RAIO-0419-65230

April 15, 2019

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. 512 (eRAI No. 9634) on the NuScale Design Certification Application

REFERENCES:

1. U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 512 (eRAI No. 9634)," dated November 29, 2018
2. NuScale Power, LLC Response to NRC "Request for Additional Information No. 512 (eRAI No.9634)." dated January 10, 2019
3. NuScale Power, LLC Response to NRC "Request for Additional Information No. 512 (eRAI No.9634)." dated January 16, 2019
4. NuScale Power, LLC Response to NRC "Request for Additional Information No. 512 (eRAI No.9634)." dated January 29, 2019
5. NuScale Power, LLC Response to NRC "Request for Additional Information No. 512 (eRAI No.9634)." dated February 25, 2019

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 Questions from NRC eRAI No. 9634:

- 16-60-2
- 16-60-77

Other portions of the NuScale response to question 16-60 were previously provided in References 2,3,4 and 5. This completes all responses to eRAI 9634.

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 Carrie Fosaaen at 541-452-7126 or at cfosaaen@nuscalepower.com.

Sincerely,

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

Distribution: Gregory Cranston, NRC, OWFN-8H12
Samuel Lee, NRC, OWFN-8H12
Getachew Tesfaye, NRC, OWFN-8H12

Attachment 1: eRAI No. 9634, Question 16-60 Cross-Reference Table
Enclosure 1: NuScale Response to NRC Request for Additional Information eRAI No. 9634

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NuScale Tracking Number	NRC RAI Sub-paragraph Number	NuScale Letter No.	Submittal Letter Date	Accession Number
16-60-1	1	RAIO-0119-64111	January 10, 2019	ML19010A409
16-60-2	2	RAIO-0419-65230	April 15, 2019	Pending
16-60-3	3	RAIO-0119-64281	January 29, 2019	ML19029B572
16-60-4	4	RAIO-0119-64111	January 10, 2019	ML19010A409
16-60-5	5	RAIO-0119-64111	January 10, 2019	ML19010A409
16-60-6	6	RAIO-0119-64178	January 16, 2019	ML19016A374
16-60-7	7	RAIO-0119-64281	January 29, 2019	ML19029B572
16-60-8	8	RAIO-0119-64111	January 10, 2019	ML19010A409
16-60-9	9	RAIO-0119-64281	January 29, 2019	ML19029B572
16-60-10	10	RAIO-0119-64111	January 10, 2019	ML19010A409
16-60-11	11	RAIO-0119-64111	January 10, 2019	ML19010A409
16-60-12	12	RAIO-0119-64111	January 10, 2019	ML19010A409
16-60-13	13	RAIO-0119-64111	January 10, 2019	ML19010A409
16-60-14	14	RAIO-0119-64111	January 10, 2019	ML19010A409
16-60-15	15	RAIO-0119-64111	January 10, 2019	ML19010A409
16-60-16	16	RAIO-0119-64111	January 10, 2019	ML19010A409
16-60-17	17	RAIO-0119-64281	January 29, 2019	ML19029B572
16-60-18	18	RAIO-0119-64281	January 29, 2019	ML19029B572
16-60-19	18	RAIO-0119-64111	January 10, 2019	ML19010A409
16-60-20	19	RAIO-0119-64111	January 10, 2019	ML19010A409
16-60-21	20	RAIO-0119-64281	January 29, 2019	ML19029B572
16-60-22	21	RAIO-0119-64281	January 29, 2019	ML19029B572
16-60-23	22	RAIO-0119-64281	January 29, 2019	ML19029B572
16-60-24	23	RAIO-0119-64281	January 29, 2019	ML19029B572
16-60-25	24	RAIO-0119-64281	January 29, 2019	ML19029B572
16-60-26	25	RAIO-0119-64281	January 29, 2019	ML19029B572
16-60-27	26	RAIO-0119-64281	January 29, 2019	ML19029B572
16-60-28	27	RAIO-0119-64281	January 29, 2019	ML19029B572
16-60-29	28	RAIO-0119-64281	January 29, 2019	ML19029B572
16-60-30	29	RAIO-0119-64281	January 29, 2019	ML19029B572
16-60-31	29	RAIO-0119-64281	January 29, 2019	ML19029B572
16-60-32	29	RAIO-0119-64281	January 29, 2019	ML19029B572
16-60-33	30	RAIO-0119-64281	January 29, 2019	ML19029B572
16-60-34	30	RAIO-0119-64281	January 29, 2019	ML19029B572
16-60-35	31	RAIO-0119-64281	January 29, 2019	ML19029B572
16-60-36	32	RAIO-0119-64111	January 10, 2019	ML19010A409
16-60-37	33	RAIO-0119-64111	January 10, 2019	ML19010A409
16-60-38	34	RAIO-0119-64111	January 10, 2019	ML19010A409

