Industry/TSTF Standard Technical Specification Change Traveler

Relocate value for shutdown margin to COLR

Classification: 3) Improve Specifications

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

Description:

Relocate the value for shutdown margin to the COLR

Justification:

The specific value for Shutdown Margin (SDM) located throughout the Technical Specifications have been relocated to the COLR. SDM is a cycle-specific variable similar to Moderator Temperature Coefficient, Rod Insertion Limits, Axial Flux Difference, Heat Flux Hot Channel Factor, and Nuclear Enthalpy Rise Hot Channel Factor, which are currently contained in the COLR. In addition, there is an NRC-approved methodology for calculating SDM. Relocating SDM to the COLR will provide core design and operational flexibility that can be used for improved fuel management and to solve plant specific issues. If the SDM were contained in the COLR, the core design could be finalized after shutdown, when the actual end of cycle burnup is known. This would save redesign efforts if the actual burnup differs from the projected value. Current reload design efforts and the resolution of plant specific issues are restricted by the guidelines to not change the SDM, since it would result in a License Amendment request.

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NRC Contact: None Assigned

Revision History

OG Revision 0 Revision Status: Closed

Revision Proposed by:

Revision Description:
Original Issue

Owners Group Review Information

Date Originated by OG: 15-Mar-95

Owners Group Comments
WOG-04, C.1

Owners Group Resolution: Approved Date: 11-Aug-95

TSTF Review Information

TSTF Received Date: 05-Sep-95 Date Distributed for Review 05-Sep-95

OG Review Completed: ☑ BWOG ☑ WOG ☑ CEOG ☑ BWROG

TSTF Comments:
(No Comments)

TSTF Resolution: Approved Date: 05-Aug-95

NRC Review Information

NRC Received Date: 03-Oct-95

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OG Revision 0 Revision Status: Closed

NRC Comments:

10/4/95 - R. Tjader referred pkg to Tech Branch for review.
11/7/95 - Tech Branch modified package
11/14/95 - Pkg to TSB mgmt
11/17/95 TSB mgmt requested reviewer to add more description to modification
12/11/95 - Reviewer added greater description and resubmitted pkg to C. Grimes to review.

Final Resolution: Superceded by Revision Final Resolution Date: 08-Jan-96

TSTF Revision 1 Revision Status: Active Next Action:

Revision Proposed by: TSTF

Revision Description:
Remarked the pages to use TSTF number instead of OG number.
The changes to relocate the specific value of shutdown margin to the COLR was marked as applicable to PWRs only but is applicable to the BWR NUREGs as well. This was corrected.
The revised LCO and SR refer to "limits" (plural). For consistency, the Condition was be revised to be plural.
The WOG Tech Spec markup contained many other changes not discussed in the Discussion or Justification. The TSTF package was WOG-4, C.1 only, but changes WOG-4, C.2, C.3, C.4, and C.6 were included in the TSTF package. These changes were removed.
Other LCOs with limits in the COLR discuss this fact in the LCO portion of the Bases. Such a discussion was added to the Shutdown Margin Bases.

TSTF Review Information

TSTF Received Date: 08-Jan-96 Date Distributed for Review 08-Jan-96

OG Review Completed: ☑ BWOG ☑ WOG ☑ CEOG ☑ BWROG

TSTF Comments:
(No Comments)

TSTF Resolution: Approved Date: 08-Jan-96

NRC Review Information

NRC Received Date: 08-Jan-96

NRC Comments:

6/11/96 - C. Grimes comment: TSTF-09 to be referred to SRXB.
9/18/96 - NRC approves. TSTF to verify that no other TSTF markups are in TSTF-9, Rev. 1.
9/19/96 - Verification performed. No changes needed.

10/16/2000 - The NRC (Reactor Systems Branch) has disagreed with the application of TSTF-9 to the BWRs and has not approved license amendments adopting TSTF-9 submitted by BWRs.

3/14/2001 - WOG-ED-28 revised TSTF-9 by adding the same change to WOG LCO 3.5.6, "Boron Injection Tank."

Final Resolution: NRC Approves Final Resolution Date: 18-Sep-96

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Incorporation Into the NUREGs

File to BBS/LAN Date: TSTF Informed Date: TSTF Approved Date:

NUREG Rev Incorporated:

Affected Technical Specifications

LCO 3.1.1	Shutdown Margin	NUREG(s)- 1430 Only
Action 3.1.4.A	Control Rod Group Alignment Limits	NUREG(s)- 1430 Only
Action 3.1.4.C	Control Rod Group Alignment Limits	NUREG(s)- 1430 Only
Action 3.1.4.D	Control Rod Group Alignment Limits	NUREG(s)- 1430 Only
Action 3.1.5.A	Safety Rod Insertion Limits	NUREG(s)- 1430 Only
Action 3.1.5.B	Safety Rod Insertion Limits	NUREG(s)- 1430 Only
S/A 3.1.8 Bases	Physics Tests Exceptions - Mode 1	NUREG(s)- 1430 Only
LCO 3.1.8	Physics Tests Exceptions - Mode 1	NUREG(s)- 1430 Only
LCO 3.1.8 Bases	Physics Tests Exceptions - Mode 1	NUREG(s)- 1430 Only
SR 3.1.8.4	Physics Tests Exceptions - Mode 1	NUREG(s)- 1430 Only
LCO 3.1.9	Physics Tests Exceptions - Mode 2	NUREG(s)- 1430 Only
LCO 3.1.9 Bases	Physics Tests Exceptions - Mode 2	NUREG(s)- 1430 Only
SR 3.1.9.3	Physics Tests Exceptions - Mode 2	NUREG(s)- 1430 Only
Action 3.2.1.C	Regulating Rod Insertion Limits	NUREG(s)- 1430 Only
SR 3.2.1.3	Regulating Rod Insertion Limits	NUREG(s)- 1430 Only
Action 3.3.9.B	Source Range Neutron Flux	NUREG(s)- 1430 Only
Action 3.3.9.B Bases	Source Range Neutron Flux	NUREG(s)- 1430 Only
LCO 3.1.1	Shutdown Margin - Tavg > 200 F (CEOG - Analog and Digital)	NUREG(s)- 1431 1432 Only
SR 3.1.1.1	Shutdown Margin - Tavg > 200 F (CEOG - Analog and Digital)	NUREG(s)- 1431 1432 Only
LCO 3.1.2	Shutdown Margin - Tavg <= 200 F (CEOG - Analog and Digital)	NUREG(s)- 1431 1432 Only
SR 3.1.2.1	Shutdown Margin - Tavg <= 200 F (CEOG - Analog and Digital)	NUREG(s)- 1431 1432 Only
Action 3.1.5.A	Rod Group Alignment Limits	NUREG(s)- 1431 Only
Action 3.1.5.B	Rod Group Alignment Limits	NUREG(s)- 1431 Only

