

TSTF-576 “Revise Safety/Relief Valve Requirements” Presubmittal Meeting

September 12, 2019

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Background

- The Safety/Relief Valve (S/RV) LCO requires *each* S/RV to be operable. The associated Surveillance Requirement (SR) requires that each valve opens within the specified tolerance around the lift setpoint.
- The need for TSTF-576 was highlighted by many LERs describing failure to meet the S/RV SR, even though the safety function (to prevent vessel over-pressurization) would still have been performed.
 - This indicated that the S/RV LCO is not consistent with 10 CFR 50.36(c)(2), “the lowest functional capability or performance levels of equipment required for safe operation of the facility.”
 - The SR is not consistent with 10 CFR 50.36(c)(3), to verify that “facility operation will be within safety limits, and that the limiting conditions for operation will be met.”
- As a separate action, the BWROG continues to pursue improvements to the S/RVs to address the underlying cause of the test failures.

Background

- The safety function of the S/RVs is to *collectively* ensure that the reactor steam dome pressure doesn't exceed the value in Safety Limit (SL) 2.1.2, "Reactor Coolant System Pressure SL."
 - The SL is based on not exceeding the ASME Boiler and Pressure Vessel Code, Section III limit of 110% of the design pressure.
- The S/RVs collectively are typically able to perform the safety function, even if individual S/RVs may open above or below the setpoint.

Background

- The TS contain multiple specifications that govern the S/RVs depending on the function they are fulfilling.
 - BWR/4 STS 3.4.3 and BWR/6 STS 3.4.4, both titled, “Safety/Relief Valves,” which requires the S/RVs in safety mode and, for BWR/6 plants, relief mode.
 - This TS is the subject of the traveler.
 - STS 3.5.1, "ECCS - Operating," that requires a subset of the S/RVs to actuate in ADS mode
 - STS 3.6.1.6, "Low-Low Set (LLS) Valves," that requires a subset of the S/RVs to actuate in LLS mode.
- STS 3.5.1 and 3.6.1.6 are not affected by the traveler.

Proposed LCO Changes

- The BWR/4 STS 3.4.3 LCO is changed from:
 - The safety function of [11] S/RVs shall be OPERABLE.
- To:
 - The safety mode of the S/RVs shall be OPERABLE.
- The safety mode is the capability of the S/RVs to mechanically open to relieve excess pressure when the lift setpoint is exceeded.

Proposed LCO Changes

- The BWR/6 STS 3.4.4 LCO is changed from:
 - The safety function of [seven] S/RVs shall be OPERABLE.
 - AND
 - The relief function of [seven] additional S/RVs shall be OPERABLE.
- To:
 - The safety mode of the S/RVs shall be OPERABLE.
 - AND
 - The relief mode of [seven] additional S/RVs shall be OPERABLE.
- In the relief mode, the S/RVs are opened by switches located in the control room or by pressure-sensing instrumentation.

Proposed LCO Changes

- The proposed change revises the LCO to no longer specify the number of safety mode S/RVs required to be operable, but to instead require the safety function to be operable, which is tied to the Safety Limit.
- In the BWR/6 design, as well as two non-BWR/6 plants (Dresden and Quad Cities), the licensing basis permits limited credit for S/RVs in the relief mode to protect the ASME overpressure limit.
 - That LCO requirement is not changed.
- The terms “safety function” and “relief function” are replaced with “safety mode” and “relief mode” for consistency.
 - Both terms are used in the Bases.
 - The term "safety function" could be easily confused with the term "specified safety function" used in the definition of operability.

Proposed SR Changes

- The existing SR specifies the number of S/RVs at each setpoint and the as-found tolerance, the as-left tolerance, and any allowances:

SR 3.4.3.1 -----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%.

- The proposed SR states:
 - Verify the safety mode of the S/RVs will prevent reactor steam dome pressure from exceeding Safety Limit 2.1.2.

Proposed SR Changes

- The ASME Code (required to be met by 10 CFR 50.55a(f)) continues to require as-found testing of each S/RV to licensee-controlled setpoints and tolerances.
- The results of the ASME testing will be used to verify the SR:
 - If all S/RVs lift within the as-found tolerance, the proposed SR is met.
 - If one or more S/RVs fail to lift within the as-found tolerance, an analysis is performed to determine if the S/RVs, collectively, would protect the Safety Limit and accident analyses, using NRC-approved methods.
- This type of analysis-based SR is used in other TS, such as, “Verify each [control room AC] subsystem has the capability to remove the assumed heat load,” which is performed by means of a combination of testing and calculation.

Proposed SR Changes

- For the BWR/6 plants (as well as Dresden and Quad Cities), the relief mode SR is not changed.
- The existing SR that verifies that each required S/RV opens when manually actuated is deleted.
 - Manual actuation is not required to verify the S/RVs can mechanically open to relieve excess pressure when the lift setpoint is exceeded. Inability to be manually actuated should not render the LCO not met.
 - The BWR/6 relief mode is not manually actuated.
 - ADS and LLS TS contains a similar test as SR 3.5.1.12 and SR 3.6.1.6.1, which are not being revised.

Proposed Action Changes

- Given that the LCO requires the safety function to be operable, the existing Actions are replaced with a single Action that applies when the requirements of the LCO are not met.
 - Requires being in Mode 3 in 12 hours and Mode 4 in 36 hours.
- While the BWR/6 STS has several actions applicable to inoperable S/RVs, the TS for the four 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. That Action is adopted in the BWR/6 STS.

Conclusion

- TSTF-576 revises the Safety/Relief Valve specification to reflect the plant design and accident analysis, and to be consistent with the requirements of 10 CFR 50.36.
 - S/RV requirements pertaining to ADS and LLS are unchanged.

TSTF-576 Review

- TSTF-576 is a management priority for the BWR fleet and the NRC.
- The TSTF intends to request an 18-month review of TSTF-576 and to request licensee adoption under the CLIIP.

Discussion