RAIO-0718-60977

July 19, 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. 410 (eRAI No. 9310) on the NuScale Design Certification Application

REFERENCES:

1. U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 410 (eRAI No. 9310)," dated April 09, 2018
2. NuScale Power, LLC Supplemental Response to NRC "Request for Additional Information No. 410 (eRAI No. 9310)," dated June 08, 2018
3. NuScale Power, LLC Supplemental Response to NRC "Request for Additional Information No. 410 (eRAI No. 9310)," dated June 20, 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. 9310:

- 03.09.02-64

The schedule for questions 03.09.02-62, 03.09.02-69, 03.09.02-70 and 03.09.02-71 were provided in emails to NRC (Greg Cranston) dated May 09, 2018 and June 1, 2018. Markups for the NPM Seismic Analysis technical report TR-0916-51502 are not included with this RAI response. Revision 1 of TR-0916-51502 is in preparation and will be provided at a later date.

Enclosure 1 is the proprietary version of the NuScale Response to NRC RAI No. 410 (eRAI No. 9310). NuScale requests that the proprietary version be withheld from public disclosure in accordance with the requirements of 10 CFR § 2.390. The proprietary enclosures have been deemed to contain Export Controlled Information. This information must be protected from disclosure per the requirements of 10 CFR § 810. 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 Marty Bryan at 541-452-7172 or at mbryan@nuscalepower.com.

Sincerely,

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

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

Enclosure 1: NuScale Response to NRC Request for Additional Information eRAI No. 9310, proprietary

Enclosure 2: NuScale Response to NRC Request for Additional Information eRAI No. 9310, nonproprietary

Enclosure 3: Affidavit of Zackary W. Rad, AF-0718-60978

Enclosure 1:

NuScale Response to NRC Request for Additional Information eRAI No. 9310, proprietary

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Enclosure 2:

NuScale Response to NRC Request for Additional Information eRAI No. 9310, nonproprietary

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NuScale Power™

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

eRAI No.: 9310
Date of RAI Issue: 04/09/2018

NRC Question No.: 03.09.02-64

In the response to Subquestion 2 of RAI 8911, Question 03.09.02-29, the applicant stated that the upper riser bellows are between the upper riser shell and the upper riser cone section. The bellows allow for vertical thermal growth while limiting relative horizontal deflections between the upper riser and the lower riser. The applicant further stated that while the geometry of the bellows has not been explicitly modeled, its effect has been captured by coupling the upper riser and lower riser in the horizontal directions while the vertical direction is not coupled. The staff is not clear about the properties and modeling of the bellows. Provide the following information:

1. Describe detailed properties of the bellows (thickness, connections to the upper riser including connections between the bellow and the riser sliding surfaces, sketches, etc.).
2. Does the bellow behave like a spring in axial direction? Explain why the bellows are not modelled as springs in the NPM seismic model and provide justification that the NPM seismic response without considering the spring constant of the bellows in the upper/lower riser conical joint is conservative.
3. Discuss whether sliding in the upper/lower riser conical joint will introduce nonlinearity under seismic loading. If yes, provide justification that not modeling sliding behavior in the upper/lower riser conical joint in the NPM seismic model is conservative.
4. Table C-1 of TR-0916-51502 states that the upper riser is not restrained in the vertical direction other than by gravity and compression of the bellows which keeps the interface between the upper riser and lower riser closed. Figure B-21 of TR-0916-51502 indicates that the vertical spectral frequency at high frequency end is about 1.6 g. Address the potential that the upper riser may uplift from the lower riser at the upper/lower riser conical joint under 1.6 g vertical spectral acceleration.
5. Provide stress evaluation of the upper riser bellows in the response to RAI 8911, Question 03.09.02-18 which is scheduled for July 2018.

Include the requested information in the NPM Seismic Report.

