



January 16, 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

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 additional responses to RAI Questions from NRC eRAI No. 9634:

- 16-60-6
- 16-60-55
- 16-60-59
- 16-60-64
- 16-60-67
- 16-60-68
- 16-60-69
- 16-60-70
- 16-60-71

Other portions of the NuScale response to question 16-60 were provided in Reference 2.

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
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Attachment 1: eRAI No. 9634, Question 16-60 Cross-Reference Table

Enclosure 1: NuScale Response to NRC Request for Additional Information eRAI No. 9634

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	pending		
16-60-3	3	pending		
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	
16-60-7	7	pending		
16-60-8	8	RAIO-0119-64111	January 10, 2019	ML19010A409
16-60-9	9	pending		
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	pending		
16-60-18	18	pending		
16-60-19	18	pending		
16-60-20	19	RAIO-0119-64111	January 10, 2019	ML19010A409
16-60-21	20	RAIO-0119-64111	January 10, 2019	ML19010A409
16-60-22	21	pending		
16-60-23	22	pending		
16-60-24	23	pending		
16-60-25	24	pending		
16-60-26	25	pending		
16-60-27	26	pending		
16-60-28	27	pending		
16-60-29	28	pending		
16-60-30	29	pending		
16-60-31	29	pending		
16-60-32	29	pending		
16-60-33	30	pending		
16-60-34	30	pending		
16-60-35	31	pending		
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	pending		
16-60-41	37.1	RAIO-0119-64111	January 10, 2019	ML19010A409
16-60-42	37.2	pending		
16-60-43	37.3	pending		
16-60-44	38	RAIO-0119-64111	January 10, 2019	ML19010A409
16-60-45	39	pending		
16-60-46	40	pending		
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	45	pending		
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	
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	
16-60-60	53	pending		
16-60-61	54	pending		
16-60-62	55	pending		
16-60-63	55	pending		
16-60-64	56, 57, 58	RAIO-0119-64178	January 16, 2019	
16-60-65	59	pending		
16-60-66	60	pending		
16-60-67	61	RAIO-0119-64178	January 16, 2019	
16-60-68	62	RAIO-0119-64178	January 16, 2019	
16-60-69	63	RAIO-0119-64178	January 16, 2019	
16-60-70	64	RAIO-0119-64178	January 16, 2019	
16-60-71	65	RAIO-0119-64178	January 16, 2019	
16-60-72	66	pending		
16-60-73	67	pending		
16-60-74	68	pending		
16-60-75	69 (i – iv)	pending		
16-60-76	69 (v)	pending		
16-60-77	70	pending		



Attachment 1:
eRAI No. 9634, Question 16-60
Cross-Reference Table

RAIO-0119-64178
01/16/2019
Page 3 of 3

NuScale Tracking Number	NRC RAI Sub-paragraph Number	NuScale Letter No.	Submittal Letter Date	Accession Number
16-60-78	71	pending		
16-60-79	72	pending		
16-60-80	73	pending		
16-60-81	74	RAIO-0119-64111	January 10, 2019	ML19010A409
16-60-82	75	pending		

Enclosure 1:

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

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

eRAI No.: 9634

Date of RAI Issue: 11/29/2018

NRC Question No.: 16-60-6

6. In Revision 2 of DCA part 4, the GTS definition of Mode 3 in Table 1.1-1 also includes meeting one or more of three conditions, as specified by table footnote (a):

(a) Any CRA capable of withdrawal, any CVCS or CFDS connection to the module not isolated.

The staff understands that this footnote means the unit is in Mode 4 when (i) no CRA is capable of being withdrawn, and (ii) all CVCS and CFDS module connections are isolated. The applicant is requested to point to or provide a clear description of how each module connection must be isolated for the unit to enter Mode 4.

NuScale Response:

Detailed description of plant configurations are not appropriate for inclusion in the FSAR or technical specifications. Plant activities and configurations are governed in plant procedures as required by technical specification 5.4, Procedures. A detailed description of the isolation of module connections is a level of detail that will be incorporated into plant procedures, as are descriptions of other plant operating configurations in NuScale and other commercial nuclear power plants.

