

NuScaleDCRaisPEm Resource

From: Cranston, Gregory
Sent: Friday, August 25, 2017 1:52 PM
To: RAI@nuscalepower.com
Cc: NuScaleDCRaisPEm Resource; Lee, Samuel; Chowdhury, Prosanta; Whitman, Jennifer; Harbuck, Craig; Markley, Anthony
Subject: RE: Request for Additional Information No. 197, RAI 9051 (16)
Attachments: Request for Additional Information No. 197 (eRAI No. 9051).pdf

Attached please find NRC staff's request for additional information concerning review of the NuScale Design Certification Application.

Please submit your technically correct and complete response within 60 days of the date of this RAI to the NRC Document Control Desk.

If you have any questions, please contact me.

Thank you.

Gregory Cranston, Senior Project Manager
Licensing Branch 1 (NuScale)
Division of New Reactor Licensing
Office of New Reactors
U.S. Nuclear Regulatory Commission
301-415-0546

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Request for Additional Information No. 197 (eRAI No. 9051)

Issue Date: 08/25/2017

Application Title: NuScale Standard Design Certification - 52-048

Operating Company: NuScale Power, LLC

Docket No. 52-048

Review Section: 16 - Technical Specifications

Application Section: 3.4 Reactor Coolant System; 3.6 Containment

QUESTIONS

16-25

Paragraph (a)(11) of 10 CFR 52.47 and paragraph (a)(30) of 10 CFR 52.79 state that a design certification (DC) applicant and a combined license (COL) applicant, respectively, are to propose technical specifications (TS) prepared in accordance with 10 CFR 50.36 and 50.36a. 10 CFR 50.36 sets forth requirements for TS to be included as part of the operating license for a nuclear power facility. The model standard technical specifications (STS) in the following documents provide NRC guidance on format and content of TS as acceptable means to meet 10 CFR 50.36 requirements. These documents may be accessed using the Agencywide Documents Access and Management Systems (ADAMS) by their accession numbers.

- NUREG-1431, "STS Westinghouse Plants," Revision 4
(ADAMS Accession Nos. ML12100A222 and ML12100A228)
- NUREG-1432, "STS Combustion Engineering Plants," Revision 4
(ADAMS Accession Nos. ML12102A165 and ML12102A169)
- NUREG-2194, "STS Westinghouse Advanced Passive 1000 (AP1000) Plants," Revision 0
(ADAMS Accession No. ML16111A132)

The NRC staff needs to evaluate technical differences in the proposed generic TS (GTS) from applicable provisions in these documents, which are referenced by the DC applicant in Design Control Document (DCD) Tier 2, Section 16.1, and the docketed rationale for each difference because conformance to STS provisions is used in the safety review as the initial point of guidance for evaluating the adequacy of the GTS to ensure adequate protection of public health and safety, and the completeness and accuracy of the GTS Bases.

a. Subsection 3.4.7, "RCS Leakage Detection Instrumentation"

1. LCO 3.4.7.a requires two OPERABLE "Containment Evacuation System (CES) condensate channels." The applicant is requested to consider changing "channels" to "monitor channels" for consistency. SR 3.4.7.1 specifies a CHANNEL CHECK of "required CES condensate monitor." In addition, SR 3.4.7.5 specifies a CHANNEL CALIBRATION of "required CES condensate monitor." The applicant is requested to change "monitor" to "monitor channels," since two channels are required OPERABLE as one of the two required methods of leak detection, and for consistency.
2. LCO 3.4.7.b requires two OPERABLE "CES inlet pressure channels." The applicant is requested to consider changing "channels" to "monitor channels" for

consistency. SR 3.4.7.2 specifies a CHANNEL CHECK for the “required CES inlet pressure monitors.” In addition, SR 3.4.7.6 specifies a CHANNEL CALIBRATION of required CES inlet pressure monitors.” The applicant is requested to consider changing “monitors” to “monitor channels” for consistency.

