

Industry/TSTF Standard Technical Specification Change Traveler

Applicabilities of Suppression Pool Average Temperature Limits

Priority/Classification 3) Improve Specifications

NUREGs Affected: 1430 1431 1432 1433 1434

Description:

NUREG-1433 and NUREG-1434 (ISTS) LCO 3.6.2.1 is revised to provide the option of using a specific thermal power level of 1% RATED THERMAL POWER (RTP) or specifying the instrumentation readings used to approximate 1% RTP to define the applicabilities of the suppression pool temperature limits. This is accomplished by adding brackets to the ISTS LCO 3.6.2.1 statements, "when any OPERABLE intermediate range monitor (IRM) channel is > [25/40] division of full scale on Range 7" and "when all OPERABLE IRM channels are < [25/40] division of full scale on Range 7" and by adding bracketed statements, "with THERMAL POWER > 1% RTP" and "with THERMAL POWER < 1% RTP." As a result of these changes, corresponding changes are made to ISTS 3.6.2.1 Conditions A and C and ISTS 3.6.2.1 Required Action B.1. Corresponding changes are also made to the associated Bases.

Justification:

The Applicability of the suppression pool average temperature limits is MODES 1, 2, and 3. However, different suppression pool temperature limits apply, in MODES 1, 2, and 3, depending on whether the reactor is at a power level where heat input is approximately equal to normal system heat losses (i.e., 1% RTP). In this condition, suppression pool average temperature is allowed to be < 110 F, since the suppression pool is designed to absorb decay heat and sensible heat. As described in NEDO-31695-A, "BWR Suppression Pool Temperature Technical Specification Limits," dated May 1995, the reactor is required to be scrammed if the suppression pool average temperature is > 110 F when thermal power is > 1% RTP. This limit was established to address unstable steam condensation during safety relief valve operation at high mass flux and elevated suppression pool temperatures. As a result, the use of a specific thermal power level of 1% RTP to define the applicabilities of the suppression pool average temperature limits is consistent with analyses.

In addition, while Range 7 of IRMs may approximate 1% RTP, this power level can also be approximated from SRMs or by determining the point of adding heat. The use of a specific reading, in divisions of full scale on Range 7, of the IRMs to approximate 1% RTP may change based on core loading. Consistent with other Applicabilities in the ISTS, not all licensees will want to specify the method used to determine thermal power level for determining the applicability of the suppression pool average temperature limits. Therefore, the option is provided to specify the applicability of the suppression pool average temperature limits in terms of either the specific thermal power level of 1% RTP or the instrumentation readings used to approximate 1% RTP.

This change has been approved on many plants and is consistent with current licensing basis for many plants. It was always the intent of the ISTS to provide indication equivalent to 1% RTP and 1% RTP is in the old BWR standard Technical Specifications (NUREG-0123). This change is being made solely at the NRC's request in order for BWR plants to retain their current licensing basis.

Revision History

OG Revision 0

Revision Status: Active

Next Action: BWROG

Revision Proposed by: Brunswick

Revision Description:
Original Issue

2/10/98

Owners Group Review Information

Date Originated by OG: 14-Jan-97

Owners Group Comments
(No Comments)

Owners Group Resolution: Approved Date: 04-Feb-98

TSTF Review Information

TSTF Received Date: 05-Feb-98 Date Distributed for Review 05-Feb-98

OG Review Completed: BWOG WOG CEOG BWROG

TSTF Comments:

BWROG 4 and 6 only. Approved by TSTF.

TSTF Resolution: Approved Date: 05-Feb-98

Incorporation Into the NUREGs

File to BBS/LAN Date:

TSTF Informed Date:

TSTF Approved Date:

NUREG Rev Incorporated:

Affected Technical Specifications

LCO 3.6.2.1 Suppression Pool Average Temperature

LCO 3.6.2.1 Bases Suppression Pool Average Temperature

Action 3.6.2.1.A Suppression Pool Average Temperature

Action 3.6.2.1.B Suppression Pool Average Temperature

Action 3.6.2.1.B Bases Suppression Pool Average Temperature

Action 3.6.2.1.C Suppression Pool Average Temperature

Action 3.6.2.1.C Bases Suppression Pool Average Temperature

2/10/98

Suppression Pool Average Temperature
3.6.2.1

TSTF 206
Rev O

3.6 CONTAINMENT SYSTEMS

3.6.2.1 Suppression Pool Average Temperature

LCO 3.6.2.1 Suppression pool average temperature shall be:

