NuScaleDCRaisPEm Resource

From: Cranston, Gregory
Sent: Friday, August 25, 2017 1:42 PM
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Cc: NuScaleDCRaisPEm Resource; Lee, Samuel; Chowdhury, Prosanta; Whitman, Jennifer; Harbuck, Craig; Markley, Anthony
Subject: RE: Request for Additional Information No. 196, RAI 9050 (16)
Attachments: Request for Additional Information No. 196 (eRAI No. 9050).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. 196 (eRAI No. 9050)

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Operating Company: NuScale Power, LLC
Docket No. 52-048
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Application Section: 3.3 Instrumentation

QUESTIONS

16-16

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 the Background section of Bases Subsection B 3.3.1, the applicant is requested to do the following:

a. In the first sentence of the second paragraph, clarify the phrase "ensure safe operation of the reactor and MODULE." Since the definition of MODULE seems to imply inclusion of the reactor, the phrase seems redundant. The second sentence of the 10th paragraph states, "The reactor module must enter the Condition for the particular [MODULE Protection System] Functions affected." Consider using "reactor module" in place of "reactor and MODULE" in the first sentence of the second paragraph.

Note that this is an example of a global (DCA-wide) request to check for consistency in the use of the terms "reactor module"; "modular unit"; "unit"; "plant"; "facility"; "NuScale power module (NPM)"; "MODULE"; "site"; "reactor"; and any other related terms.

b. Justify using "parameters" instead of "variables" or "process variables" in the 2nd sentence of the 2nd paragraph, which states:

> This is achieved by specifying limiting safety system settings (LSSS) in terms of *parameters* directly monitored by the [MODULE Protection System], as well as LCOs on other reactor system *parameters* and equipment performance.

Note that this is an example of a global (DCA-wide) request to check for consistency in the use of the terms "parameters" and "variables." In a public meeting on May 24, 2017, the applicant told the NRC staff that the term "parameter" is used to delineate an item having a fixed number (e.g. setpoint, range). The term "variable" is used to delineate an item that is liable to vary or change (e.g., pressure, temperature). The applicant committed to fix this inconsistency throughout the design certification application. See meeting summary dated June 15, 2017 (ML17159A750).

c. The 4th paragraph discusses the limiting trip setpoint (LTSP) instead of the nominal trip setpoint (NTSP) as discussed in the equivalent paragraph in the AP1000 STS Bases for Specifications 3.3.1 and 3.3.8. Explain which term is correct for NuScale in this instance.

d. Revise, 7th paragraph (see page B 3.3.1-3) for consistency with (i) SL 2.1.1.2, and (ii) the defined term "MODULE," as follows.

> During AOOs, which are those events expected to occur one or more times during the ~~plant~~ MODULE life, the acceptable limits are:
>
> - The critical heat flux ratio (CHFR) shall be maintained above the SL value to prevent critical heat flux (CHF);
> - The peak linear heat rate shall be maintained below the SL value to prevent fuel centerline melting ~~Fuel centerline melting shall not occur~~; and
> - Pressurizer pressure SL of 2285 psia shall not be exceeded.
>
> Maintaining the *parameters* within the above values ensures that the offsite dose will be within the 10 CFR 50 (Ref. 2) and 10 CFR 100 (Ref. 3) criteria during AOOs.

Note that the use of the word "parameters" in the above paragraph is an example of a global (DCA-wide) request to check for consistency in the use of the terms "parameters" and "variables."

e. The 14th paragraph below the heading "Measurement Channels" (page B 3.3.1-7) states:

> In addition to the self-checking features, the system includes functional testing features. Functional testing of the entire MPS, from SFM input through the opening of individual RTBs and actuation of ESFAS components, can be performed either at power or shutdown. The manual

actuation switches in the MCR cannot be tested at power because they would cause a reactor trip or ESF actuation. FSAR, Chapter 7 (Ref. 4), provides more detail on MPS testing.

This discussion implies that the MPS can support performance of a 92 day Frequency CHANNEL OPERATIONAL TEST (COT). The applicant is requested to include a COT surveillance requirement (SR) in Subsection 3.3.1 and an appropriate discussion in the SR section of Bases Subsection B 3.3.1.