3. LCO 3.4.7.c requires one OPERABLE “CES gaseous radioactivity monitor channel.” SR 3.4.7.3 specifies a CHANNEL CHECK of “required CES gaseous radioactivity monitor.” In addition, SR 3.4.7.7 specifies a CHANNEL CALIBRATION of “required CES gaseous radioactivity monitor.” The applicant is requested to consider changing “monitor” to “monitor channel” for consistency. Also requested is an explanation of how a CHANNEL CHECK is performed with just one monitor channel.
4. SR 3.4.7.4 specifies a CHANNEL OPERATIONAL TEST of “required CES gaseous radioactivity monitor.” The applicant is requested to consider changing “monitor” to “monitor channel” for consistency. Also requested is an explanation why a CHANNEL OPERATIONAL TEST is only specified for the “required CES gaseous radioactivity monitor” channel, but not for the CES condensate monitor channels and the CES inlet pressure monitor channels.
5. The applicant is requested to explain whether a leak detection method with two monitor channels required to be OPERABLE by LCO 3.4.7.a or LCO 3.4.7.b, is still considered OPERABLE when one monitor channel is inoperable. If not, then Actions A and B would be stated more clearly, as indicated (the Required Action A.1 Note is omitted):
 - A. One or more required leakage detection instrumentation methods with one required monitor channel ~~channel(s)~~ inoperable. | A.1 Perform SR 3.4.5.1. | Once per 24 hours AND A.2 Restore required leakage detection monitor channel(s) to OPERABLE status. | 14 days
 - B. One required leakage detection instrumentation method with all required monitor channels inoperable. | B.1 Restore one monitor channel of affected required leakage detection instrumentation method to OPERABLE status. | 72 hours

In addition, Action C (with second Condition statement only) should say:

- C. Two ~~All~~ required leakage detection instrumentation methods with all required monitor channels inoperable. | C.1 Be in MODE 2. | 6 hours AND C.2 Be in MODE 3 with RCS temperature hot < 200 °F. | 48 hours

These Actions may be abbreviated as follows:

- A. One or more required methods with one required channel inoperable. | A.1 Perform SR 3.4.5.1. | Once per 24 hours AND A.2 Restore required channel(s) to OPERABLE status. | 14 days
- B. One required method with all required channels inoperable. | B.1 Restore one channel of affected required method to OPERABLE status. | 72 hours
- C. Two required methods with all required channels inoperable. | C.1 Be in MODE 2. | 6 hours AND C.2 Be in MODE 3 with RCS temperature hot < 200 °F. | 48 hours

Paragraph (a)(11) of 10 CFR 52.47 and paragraph (a)(30) of 10 CFR 52.79 state that a design certification (DC) applicant and a combined license (COL) applicant, respectively, are to propose technical specifications (TS) prepared in accordance with 10 CFR 50.36 and 50.36a. 10 CFR 50.36 sets forth requirements for TS to be included as part of the operating license for a nuclear power facility. The model standard technical specifications (STS) in the following documents provide NRC guidance on format and content of TS as acceptable means to meet 10 CFR 50.36 requirements. These documents may be accessed using the Agencywide Documents Access and Management Systems (ADAMS) by their accession numbers.

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In Subsection 3.4.7, "RCS Leakage Detection Instrumentation," the applicant is requested to justify including the Actions table Note, which states, "LCO 3.0.4.c is applicable." The GTS appear to incorporate TSTF-359-A, Revision 9, as a reason for this Note. However, the markups of the B&W-STS, the W-STS, and the CE-STS in this traveler do not include this Note for the RCS leakage detection instrumentation subsection. The W-AP1000-STS, which does not include TSTF-359-A, has a similar Actions table Note, which states, "LCO 3.0.4 is not applicable." Regardless of which version of LCO 3.0.4 governs, in both cases, entry into the Applicability from a lower MODE is permitted; however, compliance with the LCO must be restored in accordance with the required action completion times, which begin upon entering the Applicability.

The first paragraph of the Actions section of the Bases for Subsection 3.4.7 justifies the Note that allows MODE changes with less than the required channels and methods of leakage detection instrumentation OPERABLE (staff suggested edits noted by markup) as follows:

The actions are modified by a Note that indicates that the provisions of LCO 3.0.4.c ~~is-are~~ applicable. As a result, a MODE change is allowed

when required leakage detection channels are inoperable. This allowance is provided because liquid leakage detection systems and methods will not be OPERABLE during the MODE 3 conditions while the containment is being drained and evacuated.

The last sentence appears to restrict application of this Note to transitioning from MODE 3 with RCS temperature hot < 200 °F to MODE 3 with RCS temperature hot ≥ 200 °F, but not transitioning from MODE 3 (all RCS temperatures < 420 °F) to MODE 2 (any [one to all but one] RCS temperatures ≥ 420 °F), and transitioning from MODE 2 (all but one RCS temperature ≥ 420 °F) to MODE 1 (all RCS temperatures ≥ 420 °F).