- a. $\leq [95]^\circ\text{F}$ [when any OPERABLE intermediate range monitor (IRM) channel is $> [25/40]$ divisions of full scale on Range 7] and no testing that adds heat to the suppression pool is being performed;
- b. $\leq [105]^\circ\text{F}$ [when any OPERABLE IRM channel is $> [25/40]$ divisions of full scale on Range 7] and testing that adds heat to the suppression pool is being performed; and
- c. $\leq [110]^\circ\text{F}$ [when all OPERABLE IRM channels are $\leq [25/40]$ divisions of full scale on Range 7].

[with
THERMAL
POWER $> 1\%$ RTP]

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. Suppression pool average temperature $> [95]^\circ\text{F}$ but $\leq [110]^\circ\text{F}$.</p> <p><u>AND</u></p> <p>[Any OPERABLE IRM channel $> [25/40]$ divisions of full scale on Range 7]</p> <p><u>AND</u></p> <p>Not performing testing that adds heat to the suppression pool.</p>	<p>A.1 Verify suppression pool average temperature $\leq [110]^\circ\text{F}$.</p> <p><u>AND</u></p> <p>A.2 Restore suppression pool average temperature to $\leq [95]^\circ\text{F}$.</p>	<p>Once per hour</p> <p>24 hours</p>

(continued)

[THERMAL POWER
 $> 1\%$ RTP]

Suppression Pool Average Temperature
3.6.2.1

*TSTF 206
Rev 0*

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time of Condition A not met.	B.1 Reduce THERMAL POWER Until all OPERABLE IRM channels $\leq [25/40]$ divisions of full scale on Range 7. [$\Delta T \leq 1\% RTP$]	12 hours
C. Suppression pool average temperature $> [105]^\circ F$. <u>AND</u> [Any OPERABLE IRM channel $> [25/40]$ divisions of full scale on Range 7.] <u>AND</u> Performing testing that adds heat to the suppression pool.	C.1 Suspend all testing that adds heat to the suppression pool. [THERMAL POWER $> 1\% RTP$]	Immediately
D. Suppression pool average temperature $> [110]^\circ F$ but $\leq [120]^\circ F$.	D.1 Place the reactor mode switch in the shutdown position. <u>AND</u> D.2 Verify suppression pool average temperature $\leq [120]^\circ F$. <u>AND</u> D.3 Be in MODE 4.	Immediately Once per 30 minutes 36 hours

(continued)

*TSF 206
REVO*

BASES (continued)

APPLICABLE SAFETY ANALYSES

The postulated DBA against which the primary containment performance is evaluated is the entire spectrum of postulated pipe breaks within the primary containment. Inputs to the safety analyses include initial suppression pool water volume and suppression pool temperature (Reference 1 for LOCA's and Reference 2 for the pool temperature analyses required by Reference 3). An initial pool temperature of [95]°F is assumed for the Reference 1 and Reference 2 analyses. Reactor shutdown at a pool temperature of [110]°F and vessel depressurization at a pool temperature of [120]°F are assumed for the Reference 2 analyses. The limit of [105]°F, at which testing is terminated, is not used in the safety analyses because DBAs are assumed to not initiate during unit testing.

Suppression pool average temperature satisfies Criteria 2 and 3 of the NRC Policy Statement.