NuScale Tracking Number	NRC RAI Sub-paragraph Number	NuScale Letter No.	Submittal Letter Date	Accession Number
16-60-39	35	RAIO-0119-64111	January 10, 2019	ML19010A409
16-60-40	36	RAIO-0119-64281	January 29, 2019	ML19029B572
16-60-41	37.1	RAIO-0119-64111	January 10, 2019	ML19010A409
16-60-42	37.2	RAIO-0119-64281	January 29, 2019	ML19029B572
16-60-43	37.3	RAIO-0119-64281	January 29, 2019	ML19029B572
16-60-44	38	RAIO-0119-64111	January 10, 2019	ML19010A409
16-60-45	39	RAIO-0219-64635	February 25, 2019	ML19056A587
16-60-46	40	RAIO-0119-64281	January 29, 2019	ML19029B572
16-60-47	41	RAIO-0119-64111	January 10, 2019	ML19010A409
16-60-48	42	RAIO-0119-64111	January 10, 2019	ML19010A409
16-60-49	43	RAIO-0119-64111	January 10, 2019	ML19010A409
16-60-50	44	RAIO-0119-64111	January 10, 2019	ML19010A409
16-60-51	45	RAIO-0119-64111	January 10, 2019	ML19010A409
16-60-52	Tracking number 16-60-52 not used			
16-60-53	46	RAIO-0119-64111	January 10, 2019	ML19010A409
16-60-54	47	RAIO-0119-64111	January 10, 2019	ML19010A409
16-60-55	48	RAIO-0119-64178	January 16, 2019	ML19016A374
16-60-56	49	RAIO-0119-64111	January 10, 2019	ML19010A409
16-60-57	50	RAIO-0119-64111	January 10, 2019	ML19010A409
16-60-58	51	RAIO-0119-64111	January 10, 2019	ML19010A409
16-60-59	52	RAIO-0119-64178	January 16, 2019	ML19016A374
16-60-60	53	RAIO-0219-64635	February 25, 2019	ML19056A587
16-60-61	54	RAIO-0119-64281	January 29, 2019	ML19029B572
16-60-62	55	RAIO-0119-64281	January 29, 2019	ML19029B572
16-60-63	55	RAIO-0119-64281	January 29, 2019	ML19029B572
16-60-64	56, 57, 58	RAIO-0119-64178	January 16, 2019	ML19016A374
16-60-65	59	RAIO-0219-64635	February 25, 2019	ML19056A587
16-60-66	60	RAIO-0219-64635	February 25, 2019	ML19056A587
16-60-67	61	RAIO-0119-64178	January 16, 2019	ML19016A374
16-60-68	62	RAIO-0119-64178	January 16, 2019	ML19016A374
16-60-69	63	RAIO-0119-64178	January 16, 2019	ML19016A374
16-60-70	64	RAIO-0119-64178	January 16, 2019	ML19016A374
16-60-71	65	RAIO-0119-64178	January 16, 2019	ML19016A374
16-60-72	66	RAIO-0119-64281	January 29, 2019	ML19029B572
16-60-73	67	RAIO-0119-64281	January 29, 2019	ML19029B572
16-60-74	68	RAIO-0119-64111	January 10, 2019	ML19010A409
16-60-75	69 (i – iv)	RAIO-0219-64635	February 25, 2019	ML19056A587
16-60-76	69 (v)	RAIO-0219-64635	February 25, 2019	ML19056A587
16-60-77	70	RAIO-0419-65230	April 15, 2019	Pending