For example, the meaning of 'fully tensioned' as used in MODE definition tables of plants is not typically addressed in detail in the plant technical specifications or FSAR. Bolt tension varies depending on the temperature of the bolt and the surroundings, so the required tension for a bolt to be 'fully tensioned' varies. The details of that temperature / tension relationship are not provided in the licensing basis. Instead, plant operating procedures define the criteria and



provide the detailed description of the satisfying the requirement. The NuScale footnotes describe corresponding configurations that are appropriately described in operating procedures.

Procedures are written and reviewed based on the content of the licensing basis described in FSAR section 13.5, Plant Procedures. Content and changes to procedures are subject to review in accordance with 10 CFR 50.59 which will assure continued conformance with the licensing basis and safety analyses, or prior review of the proposed change.

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.: 16-60-55

48. A response is not required because the applicant stated in the November 6, 2018, public meeting conference call that it would address this purely editorial item in Revision 3 of DCA part 4. In general, keep a numerical value and its associated unit of measure on the same line. E.g., Revision 2 of DCA part 4, on page 3.0-4, the first sentence of SR 3.0.3: “24 hours” is split across adjacent lines.

NuScale Response:

See response to RAI 16-60-10.

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.: 16-60-59

59. In Revision 2 of DCA part 4, on Page B 3.0-19, regarding Bases for SR 3.0.3, the W-STS paragraph that begins with the phrase “Failure to comply ...,” is split into two paragraphs beginning at the sentence that begins with, “The missed Surveillance should be treated as an emergent condition...” The applicant is requested to explain why this split is needed.

NuScale Response:

The paragraph was split to improve readability and understandability of the discussion. The paragraph discusses a number of issues and the break was placed to improve the distinction between the first portion that is related to failure to comply with the specified Frequencies of SRs, and the new second paragraph that is related to how any missed Surveillance should be treated.

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.: 16-60-64

56. 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 purely editorial item in Revision 3 of DCA part 4. Per the writer's guide, if a SR table begins on a page that an Actions table ends, three blank lines separate the tables (three blank lines above the title "SURVEILLANCE REQUIREMENTS"). The number of lines appears to be more than three on Pages 3.2.1-1, 3.2.2-1, 3.3.4-3, 3.4.2-1, 3.4.3-2, 3.4.7-2, and 3.6.1-1. The applicant is requested to conform to the STS format convention.

57. 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 purely editorial item in Revision 3 of DCA part 4. In Subsection 3.3.1, the "OR" logical connector should align with the period before the last digit of "N.2.1" and "N.2.2"; it is a bit too far to the right. In Required Action M.3, a space is missing between "temperature" and "below." The applicant is requested to correct these typographical errors.

58. 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 purely editorial item in Revision 3 of DCA part 4. In Subsection 3.2.2, the Completion Time for Required Action A.1 should say "6 hours" not "6 Hours" The applicant is requested to correct this typographical error.

NuScale Response:

See response to RAI 16-60-10.



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.: 16-60-67

61. 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 purely editorial item in Revision 3 of DCA part 4. In Revision 2 of DCA part 4, Subsection 3.3.1, Header Row of Table 3.3.1-1. For consistency with the STS format convention, one blank line should appear above and below the single spaced text, with the text positioned using ¶, as follows (ignore double spacing):

¶	¶	¶	¶
¶	APPLICABLE MODES OR	¶	¶
¶	OTHER SPECIFIED	REQUIRED	¶
FUNCTION¶	CONDITIONS¶	CHANNELS¶	CONDITIONS¶

The applicant is requested to revise all such tables in the generic TS to conform to this convention. Also notice that "APPLICABLE" and "MODES OR" appear in separate lines on page 1 of Table 3.3.1-1, but in the same line on pages 2 through 7; the applicant is requested to be consistent in the presentation of the title of each column in the instrumentation function tables.

NuScale Response:

The requested format changes were made to the headers of technical specification table 3.3.1-1, and similar changes were made to the headers of tables 3.3.3-1, and 3.3.4-1.



Impact on DCA:

The Technical Specifications have been revised as described in the response above and as shown in the markup provided in this response.

