Technical Specifications Task Force
Improved Standard Technical Specifications Change Traveler

Revise Safety/Relief Valve Requirements

NUREGs Affected: ☐ 1430 ☐ 1431 ☐ 1432 ☑ 1433 ☑ 1434 ☐ 2194

Classification: 1) Technical Change

Recommended for CLIIP?: Yes

Correction or Improvement: Improvement

NRC Fee Status: Not Exempt

Benefit: Increases Equipment Operability

Changes Marked on ISTS Rev 4.0

PWROG RISD & PA (if applicable): N/A,N/A

See attached.

Revision History

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Revision Proposed by: BWROG LC

Revision Description:
Original Issue

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Owners Group Comments
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TSTF Comments:
(No Comments)

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Affected Technical Specifications

S/A 3.4.3 Bases	S/RVs	NUREG(s)- 1433 Only
LCO 3.4.3	S/RVs	NUREG(s)- 1433 Only
LCO 3.4.3 Bases	S/RVs	NUREG(s)- 1433 Only
Appl. 3.4.3 Bases	S/RVs	NUREG(s)- 1433 Only
Action 3.4.3.A	S/RVs Change Description: Deleted	NUREG(s)- 1433 Only

Action 3.4.3.A Bases	S/RVs		NUREG(s)- 1433 Only
	Change Description:	Deleted	
Action 3.4.3.B	S/RVs		NUREG(s)- 1433 Only
	Change Description:	Deleted	
Action 3.4.3.B Bases	S/RVs		NUREG(s)- 1433 Only
	Change Description:	Deleted	
Action 3.4.3.C	S/RVs		NUREG(s)- 1433 Only
	Change Description:	Revised and renamed "A"	
Action 3.4.3.C Bases	S/RVs		NUREG(s)- 1433 Only
	Change Description:	Revised and renamed "A"	
SR 3.4.3.1	S/RVs		NUREG(s)- 1433 Only
SR 3.4.3.1 Bases	S/RVs		NUREG(s)- 1433 Only
SR 3.4.3.2	S/RVs		NUREG(s)- 1433 Only
	Change Description:	Deleted	
SR 3.4.3.2 Bases	S/RVs		NUREG(s)- 1433 Only
	Change Description:	Deleted	
Ref. 3.4.3 Bases	S/RVs		NUREG(s)- 1433 Only
S/A 3.4.4 Bases	S/RVs		NUREG(s)- 1434 Only
LCO 3.4.4	S/RVs		NUREG(s)- 1434 Only
LCO 3.4.4 Bases	S/RVs		NUREG(s)- 1434 Only
Appl. 3.4.4 Bases	S/RVs		NUREG(s)- 1434 Only
Action 3.4.4.A	S/RVs		NUREG(s)- 1434 Only
	Change Description:	Deleted	
Action 3.4.4.A Bases	S/RVs		NUREG(s)- 1434 Only
	Change Description:	Deleted	
Action 3.4.4.B	S/RVs		NUREG(s)- 1434 Only
	Change Description:	Deleted	
Action 3.4.4.B Bases	S/RVs		NUREG(s)- 1434 Only
	Change Description:	Deleted	
Action 3.4.4.C	S/RVs		NUREG(s)- 1434 Only
	Change Description:	Renamed A	
Action 3.4.4.C Bases	S/RVs		NUREG(s)- 1434 Only
	Change Description:	Renamed A	

SR 3.4.4.1	S/RVs	NUREG(s)- 1434 Only
SR 3.4.4.1 Bases	S/RVs	NUREG(s)- 1434 Only
SR 3.4.4.2	S/RVs	NUREG(s)- 1434 Only
SR 3.4.4.2 Bases	S/RVs	NUREG(s)- 1434 Only
SR 3.4.4.3	S/RVs Change Description: Deleted	NUREG(s)- 1434 Only
SR 3.4.4.3 Bases	S/RVs Change Description: Deleted	NUREG(s)- 1434 Only

1. SUMMARY DESCRIPTION

The proposed change revises the Safety/Relief Valve (S/RV) Technical Specifications (TS) to align the requirements with the safety limits and the regulations. The proposed change modifies NUREG-1433, "Standard Technical Specifications, General Electric BWR/4 Plants," and NUREG-1434, "Standard Technical Specifications, General Electric BWR/6 Plants."[1]

2. DETAILED DESCRIPTION

2.1. System Design and Operation

The ASME Boiler and Pressure Vessel Code requires the reactor pressure vessel to be protected from overpressure during upset conditions by self-actuated safety valves. As part of the nuclear pressure relief system, the size and number of S/RVs are selected such that peak pressure in the nuclear system will not exceed the ASME Code limits for the reactor coolant pressure boundary (RCPB). Safety Limit 2.1.2 limits the reactor steam dome pressure to the lowest transient overpressure allowed in order to ensure the maximum transient pressure allowable in the RCS pressure vessel is less than the ASME Code, Section III, limit of 110% of design pressure.

The S/RVs are located on the main steam lines between the reactor vessel and the first isolation valve within the drywell. The S/RVs can actuate by either of two modes: the safety mode or the relief mode. In the safety mode (or spring mode of operation), the spring loaded disk or pilot valve opens when steam pressure overcomes the spring force holding the valve or pilot valve closed. For S/RVs with pilot valves, opening the pilot valve allows a pressure differential to develop across the main valve piston and opens the main valve. In the relief mode of operation, pneumatic pressure is used to open the valve, initiated by switches located in the control room or by pressure-sensing instrumentation.

The TS contain multiple specifications that govern the S/RVs depending on the function they are fulfilling.

- Safety Limit 2.1.2, "Reactor Coolant System Pressure SL," states, "Reactor steam dome pressure shall be $\leq$ 1325 psig." The pressure limit is plant-specific. The S/RVs are credited for meeting this safety limit.

- BWR/4 Standard Technical Specification (STS) 3.3.6.3, "Low-Low Set (LLS) Instrumentation," and BWR/6 STS 3.3.6.5, "Relief and Low-low Set (LLS) Instrumentation," provide instrumentation requirements on the S/RV relief mode and LLS mode of operation.

- BWR/4 STS 3.4.3 and BWR/6 STS 3.4.4, both titled, "Safety/Relief Valves," require the S/RVs to prevent RCPB overpressurization. For most plants, the most severe pressurization

[1] NUREG 1433 is based on the BWR/4 plant design, but is also representative of the BWR/2, BWR/3, and, in this case, BWR/5 designs. NUREG 1434 is based on the BWR/6 plant design, and is representative, in some cases, of the BWR/5 design.

transient is the closure of all main steam isolation valves (MSIVs), followed by reactor scram on high neutron flux (i.e., failure of the direct scram associated with MSIV position). For most BWR/2, BWR/3, BWR/4, and BWR/5 plants, the S/RVs in the safety mode ensure the Safety Limit is met during normal operation and Anticipated Operational Occurrences (AOOs). For BWR/6 plants and some non-BWR/6 plants, S/RVs in safety mode and some S/RVs in relief mode are required to ensure the Safety Limit is met during normal operation and AOOs.

- STS 3.5.1, "ECCS - Operating," requires the Automatic Depressurization System (ADS), which uses the S/RV's relief mode. The ADS is designed to provide depressurization of the Reactor Pressure Vessel (RPV) during a small break Loss of Coolant Accident (LOCA) if high pressure core injection (BWR/4) or high pressure core spray (BWR/6) fails or is unable to maintain the required water level in the RPV. ADS operation reduces the RPV pressure to within the operating pressure range of the low pressure ECCS subsystems, so that these subsystems can provide coolant inventory makeup. Each of the S/RVs used for automatic depressurization is equipped with an air accumulator that provides the pneumatic power to actuate the valves.

- STS 3.6.1.6, "Low-Low Set (LLS) Valves," also requires the S/RVs in relief mode. In the LLS mode, a subset of the S/RVs are signaled to open at a lower pressure than the relief or safety mode pressure setpoints and to stay open longer, so that reopening more than one S/RV is prevented on subsequent actuations. The LLS function prevents excessive short duration S/RV cycles with valve actuation at the relief setpoint.

The Inservice Testing Program (IST), implemented in accordance with 10 CFR 50.55a(f), requires periodic testing of the S/RVs. Periodic testing is described in Appendix I of the American Society of Mechanical Engineers (ASME) Operations and Maintenance (OM) Code, "Class 1 Main Steam Pressure Relief Valves with Auxiliary Actuating Devices," Section I-3300, "Periodic Testing." This testing is performed either in-situ during a plant shutdown or as a bench test performed at nominal operating temperatures and pressures. The inservice test verifies each S/RV opens with the required tolerance around the setpoint. The valves are set to the required "as left" tolerance to allow for drift during the period of operation.