16-17

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 the Applicable Safety Analyses, LCO, and Applicability (ASA-LCO-A) section of Bases Subsection B 3.3.1, below the heading "Design Basis Definition"

a. The 1st paragraph states:

> The MPS is designed to ensure that the following operational criteria are met:

- The associated actuation will occur when the *parameter* monitored by each channel reaches its setpoint and the specific coincidence logic is satisfied; and

- Separation and redundancy are maintained to permit a channel to be out of service for testing or maintenance while still maintaining redundancy within the MPS instrumentation architecture.

The applicant is requested to justify using "parameter" instead of "variable" or "process variable" in the first bullet.

Note that this is an example of a global (DCA-wide) request to check for consistency in the use of the terms "parameters" and "variables."

b. The 2nd paragraph states:

> All design basis events can be mitigated by one or more MPS Functions. The accident analysis takes credit for most of the MPS trip Functions.

The applicant is requested to list the uncredited MPS trip Functions and discuss why each of these MPS trip Functions is not credited in each of the relevant accident analyses, with a reference to the DCD subsections that describe each analysis.

For any DCD accident analysis description that does not explicitly state the applicable uncredited MPS trip Functions, consider revising the analysis description to list the applicable uncredited Functions with an explanation of why each applicable Function is not credited for that analysis.

Also consider whether to include in the Bases for each MPS trip Function a list of the relevant accidents that do not credit the Function and the associated rationale.

16-18

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 the ASA-LCO-A section of Bases Subsection B 3.3.1, the 5th, 6th, and 7th paragraphs below the heading “Design Basis Definition” state:

> Permissive and interlock setpoints automatically provide, or allow manual or automatic blocking of trips during MODULE evolutions. They are not explicitly modeled in the Safety Analyses. These permissives and interlocks ensure that the initial conditions are consistent with the safety analysis, before preventive or mitigating actions occur. Because these permissives or interlocks are only one of multiple conservative initial conditions for the accident analysis, they are generally considered as nominal values without regard to measurement accuracy.
>
> Operational bypasses are addressed in the footnotes to Table 3.3.1-1. They are not otherwise addressed as specific Table entries.
>
> The automatic bypass removal features must function as a backup to manual actions for all safety related trips to ensure the trip Functions are not operationally bypassed when the safety analysis assumes the Functions are OPERABLE.

The applicant is requested to

a. Clarify in Subsections B 3.3.1, B 3.3.2, and B 3.3.3 that the interlocks and permissives associated with each MODULE Protection System (MPS) Instrumentation Function channel, each Reactor Trip System (RTS) Logic and Actuation Function division, and each Engineered Safety Features Actuation System (ESFAS) Logic and Actuation Function division, respectively, must be OPERABLE for the associated Function channel or Function division to be OPERABLE.

b. Clarify in Subsection B 3.3.1 that the required interlocks and permissives are verified to be OPERABLE by the CHANNEL CALIBRATION specified by SR 3.3.1.4 for each associated MPS Instrument Function channel.

c. Clarify in Subsection B 3.3.2 that the required interlocks and permissives are verified to be OPERABLE by the ACTUATION LOGIC TEST specified by SR 3.3.2.1 for each associated RTS Logic and Actuation division.

d. Clarify in Subsection B 3.3.3 that the required interlocks and permissives are verified to be OPERABLE by the ACTUATION LOGIC TEST specified by SR 3.3.3.1 for each associated ESFAS Logic and Actuation Function division.

16-19

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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a. In the Applicable Safety Analyses, LCO, and Applicability (ASA-LCO-A) section of Bases Subsection B 3.3.1 and Bases Subsection B 3.3.2, there is no statement regarding which LCO selection criterion the MTS instrumentation Functions (both RTS and ESFAS) satisfy. The end of the ASA-LCO-A section of Bases Subsection B 3.3.3 does include the following statement.

   The ESFAS satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

   The applicant is requested to include similar statements in the ASA-LCO-A section of Bases Subsections B 3.3.1 and B 3.3.2 that are appropriate for MTS Instrumentation Functions and RTS Logic and Actuation Functions, respectively. Such statements may be placed after the ASA-LCO-A discussion for each Function, or if all Functions satisfy the same criterion, then at the end of the ASA-LCO-A section.

b. The last sentence of the ASA-LCO-A section of Bases Subsection B 3.3.4, “Manual Actuation Functions,” states the following in lieu of a statement about not satisfying any of the LCO selection criteria.