Table 3.3.1-1 (page 1 of 7)
Module Protection System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS
1. High Power Range Linear Power			
a. RTS	1, 2 ^(a) , 3 ^(a)	4	D
b. DWSI	1, 2 ^(a) , 3 ^(a)	4	H
2. High Power Range Positive and Negative Rate			
a. RTS	1 ^(b)	4	E
b. DWSI	1 ^(b)	4	H
3. High Intermediate Range Log Power Rate			
a. RTS	1 ^(c) , 2 ^(a) , 3 ^(a)	4	D
b. DWSI	1 ^(c) , 2 ^(a) , 3 ^(a)	4	H
4. High Source Range Count Rate			
a. RTS	1 ^(d) , 2 ^(a) , 3 ^(a)	4	D
b. DWSI	1 ^(d) , 2 ^(a) , 3 ^(a)	4	H
5. High Source Range Log Power Rate			
a. RTS	1 ^(d) , 2 ^(a) , 3 ^(a)	4	D
b. DWSI	1 ^(d) , 2 ^(a) , 3 ^(a)	4	H
6. High Subcritical Multiplication			
a. DWSI	1 ^(d) , 2 ^(a) , 3 ^(a)	4	H

- (a) When capable of CRA withdrawal.
(b) With power above the N-2H interlock.
(c) Below the N-2L Interlock.
(d) When Intermediate Range Log Power less than N-1 interlock.

Table 3.3.1-1 (page 2 of 7)
Module Protection System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS
7. High Pressurizer Pressure			
a. RTS	1, 2 ^(a) , 3 ^(a)	4	D
b. DHRS	1, 2, 3 ^(e)	4	I
c. Pressurizer Heater Trip	1, 2 ^(f) , 3 ^(f)	4	G
d. DWSI	1, 2 ^(a) , 3 ^(a)	4	H
8. Low Pressurizer Pressure			
a. RTS	1 ^(g)	4	D
b. DHRS	1 ^(g)	4	D
c. CVCSI	1 ^(g)	4	F
d. Pressurizer Heater Trip	1 ^(g)	4	G
e. DWSI	1 ^(g)	4	H
9. Low Low Pressurizer Pressure			
a. RTS	1, 2 ^(a)	4	D
b. DHRS	1, 2	4	I
c. CVCSI	1, 2	4	F
d. Pressurizer Heater Trip	1, 2	4	G
e. DWSI	1, 2 ^(a)	4	H

(a) When capable of CRA withdrawal.

(e) When not PASSIVELY COOLED.

(f) With pressurizer heater ~~trip~~ breakers closed.

(g) With narrow range RCS hot temperature above the T-4 interlock.

Table 3.3.1-1 (page 3 of 7)
Module Protection System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS
10. High Pressurizer Level			
a. RTS	1, 2 ^(a) , 3 ^(a)	4	D
b. CVCSI	1, 2, 3	4	F
c. DWSI	1, 2 ^(a) , 3 ^(a)	4	H
11. Low Pressurizer Level			
a. RTS	1, 2 ^(a) , 3 ^(a)	4	D
b. Pressurizer Heater Trip	1, 2 ^(f) , 3 ^(f)	4	G
c. DWSI	1, 2 ^(a) , 3 ^(a)	4	H
12. Low Low Pressurizer Level			
a. DHRS	1, 2, 3 ^(h)	4	N
b. CIS	1, 2, 3 ^(h)	4	L
c. CVCSI	1, 2, 3 ^(h)	4	F
d. Pressurizer Heater Trip	1, 2 ^(f) , 3 ^(f)	4	G
13. High Narrow Range RCS Hot Temperature			
a. RTS	1	4	D
b. DHRS	1, 2, 3 ^(e)	4	I
c. Pressurizer Heater Trip	1, 2 ^(f) , 3 ^(f)	4	G
d. DWSI	1	4	H
14. Low RCS Flow			
a. DWSI	1, 2, 3	4	H

(a) When capable of CRA withdrawal.

(e) When not PASSIVELY COOLED.

(f) With pressurizer heater ~~trip~~ breakers closed.

(h) With RCS temperature above the T-2 interlock and containment water level below the L-1 interlock.