2.2. Current Technical Specifications Requirements

The proposed change only affects the "Safety/Relief Valves," specification (BWR/4 STS 3.4.3 and BWR/6 STS 3.4.4).

The BWR/4 STS 3.4.3 S/RV LCO typically states, "The safety function of *XX* S/RVs shall be operable," with the required number of S/RVs (*XX*) corresponding to the minimum number needed to accommodate the limiting pressure transient without exceeding the Safety Limit using only the safety mode of operation.

The BWR/6 STS 3.4.4 LCO (which is also applicable to some non-BWR/6 plants) requires the safety function of *XX* S/RVs and the relief function of *YY* additional S/RVs to be operable. The required number of S/RVs in the safety mode (*XX*) and relief mode (*YY*) varies by plant. The

relief mode is actuated by the instrumentation required by STS 3.3.6.5, "Relief and LLS Instrumentation."

BWR/4 Surveillance Requirement (SR) 3.4.3.1 and BWR/6 SR 3.4.4.1 require verification of the safety function lift setpoints of the required S/RVs. The SRs specify the number of valves required to open within a specified tolerance (typically 3%) of the given setpoint. The SRs also specify the as-left tolerance (typically 1%) after testing.

BWR/6 SR 3.4.4.2 requires verification that each relief function S/RV actuates on an actual or simulated automatic initiation signal. Non-BWR/6 plants that require the S/RV relief mode have a similar SR.

BWR/4 SR 3.4.3.2 and BWR/6 SR 3.4.4.3 verify that each S/RV opens when manually actuated.

2.3. Reason for the Proposed Change

The S/RV LCO is written in terms of valves. However, the specified safety function is based on the combined pressure relieving capacity of the combination of the S/RVs. The failure of some valves to open within the SR tolerance may not result in the inability of the S/RVs as a group to perform the specified safety function. Therefore, the LCO should be revised to align with the specified safety function.

A review of Licensee Event Reports over the last ten years found 45 events in which main steam Safety/Relief Valves (S/RVs) failed to lift within the SR lift pressure tolerance when bench tested (BWR/4 SR 3.4.3.1 and BWR/6 SR 3.4.4.1). However, in all but a few cases, an analysis determined that the S/RVs as a group would have lifted at a pressure that would have protected Safety Limit 2.1.2. As a result, the SR should be revised.

Testing of the safety mode of each S/RV is required by the Inservice Testing Program, which is required by regulation (10 CFR 50.55a(f)). It is unnecessary to duplicate this regulatory requirement in the TS when the result of any individual valve test is not required for the specified safety function of the system to be met.

2.4. Description of the Proposed Change

The proposed change revises the S/RV LCO to require the S/RVs to collectively prevent reactor steam dome pressure from exceeding Safety Limit 2.1.2 in an event. The LCO will no longer specify the number of S/RVs required to be operable in the safety mode and revises BWR/4 SR 3.4.3.1 and BWR/6 SR 3.4.4.1 to not duplicate the Inservice Testing Program requirements.

The references to BWR/4 and BWR/6 refer to the corresponding STS: NUREG-1433 for BWR/4 plants and NUREG-1434 for BWR/6 plants. The BWR/6 STS proposed changes are also applicable to two non-BWR/6 plants (Dresden 2 and 3 and Quad Cities 1 and 2) that have an LCO that requires S/RVs in both the safety mode and relief mode.

BWR/4 LCO 3.4.3 is revised to state (deletions are struck through; insertions are in italics):

> The safety *mode* ~~function~~ of *the* ~~[11]~~ S/RVs shall be OPERABLE.

BWR/6 LCO 3.4.4 is revised to state:

The safety *mode* ~~function~~ of *the* ~~[seven]~~ S/RVs shall be OPERABLE,

AND

The relief *mode* ~~function~~ of [seven] additional S/RVs shall be OPERABLE.

BWR/4 SR 3.4.3.1 is revised to state:

Verify the safety mode of the S/RVs will prevent reactor steam dome pressure from exceeding Safety Limit 2.1.2.

~~----------NOTE----------~~
~~≤ [2] [required] S/RVs may be changed to a lower setpoint group.~~
~~----------~~

~~Verify the safety function lift setpoints of the [required] S/RVs are as follows:~~

~~Number of S/RVs~~	~~Setpoint (psig)~~
~~[4]~~	~~[1090 ± 32.7]~~
~~[4]~~	~~[1100 ± 33.0]~~
~~[3]~~	~~[1110 ± 33.3]~~

~~Following testing, lift settings shall be within ± 1%.~~

BWR/6 SR 3.4.4.1 is revised to state:

Verify the safety mode of the S/RVs, when combined with the required relief mode S/RVs, will prevent reactor steam dome pressure from exceeding Safety Limit 2.1.2.

~~----------NOTE----------~~
~~≤ [2] [required] S/RVs may be changed to a lower setpoint group.~~
~~----------~~

~~Verify the safety function lift setpoints of the [required] S/RVs are as follows:~~

~~Number of S/RVs~~	~~Setpoint (psig)~~
~~[8]~~	~~[1165 ± 34.9]~~
~~[6]~~	~~[1180 ± 35.4]~~
~~[6]~~	~~[1190 ± 35.7]~~

~~Following testing, lift settings shall be within ± 1%.~~

The current frequency has three options: In accordance with the Inservice Testing Program, [18] months, or in accordance with the Surveillance Frequency Control Program. The [18] month and Surveillance Frequency Control Program options are deleted.

BWR/6 SR 3.4.4.2 is revised to state:

> Verify each required relief *mode* ~~function~~ S/RV actuates on an actual or simulated automatic initiation signal.

BWR/4 SR 3.4.3.2 and BWR/6 SR 3.4.4.4, which state, "Verify each [required] S/RV opens when manually actuated," are deleted.

The changes to the LCO and SRs result in changes to the TS Actions.

BWR/4 Condition A, "One [or two] [required] S/RV[s] inoperable," is deleted as the LCO and SRs no longer contain requirements on individual S/RVs. Condition B, the default action when Condition A's Required Action and associated Completion Time is not met, is no longer required. Condition C, "[Three] or more [required] S/RVs inoperable," is replaced with a new Condition, "Requirements of the LCO not met." The new Condition retains the existing Required Actions to be in Mode 3 in 12 hours and in Mode 4 in 36 hours.

BWR/6 Conditions A and B are deleted. Condition C is revised to state:

> *Requirements of the LCO not met*.

The revised Condition retains the existing Required Actions to be in Mode 3 in 12 hours and in Mode 4 in 36 hours.

The TS Bases are revised to reflect the changes to the TS. The regulation at Title 10 of the Code of Federal Regulations (10 CFR), Part 50.36, states, "A summary statement of the bases or reasons for such specifications, other than those covering administrative controls, shall also be included in the application, but shall not become part of the technical specifications." A licensee may make changes to the TS Bases without prior NRC review and approval in accordance with the Technical Specifications Bases Control Program. The proposed TS Bases changes are consistent with the proposed TS changes and provide the purpose for each requirement in the specification consistent with the Commission's Final Policy Statement on Technical Specifications Improvements for Nuclear Power Reactors, dated July 2, 1993 (58 FR 39132). Therefore, the Bases changes are provided for information and approval of the Bases is not requested.

A model application is attached. The model may be used by licensees desiring to adopt the traveler following NRC approval.

3. TECHNICAL EVALUATION

The terms "safety function" and "relief function" are used in BWR/4 STS 3.4.3 and BWR/6 STS 3.4.4. However, the TS Bases, "Background" section uses the terms "safety mode" and "relief mode." For example, "The S/RVs can actuate by either of two modes: the safety mode or the relief mode," and "The S/RVs that provide the relief mode are the low-low set (LLS) valves and the Automatic Depressurization System (ADS) valves." The term "safety function" could be easily confused with the term "specified safety function" used in the definition of operability. For clarity and for consistency with the existing TS Bases, the terms are replaced with "safety mode" and "relief mode." This is an administrative change with no change in intent.

