July 2, 2019

Docket No. 52-048

U.S. Nuclear Regulatory Commission
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SUBJECT: NuScale Power, LLC Submittal of Changes to Technical Specifications Section 1.3, "Completion Times" and Section 3.7, "Plant Systems," and Bases Section 3.3, "Instrumentation," Section 3.4, "Reactor Coolant System," Section 3.5, "Passive Core Cooling Systems," and Section 3.7, "Plant Systems"

REFERENCES: Letter from NuScale Power, LLC to Nuclear Regulatory Commission, "NuScale Power, LLC Submittal of the NuScale Standard Plant Design Certification Application, Revision 2," dated October 30, 2018 (ML18311A006)

During a public teleconference on June 12, 2019 with Getachew Tesfaye, Pete Snyder, Craig Harbuck, Dinesh Taneja, and Joseph Ashcraft of the NRC Staff, NuScale Power, LLC (NuScale) discussed potential updates to Technical Specifications and Bases. As a result of this discussion, NuScale changed the Technical Specifications Section 1.3, "Completion Times," and Section 3.7, "Plant Systems'" and Bases Section 3.3, "Instrumentation," Section 3.4, "Reactor Coolant System," Section 3.5, "Passive Core Cooling Systems," and Section 3.7, "Plant Systems." The Enclosure to this letter provides a mark-up of the technical specification and bases pages incorporating revisions in redline/strikeout format. NuScale will include this change as part of a future revision to the NuScale Design Certification Application.

This letter makes no regulatory commitments or revisions to any existing regulatory commitments.

If you have any questions, please feel free to contact Rebecca Norris at 541-602-1260 or at rnorris@nuscalepower.com.

Sincerely,

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Enclosure: Changes to Technical Specifications Section 1.3, "Completion Times" and Section 3.7, "Plant Systems," and Bases Section 3.3, "Instrumentation," Section 3.4, "Reactor Coolant System," Section 3.5, "Passive Core Cooling Systems," and Section 3.7, "Plant Systems"

Enclosure:

Changes to Technical Specifications Section 1.3, “Completion Times” and Section 3.7, “Plant Systems,” and Bases Section 3.3, “Instrumentation,” Section 3.4, “Reactor Coolant System,” Section 3.5, “Passive Core Cooling Systems,” and Section 3.7, “Plant Systems”

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1.3 Completion Times

EXAMPLES (continued)

EXAMPLE 1.3-2

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One valve inoperable.	A.1 Restore valve to OPERABLE status.	7 days
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 2. AND B.2 Be in MODE 3.	6 hours 36 hours

When a valve is declared inoperable, Condition A is entered. If the valve is not restored to OPERABLE status within 7 days, Condition B is also entered and the Completion tTime clocks for Required Actions B.1 and B.2 start. If the inoperable valve is restored to OPERABLE status after Condition B is entered, Condition A and B are exited, and therefore, the Required Actions of Condition B may be terminated.

When a second valve is declared inoperable while the first valve is still inoperable, Condition A is not re-entered for the second valve. LCO 3.0.3 is entered, since the ACTIONS do not include a Condition for more than one inoperable valve. The Completion Time clock for Condition A does not stop after LCO 3.0.3 is entered, but continues to be tracked from the time Condition A was initially entered.

While in LCO 3.0.3, if one of the inoperable valves is restored to OPERABLE status and the Completion Time for Condition A has not expired, LCO 3.0.3 may be exited and operation continued in accordance with Condition A.

While in LCO 3.0.3, if one of the inoperable valves is restored to OPERABLE status and the Completion Time for Condition A has expired, LCO 3.0.3 may be exited and operation continued in accordance with Condition B. The Completion Time for Condition B is tracked from the time the Condition A Completion Time expired.

3.7 PLANT SYSTEMS

3.7.1 Main Steam Isolation Valves (MSIVs)

LCO 3.7.1 Two MSIVs and two MSIV bypass valves per steam line shall be OPERABLE.

APPLICABILITY: MODES 1 and 2,
MODES 3 and not PASSIVELY COOLED.