Table 3.3.1-1 (page 4 of 7)
Module Protection System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS
15. Low Low RCS Flow			
a. RTS	1, 2 ^(a) , 3 ^(a)	4	D
b. CVCSI	1, 2, 3	4	F
c. DWSI	1, 2 ^(a) , 3 ^(a)	4	H
16. Low RPV Riser Level			
a. ECCS	1, 2, 3	4	I
17. High Main Steam Pressure			
a. RTS	1, 2 ^(a)	4 per SG	D
b. DHRS	1, 2, 3 ^(e)	4 per SG	I
c. Pressurizer Heater Trip	1, 2 ^(f) , 3 ^(f)	4 per SG	G
d. DWSI	1, 2 ^(a)	4 per SG	H
18. Low Main Steam Pressure			
a. RTS	1 ^(b)	4 per SG	E
b. DHRS	1 ^(b)	4 per SG	E
c. Pressurizer Heater Trip	1 ^(b)	4 per SG	E
d. DWSI	1 ^(b)	4 per SG	H

- (a) When capable of CRA withdrawal.
(b) With power above the N-2H interlock.
(e) When not PASSIVELY COOLED.
(f) With pressurizer heater ~~trip~~ breakers closed.

Table 3.3.1-1 (page 5 of 7)
Module Protection System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS
19. Low Low Main Steam Pressure			
a. RTS	1, 2 ^(a)	4 per SG	D
b. DHRS	1, 2	4 per SG	K
c. Pressurizer Heater Trip	1, 2 ^(f)	4 per SG	G
d. DWSI	1, 2 ^(a)	4 per SG	H
20. High Steam Superheat			
a. RTS	1	4 per SG	D
b. DHRS	1	4 per SG	D
c. Pressurizer Heater Trip	1	4 per SG	G
d. DWSI	1	4 per SG	H
21. Low Steam Superheat			
a. RTS	1	4 per SG	D
b. DHRS	1	4 per SG	D
c. Pressurizer Heater Trip	1	4 per SG	G
d. DWSI	1	4 per SG	H

- (a) When capable of CRA withdrawal.
(f) With pressurizer heater ~~trip~~ breakers closed.

Table 3.3.1-1 (page 6 of 7)
Module Protection System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS
22. High Narrow Range Containment Pressure			
a. RTS	1, 2 ^(a) , 3 ^(a)	4	D
b. DHRS	1, 2, 3 ^(e)	4	I
c. CIS	1, 2, 3 ⁽ⁱ⁾	4	L
d. CVCSI	1, 2, 3 ⁽ⁱ⁾	4	F
e. Pressurizer Heater Trip	1, 2 ^(f) , 3 ^(f)	4	G
f. DWSI	1, 2 ^(a) , 3 ^(a)	4	H
23. High Containment Water Level			
a. ECCS	1, 2, 3 ^(e)	4	I
24. High RCS Pressure – Low Temperature Overpressure Protection			
a. LTOP	3 ^(k)	4	J
25. Low AC Voltage to ELVS Battery Chargers			
a. RTS	1, 2 ^(a) , 3 ^(a)	4 per bus	M
b. DHRS	1, 2, 3 ^(e)	4 per bus	M
c. CIS	1, 2, 3	4 per bus	M
d. DWSI	1, 2 ^(a) , 3 ^(a)	4 per bus	M
e. Pressurizer Heater Trip	1, 2 ^(f)	4 per bus	M

(a) When capable of CRA withdrawal.

(e) When not PASSIVELY COOLED.

(f) With pressurizer heater ~~trip~~ breakers closed.

(i) With RCS temperature above the T-3 interlock.

(k) With wide range RCS cold temperature below the LTOP enable temperature specified in the PTLR (T-1 interlock) and more than one reactor vent valve closed.

Table 3.3.1-1 (page 7 of 7)
Module Protection System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS
26. High Under-the-Bioshield Temperature			
a. RTS	1, 2 ^(a) , 3 ^(a)	4	M
b. DHRS	1, 2, 3	4	M
c. CIS	1, 2, 3	4	M
d. DWSI	1, 2 ^(a) , 3 ^(a)	4	M
e. Pressurizer Heater Trip	1, 2 ^(f) , 3 ^(f)	4	M

(a) When capable of CRA withdrawal.
(f) With pressurizer heater ~~trip~~ breakers closed.