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Action 3.1.5.D	Rod Group Alignment Limits	NUREG(s)- 1431 Only
Action 3.1.6.A	Shutdown Bank Insertion Limits	NUREG(s)- 1431 Only
Action 3.1.7.A	Control Bank Insertion Limits	NUREG(s)- 1431 Only
Action 3.1.7.B	Control Bank Insertion Limits	NUREG(s)- 1431 Only
S/A 3.1.9 Bases	Physics Tests Exceptions - Mode 1	NUREG(s)- 1431 Only
LCO 3.1.9	Physics Tests Exceptions - Mode 1	NUREG(s)- 1431 Only
LCO 3.1.9 Bases	Physics Tests Exceptions - Mode 1	NUREG(s)- 1431 Only
SR 3.1.9.4	Physics Tests Exceptions - Mode 1	NUREG(s)- 1431 Only
S/A 3.1.10 Bases	Physics Tests Exceptions - Mode 2	NUREG(s)- 1431 Only
LCO 3.1.10	Physics Tests Exceptions - Mode 2	NUREG(s)- 1431 Only
LCO 3.1.10 Bases	Physics Tests Exceptions - Mode 2	NUREG(s)- 1431 Only
SR 3.1.10.3	Physics Tests Exceptions - Mode 2	NUREG(s)- 1431 Only
Action 3.1.5.A	CEA Alignment (Analog and Digital)	NUREG(s)- 1432 Only
Action 3.1.5.A Bases	CEA Alignment (Digital)	NUREG(s)- 1432 Only
Action 3.1.5.B	CEA Alignment (Analog and Digital)	NUREG(s)- 1432 Only
Action 3.1.5.B Bases	CEA Alignment (Digital)	NUREG(s)- 1432 Only
Action 3.1.6.A	Shutdown CEA Insertion Limits (Analog and Digital)	NUREG(s)- 1432 Only
Action 3.1.7.A	Regulating CEA Insertion Limits (Analog and Digital)	NUREG(s)- 1432 Only
Action 3.1.7.D	Regulating CEA Insertion Limits (Digital)	NUREG(s)- 1432 Only
S/A 3.1.9 Bases	Special Test Exceptions - Modes 1 and 2 (Analog)	NUREG(s)- 1432 Only
LCO 3.1.9	Special Test Exceptions - Modes 1 and 2 (Analog)	NUREG(s)- 1432 Only
LCO 3.1.9 Bases	Special Test Exceptions - Modes 1 and 2 (Analog)	NUREG(s)- 1432 Only
SR 3.1.9.2	Special Test Exceptions - Modes 1 and 2 (Analog)	NUREG(s)- 1432 Only
S/A 3.1.10 Bases	Special Test Exceptions - Modes 1 and 2 (Digital)	NUREG(s)- 1432 Only
LCO 3.1.10	Special Test Exceptions - Modes 1 and 2 (Digital)	NUREG(s)- 1432 Only
LCO 3.1.10 Bases	Special Test Exceptions - Modes 1 and 2 (Digital)	NUREG(s)- 1432 Only
SR 3.1.10.2	Special Test Exceptions - Modes 1 and 2 (Digital)	NUREG(s)- 1432 Only

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LCO 3.1.1	Shutdown Margin	NUREG(s)- 1433 1434 Only
SR 3.1.1.1	Shutdown Margin	NUREG(s)- 1433 1434 Only

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3.1 REACTIVITY CONTROL SYSTEMS

3.1.1 SHUTDOWN MARGIN (SDM)

LCO 3.1.1 The SDM shall be ~~[greater than or equal to the limit specified in the COLR. The minimum limit shall be] > [1.0]% Δk/k.~~ within the limit provided in the COLR.

APPLICABILITY: MODES 3, 4, and 5.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. SDM not within limit.	A.1 Initiate boration to restore SDM to within limit.	15 minutes

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.1.1	Verify SDM greater than or equal to the limit specified in the COLR.	24 hours

3.1 REACTIVITY CONTROL SYSTEMS

3.1.4 CONTROL ROD Group Alignment Limits

LCO 3.1.4 Each CONTROL ROD shall be OPERABLE and aligned to within [6.5]% of its group average height.