ACTIONS

----------NOTES----------

1. Separate Condition entry is allowed for each inoperable valve.

2. Main steam line flow path(s) may be unisolated intermittently under administrative controls.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ----------NOTE---------- Separate Condition entry is allowed for each valve. ---------- One or more required MSIV valves inoperable.	A.1 Isolate the affected main steam line flow path by use of at least one closed and de-activated automatic valve, closed manual valve, or blind flange. AND A.2 ----------NOTES---------- 1. Isolation devices in high radiation areas may be verified by use of administrative means. 2. Isolation devices that are locked, sealed, or otherwise secured may be verified by use of administrative means. ---------- Verify the affected main steam line flow path is isolated.	72 hours Once per 7 days

BASES

ACTIONS (continued)

When more than two channels of an MPS Function are inoperable, the affected MPS Function is lost and the unit is outside the assumptions of the applicable safety analyses. This condition is addressed for all MPS Functions by the second ~~c~~Condition statement 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 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.

BASES

ACTIONS (continued)

~~K.1 and K.2~~

~~Condition K is entered when Condition C applies to Functions that result in actuation of the DHRS on Low Low Main Steam Pressure as listed in Table 3.3.1-1.~~

~~If the Required Actions associated with this Condition cannot be completed within the required Completion Time, the unit must be brought to a MODE in which the LCO does not apply. This is accomplished by Required Actions K.1 and K.2. K.1 places the unit in MODE 2 within 6 hours. This action limits the time the unit may continue to operate with a limited or inoperable DHRS automatic channel. K.2 places the unit in MODE 3 within 36 hours. The allowed Completion Times are reasonable to reach the required unit conditions from full power conditions in an orderly manner.~~

~~L~~K.1 and ~~L~~K.2

Condition ~~L~~K is entered when Condition C applies to Functions that result in actuation of the Containment Isolation system as listed in Table 3.3.1-1.

If the Required Actions associated with this Condition cannot be completed within the required Completion Time, the unit must be brought to a MODE in which the LCO does not apply. This is accomplished by Required Actions ~~L~~K.1 and ~~L~~K.2. ~~L~~K.1 places the unit in MODE 2 within 6 hours. This action limits the time the unit may continue to operate with a limited or inoperable CIS automatic channel. ~~L~~K.2 places the unit in MODE 3 with RCS hot temperature < 200°F within 48 hours of entering the ~~c~~Condition. This ~~c~~Condition assures the unit will maintain the RCS depressurized and the unit being in a condition for which the LCO no longer applies.

Completion Times are established considering the likelihood of a design basis event that would require CIS actuation during the period of inoperability. They also provide adequate time to permit evaluation of conditions and restoration of channel OPERABILITY without challenging plant systems during a shutdown.

~~M~~L.1, ~~M~~L.2, ~~and M~~L.3, L.4, and L.5

Condition L~~M~~ is entered when Condition C applies to Functions that result in a reactor trip, CIS actuation, DHR actuation, DWSI, SSI, and Pressurizer Heater Trip due to the Low ELVS Voltage or High Under-the-Bioshield Temperature as listed in Table 3.3.1-1.

BASES

ACTIONS (continued)

If the Required Actions associated with this Condition cannot be completed within the required Completion Time, the unit must be brought to a MODE or other specified condition where the Required Actions do not apply. This is accomplished by Required Actions ~~M~~L.1, ~~M~~L.2, ~~M~~L.3, ~~M~~L.4, and ~~M~~L.5.

~~M~~L.1 places the unit in MODE 2 within ~~6~~72 hours. This action limits the time the unit may continue to operate with a limited or inoperable automatic channel. ~~M~~L.2 requires the unit to be in MODE 3 and PASSIVELY COOLED within ~~3~~96 hours of entering the Condition. These conditions assure adequate passive decay heat transfer to the UHS and result in the unit being in a condition for which the DHRS OPERABILITY is no longer required.

~~M~~L.3 places the unit in MODE 3 with RCS temperature below the T-2 interlock within ~~3~~96 hours of entering the ~~c~~Condition. This ~~c~~Condition assures the unit will maintain the RCS depressurized and the unit being in a condition for which the LCO no longer applies.

~~M~~L.4 isolates the dilution source flow paths in the CVCS makeup line by use of at least one closed manual or one closed and de-activated automatic valve~~demineralized water flowpath to the RCS~~ within ~~3~~96 hours. This completes the function of the DWSI.

~~M~~L.5 opens the power supply breakers to the pressurizer heaters within ~~3~~96 hours.