NuScale Tracking Number	NRC RAI Sub-paragraph Number	NuScale Letter No.	Submittal Letter Date	Accession Number
16-60-78	71	RAIO-0119-64281	January 29, 2019	ML19029B572
16-60-79	72	RAIO-0219-64635	February 25, 2019	ML19056A587
16-60-80	73	RAIO-0219-64635	February 25, 2019	ML19056A587
16-60-81	74	RAIO-0219-64635	February 25, 2019	ML19056A587
16-60-82	75	RAIO-0219-64635	February 25, 2019	ML19056A587

Enclosure 1:

NuScale Response to NRC Request for Additional Information eRAI No. 9634

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

eRAI No.: 9634
Date of RAI Issue: 11/29/2018

NRC Question No.: 16-60-2

2. A response is not required because this item is already included in and will be addressed in the response to RAI 506-9614, Question 16-59. In Revision 2 of DCA part 2, FSAR Section 15.1.1.2 says “In a decrease in feedwater temperature event that results in a reactor trip, the subsequent actuation of the decay heat removal system (DHRS) is credited with maintaining reactor cooling. The MPS signals credited for DHRS actuation are low PZR pressure, high steam superheat, low PZR level, high steam pressure, or high hot leg temperature.” The listing of Low PZR level is a typo, because low low PZR level initiates DHRS.

NuScale Response:

The actuation logic of the DHRS has been modified, and a new ESFAS function ‘Secondary System Isolation’ (SSI) was added to the module protection system design. The DHRS actuation logic no longer includes actuation on reduced pressurizer level.

The new SSI function actuates on Low-Low Pressurizer Level. Technical specification Table 3.3.1-1 has been modified to reflect this design change as shown in the unilateral submittal provided in NuScale letter LO-0419-65170 dated April 15, 2019.

Impact on DCA:

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

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

eRAI No.: 9634
Date of RAI Issue: 11/29/2018

NRC Question No.: 16-60-77

70. A response is not required because the applicant stated in an email dated November 12, 2018, to follow up the November 6, 2018, public meeting conference call, that it would address this item in the response to RAI 506-9614, Question 16-59, and in Revision 3 of DCA part 4. DCA Revision 2, part 4, on DCA pages B 3.3.1-14 and 15, describe the T-3 interlock as automatically bypassing MPS Functions 9.b, 9.c, and 9.d when wide range RCS hot temperature is < 350°F (T-3 interlock); but an RCS hot temperature below 350°F implies the NPM is in MODE 3, which is outside the stated Applicability of these Functions, which is MODES 1 and 2.

The Bases rationale for not including MODE 3 seems to be the passage on page B 3.3.1-25:

> Four Low Low Pressurizer Pressure DHRS, CVCSI and Pressurizer Heater Trip channels are required to be OPERABLE when operating in MODES 1 and 2. In MODES 3, 4, and 5 the reactor is subcritical.

The applicant is requested to explain and clarify this rationale.

NuScale Response:

The actuation of the decay heat removal system (DHRS), chemical volume and control system isolation, and the pressurizer heater trip on receipt of the Low Low Pressurizer Pressure signals in MODE 3 do not provide protective functions. In MODES 4 and 5 the module is not in its operating location and the sensors are not OPERABLE.

Note that as a result of recent design changes, the DHRS and pressurizer heater trip are no longer actuated directly by the Low Low Pressurizer Pressure signal. The Low Low Pressurizer Pressure signal causes a secondary system isolation actuation.

As described in FSAR Table 15.0-7, the Low Low Pressurizer Pressure signal is designed to detect and mitigate primary high energy line breaks outside containment and to protect the reactor coolant subcooled margin against instability events.

The actuations resulting from the Low Low Pressurizer Pressure signal are not necessary when the reactor coolant temperature is below 420 F because the low pressurizer level provides inventory protection for the RPV.

Similarly, the actuations provided by the Low Low Pressurizer Pressure signal are not necessary for protecting the subcooled margin when the reactor is subcritical because the instability events of concern cannot occur.

Impact on DCA:

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