> *While not specifically credited in the safety analyses, manual actuation of the functions provides defense in depth to mitigate postulated events, and provides operators with the ability to address other events that may occur with the assistance of the automatic actuation portions of the MPS.*

The applicant is requested to explicitly address in the Bases ASA-LCO-A section why the manual actuation functions (either individually or collectively) do not satisfy one or more of Criteria 2, 3, and 4.

Past experience with GTS development where an LCO is included solely for defense in depth shows that a COL holder will likely seek a license amendment to relocate the LCO out of the plant-specific TS because it satisfies none of the LCO selection criteria. The applicant is requested to reconsider whether manual actuation functions should be included based on general experience with operating PWR facilities having demonstrated such capability is significant to public health and safety and therefore conclude that manual actuation functions satisfy Criterion 4.

c. The second paragraph of the ASA section of Bases Subsection B 3.3.5, “Remote Shutdown Station (RSS),” references 10 CFR 50, Appendix A, general design criterion (GDC) 19, consistent with the equivalent paragraph in the second paragraph of the ASA section of Bases Subsection B 3.3.18, “Remote Shutdown Workstation (RSW),” of the W-AP1000-STS with two exceptions as indicated by the following markup of the W-AP1000-STS paragraph to match the NuScale GTS paragraph:

> The criteria governing the design and the specific system requirements of ~~the RSW~~ instrumentation located in the RSS are ~~located~~ specified in 10 CFR 50, Appendix A, GDC 19 (Ref. 2).

The applicant is requested to change “specified” to “located” for consistency with the W-AP1000-STS and to avoid unintended inferences about what LCO 3.3.5 is intended to require. Unlike STS, the GTS do not explicitly require controls for safe shutdown systems to be operable. The GTS only requires operability of instrumentation needed to monitor the performance of passive core cooling systems and maintain safe shutdown of the MODULE.

d. The W-AP1000-STS states that the RSW satisfies LCO selection Criterion 4, but the GTS does not address whether the RSS satisfies one or more of Criteria 2, 3, and 4. The applicant is requested to add a discussion to the Bases ASA section about why the RSS does or does not satisfy any of the LCO selection criteria. If the RSS does not, then also state in the Bases ASA section the reason for including an LCO for the RSS.

e. The GTS Subsection 3.3.5, “Remote Shutdown Station (RSS),” Applicability is MODES 1 and 2, which covers an RCS cooldown to 420 deg F. Since the RSS instrumentation will also be needed to monitor entry into MODE 3, Safe Shutdown, and maintaining the MODULE below 420 deg F and k_{eff} < 0.99, it is reasonable to also require RSS operability in some or all of the RCS temperature range of MODE 3. The applicant is requested to reconsider including MODE 3 in the Applicability of Subsection 3.3.5.

f. The applicant is requested to explain how each SR in Subsection 3.3.5, “Remote Shutdown Station (RSS),” supports operability of the monitoring instrumentation required by LCO 3.3.5. The staff needs this information to verify that failure to meet each of these SRs would imply the LCO is not met and require entry into Actions Condition A, which states “Instrumentation in the RSS inoperable.”

16-20

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The applicant is requested to provide the requested justifications for Subsection 3.3.3, “ESFAS Logic and Actuation,”

a. Function 4, Demineralized Water Supply Isolation (DWSI), Action E: Justify indefinitely continuing operation in MODE 1 with the DWS isolated.

b. Function 5, Chemical and Volume Control System Isolation (CVCSI), Action F: Justify indefinitely continuing operation in MODE 1 with the CVCS isolated.

c. How often would administrative controls, which are specified by the Required Action Note (Flow path(s) may be unisolated intermittently under administrative controls.) for Actions E and F, need to be employed to place DWS and CVCS back in service while operating in MODE 1? Justfy such MODULE operation.

d. The applicant is requested to justify allowing operation in MODE 1 for an entire cycle with the MODULE in Condition E, Condition F, or both (while presumably manually operating DWS and CVCS as described in the explanation requested by Sub-question c.