Table 3.3.3-1 (page 1 of 1)
ESFAS Logic and Actuation Functions

ACTUATION FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED DIVISIONS	CONDITIONS
1. Emergency Core Cooling System (ECCS)	1, 2, 3 ^(a)	2	C
2. Decay Heat Removal System (DHRS)	1, 2, 3 ^(a)	2	C
3. Containment Isolation System (CIS)	1, 2, 3 ^(b)	2	D
4. Demineralized Water Supply Isolation (DWSI)	1, 2, 3	2	E
5. CVCS Isolation (CVCSI)	1, 2, 3	2	F
6. Pressurizer Heater Trip	1, 2 ^(c) , 3 ^(c)	2	G
7. Low Temperature Overpressure Protection (LTOP)	3 ^(d)	2	A

(a) Not PASSIVELY COOLED.

(b) With any RCS temperature above the T-2 interlock.

(c) ~~Not required when Pressurizer Heater trip breakers are open and deactivated.~~ With pressurizer heater breakers closed.

(d) With wide range RCS cold temperature below the LTOP enable temperature specified in the PTLR (T-1 interlock) and more than one reactor vent valve closed.

Table 3.3.4-1 (page 1 of 1)
Manual Actuation Functions

MANUALLY ACTUATED FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED DIVISIONS	CONDITIONS
1. Reactor Trip System	1, 2 ^(a) , 3 ^(a)	2	C
2. Emergency Core Cooling System	1, 2, 3 ^(b)	2	D
3. Decay Heat Removal System	1, 2, 3 ^(b)	2	D
4. Containment Isolation System	1, 2, 3 ^(c)	2	I
5. Demineralized Water Supply Isolation	1, 2, 3	2	E
6. CVCS Isolation System	1, 2, 3	2	F
7. Pressurizer Heater Trip	1, 2 ^(d) , 3 ^(d)	2	G
8. Low Temperature Overpressure Protection	3 ^(e)	2	H

(a) When capable of CRA withdrawal.

(b) When not PASSIVELY COOLED.

(c) With any RCS temperature above the T-2 interlock.

(d) ~~Not required when pressurizer heater trip breakers are open and deactivated.~~ With pressurizer heater breakers closed.

(e) With wide range RCS cold temperature below the LTOP enable temperature specified in the PTLR (T-1 interlock) and more than one reactor vent valve closed.

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

eRAI No.: 9634

Date of RAI Issue: 11/29/2018

NRC Question No.: 16-60-68

62. 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 "Part 2, Item 10" of a supplemental response to RAI 197-9051, Question 16-28, and in Revision 3 of DCA part 4. In Revision 2 of DCA part 4, Subsection 3.3.3, Required Action G.1 Note says "Heater(s) may be energized intermittently under manual controls." Why not say "under administrative controls"? The Bases for this Required Action, on page B 3.3.3-8, uses "administrative controls." The applicant is requested to change "manual" to "administrative" in the Note.

NuScale Response:

The proposed change was implemented as shown in the NRC's request.

Impact on DCA:

The Technical Specifications have been revised as described in the response above and as shown in the markup provided in this response.

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>G. As required by Required Action B.1 and referenced in Table 3.3.3-1.</p> <p><u>OR</u></p> <p>Both divisions of Pressurizer Heater <u>trip actuation</u>de-energization function inoperable.</p>	<p>G.1 -----NOTE----- Heater(s) may be energized<u>Pressurizer heater breakers may be closed</u> intermittently under manual <u>administrative</u> controls. ----- <u>Open pressurizer heater breakers.</u>De-energize Pressurizer Heaters.</p>	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.3.1	Perform ACTUATION LOGIC TEST.	In accordance with the Surveillance Frequency Control Program
SR 3.3.3.2	<p>-----NOTE----- Not required to be met for pressurizer heater breakers that are open or closed under manual <u>administrative</u> control. -----</p> <p>Verify required pressurizer heater breaker response time is within limits.</p>	In accordance with the Surveillance Frequency Control Program

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.3.2

This SR ensures that the pressurizer heater breaker opening response times are verified to be less than or equal to the maximum values assumed in the safety analysis. Individual component response times are not modeled in the analyses. The analyses model the overall or total elapsed time, from the point at which the process variable exceeds the trip setpoint value at the sensor to the time at which ESF component actuates. Total response time may be verified by any series of sequential, overlapping, or total channel measurements.