LCO

A limitation on the suppression pool average temperature is required to provide assurance that the containment conditions assumed for the safety analyses are met. This limitation subsequently ensures that peak primary containment pressures and temperatures do not exceed maximum allowable values during a postulated DBA or any transient resulting in heatup of the suppression pool. The LCO requirements are:

- a. Average temperature \leq [95]°F [when any OPERABLE intermediate range monitor (IRM) channel is $> [25/40]$ divisions of full scale on Range 7] and no testing that adds heat to the suppression pool is being performed. This requirement ensures that licensing bases initial conditions are met.
- b. Average temperature \leq [105]°F [when any OPERABLE IRM channel is $> [25/40]$ divisions of full scale on Range 7] and testing that adds heat to the suppression pool is being performed. This required value ensures that the unit has testing flexibility, and was selected to provide margin below the [110]°F limit at which reactor shutdown is required. When testing ends, temperature must be restored to $\leq [95]$ °F within 24 hours according to Required Action A.2. Therefore, the time period that the temperature is $> [95]$ °F is

(continued)

TSTF-206
REV O

BASES

LCO

(continued)

short enough not to cause a significant increase in unit risk.

- c. Average temperature $\leq [110]^\circ\text{F}$ when all OPERABLE IRM channels are $\leq [25/40]$ divisions of full scale on Range 7. This requirement ensures that the unit will be shut down at $> [110]^\circ\text{F}$. The pool is designed to absorb decay heat and sensible heat but could be heated beyond design limits by the steam generated if the reactor is not shut down.

[Note that [25/40] divisions of full scale on I RM Range 7 is a convenient measure of when the reactor is producing power essentially equivalent to 1% RTP]. At [this power level], heat input is approximately equal to normal system heat losses. [1% RTP]

APPLICABILITY

In MODES 1, 2, and 3, a DBA could cause significant heatup of the suppression pool. In MODES 4 and 5, the probability and consequences of these events are reduced due to the pressure and temperature limitations in these MODES. Therefore, maintaining suppression pool average temperature within limits is not required in MODE 4 or 5.

ACTIONS

A.1 and A.2

With the suppression pool average temperature above the specified limit when not performing testing that adds heat to the suppression pool and when above the specified power indication, the initial conditions exceed the conditions assumed for the Reference 1, 3, and 4 analyses. However, primary containment cooling capability still exists, and the primary containment pressure suppression function will occur at temperatures well above those assumed for safety analyses. Therefore, continued operation is allowed for a limited time. The 24 hour Completion Time is adequate to allow the suppression pool average temperature to be restored below the limit. Additionally, when suppression pool temperature is $> [95]^\circ\text{F}$, increased monitoring of the suppression pool temperature is required to ensure that it remains $\leq [110]^\circ\text{F}$. The once per hour Completion Time is adequate based on past experience, which has shown that pool temperature increases relatively slowly except when testing

(continued)

TSX 206
REV O

BASES

ACTIONS

A.1 and A.2 (continued)

that adds heat to the suppression pool is being performed. Furthermore, the once per hour Completion Time is considered adequate in view of other indications in the control room, including alarms, to alert the operator to an abnormal suppression pool average temperature condition.

B.1

If the suppression pool average temperature cannot be restored to within limits within the required Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the power must be reduced to [$< [25/40]$] divisions of full scale on Range 7 for all OPERABLE IRMs within 12 hours. The 12 hour Completion Time is reasonable, based on operating experience, to reduce power from full power conditions in an orderly manner and without challenging plant systems.

[$\leq 1\%$ RTP]

C.1

Suppression pool average temperature is allowed to be $> [95]^\circ\text{F}$ [when any OPERABLE IRM channel is $> [25/40]$ divisions of full scale on Range 7] and when testing that adds heat to the suppression pool is being performed. However, if temperature is $> [105]^\circ\text{F}$, all testing must be immediately suspended to preserve the heat absorption capability of the suppression pool. With the testing suspended, Condition A is entered and the Required Actions and associated Completion Times are applicable.