Completion Times are established considering the likelihood of a design basis event that would require automatic actuation during the period of inoperability. They also provide adequate time to permit evaluation of conditions and restoration of channel OPERABILITY without challenging plant systems during a shutdown.

~~N.1 and N.2~~

~~Condition N is entered when Condition C applies to Functions that result in the actuation of DHRS on Low Low Pressurizer Level as listed in Table 3.3.1-1.~~

~~If the Required Actions associated with this Condition cannot be completed within the required Completion Time, the unit must be brought to a MODE or other specified condition where the Required Actions do not apply. This is accomplished by Required Actions N.1 and N.2. N.1 places the unit in MODE 2 within 6 hours. This action limits the time the unit may continue to operate with a limited or inoperable DHRS automatic channel. N.2 places the unit in MODE 3 with RCS~~

BASES

ACTIONS

A.1 and A.2

Condition A applies if a single RTB is inoperable. This ~~c~~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 ~~c~~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 ~~c~~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

ACTIONS

When the required ESFAS logic for the Actuation Functions listed in Table 3.3.3-1 are inoperable, the unit is outside the safety analysis, if applicable in the current MODE of operation. Required Actions must be initiated to limit the duration of operation or to place the unit in a MODE or other applicable condition in which the Condition no longer applies.

A Note has been added to the ACTIONS to clarify the application of the Completion Time rules. The Conditions of this Specification may be entered independently for each Actuation Function. The Completion Time for the inoperable ~~f~~Function will be tracked separately for each ~~f~~Function, starting from the time the Condition was entered for that Actuation Function.

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) within one hour. This places the unit in a condition in which the LCO no longer applies. The one hour ~~c~~Completion ~~t~~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.

B.1

Condition B applies if one division of an ESFAS actuation logic ~~f~~Function is inoperable. This Condition is not applicable to LTOP actuation logic.

The redundant signal paths and logic of the OPERABLE division provides sufficient capability to automatically actuate the required ESFAS function with a single division of logic OPERABLE.

If one division of ~~A~~actuation~~CTUATION~~ Function~~UNCTION~~ logic cannot be restored to OPERABILITY within six hours, then the Conditions listed in Table 3.3.3-1 must be entered to limit the duration of operation with an inoperable division and to place the unit in a MODE or other applicable condition in which the LCO no longer applies. The six hour limit provides a reasonable time during which the actuation system may be restored to OPERABILITY.

BASES

ACTIONS (continued)

C.1 and C.2

If Required Action B.1 directs entry into Condition C as specified in Table 3.3.3-1, or if both divisions of ECCS or DHRS are inoperable the unit is outside its design basis ability to automatically mitigate a postulated event.

With one division of actuation logic inoperable the redundant signal paths and logic of the OPERABLE division provide sufficient capability to automatically actuate the ECCS or DHRS if required.

C.1 requires the unit to be in MODE 2 within 6. This action limits the time the unit may continue to operate with limited or inoperable automatic actuation logic.

C.2 requires the unit to be in MODE 3 and PASSIVELY COOLED within 36 hours of entering the Condition. This ~~c~~Condition assures adequate passive decay heat transfer to the UHS and result in the unit being in a condition for which the LCO no longer applies.

Completion Times are established considering the likelihood of a LOCA event that would require ECCS or DHRS actuation. They also provide adequate time to permit evaluation of conditions and restoration of actuation logic OPERABILITY without challenging plant systems during a shutdown.

D.1 and D.2

If Required Action B.1 directs entry into Condition D as specified in Table 3.3.3-1, or if both divisions of the containment isolation or secondary system isolation actuation ~~f~~Function are inoperable then the unit is outside its design basis ability to automatically mitigate some design basis events.

With one division of actuation logic inoperable, the redundant signal paths and logic of the OPERABLE division provide sufficient capability to automatically actuate the CIS if required.

D.1 requires the unit to be in MODE 2 within 6 hours of entering the Condition. This action limits the time the unit may continue to operate with limited or inoperable CIS automatic actuation logic.

D.2 requires the unit to be placed in MODE 3 with RCS temperature below the T-2 interlock within 48 hours of entering the Condition. This

BASES

ACTIONS (continued)

condition assures the unit will maintain the RCS depressurized, and the unit being in a condition for which the LCO no longer applies.

Completion Times are established considering the low probability of a design basis event that would require CIS actuation during the period of inoperability. They also provide adequate time to permit evaluation of conditions and restoration of actuation logic OPERABILITY without challenging plant systems during a shutdown.