LCO Changes

The S/RV LCO is not consistent with the relevant regulations. Title 10 of the Code of Federal Regulations (10 CFR), Paragraph 50.36(c)(2)(i) states, "Limiting conditions for operation are the lowest functional capability or performance levels of equipment required for safe operation of the facility." The existing S/RV LCO is written in terms of individual valves, but the specified safety function is based on the combined pressure relieving capacity of the S/RVs. The failure of a particular valve or valves to open within the SR tolerance may not (and based on historical performance, is very likely not to) result in the inability of the S/RVs as a group to perform the specified safety function. Given that the LCO is not consistent with the regulatory requirements, it is revised to represent the lowest functional capability or performance level of equipment required for safe operation of the facility.

The BWR/4 LCO only addresses the safety mode of the S/RVs. It is revised to no longer specify the number of operable S/RVs, and to instead require that the safety mode of the S/RVs be operable. The proposed LCO requirements are applicable only to the collective capability of the S/RVs to mechanically open to relieve excess pressure (i.e., the safety mode), not on the response of individual valves.

The BWR/6 LCO requires the safety mode of the S/RVs and relief mode of operation for a subset of S/RVs. The plant design permits crediting some of the pressure relieving capability of electrically operated pressure relief valves in the overpressure analysis. (Two non-BWR/6 plants, Dresden 2 and 3 and Quad Cities 1 and 2, also credit electrically operated pressure relief valves. The changes described as "BWR/6" in this section are also applicable to those plants.) The safety mode requirement is revised to be consistent with the change to the BWR/4 LCO. The existing LCO requirement that the relief function of a specified number of S/RVs shall be operable is not revised, except that the word "function" is replaced with "mode" as an administrative change. The LCO Bases are revised to specify that the S/RVs credited for the relief mode cannot also be credited for meeting the safety mode portion of LCO, consistent with the term "additional" which appears in the LCO.

BWR/4 SR 3.4.3.1 and BWR/6 SR 3.4.4.1 Changes

Paragraph 10 CFR 50.36(c)(3) states, "Surveillance requirements are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for

operation will be met." While the existing test of each S/RV assures the necessary quality of the components is maintained, the testing is duplicative of the Inservice Testing Program, which is required by regulation (10 CFR 50.55a(f)). The existing SR does not meet the regulatory guidance that the SR will assure that facility operation will be within safety limits, as the SR requirements are overly conservative for that purpose. The existing SR verifies that the existing LCO is met, but as discussed above, the LCO is also not consistent with the regulatory requirements.

The existing SR verifies each S/RV lifts within the tolerance around the specified setpoint. As previously discussed, the specified safety function is based on the collective capability of the S/RVs to relieve pressure, not the ability of each S/RV to lift within a specified tolerance. Therefore, the SR is replaced with a requirement to verify the S/RVs will prevent reactor steam dome pressure from exceeding the Safety Limit.

In BWR/4 SR 3.4.3.1, the SR requires verification that the safety mode of the S/RVs will prevent the reactor steam dome pressure from exceeding the Safety Limit, consistent with the LCO. In the BWR/6 SR 3.4.4.1, the SR requires verification that the S/RVs in the safety mode, when combined with the required relief mode S/RVs, will prevent the reactor steam dome pressure from exceeding the Safety Limit, consistent with the LCO. BWR/6 SR 3.4.4.2 tests the relief mode of the S/RVs. The BWR/6 design permits crediting a portion of the relief mode S/RV capability in the overpressure analysis. Therefore, this credited capacity is considered when determining whether the S/RVs in safety mode will protect the safety limit.

The proposed change to the SR no longer specifies the number of S/RVs set at each lift setpoint and the as-found tolerance around the setpoint. This information is controlled by the ASME Operations and Maintenance (OM) Code, which is required to be followed by 10 CFR 50.55a. Appendix I of the ASME OM Code provides S/RV testing requirements, including establishment of setpoints, as-found tolerances, and as-left tolerances. ASME OM Code requirement I-1310(e), states, "The Owner, based upon system and valve design basics or technical specification, shall establish and document acceptance criteria for tests required by this Mandatory Appendix." Therefore, the acceptance criteria will be specified in the licensee controlled documents.

Periodic testing of S/RVs will still be performed as required by Appendix I of the ASME OM Code, "Class 1 Main Steam Pressure Relief Valves with Auxiliary Actuating Devices," Section I-3300, "Periodic Testing." Title 10 of the Code of Federal Regulations, Part 50, paragraph 55a, "Codes and standards," requires licensees to follow the ASME OM Code. The results of the OM Code-required testing will be used to evaluate S/RV performance under the proposed BWR/4 SR 3.4.3.1 and BWR/6 SR 3.4.4.1.

The S/RV safety mode lift setpoints and tolerances are inputs to the overpressure and accident analyses. The licensee may set the number of S/RVs at each lift setpoint, and the as-found and as-left tolerances, as specified by the OM Code and verify that the overpressure and accident analyses, performed using NRC-approved methods, provide acceptable results. The S/RV safety mode lift setpoints and tolerances will be maintained in licensee-controlled documents subject to the 10 CFR 50.59 change controls, similar to other analysis assumptions.

The BWR/6 S/RV relief mode setpoints will continue to be specified in STS 3.3.6.5, "Relief and Low-low Set (LLS) Instrumentation."

Under the proposed SR, the results of the Inservice Testing Program individual valve testing will be reviewed and aggregated to verify that the collective performance of the S/RVs will ensure Safety Limit 2.1.2 is protected. Should an S/RV not actuate within the assumed tolerance, the actual lift settings will be used to evaluate the affected overpressure analyses to determine whether the Safety Limit would have been protected. If not, the SR is not met. If the Safety Limit would have continued to be protected, the SR is met. If other analyses would have been potentially affected by an S/RV not actuating with the assumed tolerance, the condition will be evaluated under the licensee's corrective action program, as is the current requirement.

The proposed approach is similar to other SRs that require analysis to evaluate whether the SR is met. For example, BWR/4 SR 3.7.5.1 states, "Verify each [control room AC] subsystem has the capability to remove the assumed heat load." As discussed in the associated Bases, performance of the SR consists of a combination of testing and calculation, just as the proposed S/RV SR will require a combination of testing and calculation to verify the SR is met.

In summary, the proposed BWR/4 SR 3.4.3.1 and BWR/6 SR 3.4.4.1 will verify that the collective function of the S/RVs will perform the specified safety function and will confirm that facility operation will be within safety limits. The requirements on individual S/RVs will be adequately controlled by 10 CFR 50.55a, the ASME OM Code, and 10 CFR 50.59, and do not need to appear in the TS.

<u>BWR/6 SR 3.4.4.2 Changes</u>

BWR/6 SR 3.4.4.2 states, "Verify each [required] relief function S/RV actuates on an actual or simulated automatic initiation signal." The SR is revised to refer to the "relief mode" instead of the "relief function" as previously discussed. The brackets around the word "required" are removed. Brackets indicate a plant-specific option. The equivalent SR in all four BWR/6 plants contains the word "required." Therefore, the brackets are removed to make the STS consistent with the plant TS.

<u>BWR/4 SR 3.4.3.2 and BWR/6 SR 3.4.4.3 Changes</u>

The existing SRs verify that each S/RV opens when manually actuated. The Bases for the SRs state that a manual actuation is performed to verify that, mechanically, the valve is functioning properly, and no blockage exists in the valve discharge line. This SR is relocated to the licensee's control as part of post-maintenance testing.

There is no analysis that credits manual opening of the S/RVs for overpressure protection (safety mode). The inability to open an S/RV manually would not render the S/RV incapable of performing in the safety mode. The existing SR is a post-maintenance test to assure the S/RVs are operable after completion of the Inservice Testing. However, one goal of the Standard Technical Specifications was removal of post-maintenance SRs. As discussed in the SR 3.0.1 Bases, "Upon completion of maintenance, appropriate post maintenance testing is required to declare equipment OPERABLE. This includes ensuring applicable Surveillances are not failed

and their most recent performance is in accordance with SR 3.0.2." Therefore, the existing SR is unnecessary and inconsistent with the Standard Technical Specifications and is removed.

Required manual operation of the S/RV valves in the relief mode is tested by BWR/4 SR 3.5.1.12 and BWR/6 SR 3.5.1.7, "Verify each ADS valve opens when manually actuated," and BWR/4 and BWR/6 SR 3.6.1.6.1, "Verify each LLS valve opens when manually actuated."