[with
THERMAL
POWER
 $> 1\%$ RTP]

D.1 and D.2

Suppression pool average temperature $> [110]^\circ\text{F}$ requires that the reactor be shut down immediately. This is accomplished by placing the reactor mode switch in the shutdown position. Further cooldown to Mode 4 is required at normal cooldown rates (provided pool temperature remains $\leq [120]^\circ\text{F}$). Additionally, when suppression pool temperature is $> [110]^\circ\text{F}$, increased monitoring of pool temperature is required to ensure that it remains $\leq [120]^\circ\text{F}$. The once per 30 minute Completion Time is adequate, based on operating

(continued)

Suppression Pool Average Temperature
3.6.2.1

TSFR 206
REV O

3.6 CONTAINMENT SYSTEMS

3.6.2.1 Suppression Pool Average Temperature

LCO 3.6.2.1 Suppression pool average temperature shall be:

- a. $\leq [95]^\circ\text{F}$ [when any OPERABLE intermediate range monitor (IRM) channel is $> [25/40]$ divisions of full scale on Range 7] and no testing that adds heat to the suppression pool is being performed;
- b. $\leq [105]^\circ\text{F}$ [when any OPERABLE IRM channel is $> [25/40]$ divisions of full scale on Range 7 and testing that adds heat to the suppression pool is being performed; and]
- c. $\leq [110]^\circ\text{F}$ [when all OPERABLE IRM channels are $\leq [25/40]$ divisions of full scale on Range 7]

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. Suppression pool average temperature $> [95]^\circ\text{F}$ but $\leq [110]^\circ\text{F}$.</p> <p><u>AND</u></p> <p>[Any OPERABLE IRM channel $> [25/40]$ divisions of full scale on Range 7].</p> <p><u>AND</u></p> <p>Not performing testing that adds heat to the suppression pool.</p>	<p>A.1 Verify suppression pool average temperature is $\leq [110]^\circ\text{F}$.</p> <p><u>AND</u></p> <p>A.2 Restore suppression pool average temperature to $\leq [95]^\circ\text{F}$.</p>	<p>Once per hour</p> <p>24 hours</p>

(continued)

Suppression Pool Average Temperature
3.6.2.1

TSTF 206
REV O

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time of Condition A not met.	B.1 Reduce THERMAL POWER [until all OPERABLE IRM channels are $\leq [25/40]$ divisions of full scale on Range 7. [to $\leq 1\%$ RTP]]	12 hours
C. Suppression pool average temperature $> [105]^\circ\text{F}$. <u>AND</u> Any OPERABLE IRM channel $> [25/40]$ divisions of full scale on Range 7. <u>AND</u> Performing testing that adds heat to the suppression pool.	C.1 Suspend all testing that adds heat to the suppression pool. [THERMAL POWER $> 1\%$ RTP]	Immediately
D. Suppression pool average temperature $> [110]^\circ\text{F}$ but $\leq [120]^\circ\text{F}$.	D.1 Place the reactor mode switch in the shutdown position. <u>AND</u> D.2 Verify suppression pool average temperature is $\leq [120]^\circ\text{F}$. <u>AND</u> D.3 Be in MODE 4.	Immediately Once per 30 minutes 36 hours

(continued)

TSX 206
REV O

BASES

BACKGROUND
(continued)

temperatures are within the range of Mark III tested conditions].

APPLICABLE
SAFETY ANALYSES

The postulated DBA against which the primary containment performance is evaluated is the entire spectrum of postulated pipe breaks within the primary containment. Inputs to the safety analyses include initial suppression pool water volume and suppression pool temperature (Reference 1 for LOCA's and Reference 2 for the suppression pool temperature analyses required by Reference 3). An initial pool temperature of [95]°F is assumed for the Reference 1 and 2 analyses. Reactor shutdown at a pool temperature of [110]°F and vessel depressurization at a pool temperature of [120]°F are assumed for the Reference 2 analyses. The limit of [105]°F, at which testing is terminated, is not used in the safety analyses because DBAs are assumed to not initiate during plant testing.

Suppression pool average temperature satisfies Criteria 2 and 3 of the NRC Policy Statement.