E.1

If Required Action B.1 directs entry into Condition E as specified in Table 3.3.3-1, or if both divisions of demineralized water supply isolation actuation are inoperable then the unit is outside its design basis ability to automatically mitigate some design basis events.

With one division of actuation logic inoperable, the redundant signal paths and logic of the OPERABLE division provide sufficient capability to automatically actuate the DWSI if required.

In this ~~c~~Condition the demineralized water supply flow path(s) to the RCS must be isolated within 1 hour to preclude an inadvertent boron dilution event.

Isolation can be accomplished by manually isolating the demineralized water isolation valve(s). Alternatively, the dilution path may be isolated by closing appropriate isolation valve(s) in the flow path(s) from the demineralized water storage tank to the RCS.

The Required Action is modified by a Note allowing the flow path(s) to be unisolated intermittently under administrative controls. These administrative controls consist of stationing a dedicated operator at the valve controls, who is in continuous communication with the main control room. In this way, the flow path can be isolated when a need for isolation is indicated.

F.1

If Required Action B.1 directs entry into Condition F as specified in Table 3.3.3-1, or if both divisions of the CVCS isolation actuation ~~f~~Function are inoperable then the unit is outside its design basis ability to automatically mitigate some design basis events.

BASES

ACTIONS (continued)

With one division of actuation logic inoperable, the redundant signal paths and logic of the OPERABLE division provide robust capability to automatically actuate the CVCSI if required.

F.1 requires the isolation of all four~~flow paths from the~~ CVCS flow paths to and from the reactor coolant system within 1 hour of entering the Condition. The Action is modified by a Note that permits the flow path(s) to be unisolated intermittently under administrative controls. This Note limits the likelihood of an event by requiring additional administrative control of the CVCS flow paths. These administrative controls consist of stationing a dedicated operator at the valve controls, who is in continuous communication with the main control room. In this way, the flow path(s) can be isolated when a need for isolation is indicated. This permits the unit to continue to operate while in the Condition.

G.1

If Required Action B.1 directs entry into Condition G as specified in Table 3.3.3-1, or if both divisions of the pressurizer heater trip actuation ~~f~~Function are inoperable then the unit is outside its design basis ability to automatically mitigate some design basis events.

With one division of actuation logic inoperable, the redundant signal paths and logic of the OPERABLE division provide sufficient capability to automatically actuate the PHT if required.

G.1 requires de-energization of the pressurizer heaters within 6 hours of entering the Condition. This action limits the time the unit may continue to operate with limited or inoperable PHT automatic actuation logic. The Action is modified by a Note that permits the heaters to be energized intermittently under administrative controls. These administrative controls consist of stationing a dedicated operator at the breaker controls, who is in continuous communication with the main control room. In this way, the pressurizer heaters can be de-energized when a need for de-energization is indicated. This permits the unit to continue to operate while in the Condition.

The ~~c~~Completion ~~t~~Time was established considering the likelihood of a design basis event that would require automatic de-energization.

BASES

APPLICABLE SAFETY ANALYSES, LCOs, and APPLICABILITY

The MPS functions to maintain the SLs during all AOOs and mitigates the consequences of DBAs in MODES 1, 2, and 3.

The LCO requires each ~~m~~Manual ~~a~~Actuation ~~f~~Function division~~s~~ performing an RTS or ESFAS Function, listed in Table 3.3.4-1, to be OPERABLE.

The safety analyses, LCO OPERABILITY and applicability requirements of ~~m~~Manual ~~a~~Actuation ~~f~~Functions listed in Table 3.3.4-1 are discussed in the Bases for LCO 3.3.2, “Reactor Trip System (RTS) Logic and Actuation,” and LCO 3.3.3, “Engineered Safety Features Actuation System (ESFAS) Logic and Actuation.” While not specifically credited in the safety analyses, manual actuation of the ~~f~~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 ~~m~~Manual ~~a~~Actuation ~~f~~Function~~s~~ satisfy~~ies~~ Criterion 4 of 10 CFR 50.36(c)(2)(ii).

ACTIONS

A Note has been added in the ACTIONS to clarify the application of Completion Time rules. Separate Condition entry is allowed for each Function listed in Table 3.3.4-1. The Completion Time(s) of the inoperable Function will be tracked separately for each Function starting from the time the Condition was entered for that Function.