NuScale Response:
The subquestions are addressed individually below:

1. A sketch of the bellows assembly design is provided below in Figure 1. A section view showing the overall dimensions of the bellows assembly is shown in Figure 2. As indicated in Figure 2, the bellows assembly is welded to the upper riser section and the upper riser transition (cone) using full penetration welds. Figure 3 is an enlarged view of the lateral restraints and bellows. The upper and lower lateral restraints overlap preventing relative lateral displacement between the upper and lower sections of the bellows assembly. This lateral restraint is necessary in order to provide structural support for the control rod drive shafts and the ICI guide tubes. Therefore, the lateral restraints are classified as Seismic Category I. The upper and lower lateral restraints are allowed to slide vertically relative to each other, accommodating the thermal expansion of the upper riser assembly. The bellows vertical expansion structure (i.e., the convolutions) is a Seismic Category II component and prevents bypass flow from occurring between the cold and hot legs during operation. The details of the bellows assembly are to be provided by the supplier.

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}}2(a),(c),ECI

Figure 1. Sketch of bellows assembly

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}}2(a),(c),ECI

Figure 2. Bellows assembly section view (units in inches)

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}}2(a),(c),ECI

Figure 3. Lateral restraint and sliding surface

2. The bellows are not modeled using a spring in the axial direction. Instead, in order to account for the bellows, the upper and lower risers are decoupled in the vertical direction. The primary function of the bellows assembly is to decouple the vertical load path from the lower riser to the upper riser in order to accommodate thermal expansion. The specific function of the bellows (i.e., the convolutions portion) is to prevent bypass flow between the cold and hot legs during operation. The bellows vertical expansion structure does not provide any structural function. The bellows exerts a force on the lower riser under normal operating conditions. The magnitude of the force between the risers is a combination of the mass of the upper riser beneath the bellows and the displacement of the bellows with respect to their equivalent spring

constant. The total force (considering the bellows stiffness, preload, and the mass of the upper riser section beneath the bellows) exerted on the lower riser by the bellows is assumed to be insignificant for the seismic model.

3 and 4. These subquestions are similar to RAI 8911 Question 03.09.02-45 which asks to provide a discussion on the possibility and consequences of uplift of the upper riser transition cone from the lower riser during a seismic event. The RAI 8911 Question 03.09.02-45 response will address this as well as other non-linearities at this interface, such as sliding or “pitching” of the transition cones and is scheduled for submittal December 21, 2018.

The responses to these Subquestions 3 and 4 are therefore referred to RAI 8911 Question 03.09.02-45.

5. The stress evaluation of the Seismic Category I portions of the upper riser bellows assembly (i.e., the lateral restraints) will be provided in the response to RAI 8911, Question 03.09.02-18, scheduled for September 2018.

Impact on DCA:

The FSAR Tier 2, Table 3.2-1 and Table 17.4-1 have been revised as described in the response above and as shown in the markup provided with this response.

RAI 03.02.01-2, RAI 03.02.01-3, RAI 03.02.02-2, RAI 03.02.02-6, RAI 03.08.02-14, RAI 03.09.02-64, RAI 05.04.02.01-6, RAI 06.02.04-2, RAI 09.02.02-1, RAI 09.02.04-1, RAI 09.02.04-1S1, RAI 09.02.05-1, RAI 09.02.06-1, RAI 09.02.07-4, RAI 09.02.07-5, RAI 09.02.09-2, RAI 09.03.04-5, RAI 09.04.02-1, RAI 10.04.07-2, RAI 11.02-1, RAI 15-17, RAI 19-14