APPLICABILITY: MODES 1 and 2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One trippable CONTROL ROD inoperable, or not aligned to within [6.5]% of its group average height, or both.	A.1 Align all CONTROL RODS in the group to within [6.5]% of the group average height, while maintaining the rod insertion, group sequence, and group overlap limits in accordance with LCO 3.2.1, "Regulating Rod Insertion Limits."	1 hour
	OR	
	A.2.1.1 Verify SDM ~~is ≥ [1]% Δk/k.~~ to be within the limit provided in the COLR.	1 hour AND Once per 12 hours thereafter
	OR	
	A.2.1.2 Initiate boration to restore SDM to within limit.	1 hour
	AND	
		(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2.2 Reduce THERMAL POWER to ≤ 60% of the ALLOWABLE THERMAL POWER.	2 hours
	AND	
	A.2.3 Reduce the nuclear overpower trip setpoint to ≤ 70% of the ALLOWABLE THERMAL POWER.	10 hours
	AND	
	A.2.4 Verify the potential ejected rod worth is within the assumptions of the rod ejection analysis.	72 hours
	AND	
	A.2.5 Perform SR 3.2.5.1.	72 hours
B. Required Action and associated Completion Time for Condition A not met.	B.1 Be in MODE 3.	6 hours
C. More than one trippable CONTROL ROD inoperable, or not aligned within [6.5]% of its group average height, or both.	C.1.1 Verify SDM ~~is ≥ [1]% Δk/k.~~	1 hour
	OR	
		(continued)

To be within the time provided in the COLR.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. (continued)	C.1.2 Initiate boration to restore SDM to within limit. AND C.2 Be in MODE 3.	1 hour 6 hours
D. One or more rods untrippable.	D.1.1 Verify SDM ~~is ≥ [1]% Δk/k.~~ to be within the limits provided in the COLR. OR D.1.2 Initiate boration to restore SDM to within limit. AND D.2 Be in MODE 3.	1 hour 1 hour 6 hours

3.1 REACTIVITY CONTROL SYSTEMS

3.1.5 Safety Rod Insertion Limits

LCO 3.1.5 Each safety rod shall be fully withdrawn.

APPLICABILITY: MODES 1 and 2.

----------NOTE----------
This LCO is not applicable while performing SR 3.1.4.2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One safety rod not fully withdrawn.	A.1 Withdraw the rod fully.	1 hour
	OR	
	A.2.1.1 Verify SDM ~~is ≥ 1% Δk/k.~~ to be within the limits provided in the COLR.	1 hour
	OR	
	A.2.1.2 Initiate boration to restore SDM to within limit.	1 hour
	AND	
	A.2.2 Declare the rod inoperable.	1 hour

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. More than one safety rod not fully withdrawn.	B.1.1 Verify SDM ~~is ≥ 1% Δk/k.~~ to be within the limits provided in the COLR.	1 hour
	OR	
	B.1.2 Initiate boration to restore SDM to within limit.	1 hour
	AND	
	B.2 Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.5.1	Verify each safety rod is fully withdrawn.	12 hours

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3.1 REACTIVITY CONTROL SYSTEMS

3.1.8 PHYSICS TESTS Exceptions—MODE 1

LCO 3.1.8 During the performance of PHYSICS TESTS, the requirements of

LCO 3.1.4, "CONTROL ROD Alignment Limits";
LCO 3.1.5, "Safety Rod Insertion Limits";
LCO 3.1.6, "AXIAL POWER SHAPING ROD (APSR) Alignment Limits";
LCO 3.2.1, "Regulating Rod Insertion Limits," for the restricted operation region only;
LCO 3.2.3, "AXIAL POWER IMBALANCE Operating Limits"; and
LCO 3.2.4, "QUADRANT POWER TILT (QPT)"

may be suspended, provided:

a. THERMAL POWER is maintained ≤ 85% RTP;

b. Nuclear overpower trip setpoint is ≤ 10% RTP higher than the THERMAL POWER at which the test is performed, with a maximum setting of 90% RTP;

c. $F_Q(Z)$ and $F^N_{\Delta H}$ are maintained within the limits specified in the COLR; and

d. SDM is ~~≥ [1.0]% Δk/k~~. within the limits provided in the COLR.

APPLICABILITY: MODE 1 during PHYSICS TESTS.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. SDM not within limit.	A.1	Initiate boration to restore SDM to within limit.	15 minutes
	AND		
	A.2	Suspend PHYSICS TESTS exceptions.	1 hour

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.1.8.4	Verify SDM ~~is ≥ [1.0]% Δk/k.~~ to be within the limits provided in the COLR.	24 hours

3.1 REACTIVITY CONTROL SYSTEMS

3.1.9 PHYSICS TESTS Exceptions—MODE 2

LCO 3.1.9 During performance of PHYSICS TESTS, the requirements of

LCO 3.1.3, "Moderator Temperature Coefficient (MTC)";
LCO 3.1.4, "CONTROL ROD Group Alignment Limits";
LCO 3.1.5, "Safety Rod Insertion Limits";
LCO 3.1.6, "AXIAL POWER SHAPING ROD (APSR) Alignment Limits";
LCO 3.2.1, "Regulating Rod Insertion Limits," for the restricted operation region only; and
[LCO 3.4.2, "RCS Minimum Temperature for Criticality"]

may be suspended, provided:

a. THERMAL POWER is ≤ 5% RTP;

b. Reactor trip setpoints on the OPERABLE nuclear overpower channels are set to ≤ 25% RTP;

c. Nuclear instrumentation source range and intermediate range high startup rate CONTROL ROD withdrawal inhibit are OPERABLE; and

d. SDM is ~~≥ [1.0]% Δk/k.~~ Within the limits provided in the COLR.

APPLICABILITY: MODE 2 during PHYSICS TESTS.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. THERMAL POWER not within limit.	A.1 Open control rod drive trip breakers.	Immediately

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.1.9.3	Verify SDM ~~is ≥ [1.0]% Δk/k.~~	24 hours

to be within the limit provided in the COLR.