BWR/4 3.4.3 Action Changes

Existing Condition A applies when one or two [required] S/RVs are inoperable. This action is no longer needed as the revised LCO and SR no longer contain requirements on each S/RV, but on the aggregate S/RV function. An inoperable S/RV would not render the LCO not met unless Safety Limit 2.1.2 would not be protected, in which case a plant shutdown is warranted.

Existing Condition B applies when the Required Action and associated Completion Time of Condition A is not met. As Condition A is deleted, Condition B is no longer needed and is also deleted.

Existing Condition C applies when [three] or more [required] S/RVs are inoperable. The Condition is renumbered Condition A and revised to state, "Requirements of the LCO not met." The existing Required Actions to be in Mode 3 in 12 hours and Mode 4 in 36 hours are retained.

BWR/6 3.4.4 Action Changes

The existing BWR/6 STS 3.4.4 Actions are not consistent with the plant TS of the four BWR/6 plants. TS 3.4.4 for the BWR/6 plants (River Bend, Grand Gulf, Perry, and Clinton) contains a single action for one or more required S/RVs inoperable, that requires being in Mode 3 in 12 hours and in Mode 4 in 36 hours. Therefore, consistent with the existing plant TS and the proposed BWR/4 TS, existing Condition A is revised to apply when the requirements of the LCO are not met and retains the existing Required Actions to be in Mode 3 in 12 hours and Mode 4 in 36 hours.

The Dresden 2 and 3 and Quad Cities 1 and 2 TS 3.4.3 Actions are similar to the BWR/6 STS 3.4.4 Actions. Those plants may choose to retain their existing Condition A and B, and to revise Condition C to state, "Requirements of the LCO not met for reasons other than Condition A."

4. REGULATORY EVALUATION

4.1. Applicable Regulatory Requirements/Criteria

Section IV, "The Commission Policy," of the "Final Policy Statement on Technical Specifications Improvements for Nuclear Power Reactors" (58 Federal Register 39132), dated July 22, 1993, states in part:

> The purpose of Technical Specifications is to impose those conditions or limitations upon reactor operation necessary to obviate the possibility of an abnormal situation or event giving rise to an immediate threat to the public health and safety by identifying those

> features that are of controlling importance to safety and establishing on them certain conditions of operation which cannot be changed without prior Commission approval.
>
> …[T]he Commission will also entertain requests to adopt portions of the improved STS, even if the licensee does not adopt all STS improvements.
>
> …The Commission encourages all licensees who submit Technical Specification related submittals based on this Policy Statement to emphasize human factors principles.
>
> …In accordance with this Policy Statement, improved STS have been developed and will be maintained for [BWR designs]. The Commission encourages licensees to use the improved STS as the basis for plant-specific Technical Specifications.
>
> …[I]t is the Commission intent that the wording and Bases of the improved STS be used … to the extent practicable.

As described in the Commission's "Final Policy Statement on Technical Specifications Improvements for Nuclear Power Reactors," recommendations were made by NRC and industry task groups for new STS that include greater emphasis on human factors principles in order to add clarity and understanding to the text of the STS, and provide improvements to the Bases of STS, which provides the purpose for each requirement in the specification. Improved vendor-specific STS were developed and issued by the NRC in September 1992.

The regulation at Title 10 of the Code of Federal Regulations (10 CFR) Section 50.36(a)(1) requires an applicant for an operating license to include in the application proposed TS in accordance with the requirements of 10 CFR 50.36. The applicant must include in the application a "summary statement of the bases or reasons for such specifications, other than those covering administrative controls…." However, per 10 CFR 50.36(a)(1), these technical specification bases "shall not become part of the technical specifications." The Final Policy Statement provides the following description of the scope and the purpose of the Technical Specification Bases:

> Appropriate Surveillance Requirements and Actions should be retained for each LCO [limiting condition for operation] which remains or is included in the Technical Specifications. Each LCO, Action, and Surveillance Requirement should have supporting Bases. The Bases should at a minimum address the following questions and cite references to appropriate licensing documentation (e.g., FSAR, Topical Report) to support the Bases.
>
> 1. What is the justification for the Technical Specification, i.e., which Policy Statement criterion requires it to be in the Technical Specifications?
>
> 2. What are the Bases for each LCO, i.e., why was it determined to be the lowest functional capability or performance level for the system or component in question necessary for safe operation of the facility and, what are the reasons for the Applicability of the LCO?

3. What are the Bases for each Action, i.e., why should this remedial action be taken if the associated LCO cannot be met; how does this Action relate to other Actions associated with the LCO; and what justifies continued operation of the system or component at the reduced state from the state specified in the LCO for the allowed time period?

4. What are the Bases for each Safety Limit?

5. What are the Bases for each Surveillance Requirement and Surveillance Frequency; i.e., what specific functional requirement is the surveillance designed to verify? Why is this surveillance necessary at the specified frequency to assure that the system or component function is maintained, that facility operation will be within the Safety Limits, and that the LCO will be met?

   Note: In answering these questions the Bases for each number (e.g., Allowable Value, Response Time, Completion Time, Surveillance Frequency), state, condition, and definition (e.g., operability) should be clearly specified. As an example, a number might be based on engineering judgment, past experience, or PSA [probabilistic safety assessment] insights; but this should be clearly stated.

Additionally, 10 CFR 50.36(b) requires:

> Each license authorizing operation of a … utilization facility … will include technical specifications. The technical specifications will be derived from the analyses and evaluation included in the safety analysis report, and amendments thereto, submitted pursuant to [10 CFR] 50.34 ["Contents of applications; technical information"]. The Commission may include such additional technical specifications as the Commission finds appropriate.

The categories of items required to be in the TSs are provided in 10 CFR 50.36(c). As required by 10 CFR 50.36(c)(2)(i), the TSs will include LCOs, which are the lowest functional capability or performance levels of equipment required for safe operation of the facility. Per 10 CFR 50.36(c)(2)(i), when an LCO of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the TSs until the condition can be met.

The regulation at 10 CFR 50.36(c)(3) requires TSs to include items in the category of SRs, which are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the LCOs will be met.

Per 10 CFR 50.90, whenever a holder of a license desires to amend the license, application for an amendment must be filed with the Commission, fully describing the changes desired, and following as far as applicable, the form prescribed for original applications.

Per 10 CFR 50.92(a), in determining whether an amendment to a license will be issued to the applicant, the Commission will be guided by the considerations which govern the issuance of initial licenses to the extent applicable and appropriate.

The NRC staff's guidance for the review of TSs is in Chapter 16, "Technical Specifications," of NUREG-0800, Revision 3, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants" (SRP), dated March 2010 (ADAMS Accession No. ML100351425). As described therein, as part of the regulatory standardization effort, the NRC staff has prepared Standard Technical Specifications for each of the light-water reactor nuclear designs.

4.2. Conclusions

In conclusion, based on the considerations discussed above, the proposed revision does not alter the current manner of operation and (1) there is reasonable assurance that the health and safety of the public will not be endangered by continued operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the approval of the proposed change will not be inimical to the common defense and security or to the health and safety of the public.

5. REFERENCES

None.

Model Application

[DATE] 10 CFR 50.90

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

PLANT NAME
DOCKET NO. 50-[xxx]
SUBJECT: Application to Revise Technical Specifications to Adopt TSTF-576, "Revise Safety/Relief Valve Requirements"

Pursuant to 10 CFR 50.90, [LICENSEE] is submitting a request for an amendment to the Technical Specifications (TS) for [PLANT NAME, UNIT NOS.].

[LICENSEE] requests adoption of TSTF 576, "Revise Safety/Relief Valve Requirements." The proposed change revises the Safety/Relief Valve (S/RV) TS to align the requirements with the safety limits and the regulations.

The enclosure provides a description and assessment of the proposed changes. Attachment 1 provides the existing TS pages marked to show the proposed changes. Attachment 2 provides revised (clean) TS pages. Attachment 3 provides the existing TS Bases pages marked to show revised text associated with the proposed TS changes and is provided for information only.

[[LICENSEE] requests that the amendment be reviewed under the Consolidated Line Item Improvement Process (CLIIP).] Approval of the proposed amendment is requested by [date]. Once approved, the amendment shall be implemented within [ ] days.

There are no regulatory commitments made in this submittal.

In accordance with 10 CFR 50.91, a copy of this application, with attachments, is being provided to the designated [STATE] Official.