Table 3.2-1: Classification of Structures, Systems, and Components

SSC (Note 1)	Location	SSC Classification (A1, A2, B1, B2)	RTNSS Category (A,B,C,D,E)	QA Program Applicability (Note 2)	Augmented Design Requirements (Note 3)	Quality Group / Safety Classification (Ref RG 1.26 or RG 1.143) (Note 4)	Seismic Classification (Ref. RG 1.29 or RG 1.143) (Note 5)
CNTS, Containment System							
All components (except as listed below)	RXB	A1	N/A	Q	None	B	I
• CVC Injection & Discharge Nozzles • CVC PZR Spray Nozzle • CVC PZR Spray CIV • CVC RPV High Point Degasification Nozzle • CVC RPV High Point Degasification CIV • RVV & RRV Trip/Reset # 1 & 2 Nozzles • RVV Trip 1 & 2/Reset #3 Nozzles • CVC Injection & Discharge CIVs	RXB	A1	N/A	Q	None	A	I
• NPM Lifting Lugs • Top Support Structure • Top Support Structure Diagonal Lifting Braces	RXB	B1	None	AQ-S	• ANSI/ANS 57.1-1992 • ASME NOG-1 • NUREG-0554	N/A	I
• CNV Fasteners • Hydraulic skid • CNV Seismic Shear Lug • CNV CRDM Support Frame • Containment Pressure Transducer (Narrow Range) • Containment Water Level Sensors (Radar Transceiver) • SG 1 & 2 Steam Temperature Sensors (RTD)	RXB	A1	N/A	Q	None	N/A	I
CNTS CFDS Piping in containment	RXB	B2	None	AQ-S	None	B	II
Piping from (CES, CFDS, FWS, MSS, and RCCWS) CIVs to disconnect flange (outside containment)	RXB	B2	None	AQ-S	None	D	I
CVCS Piping from CIVs to disconnect flange (outside containment)	RXB	B2	None	AQ-S	None	C	I
CIV Close and Open Position Sensors: • CES, Inboard and Outboard • CFDS, Inboard and Outboard • CVCS, Inboard and Outboard PZR Spray Line • CVCS, Inboard and Outboard RCS Discharge • CVCS, Inboard and Outboard RCS Injection • CVCS, Inboard and Outboard RPV High-Point Degasification • FWS, Supply to SGs and DHR HXs FWIV • RCCWS, Inboard and Outboard Return and Supply • SGS, Steam Supply CIV/MSIVs and CIV/MSIV Bypasses	RXB	B2	None	AQ-S	IEEE 497-2002 with CORR 1	N/A	I
Containment Pressure Transducer (Wide Range)	RXB	B2	None	AQ-S	IEEE 497-2002 with CORR 1	N/A	I
• Containment Air Temperature (RTDs) • FW Temperature Transducers	RXB	B2	None	AQ-S	None	N/A	II
SGS, Steam Generator System							
• SG tubes • Feedwater plenums • Steam plenums	RXB	A1	N/A	Q	None	A	I
• SG tube supports • Upper and lower SG supports	RXB	A1	N/A	Q	None	N/A	I
• Steam piping inside containment • Feedwater piping inside containment • Feedwater supply nozzles • Main steam supply nozzles • Thermal relief valves	RXB	A2	N/A	Q	None	B	I
Flow restrictors	RXB	A2	N/A	Q	None	N/A	I

Table 3.2-1: Classification of Structures, Systems, and Components (Continued)