A.1

Condition A applies if one or more Functions with one manual actuation division inoperable. Required Action A.1 requires the Condition associated with the inoperable ~~f~~Function~~(s)~~ listed in Table 3.3.4-1 to be corrected, or the Condition listed in Table 3.3.4-1 to be entered within 48 hours. In this ~~c~~Condition, one division of manual actuation remains OPERABLE and the automatic MPS actuation capabilities remain available to perform the safety function consistent with the limits of LCO 3.3.1, 3.3.2, and 3.3.3.

The Completion Time of 48 hours is based on continued operation in conformance with the design basis for automatic actuation of protective functions, as well as an OPERABLE means of manually actuating the protective functions. The time also provides adequate opportunity to identify and implement corrective actions to restore a ~~m~~Manual ~~a~~Actuation ~~f~~Function without entering the Condition specified in Table 3.3.4-1.

BASES

ACTIONS (continued)

B.1

Condition B applies to the ~~m~~Manual ~~a~~Actuation ~~f~~Functions identified in Table 3.3.4-1. Condition B addresses the situation where one or more Functions have both manual actuation divisions inoperable. One manual actuation division consists of an actuation switch and the associated hardware (such as contacts and wiring) up to but not including the affected EIMs. EIM OPERABILITY is addressed in LCO 3.3.2 and LCO 3.3.3.

With both manual actuation divisions inoperable, the Condition listed in Table 3.3.4-1 must be entered in 6 hours. In this Condition, the automatic MPS actuations remain available to perform the design basis safety functions consistent with the limits of LCO 3.3.1, 3.3.2, and 3.3.3. The Completion Time of 6 hours provides adequate opportunity to identify and implement corrective actions to restore a ~~m~~Manual ~~a~~Actuation ~~f~~Function without entering the Condition specified in Table 3.3.4-1.

C.1

If Required Actions A.1 or B.1 direct entry into Condition C as specified in Table 3.3.4-1, then the reactor trip breakers must be opened immediately. Opening the reactor trip breakers satisfies the safety function of the system and places the unit in a MODE or specified conditions in which the LCO no longer applies.

The immediate ~~c~~Completion ~~t~~Time is consistent with the importance of the ability to initiate a manual reactor trip using the actuation ~~f~~Function.

D.1 and D.2

If Required Actions A.1 or B.1 direct entry into Condition D as specified in Table 3.3.4-1, then Condition D provides 24 hours to restore the manual actuation capability to OPERABLE status before the unit must be in MODE 2. Required Action D.2 requires the unit be in MODE 3 and PASSIVELY COOLED within 72 hours of entering the ~~c~~Condition. The Completion Times provide opportunity for correction of the identified inoperability while maintaining the reactor coolant system closed, minimizing the transients and complexity of a return to operation when OPERABILITY is restored.

BASES

ACTIONS (continued)

C.1 and C.2

Actions must be initiated immediately to correct operation outside of the P/T limits at times other than when in MODE 1, 2, or 3, so that the RCPB is returned to a condition that has been verified by stress analysis.

The immediate Completion Time reflects the urgency of initiating action to restore the parameters to within the analyzed range. Most violations will not be severe, and the activity can be accomplished in a short period of time in a controlled manner.

Besides restoring operation within limits, an evaluation is required to determine if RCS operation can continue. The evaluation must verify that the RCPB integrity remains acceptable and must be completed prior to entry into MODE 3. Several methods may be used, including comparison with pre-analyzed transients in the stress analyses, or inspection of the components.

ASME Code, Section XI, Appendix E (Ref. 6), may be used to support the evaluation. However, its use is restricted to evaluation of the vessel beltline.

Condition C is modified by a Note requiring Required Action C.2 to be completed whenever the Condition is entered. The Note emphasizes the need to perform the evaluation of the effects of the excursion outside the allowable limits. Restoration alone per Required Action C.1 is insufficient because higher than analyzed stresses may have occurred and may have affected the RCPB integrity.

D.1, D.2 and D.3

Condition D is based on an unexpected containment flooding initiated when RCS temperature is in excess of the maximum allowable temperature limit for containment flooding specified in the PTLR. The containment flooding system transfers borated water between the ultimate heat sink and the containment vessel. It is expected to be used during refuel preparations and during select beyond design basis events. Both of these functions are non-safety related.