16-21

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 applicant is requested to provide the requested justifications for Subsection 3.3.4, "Manual Actuation Functions,"

a. Action A: Justify the restoration completion time of 48 hours for loss of redundancy for each of the manual Functions.

b. Action B: Justify the restoration completion time of 6 hours for loss of Function for each of the manual Functions.

c. Function 4, Manual DWSI, Action E: Justify indefinitely continuing operation in MODE 1 with the DWS isolated.

d. Function 6, Manual CVCSI, Action F: Justify indefinitely continuing operation in MODE 1 with the CVCS isolated.

e. Function 7, Manual Pressurizer Heater Trip, Action G: Justify indefinitely continuing operation in MODE 1 with the pressurizer heaters de-energized. Confirm that opening the pressurizer heater breakers is the normal means of de-energizing the pressurizer heaters. What other means could be used to accomplish Required Action G.1?

f. How often would administrative controls need to be employed to place DWS and CVCS back in service, and to energize the pressurizer heaters while operating in MODE 1? Justify allowing such operation indefinitely under administrative controls.

16-22

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 applicant is requested to justify not including a Section 3.3 subsection with an LCO for PAM instrumentation for Type B and C variables, and also a Section 5.6 Specification for a PAM report. The justification should address the discussion about PAM instrumentation technical specifications in the 1988 "split report" (Thomas E. Murley, Director, Office of Nuclear Reactor Regulation, to Walter S. Wilgus, Chairman, The B&W Owners Group, "NRC Staff Review of Nuclear Steam Supply Vendors Owners Groups' Application of The Commission's Interim Policy Statement Criteria to Standard Technical Specifications," May 9, 1988, ADAMS Accession No. ML11264A057). Alternatively, the applicant is requested to add a Section 3.3 subsection with an LCO for PAM instrumentation for Type B and C variables.

Whether or not a PAM LCO is added, the applicant is requested to add a Section 5.6 Specification for a PAM report, with suitable changes to the W-STS PAM report language to reflect the location of information regarding PAM variable categorization and the design of associated PAM instrumentation, and the location of commitments for its use by control room operators to monitor MODULE conditions post accident to verify passive cooling systems are functioning as designed to maintain the reactor in a safe shutdown condition.

16-23

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a. The applicant is requested to make clarifying changes to the LCO statement of Subsection 3.3.1, "MODULE Protection System (MPS) Instrumentation," as indicated in the following markup:

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

b. The applicant is requested to remove the unnecessary word "automatic" from Condition B of Subsection 3.3.1, 'MPS Instrumentation," since all MPS Functions listed in Table 3.3.1-1 only require "automatic channels."

c. The phrasing of the MODE 3 applicability Footnote (k) of Table 3.3.1-1 for Function 24.a, "High RCS Pressure – Low Temperature Overpressure Protection (LTOP)," and the

phrasing of equivalent Footnote (d) in Table 3.3.3-1 for Function 7, "ESFAS Logic and Actuation LTOP," and equivalent Footnote (e) in Table 3.3.4-1 for Function 8, "Manually Actuated LTOP," are inconsistent. These footnotes are as follows:

(k) With wide range RCS cold temperature ≤ LTOP enable temperature specified in PTLR (T-1 Interlock) and less than two reactor vent valves open.

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

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

The applicant is requested to revise the phrasing and capitalization of these footnotes so they are identical, and are consistent with phrasing and capitalization in the Bases and elsewhere in the generic TS and Bases where the T-1 interlock and LTOP are addressed.

d. Table 3.3.1-1 Footnote (b) "< 15% RTP (N-2H Interlock)," modifies the MODE 1 applicability of MPS Instrumentation Function 2, Reactor Trip System (RTS) and Demineralized Water System isolation (DWSI) on "High Power Range Positive and Negative Rate." Since Function 2 must be OPERABLE at or above 15% RTP (as indicated by power range neutron flux excore nuclear instrumentation) and is automatically enabled (bypass removed) by the Power Range Linear Power Interlock, N-2H, on **increasing power** at 15% RTP (see FSAR Tier 2, Figures 7.1-1c and 7.1-1d, and Table 7.1-5: Module Protection System Interlocks – page 7.1-70; and Bases page B 3.3.1-13). Therefore, the applicant is requested to revise Footnote (b) to state: "≥ 15% RTP (N-2H Interlock)."