SSC (Note 1)	Location	SSC Classification (A1, A2, B1, B2)	RTNSS Category (A,B,C,D,E)	QA Program Applicability (Note 2)	Augmented Design Requirements (Note 3)	Quality Group / Safety Classification (Ref RG 1.26 or RG 1.143) (Note 4)	Seismic Classification (Ref. RG 1.29 or RG 1.143) (Note 5)
RXC, Reactor Core System							
Fuel assembly (RXF)	RXB	A1	N/A	Q	None	N/A	I
Fuel Assembly Guide Tube	RXB	A2	N/A	Q	None	N/A	I
Incore Instrument Tube	RXB	B2	None	AQ-S	None	N/A	I
CRDS, Control Rod Drive System							
• Control Rod Drive Shafts • Control Rod Drive Latch Mechanism	RXB	A1	N/A	Q	None	N/A	I
CRDM Pressure Boundary (Latch Housing, Rod Travel Housing, Rod Travel Housing Plug)	RXB	A2	N/A	Q	None	A	I
CRDS Cooling Water Piping and Pressure Relief Valve	RXB	B2	None	AQ-S	None	B	II
Rod Position Indication (RPI) Coils	RXB	B2	None	AQ-S	None	N/A	I
• Control Rod Drive Coils • CRDM power cables from EDN breaker to MPS breaker • CRDM power cables from MPS breaker to CRDM Cabinets	RXB	B2	None	AQ-S	None	N/A	II
• CRDM Control Cabinet • CRDM Power & Rod Position Indication Cables • Rod Position Indication Cabinets (Train A/B)	RXB	B2	None	AQ	None	N/A	III
CRA, Control Rod Assembly							
All components	RXB	A2	N/A	Q	None	N/A	I
NSA, Neutron Source Assembly							
All components	RXB	B2	None	AQ-S	None	N/A	I
RCS, Reactor Coolant System							
All components (except as listed below)	RXB	A1	N/A	Q	None	A	I
• Reactor vessel internals (upper riser assembly (Note 7), lower riser assembly, core support assembly, flow diverter, and pressurizer spray nozzles)	RXB	A1	None	Q	None	N/A	I
• Reactor vessel internals upper riser bellows-lateral seismic restraining structure	RXB	A1	N/A	Q	None	N/A	I
• Reactor vessel internals upper riser bellows-vertical expansion structure	RXB	B2	N/A	AQ-S	ASME B&PVC Section III Division 1 NG guidance	N/A	II
• Narrow Range Pressurizer Pressure Elements • PZR/RPV Level Elements • Narrow Range RCS Hot Leg Temperature Elements • Wide Range RCS Hot Leg Temperature Elements • RCS Flow Transmitters (Ultrasonic)							
• Wide Range RCS Pressure Elements • Wide Range RCS Cold Leg Temperature Elements	RXB	A2	N/A	Q	None	N/A	I
Reactor Safety Valve Position Indicator	RXB	B2	None	AQ-S	Environmental Qualification Power from EDS	N/A	I
• PZR Control Cabinet • PZR Vapor Temperature Element • PZR heater power cabling from MPS breaker to PZR heaters • Pressurizer Liquid Temperature Element • Narrow Range RCS Cold Leg Temperature Element	RXB	B2	None	AQ-S	None	N/A	II
PZR heater power cabling from ELV breaker to MPS breaker	RXB	B2	None	None	None	N/A	III
CVCS, Chemical and Volume Control System							
DWS Supply Isolation Valves	RXB	A2	N/A	Q	None	C	I
Position Indication for DWS Supply Isolation Valves	RXB	B2	None	AQ-S	IEEE 497-2002 with CORR 1	N/A	I

Table 3.2-1: Classification of Structures, Systems, and Components (Continued)

SSC (Note 1)	Location	SSC Classification (A1, A2, B1, B2)	RTNSS Category (A,B,C,D,E)	QA Program Applicability (Note 2)	Augmented Design Requirements (Note 3)	Quality Group / Safety Classification (Ref RG 1.26 or RG 1.143) (Note 4)	Seismic Classification (Ref. RG 1.29 or RG 1.143) (Note 5)
[[SCB, Security Buildings (Guardhouse)]]							
• Security Building • Vehicle inspection sally port	Yard	B2	None	None	None	N/A	III
[[ANB, Annex Building]]							
Annex Building	Yard	B2	None	None	None	N/A	III
[[DGB, Diesel Generator Building]]							
Diesel Generator Building	Yard	B2	None	None	None	N/A	III
[[CUB, Central Utility Building]]							
Central Utility Building	Yard	B2	None	None	None	N/A	III
[[FWB, Firewater Building]]							
Firewater Building	Yard	B2	None	None	None	N/A	III
CRB, Control Building							
CRB Structure at EL 120′-0″ and below (except as discussed below).	Yard	A1	N/A	Q	None	N/A	I
• CRB Structure above EL 120′-0″ • Inside the CRB elevator shaft and two stairwells, full height of structure • CRB Fire Protection Vestibule (on East Side of CRB)	Yard	B2	None	AQ-S	None	N/A	II
MEMS, Metrology and Environmental Monitoring System							
All components	Yard, CRB	B2	None	AQ	IEEE 497-2002 with CORR 1	N/A	III
COMS, Communication Systems							
All components	Yard for collection of data CRB for display of results	B2	None	None	None	N/A	III
SMS, Seismic Monitoring System							
All components	RXB, CRB	B2	None	AQ-S	None	N/A	I

Note 1: Acronyms used in this table are listed in Table 1.1-1.