Response times of the sensors are tested in accordance with LCO 3.3.1. The maximum digital time response is described in the FSAR. This SR encompasses the response time of the ESFAS from the output of the equipment interface modules to the loss of voltage at the output of the pressurizer heater breaker. The response time of valves actuated by the ESFAS are verified in accordance with the IST program, and LCO 3.4.6, "Chemical and Volume Control System Isolation Valves," LCO 3.4.10, "LTOP Valves," LCO 3.5.1, "ECCS," LCO 3.5.2, "DHRs," LCO 3.6.2, "Containment Isolation Valves," LCO 3.7.1, "MSIVs," and LCO 3.7.2, "Feedwater Isolation."

A note provides an allowance for the SR so that it does not need to be met for pressurizer heater breakers that are open in their actuated position. This allowance permits continued operation when a pressurizer heater ~~trip~~ breaker is open because it has performed its safety function. The note also allows intermittent closure of the breakers under ~~manual~~ administrative control when the SR is not met because the slowly occurring nature of the phenomena the automatic heater ~~trip~~ breakers mitigate.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

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

eRAI No.: 9634

Date of RAI Issue: 11/29/2018

NRC Question No.: 16-60-69

63. Based on Revision 2 of DCA part 4, the applicant is requested to verify that the adjective “required” in Condition, Required Action, and Surveillance statements is used only when needed. For example, the staff notes the following instances where its use may not be needed: SR 3.3.1.1, SR 3.3.1.4, SR 3.3.3.2.

NuScale Response:

SR 3.3.1.1 and SR 3.3.1.4 include the term “required” as described in section 4.1.3.b of TSTF-GG-05-01, Rev. 1, *Writer’s Guide for Plant-Specific Improved Technical Specifications*, August 2010. The guide indicates that “required” should be used in cases where the LCO only requires some of all possible components be used to satisfy the LCO requirement. Table 3.3.1-1 does not explicitly list which surveillance requirements (SR) are applicable to which components as used in some other industry instrumentation table formats.

The SRs apply to all channels of instrumentation, however the various MODES and functional requirements results in cases where not all channels are required to be OPERABLE to satisfy the LCO. This results in the SR requirements applicable to those channels varying based on the Applicability shown in Table 3.3.1-1. The inclusion of “required” could be interpreted as unnecessary by application of complex arguments regarding what the LCO requires when it refers to and incorporates Table 3.3.1-1; however based on human factors consideration to simplify and clarify the intent of the SR requirement, “required” is used in these two locations.

“Required” was removed from SR 3.3.3.2 as it is unnecessary.



Impact on DCA:

The Technical Specifications have been revised as described in the response above and as shown in the markup provided in this response.

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>G. As required by Required Action B.1 and referenced in Table 3.3.3-1.</p> <p><u>OR</u></p> <p>Both divisions of Pressurizer Heater <u>trip actuation</u>de-energization function inoperable.</p>	<p>G.1 -----NOTE----- Heater(s) may be energized<u>Pressurizer heater breakers may be closed</u> intermittently under manual <u>administrative</u> controls. ----- <u>Open pressurizer heater breakers.</u>De-energize Pressurizer Heaters.</p>	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.3.1	Perform ACTUATION LOGIC TEST.	In accordance with the Surveillance Frequency Control Program
SR 3.3.3.2	<p>-----NOTE----- Not required to be met for pressurizer heater breakers that are open or closed under manual <u>administrative</u> control. -----</p> <p>Verify required pressurizer heater breaker response time is within limits.</p>	In accordance with the Surveillance Frequency Control Program

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

eRAI No.: 9634

Date of RAI Issue: 11/29/2018

NRC Question No.: 16-60-70

64. Based on Revision 2 of DCA part 4, Subsection 3.3.1 Actions table Note. The applicant is requested to consider whether the following additional Note would clarify the intent of the existing Note on separate Condition entry (ignore formatting):

-----NOTES-----

1. Separate Condition entry is allowed for each Function.
2. Separate Condition entry is allowed for each steam generator for Functions 17, 18, 19, 20, and 21; and for each bus for Function 25.

NuScale Response:

The proposed changes were incorporated into the Notes to the Actions table of LCO 3.3.1. The proposed new Note was divided into two parts - one for the steam generator Functions and another for the Function 25. Conforming changes were implemented in the Bases.

Impact on DCA:

The Technical Specifications have been revised as described in the response above and as shown in the markup provided in this response.

