Zackary W. Rad