The immediate ~~c~~Completion ~~t~~Time for Action D.1 is appropriate because the system is designed to be utilized for containment flooding when the module has already been shutdown. Allowing operation to flood containment in these MODES would place the unit in an unanalyzed condition.

BASES

ACTIONS (continued)

The 36 hour ~~c~~Completion ~~t~~Time for Action D.2 allows sufficient time to cool down the unit to a condition that containment flooding is allowed.

Action D.3 requires evaluation of the RCS for continued operation prior to returning to MODE 2 after MODE 3 was entered to comply with the ~~r~~Required ~~a~~Actions. This is necessary to ensure P-T limits and cool down rates were not exceeded or an engineering evaluation performed if they were.

SURVEILLANCE REQUIREMENTS

SR 3.4.3.1

Verification that operation is within PTLR limits is required when RCS P/T conditions are undergoing planned changes. The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program. Pressurizer pressure instrumentation is utilized to monitor vessel pressure during planned changes. Use of temperature monitoring instrumentation is based on evolution being performed and delineated in PTLR.

Surveillance for heatup and cooldown, may be discontinued when the definition given in the relevant plant procedure for ending the activity is satisfied.

This SR is modified by a Note that only requires this surveillance to be performed during system heatup and cooldown and inservice leak and hydrostatic testing.

REFERENCES

1. 10 CFR 50, Appendix G, “Fracture Toughness Requirements.”
2. ASME Boiler and Pressure Vessel Code, Section XI, Appendix G, "Fracture Toughness Criteria For Protection Against Failure." (2013)
3. ASTM E 185-82, “Standard Practice for Conducting Surveillance Tests for Light-Water Cooled Nuclear Power Reactor Vessels,” July 1982.
4. 10 CFR 50, Appendix H, “Reactor Vessel Material Surveillance Program Requirements.”
5. Regulatory Guide 1.99, “Radiation Embrittlement of Reactor Vessel Materials,” May 1988.

BASES

APPLICABILITY (continued)

containment vessel or direct communication and contact of the core with the ultimate heat sink. Therefore the ECCS valves are not required to be OPERABLE in MODE 4 or 5.

ACTIONS

A.1

To meet the ECCS safety function at least two RVVs must open. If a single RVV is inoperable it eliminates the redundancy of this safety system. The valve must be restored to OPERABLE. A ~~c~~Completion ~~t~~Time of 72 hours is reasonable based on the probability of a LOCA or LTOP condition occurring during this period, the reliability of the other RVVs, and the ability of the system to cope with this event using the chemical volume control system and the containment flooding and drain system.

B.1

To meet the ECCS safety function at least one RRV must open. If a single RRV is inoperable it eliminates the redundancy of the of this safety system. The valve must be restored to OPERABLE. A ~~c~~Completion ~~t~~Time of 72 hours is reasonable based on the probability of a LOCA condition occurring during this period, the reliability of the other RRV, and the ability of the system to cope with this event using the chemical volume control system and the containment flooding and drain system.

C.1 and C.2

If the Required Actions cannot be completed within the associated Completion Times, if two or more RVVs, or both RRVs are inoperable the unit must be placed in a condition that does not rely on the ECCS valves opening. To accomplish this, the unit must be shutdown and placed in a safe condition. This is accomplished by Required Actions C.1 and C.2.

Required Action C.1 places the unit in MODE 2 within 6 hours. Required Action C.2 places the unit in MODE 3 and passively cooled within 36 hours.

Completion Times are established considering the likelihood of a LOCA event that would require ECCS actuation. They also provide adequate time to reach the required unit condition from full power conditions in an orderly manner.

BASES

APPLICABILITY

The DHRS is relied upon to provide a passive means of decay heat removal in MODES 1 and 2. The DHRS must remain OPERABLE in MODE 3 until PASSIVE COOLING. In MODE 4, DHRS is not required because conductive shutdown cooling through the containment vessel to the ultimate heat sink (UHS) has been established. When being disassembled in MODE 4 and in MODE 5 when one or more reactor vessel flange bolts are less than fully tensioned, but before the upper module and lower reactor vessel are separated, the containment lower shell has been removed and the reactor vessel and RCS are cooled by direct contact with the UHS. In MODE 5 decay heat removal is by direct transfer to the refueling pool water which is in contact with the reactor fuel.