[In accordance with 10 CFR 50.30(b), a license amendment request must be executed in a signed original under oath or affirmation. This can be accomplished by attaching a notarized affidavit confirming the signature authority of the signatory, or by including the following statement in the cover letter: "I declare under penalty of perjury that the foregoing is true and correct. Executed on (date)." The alternative statement is pursuant to 28 USC 1746. It does not require notarization.]

If you should have any questions regarding this submittal, please contact [NAME, TELEPHONE NUMBER].

Sincerely,

[Name, Title]

Enclosure: Description and Assessment

Attachments:
1. Proposed Technical Specification Changes (Mark-Up)
2. Revised Technical Specification Pages
3. Proposed Technical Specification Bases Changes (Mark-Up) – For Information Only

[The attachments are to be provided by the licensee and are not included in the model application.]

cc: NRC Project Manager
NRC Regional Office
NRC Resident Inspector
State Contact

ENCLOSURE

DESCRIPTION AND ASSESSMENT

1.0 DESCRIPTION

[LICENSEE] requests adoption of TSTF-576, "Revise Safety/Relief Valve Requirements." The proposed change revises the Safety/Relief Valve (S/RV) Technical Specifications (TS) to align the requirements with the safety limits and the regulations.

2.0 ASSESSMENT

2.1 Applicability of Safety Evaluation

[LICENSEE] has reviewed the safety evaluation for TSTF-576 provided to the Technical Specifications Task Force in a letter dated [DATE]. This review included a review of the NRC staff's evaluation, as well as the information provided in TSTF-576. [As described herein,] [LICENSEE] has concluded that the justifications presented in TSTF-576 and the safety evaluation prepared by the NRC staff are applicable to [PLANT, UNIT NOS.] and justify this amendment for the incorporation of the changes to the [PLANT] TS.

2.2 Optional Changes and Variations

[LICENSEE is not proposing any variations from the TS changes described in TSTF-576 or the applicable parts of the NRC staff's safety evaluation dated [DATE].] [LICENSEE is proposing the following variations from the TS changes described in TSTF-576 or the applicable parts of the NRC staff's safety evaluation: describe the variations]

[The [PLANT] TS utilize different [numbering][and][titles] than the Standard Technical Specifications on which TSTF-576 was based. Specifically, [describe differences between the plant-specific TS numbering and/or titles and the TSTF-576 numbering and titles.] These differences are administrative and do not affect the applicability of TSTF-576 to the [PLANT] TS.]

[The [PLANT] TS contain requirements that differ from the Standard Technical Specifications on which TSTF-576 was based but are encompassed in the TSTF-576 justification. [Describe differences and why TSTF-576 is still applicable.]]

3.0 REGULATORY ANALYSIS

3.1 No Significant Hazards Consideration Analysis

[LICENSEE] requests adoption of TSTF-576, "Revise Safety/Relief Valve Requirements." The proposed change revises the Safety/Relief Valve (S/RV) Technical Specifications (TS) to align the requirements with the safety limits and the regulations. The Limiting Condition for Operation (LCO) and Surveillance Requirements (SRs) are revised to replace requirements on each S/RV with a requirement on the collective capability of the S/RVs to be capable of preventing an overpressure event in order to protect Safety Limit 2.1.2, "Reactor Coolant System

Pressure." An SR that tests the ability of the S/RVs to be capable of manual operation is removed as that capability is not credited in any safety analysis. The TS Actions are revised to be consistent with the changes to the LCO and SRs. Administrative changes are made to the TS for clarity and consistency.

[LICENSEE] has evaluated if a significant hazards consideration is involved with the proposed amendment(s) by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

1. Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

   Response: No

   The proposed change revises the S/RV TS to align the requirements with the safety limits and the regulations. The proposed change does not change the design or operation of the S/RVs. Therefore, the probability of an accident previously evaluated is not affected. Each S/RV will continue to be tested under the auspices of the Inservice Testing Program required by 10 CFR 50.55a(f) and the aggregate performance of the S/RVs will be verified to ensure the overpressure Safety Limit will still be met. The accident analyses consider the aggregate operation of the S/RVs, not the performance of individual valves. The proposed change moves the S/RV setpoints and tolerances to licensee control, and establishment and testing of these values is governed by the Inservice Testing Program, which is required by 10 CFR 50.55a. Altering the control process for these values has no effect on previously performed accident evaluations. Therefore, the ability of the S/RVs to mitigate any accident previously evaluated is not significantly increased.

   Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

   Response: No

   The proposed change revises the S/RV TS to align the requirements with the safety limits and the regulations. The proposed change does not alter the design function or operation of the S/RVs. The proposed change does not create any new credible failure mechanisms, malfunctions, or accident initiators not already considered in the design and licensing basis.

   Therefore, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed amendment involve a significant reduction in a margin of safety?

   Response: No

The proposed change revises the S/RV TS to align the requirements with the safety limits and the regulations. The proposed change ensures that the S/RVs can protect Safety Limit 2.1.2. Although the setpoints and tolerances of specific S/RVs are moved to licensee control, the safety margin provided by the aggregate S/RV capability, which ensures the Safety Limit is protected, is not changed. The proposed change does not alter a design basis limit or a safety limit, and, therefore, does not reduce the margin of safety.

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above, [LICENSEE] concludes that the proposed change presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

3.2 Conclusion

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

4.0 ENVIRONMENTAL EVALUATION

The proposed change does not change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, and does not change an inspection or surveillance requirement. The proposed change does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed change meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed change.

Technical Specifications and Bases Changes

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.3 Safety/Relief Valves (S/RVs)

LCO 3.4.3 The safety mode ~~function~~ of the ~~[11]~~ S/RVs shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
~~A. [One [or two] [required] S/RV[s] inoperable.~~	~~A.1 Restore the [required] S/RV[s] to OPERABLE status.~~	~~14 days]~~
~~B. [Required Action and associated Completion Time of Condition A not met.]~~	~~B.1 ----------NOTE---------- LCO 3.0.4.a is not applicable when entering MODE 3. ---------- Be in MODE 3.~~	~~12 hours~~
~~A~~C. Requirements of the LCO not met. ~~[Three] or more [required] S/RVs inoperable.~~	~~A~~C.1 Be in MODE 3. AND ~~A~~C.2 Be in MODE 4.	12 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.3.1	Verify the safety mode of the S/RVs will prevent reactor steam dome pressure from exceeding Safety Limit 2.1.2. ~~NOTE~~ ~~≤ [2] [required] S/RVs may be changed to a lower setpoint group.~~ ~~Verify the safety function lift setpoints of the [required] S/RVs are as follows:~~ ~~Number of S/RVs — Setpoint (psig)~~ ~~[4] — [1090 ± 32.7]~~ ~~[4] — [1100 ± 33.0]~~ ~~[3] — [1110 ± 33.3]~~ ~~Following testing, lift settings shall be within ± 1%.~~	~~[~~In accordance with the Inservice Testing Program ~~OR~~ ~~[[18] months]~~ ~~OR~~ ~~In accordance with the Surveillance Frequency Control Program]~~
~~SR 3.4.3.2~~	~~NOTE~~ ~~Not required to be performed until 12 hours after reactor steam pressure and flow are adequate to perform the test.~~ ~~Verify each [required] S/RV opens when manually actuated.~~	~~[[18] months [on a STAGGERED TEST BASIS for each valve solenoid~~ ~~OR~~ ~~In accordance with the Surveillance Frequency Control Program]]~~

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.3 Safety/Relief Valves (S/RVs)

BASES

BACKGROUND

The ASME Boiler and Pressure Vessel Code requires the reactor pressure vessel be protected from overpressure during upset conditions by self-actuated safety valves. As part of the nuclear pressure relief system, the size and number of S/RVs are selected such that peak pressure in the nuclear system will not exceed the ASME Code limits for the reactor coolant pressure boundary (RCPB).

The S/RVs are located on the main steam lines between the reactor vessel and the first isolation valve within the drywell. The S/RVs can actuate by either of two modes: the safety mode or the relief mode. In the safety mode (or spring mode of operation), the spring loaded pilot valve opens when steam pressure at the valve inlet overcomes the spring force holding the pilot valve closed. Opening the pilot valve allows a pressure differential to develop across the main valve piston and opens the main valve. This satisfies the Code requirement.

Each S/RV discharges steam through a discharge line to a point below the minimum water level in the suppression pool. The S/RVs that provide the relief mode are the low-low set (LLS) valves and the Automatic Depressurization System (ADS) valves. The LLS requirements are specified in LCO 3.6.1.6, "Low-Low Set (LLS) Valves," and the ADS requirements are specified in LCO 3.5.1, "ECCS - Operating."