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Regulating rod groups inserted in unacceptable operational region.	C.1 Initiate boration to restore SDM to ~~≥ 1% Δk/k.~~ within the limit provided in the COLR.	15 minutes
	AND	
	C.2.1 Restore regulating rod groups to within restricted operating region.	2 hours
	OR	
	C.2.2 Reduce THERMAL POWER to less than or equal to the THERMAL POWER allowed by the regulating rod group insertion limits.	2 hours
D. Required Action and associated Completion Time of Condition C not met.	D.1 Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.2.1.1	Verify regulating rod groups are within the sequence and overlap limits as specified in the COLR.	4 hours when the CONTROL ROD drive sequence alarm is inoperable AND 12 hours when the CONTROL ROD drive sequence alarm is OPERABLE
SR 3.2.1.2	Verify regulating rod groups meet the insertion limits as specified in the COLR	4 hours when the regulating rod insertion limit alarm is inoperable AND 12 hours when the regulating rod insertion limit alarm is OPERABLE
SR 3.2.1.3	Verify SDM ~~≥ 1% Δk/k.~~	Within 4 hours prior to achieving criticality

to be within the limits provided in the COLR

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. (continued)	B.4 Verify SDM ~~is ≥ 1% Δk/k.~~ to be within the limit provided in the COLR.	1 hour AND Once per 12 hours thereafter
C. One or more source range neutron flux channel(s) inoperable with THERMAL POWER level > 1E-10 amp on the intermediate range neutron flux channels.	C.1 Initiate action to restore affected channel(s) to OPERABLE status.	1 hour

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.9.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.9.2	----------NOTE---------- Neutron detectors are excluded from CHANNEL CALIBRATION. ---------- Perform CHANNEL CALIBRATION.	[18] months

(continued)

BASES

BACKGROUND (continued)

execution of testing required to ensure the design intent is met. PHYSICS TESTS are performed in accordance with these procedures, and test results are approved prior to continued power escalation and long term power operation. Examples of PHYSICS TESTS include determination of critical boron concentration, CONTROL ROD group worths, reactivity coefficients, flux symmetry, and core power distribution.

APPLICABLE SAFETY ANALYSES

It is acceptable to suspend certain LCOs for PHYSICS TESTS because reactor protection criteria are preserved by the LCOs still in effect and by the SRs. Even if an accident occurs during PHYSICS TESTS with one or more LCOs suspended, fuel damage criteria are preserved because the limits on nuclear hot channel factors, ejected rod worth, and shutdown capability are maintained during the PHYSICS TESTS.

Reference 5 defines requirements for initial testing of the facility, including PHYSICS TESTS. Tables 13-3 and 13-4 (Ref. 6) summarize the zero, low power, and power tests. Requirements for reload fuel cycle PHYSICS TESTS are given in Table 1 ANSI/ANS-19.6.1-1985 (Ref. 4). Although these PHYSICS TESTS are generally accomplished within the limits of all LCOs, one or more LCOs must sometimes be suspended to make completion of PHYSICS TESTS possible or practical.

This is acceptable as long as the fuel design criteria are not violated. When one or more of the limits specified in:

LCO 3.1.4, "CONTROL ROD Group Alignment Limits";
LCO 3.1.5, "Safety Rod Insertion Limits";
LCO 3.1.6, "AXIAL POWER SHAPING ROD (APSR) Alignment Limits";
LCO 3.2.1, "Regulating Rod Insertion Limits," for the restricted operation region only;
LCO 3.2.3, "AXIAL POWER IMBALANCE Operating Limits"; or
LCO 3.2.4, "QUADRANT POWER TILT (QPT)"

are suspended for PHYSICS TESTS, the fuel design criteria are preserved by maintaining the nuclear hot channel factors (in MODE 1 PHYSICS TESTS) within their limits, maintaining ejected rod worth within limits by restricting regulating rod insertion to within the acceptable operating region or the restricted operating region, by limiting maximum THERMAL POWER and by maintaining SDM ~~≥ 1.0% Δk/k~~. Therefore,

Within the [illegible]

(continued)

BASES

LCO (continued)

b. Nuclear overpower trip setpoint is ≤ 10% RTP higher than the THERMAL POWER at which the test is performed, with a maximum setting of 90% RTP;

c. $F_Q(Z)$ and $F^N_{\Delta H}$ are maintained within limits specified in the COLR; and

d. SDM is ~~maintained ≥ 1.0% Δk/k.~~

Verified to be within the limit provided in the COLR.

Operation with THERMAL POWER ≤ 85% RTP during PHYSICS TESTS provides an acceptable thermal margin when one or more of the applicable LCOs is out of specification. Eighty-five percent RTP is consistent with the maximum power level for conducting the intermediate core power distribution test specified in Reference 4. The nuclear overpower trip setpoint is reduced so that a similar margin exists between the steady state condition and trip setpoint as exists during normal operation at RTP.

APPLICABILITY

This LCO is applicable in MODE 1, when the reactor has completed low power testing and is in power ascension, or during power operation with THERMAL POWER > 5% RTP but ≤ 85% RTP. This LCO is applicable for power ascension testing, as defined by Regulatory Guide 1.68 (Ref. 3). In MODE 2, Applicability of this LCO is not required because LCO 3.1.9, "PHYSICS TESTS Exceptions—MODE 2," addresses PHYSICS TESTS exceptions in MODE 2. In MODES 3, 4, 5, and 6, Applicability is not required because PHYSICS TESTS are not performed in these MODES.

ACTIONS

A.1 and A.2

If the SDM requirements are not met, boration must be initiated promptly. A Completion Time of 15 minutes is adequate for an operator to correctly align and start the required systems and components. The operator should begin boration with the best source available for the plant conditions. Boration will be continued until SDM is within limit. In the determination of the required combination of boration flow rate and boron concentration, there is no unique requirement that must be satisfied.

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

temperature to decrease to 520°F during MODE 2 PHYSICS TESTS, based on the low probability of an accident occurring and on prior operating experience.

PHYSICS TESTS include measurement of core nuclear parameters or exercise of control components that affect process variables.

PHYSICS TESTS satisfy Criteria 1, 2, and 3 of the NRC Policy Statement.