ACTIONS

A.1

To meet the DHR safety function at least one loop~~train~~ must function. If a single loop~~train~~ of DHR is inoperable it eliminates the redundancy of this safety system. The system must be restored to OPERABLE.

A ~~c~~Completion ~~t~~Time of 72 hours is reasonable based on the probability of the DHR system being needed during this period, the reliability of the other loop~~train~~ of DHR including redundant actuation and isolation valves, and the ability of the unit to cope with this condition~~event~~ using the ECCS.

B.1 and B.2

If the Required Actions cannot be completed within the associated Completion Time, or if both loops~~trains~~ of DHRS are declared inoperable the unit must be placed in a mode that does not rely on the DHRS. This is accomplished by Required Actions B.1 and B.2.

Required Action B.1 places the unit in MODE 2 within 6 hours. Required Action B.2 places the unit in MODE 3 and ~~passively cooled~~PASSIVELY COOLED within 36 hours.

Completion Times are established considering the likelihood of an event that would require DHRS actuation. They also provide adequate time to reach the required unit condition from full power conditions in an orderly manner.

BASES

ACTIONS (continued)

~~D.1 and D.2~~

~~With Required Actions and associated Completion Times not met, isolation capability of the main steam line(s) is not maintained. The associated DHRS and the ability to isolate postulated releases from the SGs are affected. The unit must be placed in a condition in which the LCO does not apply using Required Action D.1 and D.2.~~

~~Required Action D.1 requires the unit must be placed in MODE 2 within 6 hours.~~

~~Required Action D.2 requires the unit to be in MODE 3 and PASSIVELY COOLED within 36 hours.~~

~~The Completion Times are reasonable based operating activities required to reach these conditions in an orderly manner. The time permits use of normal means to exit the conditions of Applicability. It is also consistent with the Completion Times for an inoperable train of the DHRS.~~The ACTIONS are modified by a Note indicating that steam line flow paths may be unisolated intermittently under administrative control. These administrative controls consist of stationing a dedicated operator at the device controls, who is in continuous communication with the control room. In this way, the MSIV flow path can be rapidly isolated when a need is indicated.

A.1 and A.2

Condition A is modified by a Note stating that a separate Condition entry is allowed for each valve. This is acceptable because the Required Actions provide appropriate compensatory actions for each inoperable isolation valve. The series-parallel valve arrangement could result in multiple valves being inoperable and the redundant capability to isolate the steam line maintained.

With a required valve open and inoperable, isolation of the main steam flow using that valve to perform the credited isolation function can no longer be assured. The isolation function could be susceptible to a single failure because only the redundant isolation valves on the affected steam line maintain the ability to isolate the effected steam flow.

BASES

ACTIONS (continued)

Action A.1 requires isolation of the inoperable valve flow path within 72 hours. Some repairs may be accomplished within the 72 hour period to restore OPERABILITY and exit the Condition. The 72 hour Completion Time is reasonable because the inoperable isolation valve only affects the capability of one of the two redundant isolation valves to function. Only if a single failure occurs that affects the remaining capability to isolate the steam flow path will the safety function be affected.

The 72 hour Completion Time is reasonable considering the availability of other means of mitigating design basis events, including Emergency Core Cooling System and the low probability of an accident occurring during this time period that would require closure of the specific flow path.

Alternatively, if the valve flow path can be isolated by closing the inoperable valve within 72 hours then its function is being accomplished. The capability to isolate steam flow if a single failure occurs remains unaffected.

An inoperable MSIV may be utilized to isolate the flow path only if its leak tightness has not been compromised. The 72 hours is reasonable to adjust unit conditions and take action to isolate the flowpath.

Required Action A.2 is modified by two notes. Note 1 applies to isolation devices located in high radiation areas and allows these devices to be verified closed by use of administrative means. Allowing verification by administrative means is acceptable, since access to these areas is typically restricted. Note 2 applies to isolation devices that are locked, sealed, or otherwise secured in position and allows these devices to be verified closed by use of administrative means. Allowing verification by administrative means is considered acceptable since the function of locking, sealing, or securing components is to ensure that these devices are not inadvertently repositioned. Therefore, the probability of misalignment of these devices once they have been verified to be in the proper position is small.