Note 2: QA Program applicability codes are as follows:

- Q = indicates quality assurance requirements of 10 CFR 50 Appendix B are applicable in accordance with the quality assurance program (see Section 17.5).
- AQ = indicates that pertinent augmented quality assurance requirements for non-safety related SSCs are applied to ensure that the function is accomplished when needed based on that functionality's regulatory requirements. Note that in meeting regulatory guidance, codes, and standards, those applicable SSCs may also have quality assurance requirements invoked by said guidance (e.g., RG 1.26, RG 1.143, IEEE 497, RG 1.189).
- AQ-S = indicates that the pertinent requirements of 10 CFR 50 Appendix B are applicable to nonsafety-related SSC classified as Seismic Category I or Seismic Category II in accordance with the quality assurance program.
- None = indicates no specific QA program or augmented quality requirements are applicable.

Note 3: Additional augmented design requirements, such as the application of a Quality Group, radwaste safety, or seismic classification, to nonsafety-related SSC are reflected in the columns Quality Group/Safety Classification and Seismic Classification, where applicable.

Note 4: See Section 3.2.2.1 through Section 3.2.2.4 for the applicable codes and standards for each RG 1.26 Quality Group designation A, B, C, and D. A Quality Group classification per RG 1.26 is not applicable to supports or instrumentation. See Section 3.2.1.4 for a description of RG 1.143 classifications for RW-IIa, RW-IIb, and RW-IIc.

Note 5: Where SSC (or portions thereof) as determined in the as-built plant which are identified as Seismic Category III in this table could, as the result of a seismic event, adversely affect Seismic Category I SSC or result in incapacitating injury to occupants of the control room, they are categorized as Seismic Category II consistent with Section 3.2.1.2 and analyzed as described in Section 3.7.3.8.

Note 6: Provides nonsafety-related backup isolation to a safety-related isolation device. See FSAR section 15.0.0.6.6.

Note 7: Includes all subcomponents of the reactor vessel internals upper riser assembly with the exception of the bellows lateral seismic restraining structure and bellows vertical expansion structure which are listed separately.

RAI 03.09.02-64

Table 17.4-1: D-RAP SSC Functions, Categorization, and Categorization Basis

System Function	Function Category (A1 & B1)	SSC Required to Perform System Function	Basis for Function Categorization
Containment System (CNTS)			
• Supports reactor building by providing a barrier to contain mass, energy, and fission product release from a degradation of the reactor coolant pressure boundary (RCPB) • Supports reactor building by providing a barrier to contain mass, energy, and fission product release by closure of the containment isolation valves (CIVs) upon containment isolation signal • Supports emergency core cooling system (ECCS) operations by providing a sealed containment and thermal conduction for the condensation of steam that provides makeup water to the reactor coolant system (RCS) • Supports control rod drive system (CRDS) by providing structural support for the control rod drive mechanisms • Supports RCS by providing structural support for the reactor pressure vessel (RPV) • Supports RCS by transferring core heat from reactor coolant in containment to the ultimate heat sink (UHS) • Supports ECCS by providing structural support of the trip and reset valves for the ECCS reactor vent and recirculation valves • Supports neutron monitoring system (NMS) by providing structural support for the ex-core detectors • Supports ECCS by providing electrical penetration assemblies for reactor instrumentation cables through containment vessel (CNV) • Supports RCS by closing the CIVs for pressurizer spray, chemical and volume control (CVC) makeup, CVC letdown, and RPV high point degas when actuated by module protection system (MPS) for RCS Isolation • Supports MPS by providing MPS actuation instrument information signals through CNV	A1	All CNTS SSC with the exception of the following: • CIV close and open position sensors: - Containment evacuation system (CES), inboard and outboard - Containment flooding and drain system (CFDS), inboard and outboard - Chemical and volume control system (CVCS) inboard and outboard pressurizer spray line - CVCS, inboard and outboard RCS discharge - CVCS, inboard and outboard RCS injection - CVCS, inboard and outboard reactor pressure vessel (RPV) high-point degasification - Feedwater system (FWS), supply to steam generators and decay heat removal (DHR) heat exchangers feedwater isolation valves - Reactor component cooling water system (RCCWS), inboard and outboard return and supply - Steam generator system (SGS), steam supply CIV/ main steam isolation valves (MSIVs) and CIV/MSIV bypasses • CFDS piping inside containment • Containment air temperature detectors (RTDs) • Piping from systems (CES, CFDS, CVCS, FWS, MSS, RCCWS) CIVs to disconnect flange (outside containment) • Containment pressure transducers (wide range) • Feedwater temperature transducers (RTDs) • Hydraulic skid for valve reset	Determination by probabilistic risk assessment (PRA) and concurrence by the expert panel as being needed for maintaining containment and RCPB integrity, removing fuel assembly heat, reactivity control, and emergency response
• Supports reactor building crane (RBC) by providing lifting attachment points that the RBC can connect to, so that the module can be lifted	B1	• NuScale Power Module lifting lugs and top auxiliary mechanical access structure diagonal lifting braces • Top auxiliary mechanical access structure	Determination by PRA and concurrence by the expert panel as being needed for maintaining containment integrity