LCO

This LCO permits individual CONTROL RODS to be positioned outside of their specified group alignment and withdrawal limits and to be assigned to other than specified CONTROL ROD groups during the performance of PHYSICS TESTS. In addition, this LCO permits verification of the fundamental core characteristics.

This LCO also allows suspension of LCO 3.1.3, LCO 3.1.4, LCO 3.1.5, LCO 3.1.6, LCO 3.2.1, and LCO 3.4.2, provided:

a. THERMAL POWER is ≤ 5% RTP;

b. Nuclear overpower trip setpoints on the OPERABLE nuclear power range channels are set to ≤ 25% RTP;

c. Nuclear instrumentation source range and intermediate range high startup rate CONTROL ROD withdrawal inhibit are OPERABLE; and

d. SDM is maintained within the limit provided in the COLR. ~~≥ [1.0]% Δk/k~~.

The limits of LCO 3.2.3 and LCO 3.2.4 do not apply in MODE 2. Inhibiting CONTROL ROD withdrawal, based on startup rate, also limits local linear heat rate (LHR), departure from nucleate boiling ratio (DNBR), and peak RCS pressure during accidents initiated from low power.

APPLICABILITY

This LCO is applicable in MODE 2 when the reactor is either not critical or when THERMAL POWER is ≤ 5% RTP. This LCO is applicable for initial criticality or low power testing, as defined by Regulatory Guide 1.68 (Ref. 3). In MODE 1,

(continued)

BASES

ACTIONS

A.1 (continued)

instrumentation is to delay increasing reactor power until the channel is repaired and restored to OPERABLE status. This limits power increases in the range where the operators rely solely on the source range instrumentation for power indication. The Completion Time ensures the source range is available prior to further power increases. Furthermore, it ensures that power remains below the point where the intermediate range channels provide primary protection until both source range channels are available to support the overlap verification required by SR 3.3.9.4.

B.1, B.2, B.3, and B.4

With both source range neutron flux channels inoperable with THERMAL POWER ≤ 1E-10 amp on the intermediate range neutron flux instrumentation, the operators must place the reactor in the next lowest condition for which source range instrumentation is not required. This is done by immediately suspending positive reactivity additions, initiating action to insert all CONTROL RODS, and opening the CONTROL ROD drive trip breakers within 1 hour. Periodic SDM verification ~~of ≥ 1% Δk/k~~ is then required to provide a means for detecting the slow reactivity changes that could be caused by mechanisms other than control rod withdrawal or operations involving positive reactivity changes. Since the source range instrumentation provides the only reliable direct indication of power in this condition, the operators must continue to verify the SDM every 12 hours until at least one channel of the source range instrumentation is returned to OPERABLE status. Required Action B.1, Required Action B.2, and Required Action B.3 preclude rapid positive reactivity additions. The 1 hour Completion Time for Required Action B.3 and Required Action B.4 provides sufficient time for operators to accomplish the actions. The 12 hour Frequency for performing the SDM verification ensures that the reactivity changes possible with CONTROL RODS inserted are detected before SDM limits are challenged.

C.1

With reactor power > 1E-10 amp in MODE 2, 3, 4, or 5 on the intermediate range neutron flux instrumentation, continued

(continued)

3.1 REACTIVITY CONTROL SYSTEMS

3.1.1 SHUTDOWN MARGIN (SDM)—T_{avg} > 200°F

LCO 3.1.1 SDM shall be ~~≥ [1.6]% Δk/k.~~ within the limits provided in the COLR.

APPLICABILITY: MODE 2 with k_{eff} < 1.0,
MODES 3, 4, [and 5].

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. SDM not within limit.	A.1 Initiate boration to restore SDM to within limit.	15 minutes

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.1.1.1 Verify SDM ~~is ≥ [1.6]% Δk/k.~~ to be within limits.	24 hours

3.1 REACTIVITY CONTROL SYSTEMS

3.1.2 SHUTDOWN MARGIN (SDM)—T_{avg} ≤ 200°F

LCO 3.1.2 The SDM shall be ~~≥ [1.0]% Δk/k.~~ within the limits provided in the COLR.

APPLICABILITY: MODE 5.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. SDM not within limit.	A.1 Initiate boration to restore SDM to within limit.	15 minutes

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.1.2.1 Verify SDM ~~is ≥ [1.0]% Δk/k.~~ to be within limits.	24 hours

3.1 REACTIVITY CONTROL SYSTEMS

3.1.5 Rod Group Alignment Limits

LCO 3.1.5 All shutdown and control rods shall be OPERABLE, with all individual indicated rod positions within 12 steps of their group step counter demand position.

APPLICABILITY: MODES 1 and 2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more rod(s) untrippable.	A.1.1 Verify SDM ~~is ≥ [1.6]% Δk/k.~~ to be within the limits provided in the COLR.	1 hour
	OR	
	A.1.2 Initiate boration to restore SDM to within limit.	1 hour
	AND	
	A.2 Be in MODE 3.	6 hours
B. One rod not within alignment limits.	B.1 Restore rod to within alignment limits.	1 hour
	OR	
	B.2.1.1 Verify SDM ~~is ≥ [1.6]% Δk/k.~~ to be within the limits provided in the COLR.	1 hour
	OR	
		(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. (continued)	B.2.1.2 Initiate boration to restore SDM to within limit.	1 hour
	AND	
	B.2.2 Reduce THERMAL POWER to ≤ 75% RTP.	2 hours
	AND	
	B.2.3 Verify SDM ~~is ≥ [1.6]% Δk/k.~~ to be within the limits provided in the COLR.	Once per 12 hours
	AND	
	B.2.4 Perform SR 3.2.1.1.	72 hours
	AND	
	B.2.5 Perform SR 3.2.2.1.	72 hours
	AND	
	B.2.6 Re-evaluate safety analyses and confirm results remain valid for duration of operation under these conditions.	5 days
C. Required Action and associated Completion Time of Condition B not met.	C.1 Be in MODE 3.	6 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. More than one rod not within alignment limit.	D.1.1 Verify SDM ~~is ≥ [1.6]% Δk/k~~ to be within the limits provided in the COLR.	1 hour
	OR	
	D.1.2 Initiate boration to restore required SDM to within limit.	1 hour
	AND	
	D.2 Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.5.1	Verify individual rod positions within alignment limit.	12 hours AND Once within 4 hours and every 4 hours thereafter when the rod position deviation monitor is inoperable

(continued)

3.1 REACTIVITY CONTROL SYSTEMS

3.1.6 Shutdown Bank Insertion Limits

LCO 3.1.6 Each shutdown bank shall be within insertion limits specified in the COLR.