APPLICABLE SAFETY ANALYSES

The overpressure protection system must accommodate the most severe pressurization transient. Evaluations have determined that the most severe transient is the closure of all main steam isolation valves (MSIVs), followed by reactor scram on high neutron flux (i.e., failure of the direct scram associated with MSIV position) (Ref. 1). For the purpose of the analyses, the~~[11]~~ S/RVs are assumed to operate in the safety mode. The analysis results demonstrate that the design S/RV capacity is capable of maintaining reactor pressure below the ASME Code limit of 110% of vessel design pressure (110% x 1250 psig = 1375 psig). This LCO helps to ensure that the acceptance limit of 1375 psig is met during the Design Basis Event.

From an overpressure standpoint, the design basis events are bounded by the MSIV closure with flux scram event described above. Reference 2 discusses additional events that are expected to actuate the S/RVs.

S/RVs satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

BASES

LCO

The safety ~~function~~ mode of the ~~[11]~~ S/RVs ~~are~~ is required to be OPERABLE to satisfy the assumptions of the safety analysis (Refs. 1 and 2). The requirements of this LCO are applicable only to the capability of the S/RVs to mechanically open to relieve excess pressure when the lift setpoint is exceeded (safety ~~function~~mode).

The S/RVs are operable when they can ~~setpoints are established to~~ ensure that the ASME Code limit on peak reactor pressure, as stated in Safety Limit 2.1.2, is met using the spring mode of operation (safety mode)~~satisfied~~. ~~The ASME Code specifications require the lowest safety valve setpoint to be at or below vessel design pressure (1250 psig) and the highest safety valve to be set so that the total accumulated pressure does not exceed 110% of the design pressure for overpressurization conditions. The transient evaluations in the FSAR are based on these setpoints, but also include the additional uncertainties of ± 1% of the nominal setpoint drift to provide an added degree of conservatism.~~

Failure to meet the LCO ~~Operation with fewer valves OPERABLE than specified, or with setpoints outside the ASME limits,~~ could result in a more severe reactor response to a transient than predicted, possibly resulting in Safety Limit 2.1.2 ~~the ASME Code limit on reactor pressure~~ being exceeded.

APPLICABILITY

In MODES 1, 2, and 3, the safety mode of the ~~all~~ S/RVs must be OPERABLE, since considerable energy may be in the reactor core and the limiting design basis transients are assumed to occur in these MODES. The S/RVs may be required to provide pressure relief to discharge energy from the core until such time that the Residual Heat Removal (RHR) System is capable of dissipating the core heat.

In MODE 4, decay heat is low enough for the RHR System to provide adequate cooling, and reactor pressure is low enough that the overpressure limit is unlikely to be approached by assumed operational transients or accidents. In MODE 5, the reactor vessel head is unbolted or removed and the reactor is at atmospheric pressure. The S/RV function is not needed during these conditions.

ACTIONS

~~[A.1~~

~~With the safety function of one [or two] [required] S/RV[s] inoperable, the remaining OPERABLE S/RVs are capable of providing the necessary overpressure protection. Because of additional design margin, the ASME Code limits for the RCPB can also be satisfied with two S/RVs inoperable. However, the overall reliability of the pressure relief system is reduced because additional failures in the remaining OPERABLE S/RVs could result in failure to adequately relieve pressure during a limiting event. For this reason, continued operation is permitted for a limited time only.~~

BASES

ACTIONS (continued)

~~The 14 day Completion Time to restore the inoperable required S/RVs to OPERABLE status is based on the relief capability of the remaining S/RVs, the low probability of an event requiring S/RV actuation, and a reasonable time to complete the Required Action.]~~

~~B.1~~

~~REVIEWER'S NOTE~~

~~Adoption of a MODE 3 end state requires the licensee to make the following commitments:~~

~~1. [LICENSEE] will follow the guidance established in Section 11 of NUMARC 93-01, "Industry Guidance for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," Nuclear Management and Resource Council, Revision 3, July 2000.~~

~~2. [LICENSEE] will follow the guidance established in TSTF-IG-05-02, Implementation Guidance for TSTF-423, Revision 2, "Technical Specifications End States, NEDC-32988-A," November 2009.~~

~~If the safety function of the inoperable required S/RVs cannot be restored to OPERABLE status within the associated Completion Time of Required Action A.1, the plant must be brought to a MODE in which overall plant risk is minimized. To achieve this status, the plant must be brought to MODE 3 within 12 hours.~~

~~Remaining in the Applicability of the LCO is acceptable because the plant risk in MODE 3 is similar to or lower than the risk in MODE 4 (Ref. 3) and because the time spent in MODE 3 to perform the necessary repairs to restore the system to OPERABLE status will be short. However, voluntary entry into MODE 4 may be made as it is also an acceptable low risk state.~~

~~Required Action B.1 is modified by a Note that states that LCO 3.0.4.a is not applicable when entering MODE 3. This Note prohibits the use of LCO 3.0.4.a to enter MODE 3 during startup with the LCO not met. However, there is no restriction on the use of LCO 3.0.4.b, if applicable, because LCO 3.0.4.b requires performance of a risk assessment addressing inoperable systems and components, consideration of the results, determination of the acceptability of entering MODE 3, and establishment of risk management actions, if appropriate. LCO 3.0.4 is not applicable to, and the Note does not preclude, changes in MODES or other specified conditions in the Applicability that are required to comply with ACTIONS or that are part of a shutdown of the unit.~~

BASES

ACTIONS (continued)

~~The allowed Completion Time is reasonable, based on operating experience, to reach required plant conditions from full power conditions in an orderly manner and without challenging plant systems.~~

~~A~~C.1 and ~~A~~C.2

If the S/RVs cannot perform in their safety mode, ~~[three] or more [required] S/RVs are inoperable,~~ a transient may result in the violation of the ASME Code limit on reactor pressure. The plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to MODE 3 within 12 hours and to MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.4.3.1

This Surveillance ~~requires~~ verifies that the ~~that the [required]~~ S/RV~~s~~ safety mode will prevent the reactor steam dome pressure from exceeding Safety Limit 2.1.2~~will open at the pressures assumed in the safety analysis of Reference 1~~. The testing of the ~~demonstration of the~~ S/RV ~~safe~~ safety mode lift settings is ~~must be~~ performed during shutdown, since this is a bench test, ~~[~~to be done in accordance with the Inservice Testing Program~~]~~. The measured individual S/RV mechanical lift values are reviewed and aggregated to verify that the collective performance of the S/RVs will ensure Safety Limit 2.1.2 is protected. Should one or more S/RVs not actuate within the assumed tolerance, the actual lift values will be used to evaluate the affected overpressure analyses to determine whether the Safety Limit would have been protected. ~~The lift setting pressure shall correspond to ambient conditions of the valves at nominal operating temperatures and pressures. The S/RV setpoint is ± [3]% for OPERABILITY; however, the valves are reset to ± 1% during the Surveillance to allow for drift. [A Note is provided to allow up to [two] of the required [11] S/RVs to be physically replaced with S/RVs with lower setpoints. This provides operational flexibility which maintains the assumptions in the over-pressure analysis.]~~

~~REVIEWER'S NOTE~~

~~If the testing is within the scope of the licensee's Inservice Testing Program, the Frequency "In accordance with the Inservice Testing Program" should be used. Otherwise, the periodic Frequency of 18 months or the reference to the Surveillance Frequency Control Program should be used.~~

~~[The 18 month Frequency was selected because this Surveillance must be performed during shutdown conditions and is based on the time between refuelings.~~

~~OR~~

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

BASES

SURVEILLANCE REQUIREMENTS (continued)

~~----------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.~~
~~----------]~~