For inoperable components that are not restored to OPERABLE status prior to the required Completion Time in Required Action A.1 and now have their flow path isolated, Required Action A.2 is applicable. Action A.2 requires that the flow path be verified isolated on a periodic basis. The 7 day Completion Time is reasonable based on engineering judgement, valve and system status indications available in the control room, and other administrative controls, to ensure these flow paths remain isolated.

BASES

ACTIONS (continued)

B.1

With a steam line that cannot be manually or automatically isolated the supported safety functions can no longer be met. This Condition applies when two or more inoperable isolation valves prevent automatic or manual isolation of steam flow from the steam generator. This condition exists when a flow path through the safety related MSIV and MSIV bypass valve exists, and a flow path through the non-safety related secondary MSIV and MSIV bypass valve exists, that cannot be manually or automatically isolated.

For example, one MSIV bypass valve inoperable and open, and one non-safety related secondary MSIV inoperable and open could prevent isolation of the steam flow from the associated steam generator. In this condition a steam line flow could exist through the MSIV bypass valve and the secondary MSIV that could not be isolated.

Action B.1 requires isolation of the main steam line by closure of valves so that the safety function of the steam line isolation is accomplished. Some repairs may be accomplished within the 8 hour period. The 8 hour Completion Time is reasonable because the inoperable isolation valves only affect the capability of one of the two redundant DHRS trains to function.

The 8 hour Completion Time is reasonable considering the availability of other means of mitigating design basis events, including Emergency Core Cooling System and the low probability of an accident occurring during this time period that would require isolation of the steam line.

If the main steam line can be isolated within 8 hours then its safety function is being accomplished. An inoperable MSIV or bypass valve may be utilized to isolate the steam line only if its leak tightness has not been compromised.

BASES

ACTIONS (continued)

C.1 and C.2

With Required Actions and associated Completion Times not met, isolation capability of the main steam line(s) is not maintained. The associated DHRS and the ability to isolate postulated releases from the SGs are affected. The unit must be placed in a condition in which the LCO does not apply.

Required Action C.1 requires the unit to be in MODE 2 within 6 hours.

Required Action C.2 requires the unit to be in MODE 3 and PASSIVELY COOLED within 36 hours.

The Completion Times are reasonable based on operational activities required to reach these conditions in an orderly manner. The time permits use of normal means to exit the conditions of Applicability. It is also consistent with the Completion Times for an inoperable train of the DHRS.

BASES

APPLICABLE SAFETY ANALYSES

The safety significance of plant leakage inside containment varies depending on its source, rate, and duration. Therefore, detection and monitoring of plant leakage inside containment are necessary. This is accomplished via the instrumentation required by LCO 3.4.7, “RCS Leakage Detection Instrumentation,” and the Reactor Coolant System (RCS) water inventory balance (SR 3.4.5.1). Subtracting identified leakage into the containment vessel from the total detected leakage inside containment provides qualitative information to the operators regarding possible main steam or feedwater line leakage. This allows the operators to take action should leakage occur which would be detrimental to the safety of the facility if a seismic event occurred.

This specification has been included in Technical Specifications because if a seismic event occurs when the in-containment secondary leakage is greater than the LCO limit, a main steam or feedwater pipe break could occur. This could result in an adverse interaction between the affected in-containment secondary system piping and other safety related equipment located inside the containment.

LCO

In-containment secondary piping leakage is defined as leakage inside containment in any portion of the main steam line or feedwater pipe walls. Up to 1.5 gallons per hour (gph) of leakage is allowable because it is below the leak rate for LBB analyzed cases of a secondary line crack twice as long as a crack leaking at the detectable leak rate under normal operating conditions including the stress imposed by postulated seismic events. Violation of this LCO could result in continued degradation of the main steam line or feedwater piping inside the containment vessel.

APPLICABILITY

Because of elevated secondary system temperatures and pressures, the potential for in-containment secondary system piping leakage is greatest in MODES 1, 2, and MODE 3 when not PASSIVELY COOLED.

In MODE 3 when PASSIVELY COOLED, and in MODES 4 and 5 an in-containment secondary system piping leakage limit is not provided. In MODE 3 when PASSIVELY COOLED, the secondary system temperatures and pressures are rapidly reducing, resulting in lower stresses and reduced potential for leakage or adverse effects from a postulated secondary system pipe rupture. In MODES 4 and 5 the secondary system piping is depressurized.