APPLICABILITY: MODE 1,
MODE 2 with any control bank not fully inserted.

----------NOTE----------
This LCO is not applicable while performing SR 3.1.5.2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more shutdown banks not within limits.	A.1.1 Verify SDM ~~is ≥ [1.6]% Δk/k.~~ to be within the limits provided in the COLR.	1 hour
	OR	
	A.1.2 Initiate boration to restore SDM to within limit.	1 hour
	AND	
	A.2 Restore shutdown banks to within limits.	2 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours

3.1 REACTIVITY CONTROL SYSTEMS

3.1.7 Control Bank Insertion Limits

LCO 3.1.7 Control banks shall be within the insertion, sequence, and overlap limits specified in the COLR.

APPLICABILITY: MODE 1,
MODE 2 with $k_{eff} \geq 1.0$.

----------NOTE----------
This LCO is not applicable while performing SR 3.1.5.2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Control bank insertion limits not met.	A.1.1 Verify SDM ~~is ≥ [1.6]% Δk/k.~~	1 hour
	OR	
	A.1.2 Initiate boration to restore SDM to within limit.	1 hour
	AND	
	A.2 Restore control bank(s) to within limits.	2 hours

to be within the limits provided in the COLR.

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Control bank sequence or overlap limits not met.	B.1.1 Verify SDM ~~is ≥ [1.6]% Δk/k.~~ to be within the limits provided in the COLR.	1 hour
	OR	
	B.1.2 Initiate boration to restore SDM to within limit.	1 hour
	AND	
	B.2 Restore control bank sequence and overlap to within limits.	2 hours
C. Required Action and associated Completion Time not met.	C.1 Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.7.1	Verify estimated critical control bank position is within the limits specified in the COLR.	Within 4 hours prior to achieving criticality

(continued)

3.1 REACTIVITY CONTROL SYSTEMS

3.1.9 PHYSICS TESTS Exceptions—MODE 1

LCO 3.1.9 During the performance of PHYSICS TESTS, the requirements of

LCO 3.1.5, "Rod Group Alignment Limits";
LCO 3.1.6, "Shutdown Bank Insertion Limits";
LCO 3.1.7, "Control Bank Insertion Limits";
LCO 3.2.3, "AXIAL FLUX DIFFERENCE (AFD)"; and
LCO 3.2.4, "QUADRANT POWER TILT RATIO (QPTR)"

may be suspended, provided:

a. THERMAL POWER is maintained ≤ 85% RTP;

b. Power Range Neutron Flux—High trip setpoints are ≤ 10% RTP above the THERMAL POWER at which the test is performed, with a maximum setting of 90% RTP; and

c. SDM is ~~≥ [1.6]% Δk/k.~~ within the limits provided in the COLR.

APPLICABILITY: MODE 1 during PHYSICS TESTS.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. SDM not within limit.	A.1	Initiate boration to restore SDM to within limit.	15 minutes
	AND		
	A.2	Suspend PHYSICS TESTS exceptions.	1 hour

(continued)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.9.1	Verify THERMAL POWER is ≤ 85% RTP.	1 hour
SR 3.1.9.2	Verify Power Range Neutron Flux—High trip setpoints are ≤ 10% above the PHYSICS TEST power level, and ≤ 90% RTP.	Within 8 hours prior to initiation of PHYSICS TESTS
SR 3.1.9.3	Perform SR 3.2.1.1 and SR 3.2.2.1.	12 hours
SR 3.1.9.4	Verify SDM ~~is ≥ [1.6]% Δk/k.~~ to be within limits.	24 hours

3.1 REACTIVITY CONTROL SYSTEMS

3.1.10 PHYSICS TESTS Exceptions—MODE 2

LCO 3.1.10 During the performance of PHYSICS TESTS, the requirements of

LCO 3.1.4, "Moderator Temperature Coefficient (MTC)";
LCO 3.1.5, "Rod Group Alignment Limits";
LCO 3.1.6, "Shutdown Bank Insertion Limits";
LCO 3.1.7, "Control Bank Insertion Limits"; and
LCO 3.4.2, "RCS Minimum Temperature for Criticality"

may be suspended, provided:

a. RCS lowest loop average temperature is ≥ [531]°F; and

b. SDM is ~~≥ [1.6]% Δk/k.~~ within the limits provided in the COLR.

APPLICABILITY: MODE 2 during PHYSICS TESTS.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. SDM not within limit.	A.1	Initiate boration to restore SDM to within limit.	15 minutes
	AND		
	A.2	Suspend PHYSICS TESTS exceptions.	1 hour
B. THERMAL POWER not within limit.	B.1	Open reactor trip breakers.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. RCS lowest loop average temperature not within limit.	C.1 Restore RCS lowest loop average temperature to within limit.	15 minutes
D. Required Action and associated Completion Time of Condition C not met.	D.1 Be in MODE 3.	15 minutes

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.10.1	Perform a CHANNEL OPERATIONAL TEST on power range and intermediate range channels per [SR 3.3.1.7, SR 3.3.1.8, and Table 3.3.1-1].	Within 12 hours prior to initiation of PHYSICS TESTS
SR 3.1.10.2	Verify the RCS lowest loop average temperature is ≥ [531]°F.	30 minutes
SR 3.1.10.3	Verify SDM ~~is ≥ 1.6% Δk/k.~~ to be within the limits provided in the COLR.	24 hours

Industry/TSTF Standard Technical Specification Editorial Change Traveler

WOG-ED-28 Created on 3/28/2001 Proposed by WOG

Description: TSTF-9, approved by the NRC on 9/18/1996, relocated specific SHUTDOWN MARGIN values from the Technical Specifications to the COLR. One instance, the SDM to be achieved if the Boron Injection Tank (BIT) is inoperable and not restored, was overlooked in the preparation of TSTF-9. This change relocates this SDM value to the COLR.