~~SR 3.4.3.2~~

~~A manual actuation of each [required] S/RV is performed to verify that, mechanically, the valve is functioning properly and no blockage exists in the valve discharge line. This can be demonstrated by the response of the turbine control valves or bypass valves, by a change in the measured steam flow, or by any other method suitable to verify steam flow. Adequate reactor steam dome pressure must be available to perform this test to avoid damaging the valve. Also, adequate steam flow must be passing through the main turbine or turbine bypass valves to continue to control reactor pressure when the S/RVs divert steam flow upon opening. Sufficient time is therefore allowed after the required pressure and flow are achieved to perform this test. Adequate pressure at which this test is to be performed is [920] psig (the pressure recommended by the valve manufacturer). Adequate steam flow is represented by [at least 1.25 turbine bypass valves open, or total steam flow ≥10^6 lb/hr]. Plant startup is allowed prior to performing this test because valve OPERABILITY and the setpoints for overpressure protection are verified, per ASME Code requirements, prior to valve installation. Therefore, this SR is modified by a Note that states the Surveillance is not required to be performed until 12 hours after reactor steam pressure and flow are adequate to perform the test. The 12 hours allowed for manual actuation after the required pressure is reached is sufficient to achieve stable conditions for testing and provides a reasonable time to complete the SR. If a valve fails to actuate due only to the failure of the solenoid but is capable of opening on overpressure, the safety function of the S/RV is considered OPERABLE.~~

~~[The [18] month on a STAGGERED TEST BASIS Frequency ensures that each solenoid for each S/RV is alternately tested. The 18 month Frequency was developed based on the S/RV tests required by the~~

~~ASME Boiler and Pressure Vessel Code (Ref. 4). Operating experience has shown that these components usually pass the Surveillance when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.~~

~~OR~~

BASES

SURVEILLANCE REQUIREMENTS (continued)

~~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.~~
~~----------]~~

REFERENCES

1. FSAR, Section [5.2.2.2.4].

2. FSAR, Section [15].

~~3. NEDC-32988-A, Revision 2, Technical Justification to Support Risk-Informed Modification to Selected Required End States for BWR Plants, December 2002.~~

~~4. ASME Code for Operation and Maintenance of Nuclear Power Plants.~~

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.4 Safety/Relief Valves (S/RVs)

LCO 3.4.4 The safety ~~function~~ mode of the ~~[seven]~~ S/RVs shall be OPERABLE,

AND

The relief ~~function~~ mode of [seven] additional S/RVs shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
~~A. [One [required] S/RV inoperable.~~	~~A.1 Restore [required] S/RV to OPERABLE status.~~	~~14 days]~~
~~B. [Required Action and associated Completion Time of Condition A not met.]~~	~~B.1 ----------NOTE---------- LCO 3.0.4.a is not applicable when entering MODE 3. ----------~~ ~~Be in MODE 3.~~	 ~~12 hours~~
~~A~~C. Requirements of the LCO not met. ~~[Two] or more [required] S/RVs inoperable.~~	~~A~~C.1 Be in MODE 3. AND ~~A~~C.2 Be in MODE 4.	12 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.4.1	Verify the safety mode of the S/RVs, when combined with the required relief mode S/RVs, will prevent reactor steam dome pressure from exceeding Safety Limit 2.1.2. ~~----------NOTE----------~~ ~~≤ [2] [required] S/RVs may be changed to a lower setpoint group.~~ ~~----------~~ ~~Verify the safety function lift setpoints of the [required] S/RVs are as follows:~~ ~~Number of S/RVs — Setpoint (psig)~~ ~~[8] — [1165 ± 34.9]~~ ~~[6] — [1180 ± 35.4]~~ ~~[6] — [1190 ± 35.7]~~ ~~Following testing, lift settings shall be within ± 1%.~~	~~[~~In accordance with the Inservice Testing Program ~~OR~~ ~~[[18] months]~~ ~~OR~~ ~~In accordance with the Surveillance Frequency Control Program]~~
SR 3.4.4.2	----------NOTE---------- Valve actuation may be excluded. ---------- Verify each ~~[~~required~~]~~ relief ~~function~~ mode S/RV actuates on an actual or simulated automatic initiation signal.	[[18] months OR In accordance with the Surveillance Frequency Control Program]

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
~~SR 3.4.4.3~~	~~NOTE~~ ~~Not required to be performed until 12 hours after reactor steam pressure and flow are adequate to perform the test.~~	
	~~Verify each [required] S/RV opens when manually actuated.~~	~~[[18] months on a STAGGERED TEST BASIS for each valve solenoid~~ ~~OR~~ ~~In accordance with the Surveillance Frequency Control Program]~~

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.4 Safety/Relief Valves (S/RVs)

BASES

BACKGROUND

The American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Ref. 1) requires the Reactor Pressure Vessel be protected from overpressure during upset conditions by self-actuated safety valves. As part of the nuclear pressure relief system, the size and number of safety/relief valves (S/RVs) are selected such that peak pressure in the nuclear system will not exceed the ASME Code limits for the reactor coolant pressure boundary (RCPB).

The S/RVs are located on the main steam lines between the reactor vessel and the first isolation valve within the drywell. Each S/RV discharges steam through a discharge line to a point below the minimum water level in the suppression pool.

The S/RVs can actuate by either of two modes: the safety mode or the relief mode. In the safety mode (or spring mode of operation), the direct action of the steam pressure in the main steam lines will act against a spring loaded disk that will pop open when the valve inlet pressure exceeds the spring force. In the relief mode (or power actuated mode of operation), a pneumatic piston or cylinder and mechanical linkage assembly are used to open the valve by overcoming the spring force, even with the valve inlet pressure equal to 0 psig. The pneumatic operator is arranged so that its malfunction will not prevent the valve disk from lifting if steam inlet pressure reaches the spring lift set pressures. In the relief mode, valves may be opened manually or automatically at the selected preset pressure. Six of the S/RVs providing the relief function also provide the low-low set relief function specified in LCO 3.6.1.6, "Low-Low Set (LLS) Valves." Eight of the S/RVs that provide the relief function are part of the Automatic Depressurization System specified in LCO 3.5.1, "ECCS - Operating." The instrumentation associated with the relief valve function and low-low set relief function is discussed in the Bases for LCO 3.3.6.5, "Relief and Low-Low Set (LLS) Instrumentation," and instrumentation for the ADS function is discussed in LCO 3.3.5.1, "Emergency Core Cooling Systems (ECCS) Instrumentation."

APPLICABLE SAFETY ANALYSES

The overpressure protection system must accommodate the most severe pressure transient. Evaluations have determined that the most severe transient is the closure of all main steam isolation valves (MSIVs) followed by reactor scram on high neutron flux (i.e., failure of the direct scram associated with MSIV position) (Ref. 2). For the purpose of the analyses, seven are assumed to operate in the relief mode with the remaining [required] S/RVs assumed to operate in the safety mode.~~[six] of the S/RVs are assumed to operate in the relief mode, and seven in the~~

~~safety mode.~~ The analysis results demonstrate that the design S/RV capacity is capable of maintaining reactor pressure below

BASES

APPLICABLE SAFETY ANALYSES (continued)

the ASME Code limit of 110% of vessel design pressure (110% x 1250 psig = 1375 psig). This LCO helps to ensure that the acceptance limit of 1375 psig is met during the design basis event.

From an overpressure standpoint, the design basis events are bounded by the MSIV closure with flux scram event described above. Reference 3 discusses additional events that are expected to actuate the S/RVs.

S/RVs satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The safety ~~function~~ mode of the ~~seven~~ S/RVs is required to be OPERABLE ~~in the safety mode~~, and ~~an additional~~ seven S/RVs (other than the ~~seven~~ S/RVs assumed to ~~that satisfy~~ actuate in the safety ~~function~~mode) must be OPERABLE in the relief mode. The requirements of this LCO are applicable only to the capability of the S/RVs to mechanically open to relieve excess pressure. In Reference 2, an evaluation was performed to establish the parametric relationship between the peak vessel pressure and the number of OPERABLE S/RVs. The results show that seven S/RVs in the relief mode and the remaining [required] S/RVs in the safety mode will ~~with a minimum of seven S/RVs in the safety mode and six S/RVs in the relief mode OPERABLE~~ensure~~,~~ the ASME Code limit of 1375 psig is not exceeded.

The S/RVs are operable when they can ~~setpoints are established to~~ ensure the ASME Code limit on peak reactor pressure, as stated in Safety Limit 2.1.2, is satisfied. ~~The ASME Code specifications require the lowest safety valve be set at or below vessel design pressure (1250 psig) and the highest safety valve be set so the total accumulated pressure does not exceed 110% of the design pressure for conditions. The transient evaluations in Reference 3 are based on these setpoints, but also include the additional uncertainties of ± 1% of the nominal setpoint to account for potential setpoint drift to provide an added degree of conservatism.~~

Failure to meet the LCO~~Operation with fewer valves OPERABLE than specified, or with setpoints outside the ASME limits,~~ could result in a more severe reactor response to a transient than predicted, possibly resulting in Safety Limit 2.1.2 ~~the ASME Code limit on reactor pressure~~ being exceeded.