The applicant is requested to clarify the Bases regarding the intended application of this Note. If the application is limited, as just described, then the phrasing of the Note should also state the limitation, since these Bases cannot change the meaning of LCO 3.0.4.c. If the intent is to limit the allowance of LCO 3.0.4.c to Condition A or Conditions A and B, then a Required Action Note for each Condition would be more appropriate than an Actions table Note (see Actions A and B of Subsection 3.4.8, ‘RCS Specific Activity’).

16-27

Paragraph (a)(11) of 10 CFR 52.47 and paragraph (a)(30) of 10 CFR 52.79 state that a design certification (DC) applicant and a combined license (COL) applicant, respectively, are to propose technical specifications (TS) prepared in accordance with 10 CFR 50.36 and 50.36a. 10 CFR 50.36 sets forth requirements for TS to be included as part of the operating license for a nuclear power facility. The model standard technical specifications (STS) in the following documents provide NRC guidance on format and content of TS as acceptable means to meet 10 CFR 50.36 requirements. These documents may be accessed using the Agencywide Documents Access and Management Systems (ADAMS) by their accession numbers.

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The NRC staff needs to evaluate technical differences in the proposed generic TS (GTS) from applicable provisions in these documents, which are referenced by the DC applicant in Design Control Document (DCD) Tier 2, Section 16.1, and the docketed rationale for each difference because conformance to STS provisions is used in the safety review as the initial point of guidance for evaluating the adequacy of the GTS to ensure adequate protection of public health and safety, and the completeness and accuracy of the GTS Bases.

The staff reviewed the applicant's evaluation of the NuScale design and safety analyses against the four LCO selection criteria of 10 CFR 50.36(c)(2)(ii) as documented in the Technical Specifications Regulatory Conformance and Development (TSRCD), TR-1116-52011-NP, dated December 16, 2016 (ADAMS Accession No. ML17005A136). For NuScale SSCs determined to meet none of the criteria, the applicant is requested to augment that report by stating how the availability and testing of such SSCs are intended to be controlled by a NuScale Nuclear Power Plant COL holder. The response should cite the regulatory basis for the controls.

16-28

Paragraph (a)(11) of 10 CFR 52.47 and paragraph (a)(30) of 10 CFR 52.79 state that a design certification (DC) applicant and a combined license (COL) applicant, respectively, are to propose technical specifications (TS) prepared in accordance with 10 CFR 50.36 and 50.36a. 10 CFR 50.36 sets forth requirements for TS to be included as part of the operating license for a nuclear power facility. The model standard technical specifications (STS) in the following documents provide NRC guidance on format and content of TS as acceptable means to meet 10 CFR 50.36 requirements. These documents may be accessed using the Agencywide Documents Access and Management Systems (ADAMS) by their accession numbers.

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The staff reviewed Table C-1, "Technical Specification Task Force traveler evaluation," of Technical Specifications Regulatory Conformance and Development report, TR-1116-52011-NP, Revision 0. Regarding the applicant's evaluation of unapproved traveler TSTF-541, "Add Exceptions to Surveillance Requirements When the Safety Function is Being Performed," Revision 0, which is currently under staff review, the staff noted an apparent deficiency in the applicant's evaluation.

In the "Discussion" field of Table C-1 the applicant states:

The passive NuScale design includes a limited number of valves with potential for the addressed condition to exist. Exceptions consistent with the traveler were

incorporated into the surveillance requirements of 3.6.2[, “Containment Isolation Valves.”]

Revision 0 of GTS SR 3.6.2.3 states (emphasis added):

Verify each automatic containment isolation valve *that is not locked, sealed, or otherwise secured in position*, actuates to the isolation position on an actual or simulated actuation signal.

This surveillance statement does not include a bracketed Note proposed by the traveler for similar valve actuation SRs; this Note states:

[-----NOTE-----
*Not required to be met for automatic valves that are locked,
sealed or otherwise secured in the actuated position.*
-----]

However, the Bases for GTS SR 3.6.2.3 does include a similar statement (emphasis added):

The Surveillance is *not required* for valves that are locked, sealed, or otherwise secured in the *required* position *under administrative controls*.

Compared to the traveler's proposed Note, the GTS Bases sentence uses the phrases “not required for valves” instead of “not required to be met for automatic valves”; and “required position” instead of “actuated position.” The Bases sentence also includes “under administrative controls.” Besides these phrasing differences, the staff also notes that the scope of the traveler does not address automatic containment isolation valves.