TSTF-9 relocated the specific value for Shutdown Margin (SDM) located throughout the Technical Specifications to the COLR. SDM is a cycle-specific variable similar to Moderator Temperature Coefficient, Rod Insertion Limits, Axial Flux Difference, Heat Flux Hot Channel Factor, and Nuclear Enthalpy Rise Hot Channel Factor, which are currently contained in the COLR. In addition, there is an NRC-approved methodology for calculating SDM. TSTF-9 was requested because relocating SDM to the COLR will provide core design and operational flexibility that can be used for improved fuel management and to solve plant specific issues. TSTF-9 was approved by the NRC on 9/18/1996.

TSTF-9 overlooked the relocation of the specific SDM value in ITS 3.5.6, Boron Injection Tank. ITS 3.5.6, Required Action B.2 states, "Borate to an SDM equivalent to [1]% dk/k at 200 F." The bracketed SDM value is similar to the other bracketed SDM values which were relocated under TSTF-9.

Only two Westinghouse plants credit a Boron Injection Tank in their safety analyses. Both plants have concurred that this value is similar to other SDM values relocated under TSTF-9 and should have been relocated to the COLR in TSTF-9. This Traveler corrects that oversight.

This change is considered editorial as the justification and approval for TSTF-9 applies to this change.

Affected Pages	Affected NUREGs
3.5-13	NUREG-1431

Owner's Group Review

Owner's Group Action: Approved on 3/28/2001

Date Sent to NRC: N/A

NRC Review

NRC Action: No Action Taken

NRC Comments: None

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WOG-EO-28

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.6 Boron Injection Tank (BIT)

LCO 3.5.6 The BIT shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. BIT inoperable.	A.1	Restore BIT to OPERABLE status.	1 hour
B. Required Action and associated Completion Time of Condition A not met.	B.1	Be in MODE 3.	6 hours
	AND		
	B.2	Borate to ~~an~~ SDM ~~equivalent to [1]% Δk/k at 200°F~~. provided in the COLR	6 hours
	AND		
	B.3	Restore BIT to OPERABLE status.	7 days
C. Required Action and associated Completion Time of Condition B not met.	C.1	Be in MODE 4.	12 hours

BASES

APPLICABLE SAFETY ANALYSES (continued)

LCO 3.2.4, "QUADRANT POWER TILT RATIO (QPTR)"

are suspended for PHYSICS TESTS, the fuel design criteria are preserved as long as the requirements of LCO 3.2.1, "Heat Flux Hot Channel Factor ($F_Q(Z)$)," and LCO 3.2.2, "Nuclear Enthalpy Rise Hot Channel Factor ($F^N_{\Delta H}$)," are satisfied, power level is maintained ≤ 85% RTP, and SDM is ~~≥ [1.6]% Δk/k.~~ Therefore, LCO 3.1.9 requires surveillance of the hot channel factors and SDM to verify that their limits are not being exceeded.

within the limits provided in the COLR.

PHYSICS TESTS include measurements of core nuclear parameters or the exercise of control components that affect process variables. Among the process variables involved are AFD and QPTR, which represent initial conditions of the unit safety analyses. Also involved are the movable control components (control and shutdown rods), which are required to shut down the reactor. The limits for these variables are specified for each fuel cycle in the COLR.

PHYSICS TESTS meet the criteria for inclusion in the Technical Specifications, since the component and process variable LCOs suspended during PHYSICS TESTS meet Criteria 1, 2, and 3 of the NRC Policy Statement.

Reference 7 allows special test exceptions to be included as part of the LCO that they affect. However, it was decided to retain this special test exception as a separate LCO because it was less cumbersome and provided additional clarity.

LCO

This LCO allows selected control rods and shutdown rods to be positioned outside their specified alignment limits and insertion limits to conduct PHYSICS TESTS in MODE 1, to verify certain core physics parameters. The power level is limited to ≤ 85% RTP and the power range neutron flux trip setpoint is set at 10% RTP above the PHYSICS TESTS power level with a maximum setting of 90% RTP. Violation of LCO 3.1.5, LCO 3.1.6, LCO 3.1.7, LCO 3.2.3, or LCO 3.2.4, during the performance of PHYSICS TESTS does not pose any threat to the integrity of the fuel as long as the requirements of LCO 3.2.1 and LCO 3.2.2 are satisfied and provided:

(continued)

BASES

LCO (continued)

a. THERMAL POWER is maintained ≤ 85% RTP;

b. Power Range Neutron Flux—High trip setpoints are ≤ 10% RTP above the THERMAL POWER at which the test is performed, with a maximum setting of 90% RTP; and

c. SDM is ~~≥ [1.6]% Δk/k~~ within the limits provided in the COLR.

Operation with THERMAL POWER ≤ 85% RTP during PHYSICS TESTS provides an acceptable thermal margin when one or more of the applicable LCOs is out of specification. The Power Range Neutron Flux—High trip setpoint is reduced so that a similar margin exists between the steady state condition and the trip setpoint that exists during normal operation at RTP.