3.3 INSTRUMENTATION

3.3.1 Module Protection System (MPS) Instrumentation

LCO 3.3.1 MPS instrumentation channels required for each Function in Table 3.3.1-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.1-1.

ACTIONS

NOTES

1. Separate Condition entry is allowed for each Function.
2. Separate Condition entry is allowed for each steam generator for Functions 17, 18, 19, 20, and 21.
3. Separate Condition entry is allowed for each ELVS battery charger of Function 25.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one channel inoperable.	A.1 Place inoperable channel in bypass or trip.	6 hours
B. One or more Functions with two channels inoperable.	B.1 Place one inoperable channel in bypass.	6 hours
	<u>AND</u> B.2 Place one inoperable channel in trip.	6 hours

BASES

ACTIONS (continued)

Required Action C.1 directs immediately entering the Condition referenced in Table 3.3.1-1 for the affected MPS Function. The referenced Condition provides appropriate actions to place the unit in an operational condition where the LCO for the affected MPS Function does not apply.

~~A Note has been added to the ACTIONS. The Note has been added to clarify the application of the Completion Time rules. The Conditions of this Specification may be entered independently for each Function. The Completion Times of each inoperable Function will be tracked separately for each Function, starting from the time the Condition was entered for that Function.~~ Notes have been added to the ACTIONS. The first Note has been added to clarify the application of the Completion Time rules to each Function in Table 3.3.1-1. The Conditions of this Specification may be entered independently for each Function. The Completion Times of each inoperable Function will be tracked separately for each Function, starting from the time the Condition was entered for that Function.

A second Note has been added to clarify the Completion Time rules for Functions required on a per steam generator (SG) basis. The Completion Times of each combination of inoperable Function and SG will be tracked separately.

A third Note has been added to clarify the Completion Time rules for Function 25 which applies to individual electrical supply buses supplying power to the ELVS battery chargers. The Completion Times of each inoperable low AC voltage to ELVS battery charger Function will be tracked separately starting from the time the Condition was entered for that electrical bus.

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

eRAI No.: 9634

Date of RAI Issue: 11/29/2018

NRC Question No.: 16-60-71

65. Based on Revision 2 of DCA part 4, Subsection 3.3.2. The applicant is requested to revise:

(i) LCO statement to say: "Two Reactor Trip System (RTS) Logic and Actuation divisions shall be OPERABLE." for improved clarity.

(ii) Conditions B and C and Required Action B.1 by using title case for "RTS logic and actuation"; i.e., "RTS Logic and Actuation", for consistency with the LCO statement and Subsection 3.3.3 Actions table.

NuScale Response:

Conforming changes were made to LCO 3.3.2, the Actions table, and associated bases.

Impact on DCA:

The Technical Specifications have been revised as described in the response above and as shown in the markup provided in this response.

3.3 INSTRUMENTATION

3.3.2 Reactor Trip System (RTS) Logic and Actuation

LCO 3.3.2 Two Reactor Trip System (RTS) Logic and Actuation divisions shall be OPERABLE.

APPLICABILITY: MODE 1,
MODES 2 and 3 when capable of CRA withdrawal.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One reactor trip breaker (RTB) inoperable.	A.1 Open the inoperable RTB.	48 hours
B. One division of RTS Logic and Actuation inoperable.	B.1 Restore division of RTS Logic and Actuation to OPERABLE status.	6 hours
C. Required Action and associated Completion Time not met. <u>OR</u> Both divisions of RTS Logic and Actuation inoperable. <u>OR</u> More than one RTB inoperable.	C.1 Open all RTBs.	Immediately

BASES

BACKGROUND (continued)

RTS Actuation

The EIMs for the RTBs for each division of RTS interrupt power to the control rod drive mechanisms (CRDMs) by opening two reactor trip breakers associated with that division.

Power input to the reactor trip switchgear and supplied to the CRDMs comes from the 3-phase 120/208 VAC EDNS power source.

The reactor trip switchgear consists of four RTBs, which are operated in two sets of two breakers (two divisions). Each of the two trip paths consists of two RTBs in series. For example, if a reactor trip breaker receives an open signal in trip path A, an identical breaker in trip path B will also receive an open signal. This arrangement ensures that power is interrupted to the CRDM buses.

The RTS EIMs interrupt power to the reactor trip breaker undervoltage trip coils which will cause the breakers to open. If electrical power is available, the MPS will also apply power to the breaker shunt trip coil causing the reactor trip breaker to open.