LCO

A limitation on the suppression pool average temperature is required to assure that the primary containment conditions assumed for the safety analyses are met. This limitation subsequently ensures that peak primary containment pressures and temperatures do not exceed maximum allowable values during a postulated DBA or any transient resulting in heatup of the suppression pool. The LCO requirements are as follows:

- a. Average temperature \leq [95]°F [when any OPERABLE intermediate range monitor (IRM) channel is $>$ [25/40] divisions of full scale on Range 7] and no testing that adds heat to the suppression pool is being performed. This requirement ensures that licensing bases initial conditions are met.
 A handwritten note enclosed in an oval, pointing to the first requirement, stating "[with THERMAL POWER > 1% RATED THERMAL POWER (RTP)]".
- b. Average temperature \leq [105]°F [when any OPERABLE IRM channel is $>$ [25/40] divisions of full scale on Range 7] and testing that adds heat to the suppression pool is being performed. This requirement ensures that the plant has testing flexibility, and was
 A handwritten note enclosed in an oval, pointing to the second requirement, stating "[with THERMAL POWER > 1% RTP]".

(continued)

TSTF 206
REV O

BASES

LCO
(continued)

selected to provide margin below the [110]°F limit at which reactor shutdown is required. When testing ends, temperature must be restored to \leq [95]°F within 24 hours according to Required Action A.2. Therefore, the time period that the temperature is $>$ [95]°F is short enough not to cause a significant increase in plant risk.

[with THERMAL
POWER \leq 1% RTP]

- c. Average temperature \leq [110]°F [when all OPERABLE IRM channels are \leq [25/40] divisions of full scale on Range 7]. This requirement ensures that the plant will be shut down at $>$ [110]°F. The pool is designed to absorb decay heat and sensible heat but could be heated beyond design limits by the steam generated if the reactor is not shut down.

[Note that [25/40] divisions of full scale on IRM Range 7 is a convenient measure of when the reactor is producing power essentially equivalent to 1% RTP. At [this power level], heat input is approximately equal to normal system heat losses.]

APPLICABILITY

In MODES 1, 2, and 3, a DBA could cause significant heatup of the suppression pool. In MODES 4 and 5, the probability and consequences of these events are reduced due to the pressure and temperature limitations in these MODES. Therefore, maintaining suppression pool average temperature within limits is not required in MODE 4 or 5.

ACTIONS

A.1 and A.2

With the suppression pool average temperature above the specified limit when not performing testing that adds heat to the suppression pool and when above the specified power indication, the initial conditions exceed the conditions assumed for the Reference 1 and 3 analyses. However, primary containment cooling capability still exists, and the primary containment pressure suppression function will occur at temperatures well above that assumed for safety analyses. Therefore, continued operation is allowed for a limited time. The 24 hour Completion Time is adequate to allow the suppression pool temperature to be restored to below the limit. Additionally, when pool temperature is $>$ [95]°F,

(continued)

TSTF 206
REV O

BASES

ACTIONS

A.1 and A.2 (continued)

increased monitoring of the pool temperature is required to ensure it remains $\leq [110]^\circ\text{F}$. The once per hour Completion Time is adequate based on past experience, which has shown that suppression pool temperature increases relatively slowly except when testing that adds heat to the pool is being performed. Furthermore, the once per hour Completion Time is considered adequate in view of other indications in the control room, including alarms, to alert the operator to an abnormal suppression pool average temperature condition.

B.1

If the suppression pool average temperature cannot be restored to within limits within the required Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, THERMAL POWER must be reduced to $\leq [25/40]$ divisions of full scale on Range 7 for all OPERABLE IRM channels within 12 hours. The 12 hour Completion time is reasonable, based on operating experience, to reduce reactor power from full power in an orderly manner and without challenging plant systems.

[$\leq 1\%$ RTP]

C.1

Suppression pool average temperature is allowed to be $> [95]^\circ\text{F}$ [with any OPERABLE IRM channel $> [25/40]$ divisions of full scale on Range 7], when testing that adds heat to the suppression pool is being performed. However, if temperature is $> [105]^\circ\text{F}$, the testing must be immediately suspended to preserve the pool's heat absorption capability. With the testing suspended, Condition A is entered and the Required Actions and associated Completion Times are applicable.

[with THERMAL
POWER
 $> 1\%$ RTP]

D.1 and D.2

Suppression pool average temperature $> [110]^\circ\text{F}$ requires that the reactor be shut down immediately. This is accomplished by placing the reactor mode switch in the shutdown position. Further cooldown to MODE 4 is required at normal cooldown

(continued)