Table 17.4-1: D-RAP SSC Functions, Categorization, and Categorization Basis (Continued)

System Function	Function Category (A1 & B1)	SSC Required to Perform System Function	Basis for Function Categorization
Steam Generator System (SGS)			
• Supports RCS by supplying part of the RCPB	A1	• Steam generator tubes • Steam generator tube supports • Feed plenums • Steam plenums	Determination by PRA and concurrence by the expert panel as being needed for maintaining RCPB integrity
Reactor Core System (RXC)			
• Supports control rod assembly (CRA) by providing control rod guide tubes to receive and align the CRA • Supports RCS by containing fission products and transuranics within the fuel rods to minimize contamination of the reactor coolant • Supports RCS by maintaining a coolable geometry	A1	• Fuel assembly	Determination by PRA and concurrence by the expert panel as being needed for reactivity control, radioactivity control, and removing fuel assembly heat
Control Rod Drive System (CRDS)			
• Supports CRA by releasing control rod during a reactor trip	A1	• Control rod drive shafts • Control rod drive latch mechanism	Determination by PRA and concurrence by the expert panel as being needed for reactivity control
Reactor Coolant System (RCS)			
• Supports RXC by removing heat to ensure core thermal design limits are not exceeded • Supports CNT by supplying the RCPB and a fission product boundary via the RPV and other appurtenances • Supports MPS by providing instrument information signals for MPS actuation • Supports CRDS by the RPV and the reactor vessel internals supporting and aligning the control rods • Supports ECCS by providing mechanical support for the ECCS valves • Supports in-core instrumentation (ICI) by providing structural support of the ICI guide tubes • Supports RXC by the reactor vessel internals providing mechanical support to orient, position, and seat the fuel assemblies • Supports SGS by providing physical support for the steam generator tube supports and for the integral steam and feed plenums • Supports RXC by containing soluble neutron poison	A1	All RCS SSC with the exception of the following: • Wide range RCS pressure element • Wide range RCS cold leg temperature element • Reactor safety valve position indicator • Pressurizer vapor temperature element • Pressurizer control cabinet • Pressurizer heater power cabling from MPS breaker to pressurizer heaters • Pressurizer liquid temperature element • Narrow range RCS cold leg temperature element • Pressurizer heater power cabling from low voltage AC electrical distribution system breaker to MPS breaker • Reactor vessel internals upper riser bellows-vertical expansion structure	Determination by PRA and concurrence by the expert panel as being needed for removing fuel assembly heat, maintaining containment and RCPB integrity, radioactivity control, and reactivity control

Enclosure 3:

Affidavit of Zackary W. Rad, AF-0718-60978

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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 power module seismic analysis.

    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. 410, eRAI No. 9310. 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 July 19, 2018.

Zackary W. Rad