Each set of RTBs can also be operated by manual reactor trip actuation. The OPERABILITY of the manual trip switches and their function are addressed in LCO 3.3.4.

Functional testing of the entire MPS, from sensor input to the SFM through the opening of individual RTBs can be performed at power, at reduced power or shutdown conditions. FSAR, Section 7.2 (Ref. 1), describes MPS testing in more detail.

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

The Applicable Safety Analyses for the RTS are described in the Bases of LCO 3.3.1, "Module Protection System (MPS) Instrumentation."

The LCO requires the RTS Logic and Actuation to be OPERABLE in MODE 1 and in MODES 2 and 3 when any RTB is closed. These are the MODES or other specified conditions when the CRAs are capable of withdrawal using the CRDMs. In MODES 4 and 5, the CRDMs are disconnected from their power supply and the CRAs cannot be withdrawn.

The RTS ~~r~~L~~o~~gic and ~~a~~A~~c~~tuation satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

BASES

ACTIONS

A.1 and A.2

Condition A applies if a single RTB is inoperable. This condition permits performance of required periodic surveillance testing of the RTBs. With the inoperable RTB open, both divisions of RTS logic remain capable of automatically causing a reactor trip.

The Completion Time of 48 hours is reasonable to perform any required troubleshooting, required periodic surveillance testing, and restore the RTB to OPERABLE status while minimizing the likelihood of unnecessary reactor trips. The MPS and RTS remain capable of automatically causing a reactor trip during this time.

B.1

Condition B applies when one division of RTS ~~l~~Logic and ~~a~~Actuation is inoperable. RTS logic as used in the Condition includes the SVM, EIM, and associated communication paths of a single division of RTS function. In this condition, the other division remains OPERABLE and capable of performing the required safety function. The redundant signal paths and logic of the OPERABLE division provides sufficient capability to automatically trip the reactor.

The Required Action for this condition is to restore the inoperable logic division to OPERABLE within six hours. The six hour limit provides a maximum time during which the reactor may be operated without an OPERABLE logic division.

C.1

Condition C is entered if the Required Action or Completion Time of Condition A or B are not met, if both divisions of RTS ~~l~~Logic and ~~a~~Actuation are inoperable, or if more than one RTB is inoperable.

The Required Action is for all RTBs to be opened immediately. Conditions A and B provide adequate time to troubleshoot and make necessary repairs without resulting in an unnecessary forced shutdown of the reactor. Therefore, a Completion Time of immediately is reasonable based on the limited ability of the RTS to shut down the reactor.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.2.1

An ACTUATION LOGIC TEST on each RTS Logic division is performed to ensure the division will perform its intended function when needed. These tests verify that the RTS is capable of performing its intended function, from SFM input signals to the SVM through actuation of the RTBs. A Note is provided indicating that the SR does not need to be met for reactor trip breakers that are open. This allowance permits continued operation when a trip breaker may not be able to satisfy the requirements of the ACTUATION LOGIC TEST but is already open. When a reactor trip breaker is open it has performed its safety function.

MPS testing from the input sensors to the SVMs is addressed by surveillance requirements specified in LCO 3.3.1, "Module Protection System (MPS) Instrumentation." The RTS ~~Logic~~ and ~~a~~Actuation circuitry functional testing is accomplished with continuous system self-testing features on the SVMs and EIMs and the communication between them. The self-testing features are designed to perform complete functional testing of all circuits on the SVM and EIM, with the exception of the actuation and priority logic (APL) circuitry. The self-testing includes testing of the voting and interlock/permissive logic functions. The built-in self-testing will report a failure to the operator and place the SVM or EIM in a fail-safe state.

The only portion of the RTS ~~Logic~~ and ~~a~~Actuation circuitry that is not self-tested is the APL. The manual actuation switches, enable nonsafety control switches, and operating bypass switches do not include self-testing features. The manual actuation switches are addressed by surveillance requirements specified in LCO 3.3.4, "Manual Actuation Functions."

This ACTUATION LOGIC TEST includes testing of the APL on all RTS EIMs, the enable nonsafety control switches, and the operating bypass switches. The ACTUATION LOGIC TEST includes a review of any alarms or failures reported by the self-testing features.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.