APPLICABILITY

In MODES 1, 2, and 3, the safety and relief modes of the ~~specified number of~~ S/RVs must be OPERABLE since there may be considerable energy in the reactor core and the limiting design basis transients are assumed to occur. The S/RVs may be required to provide pressure relief

to discharge energy from the core until such time that the Residual Heat Removal (RHR) System is capable of dissipating the heat.

BASES

APPLICABILITY (continued)

In MODE 4, decay heat is low enough for the RHR System to provide adequate cooling, and reactor pressure is low enough that the overpressure limit is unlikely to be approached by assumed operational transients or accidents. In MODE 5, the reactor vessel head is unbolted or removed and the reactor is at atmospheric pressure. The S/RV function is not needed during these conditions.

ACTIONS

~~A.1~~

~~With the safety function of one [required] S/RV inoperable, the remaining OPERABLE S/RVs are capable of providing the necessary overpressure protection. Because of additional design margin, the ASME Code limits for the RCPB can also be satisfied with two S/RVs inoperable. However, the overall reliability of the pressure relief system is reduced because additional failures in the remaining OPERABLE S/RVs could result in failure to adequately relieve pressure during a limiting event. For this reason, continued operation is permitted for a limited time only.~~

~~The 14 day Completion Time to restore the inoperable required S/RVs to OPERABLE status is based on the relief capability of the remaining S/RVs, the low probability of an event requiring S/RV actuation, and a reasonable time to complete the Required Action.~~

~~B.1~~

~~----------REVIEWER'S NOTE----------~~
~~Adoption of a MODE 3 end state requires the licensee to make the following commitments:~~

~~1. [LICENSEE] will follow the guidance established in Section 11 of NUMARC 93-01, "Industry Guidance for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," Nuclear Management and Resource Council, Revision 3, July 2000.~~

~~2. [LICENSEE] will follow the guidance established in TSTF-IG-05-02, Implementation Guidance for TSTF-423, Revision 2, "Technical Specifications End States, NEDC-32988-A," November 2009.~~
~~----------~~

~~If the inoperable required S/RV cannot be restored to OPERABLE status within the associated Completion Time of Required Action A.1, the plant must be brought to a MODE in which overall plant risk is minimized. To~~

~~achieve this status, the plant must be brought to at least MODE 3 within 12 hours.~~

BASES

ACTIONS (continued)

~~Remaining in the Applicability of the LCO is acceptable because the plant risk in MODE 3 is similar to or lower than the risk in MODE 4 (Ref. 4) and because the time spent in MODE 3 to perform the necessary repairs to restore the system to OPERABLE status will be short. However, voluntary entry into MODE 4 may be made as it is also an acceptable low-risk state.~~

~~Required Action B.1 is modified by a Note that states that LCO 3.0.4.a is not applicable when entering MODE 3. This Note prohibits the use of LCO 3.0.4.a to enter MODE 3 during startup with the LCO not met. However, there is no restriction on the use of LCO 3.0.4.b, if applicable, because LCO 3.0.4.b requires performance of a risk assessment addressing inoperable systems and components, consideration of the results, determination of the acceptability of entering MODE 3, and establishment of risk management actions, if appropriate. LCO 3.0.4 is not applicable to, and the Note does not preclude, changes in MODES or other specified conditions in the Applicability that are required to comply with ACTIONS or that are part of a shutdown of the unit.~~

~~The allowed Completion Time is reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.~~

~~A~~C.1 and ~~A~~C.2

If the requirements of the LCO are not met, ~~[two] or more [required] S/RVs are inoperable,~~ a transient may result in the violation of the ASME Code limit on reactor pressure. The plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to MODE 3 within 12 hours and to MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.4.4.1

This Surveillance verifies that the ~~demonstrates that the~~ [required] S/RVs in the safety mode, when combined with the required S/RVs in the relief mode tested by SR 3.4.4.2, will prevent the reactor steam dome pressure from exceeding Safety Limit 2.1.2~~will open at the pressures assumed in the safety analysis of Reference 2~~. The testing of the ~~demonstration of the~~ S/RV safety mode ~~safety function~~ lift settings is ~~must be~~ performed during shutdown, since this is a bench test~~[~~, and in accordance with the

Inservice Testing Program~~]~~. The measured individual S/RV mechanical lift values are reviewed and aggregated to verify that the collective performance of the S/RVs will ensure Safety Limit 2.1.2 is protected. Should one or more S/RVs not actuate within the assumed tolerance, the actual lift values will be used to evaluate the affected overpressure analyses to determine whether the Safety Limit would have been protected. ~~The lift setting pressure shall correspond to ambient conditions of the valves at nominal operating temperatures and pressures. The S/RV setpoint is ± [3]% for OPERABILITY; however, the valves are reset to ± 1% during the Surveillance to allow for drift. [A Note is provided to allow up to [two] of the required [11] S/RVs to be physically~~

SURVEILLANCE REQUIREMENTS (continued)

~~replaced with S/RVs with lower setpoints. This provides operational flexibility which maintains the assumptions in the over-pressure analysis.]~~

~~REVIEWER'S NOTE~~
~~If the testing is within the scope of the licensee's Inservice Testing Program, the Frequency "In accordance with the Inservice Testing Program" should be used. Otherwise, the periodic Frequency of 18 months or the reference to the Surveillance Frequency Control Program should be used.~~

~~[The [18 month] Frequency was selected because this Surveillance must be performed during shutdown conditions and is based on the time between refuelings.~~

~~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.~~
~~]~~

SR 3.4.4.2

The ~~[~~required~~]~~ relief ~~function~~ mode S/RVs ~~are required to~~ actuate automatically upon receipt of specific initiation signals. A system functional test is performed to verify the mechanical portions of the automatic relief ~~function~~ mode operate as designed when initiated either by an actual or simulated initiation signal. The LOGIC SYSTEM

FUNCTIONAL TEST in SR 3.3.6.5.4 overlaps this SR to provide complete testing of the relief mode ~~safety~~ function.

[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 these components usually pass the SR when performed at the [18 month] Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

BASES

SURVEILLANCE REQUIREMENTS (continued)

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.
----------]

This SR is modified by a Note that excludes valve actuation. This prevents an RPV pressure blowdown.

~~SR 3.4.4.3~~

~~A manual actuation of each [required] S/RV is performed to verify that, mechanically, the valve is functioning properly and no blockage exists in the valve discharge line. This can be demonstrated by the response of the turbine control valves or bypass valves, by a change in the measured steam flow, or any other method suitable to verify steam flow. Adequate reactor steam dome pressure must be available to perform this test to avoid damaging the valve. Also, adequate steam flow must be passing through the main turbine or turbine bypass valves to continue to control reactor pressure when the S/RVs divert steam flow upon opening. Sufficient time is therefore allowed after the required pressure and flow are achieved to perform this test. Adequate pressure at which this test is to be performed is 950 psig (the pressure recommended by the valve manufacturer). Adequate steam flow is represented by [at least 1.25 turbine bypass valves open, or total steam flow ≥ 10^6 lb/hr]. Plant startup is allowed prior to performing this test because valve OPERABILITY and the setpoints for overpressure protection are verified, per ASME requirements, prior to valve installation. Therefore, this SR is modified by~~

~~a Note that states the Surveillance is not required to be performed until 12 hours after reactor steam pressure and flow are adequate to perform the test. The 12 hours allowed for manual actuation after the required pressure is reached is sufficient to achieve stable conditions for testing and provides a reasonable time to complete the SR. If the valve fails to actuate due only to the failure of the solenoid but is capable of opening on overpressure, the safety function of the S/RV is considered OPERABLE.~~

~~[The [18] month on a STAGGERED TEST BASIS Frequency ensures that each solenoid for each S/RV is alternately tested. The 18 month Frequency was developed based on the S/RV tests required by the~~

BASES

SURVEILLANCE REQUIREMENTS (continued)

~~ASME (Ref. 1). Operating experience has shown that these components usually pass the 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.~~
~~----------]~~

REFERENCES

1. ASME Code for Operation and Maintenance of Nuclear Power Plants.

2. FSAR, Section [5.2.5.5.3].

3. FSAR, Section [15].

4. NEDC-32988-A, Revision 2, Technical Justification to Support Risk-Informed Modification to Selected Required End States for BWR Plants, December 2002.