   Note that on generic TS page 3.3.1-10, Footnote (b) "≥ 15% RTP (N-2 Interlock)," which modifies the MODE 1 applicability of MPS Instrumentation Function 18, RTS, DHRS, PHT, and DWSI on "Low Main Steam Pressure," has the correct inequality symbol, but mislabels the interlock as N-2. The applicant is requested to revise Footnote (b) on page 3.3.1-10 to state: "≥ 15% RTP (N-2H Interlock)."

e. Table 3.3.1-1 Footnote (c) "≥ 15% RTP (N-2L Interlock)," modifies the MODE 1 applicability of MPS Instrumentation Function 3, Reactor Trip System (RTS) and Demineralized Water System isolation (DWSI) on "High Intermediate Range Log Power Rate." Since Function 3 must be OPERABLE below 15% RTP (as indicated by power range neutron flux excore nuclear instrumentation) and is automatically enabled (bypass removed) by the Power Range Linear Power Interlock, N-2L, on **decreasing power** at 15% RTP (see FSAR Tier 2, Figures 7.1-1c and 7.1-1d, and Table 7.1-5: Module Protection System Interlocks – page 7.1-69; and Bases page B 3.3.1-12). Therefore, the applicant is requested to revise Footnote (b) to state: "< 15% RTP (N-2L Interlock)."

f. The applicant is requested to revise the following sentences or phrases in the Actions section of the Bases for Subsection 3.3.1 to improve clarity, accuracy, and logic; examples of Required Actions with Bases containing each phrase are listed after the markup of each phrase.

   The most common causes of channel inoperability are outright failure of a sensor or MPS SFM module sufficient to exceed the tolerance allowed by

the MODULE specific setpoint analysis as specified by the SP. Typically, sensor drift is found to be small and results in a delay of actuation rather than a total loss of capability to actuate within the allowed tolerance around the NTSP ~~function~~. This determination of the channel's actual trip setting is generally made during the performance of a CHANNEL CALIBRATION when the process sensor output signal is measured and verified to be within specification. If any as-found measured value is outside the ~~as found~~ as-found tolerance band, then the channel is inoperable, and corrective action is required. The MODULE must enter the Condition for the particular MPS Functions affected. The channel as-found condition will be entered into the Corrective Action Program for further evaluation and to determine the required maintenance to return the channel to OPERABLE status. (1st paragraph)

When more than two ~~the number of inoperable~~ channels ~~in~~ of an ~~a trip~~ MPS Function are inoperable, ~~exceeds that specified in any related Condition associated with the same trip Function, then~~ the affected MPS Function is lost and the MODULE is outside the assumptions of the applicable safety ~~analysis~~ analyses. This condition is addressed for all MPS Functions by the second condition statement of Condition C (One or more Functions with three or more channels inoperable). 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 MODULE in an operational condition where the LCO for the affected MPS Function does not apply.~~Therefore, LCO 3.0.3 is immediately entered if applicable in the current MODE of operation.~~ (2nd paragraph)

Condition A applies to the failure of a single ~~channel or associated~~ instrument channel ~~inoperable in any~~ of one or more MPS ~~automatic trip~~ Functions. (A.1, 1st paragraph)

The 6 hours allotted to bypass or trip the channel ~~is~~ are sufficient to allow the operator to take all appropriate actions for the failed channel and still ensure~~s~~ that the risk ~~involved in~~ of operating with the failed channel is acceptable. (A.1, 2nd paragraph, 2nd sentence)

Condition B applies to the failure of two channels ~~in any~~ of one or more MPS ~~automatic trip~~ Functions. (B.1 and B.2, 1st paragraph)

Required Actions B.1 and B.2 ~~provide for~~ direct placing one inoperable channel in bypass and the other inoperable channel in trip within a ~~the~~ Completion Time of 6 hours. This Completion Time is sufficient to allow the operator to take all appropriate actions for the failed channels while ensuring the risk ~~involved in~~ of operating with ~~the~~ two failed channels is acceptable. With one channel of ~~protective~~ an MPS instrumentation Function bypassed, the MPS Function is in a two-out-of-three logic configuration; but with another channel of the same MPS Function failed, the MPS Function may be operating in a two-out-of-two logic configuration. This is outside the assumptions made in the applicable safety analyses and ~~should~~ must be corrected. To correct ~~the~~