The staff also notes that the GTS include the following SRs for verifying [automatic] valve actuation on an “actual or simulated [actuation] signal,” to the position stated, in accordance with the Surveillance Frequency Control Program:

SR 3.1.9.1	CVCS demineralized water isolation valves	isolation position
SR 3.4.6.2	CVCS automatic valves	isolation position
SR 3.5.1.1	ECCS RVVs and RRVs	open position
SR 3.6.2.3	automatic containment isolation valves	isolation position

Since TSTF-541, Revision 0, is not yet approved by the staff, and considering the above observations, the staff cannot determine whether the proposed application of the intent of the traveler is needed for the NuScale GTS. As of May 28, 2017, the Technical Specifications Branch staff was to schedule a date for providing the TSTF feedback on a white paper regarding TSTF-541 related issues. The TSTF had submitted this white paper to the NRC on January 12, 2017.

The staff compared the phrasing of SR 3.6.2.3 to that of W-STS SR 3.6.3.8, and found them identical. It does not appear that the applicant's consideration of TSTF-541 introduced any deviation in the GTS from Revision 4 of the W-STS. However, the associated GTS Bases do depart from the W-STS Bases as indicated by the following markup of the W-STS Bases for SR 3.6.3.8:

SR 3.6.3.8

Automatic containment isolation valves close on a containment isolation signal to prevent minimize leakage of radioactive material fission products from containment and to maintain required RCS inventory following a DBA. This SR ensures that each automatic containment isolation valve will actuate to its isolation position on a containment isolation an actual or simulated actuation signal. The is surveillance is not required for valves that are locked, sealed, or otherwise secured in the required position under administrative controls. [The [18] month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass this Surveillance when performed at the [18] month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

OR

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

REVIEWER'S NOTE

~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~

]

The above deviations from the W-STS Bases for SR 3.6.3.8 appear unrelated to TSTF-541. The applicant is requested to revise the evaluation of TSTF-541 in Table C-1 to indicate that it is not applicable to automatic valve actuation surveillances in the GTS.

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The NuScale GTS LCO 3.0.4 and SR 3.0.4, and associated Bases, indicate that TSTF-359-A, Revision 9, was incorporated into the GTS and Bases. Approval of this traveler by the staff was based on qualitative risk assessments provided by each owners group applicable to each of the reactor designs associated with the STS NUREGs for operating PWR and BWR facilities. These risk assessments, reports of which are included in the traveler, do not apply to NuScale, and therefore, cannot be relied upon to justify including the revised LCO 3.0.4 regarding restrictions for entering the Applicability of LCOs with LCO-required equipment inoperable or with variables not within LCO-required limits.

Accordingly, the applicant is requested to provide a qualitative risk assessment for the NuScale design, consistent with the scope of the PWR risk assessments described in the traveler. This qualitative risk assessment should focus on the transition from MODE 5 to 4, MODE 4 to 3, transitions within MODE 3, MODE 3 to 2, and MODE 2 to 1. Also consider unique events to the MODE of interest, such as LTOP protection in MODE 3. The assessment should address "initiating events of interest" in each Mode of operation, and determine if any systems, if inoperable, or any parameters outside its limits, should preclude entering its Mode of Applicability as allowed by LCO 3.0.4.b.

The staff noted that Revision 0 of the GTS contains no exceptions to applying LCO 3.0.4.b, which allows MODE changes provided risk is assessed and managed for the period allowed by the applicable limiting required action completion time. The applicant is requested to confirm this lack of exceptions is not risk significant.

The staff also noted that Notes to allow MODE changes without having to assess and manage risk, Notes which say "LCO 3.0.4.c is applicable," are proposed for the Actions of Subsection 3.4.7, 'RCS Leakage Detection Instrumentation,' and Subsection 3.4.8, "RCS Specific Activity." See the staff's RAI-question regarding this Note in Subsection 3.4.7.

The staff recognizes that MODE 3 may be considered to have multiple configurations based on whether the MODULE is being PASSIVELY COOLED; the type of PASSIVE COOLING employed (as delineated in the definition in Section 1.1); and the reactor coolant temperature (above or below 200 °F). The applicant is requested to treat transitions between these various

states or configurations in MODE 3 in the qualitative risk assessment in support of LCO 3.0.4.b and LCO 3.0.4.c.