~~problem~~ this situation, ~~one~~ the other inoperable channel ~~is~~ can be placed in trip. This places the affected MPS Function in a one-out-of-two logic configuration. If ~~any~~ just one of the two ~~other~~ OPERABLE channels of the affected MPS Function ~~receives~~ generates a trip signal, each division of coincidence logic for the MPS Function will generate an actuation signal to the associated RTS and ESFAS logic and actuation Functions~~the trip~~. (B.1 and B.2, 2nd paragraph)

~~One of the two inoperable channels will need to be restored to OPERABLE status prior to the next required CHANNEL CALIBRATION. The channel can be tested in trip also.~~ (B.1 and B.2, 3rd paragraph)

Condition C is entered when ~~the~~ a Required Action and associated Completion Time of Condition A or B ~~is~~ are not met, or one or more ~~functions~~ MPS Functions have three or more channels inoperable. (C.1, 1st paragraph)

The Required Action is to immediately enter the Condition referenced in ~~to~~ Table 3.3.1-1 ~~and to take the Required Actions~~ for the ~~protection functions~~ MPS Function with the affected instrument channel(s). The Required Actions of the referenced Condition must be accomplished within the associated Completion Times ~~are those from the referenced Conditions and Required Actions~~. (C.1, 2nd paragraph)

Condition D is entered when Condition C applies to the following Functions that result in a reactor trip or DHRS actuation, as listed in Table 3.3.1-1.

1a	Power Range Linear Power – High	(RTS)
3a	Intermediate Range Log Power Rate – High	(RTS)
4a	Source Range Count Rate – High	(RTS)
5a	Source Range Log Power Rate – High	(RTS)
7a	Pressurizer Pressure – High	(RTS)
8a	Pressurizer Pressure – Low	(RTS)
8b	Pressurizer Pressure – Low	(DHRS)
9a	Pressurizer Pressure – Low Low	(RTS)
10a	Pressurizer Level – High	(RTS)
11a	Pressurizer Level – Low	(RTS)
12a	Pressurizer Level – Low Low	(DHRS)
13a	NR RCS Hot Temperature – High	(RTS)

15a	RCS Flow – Low Low	(RTS)
17a	Main Steam Pressure – High	(RTS)
19a	Main Steam Pressure – Low Low	(RTS)
20a	Steam Superheat – High	(RTS)
20b	Steam Superheat – High	(DHRS)
21a	Steam Superheat – Low	(RTS)
21b	Steam Superheat – Low	(DHRS)
22a	NR Containment Pressure – High	(RTS)

(D.1, 1st paragraph)

If ~~the~~ a Required Action~~s~~ associated with ~~this~~ Condition A or B~~, or~~ cannot be completed within the required Completion Time for the referenced MPS Function, or three or more channels of the referenced MPS Function are inoperable, the MODULE must be brought to a MODE or other specified condition where the LCO and Required Actions for the referenced MPS Function do not apply. This is accomplished by opening the reactor trip breakers. The above MPS Functions that result in a reactor trip or DHRS actuation (except for Function 12a) are not required to be OPERABLE when the reactor trip breakers are open. The ~~allowed~~ Completion Time ~~for D.1~~ of 6 hours is reasonable, based on operating experience, for reaching the required MODE from full power conditions in an orderly manner without challenging plant systems. (D.1, 2nd paragraph)

g. The meaning of the third paragraph of the Bases for Required Actions B.1 and B.2 of Subsection 3.3.1 is not clear, but appears related to the MODE entry restrictions of LCO 3.0.4 and SR 3.0.4. In addition, such a discussion does not seem appropriate for the Actions section of the Bases. The applicant is requested to (1) clarify the paragraph so its meaning is clear, and (2) explain why the Bases needs to include it; or (3) remove the paragraph as suggested in Sub-question (f) above.

h. Subsection 3.3.1, "MPS Instrumentation," Function 24.a, "High RCS Pressure – Low Temperature Overpressure Protection (LTOP)," Condition J applies "as required by Required Action C.1 and referenced in Table 3.3.1-1" when one channel is inoperable and has not been placed in trip or bypass within 6 hours (Condition A); or when two channels are inoperable and one channel has not been placed in trip within 6 hours or the other channel has not been placed in bypass within 6 hours (Condition B); or when three or more channels are inoperable (Condition C). Required Action J.1 states, "Open two reactor vent valves. | 1 hour."

The Bases for Subsection 3.3.1, Required Action J.1, needs editing as indicated by the following markup:

J.1

As listed in Table 3.3.1-1, Condition J is entered when Condition C applies to Function 24.a, "High RCS Pressure – Low Temperature Overpressure Protection (LTOP)," ~~Functions that~~ which results ~~result~~ in actuation of the LTOP ~~low temperature overpressure protection~~ system ~~as listed in Table 3.3.1-1~~.

If ~~the~~ a Required Action~~s~~ associated with ~~this~~ Condition A or B cannot be completed within the required Completion Time, or three or more channels of this Function are inoperable, the MODULE must be brought to a MODE or other specified condition where the LCO and Required Actions for this Function do not apply. This is accomplished by opening at least two RVVs. The ~~allowed~~ Completion Time ~~for J.1~~ of 1 hour is reasonable, based on operating experience, for establishing an RCS vent flow path sufficient to ensure low temperature overpressure protection ~~reaching the required MODE from full power conditions in an orderly manner without challenging plant systems~~.

The applicant is requested to revise the Bases for Required Action J.1 consistent with the suggested markup, for improved clarity and a more accurate rationale.

i. The applicant is requested to make clarifying changes to Subsection 3.3.3, "ESFAS Logic and Actuation," LCO 3.3.3, Required Action A.1 and associated Bases Subsection B 3.3.3. The statement of LCO 3.3.3, Action A and Bases, consistent with the following suggested clarifications and STS style edits, to state:

LCO 3.3.3 ~~Each~~ Engineered Safety Features Actuation System (ESFAS) Logic and Actuation divisions required for each Function in Table 3.3.3-1 shall be OPERABLE.

A. One or more divisions of the LTOP ~~function~~ Logic and Actuation Function inoperable. | A.1 Open two ~~Reactor Vent Valves~~ reactor vent valves (RVVs). | 1 hour

A.1

Condition A applies if one or more divisions of the LTOP Logic and Actuation Function are inoperable. The Required Action is to open two reactor vent valves (RVVs) ~~RVVs~~ within one hour. This places the MODULE ~~reactor~~ in a condition in which the LCO no longer applies. The one hour completion time provides adequate time to either immediately restore the inoperable logic or take manual action to open the RVVs, which establishes an RCS vent flow path sufficient to ensure low temperature overpressure protection.

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.

The following MODULE Protection System (MPS) ESFAS Instrumentation Functions

8b, Decay Heat Removal System (DHRS) Actuation on Low Pressurizer Pressure,

20b, DHRS Actuation on High Steam Superheat, and

21b, DHRS Actuation on Low Steam Superheat,

are not required to be OPERABLE when the reactor trip breakers are open. Therefore, Required Action D.1 ("Open reactor trip breakers. | 6 hours") of Subsection 3.3.1, "MPS Instrumentation," is an appropriate response to three or more inoperable channels for one or more of these Functions.

However, Function 12a, DHRS Actuation on Low Low Pressurizer Level, is required to be OPERABLE in MODES 1 and 2, and in MODE 3 with wide range RCS temperature hot ≥ 200°F (T-2 interlock) and containment water level ≤ 45 ft (L-1 interlock). Therefore, opening the reactor trip breakers in accordance with Required Action D.1 does not place the MODULE in an operational condition outside the Applicability of Function 12a (as claimed by the Bases for Required Action D.1 of Subsection 3.3.1).

The applicant is requested to specify the correct Condition in the Subsection 3.3.1 Actions table to reference in Table 3.3.1-1 for Function 12a and revise the Actions section of the Bases if needed. The referenced Condition for this Function in Table 3.3.1-1 should be consistent the Condition B of Subsection 3.5.2, "DHRS," and Condition C of Subsection 3.3.3 for Function 2, DHRS Logic and Actuation, in Table 3.3.3-1.