APPLICABILITY

This LCO is applicable in MODE 1 when performing PHYSICS TESTS. The applicable PHYSICS TESTS are performed at ≤ 85% RTP. Other PHYSICS TESTS are performed at full power but do not require violation of any existing LCO, and therefore do not require a PHYSICS TESTS exception. The PHYSICS TESTS performed in MODE 2 are covered by LCO 3.1.10, "PHYSICS TESTS Exceptions—MODE 2."

ACTIONS

A.1 and A.2

If the SDM requirement is not met, boration must be initiated promptly. A Completion Time of 15 minutes is adequate for an operator to correctly align and start the required systems and components. The operator should begin boration with the best source available for the plant conditions. Boration will be continued until SDM is within limit.

Suspension of PHYSICS TESTS exceptions requires restoration of each of the applicable LCOs to within specification.

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

problems, may require the operating control or process variables to deviate from their LCO limitations.

The FSAR defines requirements for initial testing of the facility, including PHYSICS TESTS. Tables [14.1-1 and 14.1-2] summarize the zero, low power, and power tests. Requirements for reload fuel cycle PHYSICS TESTS are defined in ANSI/ANS-19.6.1-1985 (Ref. 4). Although these PHYSICS TESTS are generally accomplished within the limits for all LCOs, conditions may occur when one or more LCOs must be suspended to make completion of PHYSICS TESTS possible or practical. This is acceptable as long as the fuel design criteria are not violated. When one or more of the requirements specified in LCO 3.1.4, "Moderator Temperature Coefficient (MTC)," LCO 3.1.5, LCO 3.1.6, LCO 3.1.7, and LCO 3.4.2 are suspended for PHYSICS TESTS, the fuel design criteria are preserved as long as the power level is limited to ≤ 5% RTP, the reactor coolant temperature is kept ≥ 531°F, and SDM is ~~≥ [1.6]% Δk/k.~~

Within the limits provided in the COLR.

The PHYSICS TESTS include measurement of core nuclear parameters or the exercise of control components that affect process variables. Among the process variables involved are AFD and QPTR, which represent initial conditions of the unit safety analyses. Also involved are the movable control components (control and shutdown rods), which are required to shut down the reactor. The limits for these variables are specified for each fuel cycle in the COLR. PHYSICS TESTS meet the criteria for inclusion in the Technical Specifications, since the components and process variable LCOs suspended during PHYSICS TESTS meet Criteria 1, 2, and 3 of the NRC Policy Statement.

Reference 6 allows special test exceptions (STEs) to be included as part of the LCO that they affect. It was decided, however, to retain this STE as a separate LCO because it was less cumbersome and provided additional clarity.

LCO

This LCO allows the reactor parameters of MTC and minimum temperature for criticality to be outside their specified limits. In addition, it allows selected control and shutdown rods to be positioned outside of their specified alignment and insertion limits. Operation beyond specified

(continued)

BASES

LCO (continued)

limits is permitted for the purpose of performing PHYSICS TESTS and poses no threat to fuel integrity, provided the SRs are met.

The requirements of LCO 3.1.4, LCO 3.1.5, LCO 3.1.6, LCO 3.1.7, and LCO 3.4.2 may be suspended during the performance of PHYSICS TESTS provided:

a. RCS lowest loop average temperature is ≥ [531] °F; and

b. SDM is ~~≥ [1.6]% Δk/k.~~ within the limits provided in the COLR.

APPLICABILITY

This LCO is applicable in MODE 2 when performing low power PHYSICS TESTS. The applicable PHYSICS TESTS are performed in MODE 2 at HZP. Other PHYSICS TESTS are performed in MODE 1 and are addressed in LCO 3.1.9, "PHYSICS TESTS Exceptions—MODE 1."

ACTIONS

A.1 and A.2

If the SDM requirement is not met, boration must be initiated promptly. A Completion Time of 15 minutes is adequate for an operator to correctly align and start the required systems and components. The operator should begin boration with the best source available for the plant conditions. Boration will be continued until SDM is within limit.

Suspension of PHYSICS TESTS exceptions requires restoration of each of the applicable LCOs to within specification.

B.1

When THERMAL POWER is > 5% RTP, the only acceptable action is to open the reactor trip breakers (RTBs) to prevent operation of the reactor beyond its design limits. Immediately opening the RTBs will shut down the reactor and prevent operation of the reactor outside of its design limits.

(continued)

3.1 REACTIVITY CONTROL SYSTEMS

3.1.1 SHUTDOWN MARGIN (SDM)—T_{avg} > 200°F (Analog)

LCO 3.1.1 SDM shall be ~~≥ [4.5]% Δk/k.~~ within the limits provided in the COLR.

APPLICABILITY: MODES 3 and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. SDM not within limit.	A.1 Initiate boration to restore SDM to within limit.	15 minutes

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.1.1.1 Verify SDM ~~is ≥ [4.5]% Δk/k.~~ to be within limits.	24 hours

3.1 REACTIVITY CONTROL SYSTEMS

3.1.2 SHUTDOWN MARGIN (SDM)—T_{avg} ≤ 200°F (Analog)

LCO 3.1.2 SDM shall be ~~≥ [3.0]% Δk/k.~~ within the limits provided in the COLR.

APPLICABILITY: MODE 5.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. SDM not within limit.	A.1 Initiate boration to restore SDM to within limit.	15 minutes

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.1.2.1 Verify SDM ~~is ≥ [3.0]% Δk/k.~~ to be within limits.	24 hours

3.1 REACTIVITY CONTROL SYSTEMS

3.1.5 Control Element Assembly (CEA) Alignment (Analog)

LCO 3.1.5 All CEAs shall be OPERABLE and aligned to within [7] inches (indicated position) of their respective group [, and the CEA motion inhibit and the CEA deviation circuit shall be OPERABLE].

APPLICABILITY: MODES 1 and 2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more regulating CEAs trippable and misaligned from its group by > [7 inches] and ≤ [15 inches].	A.1 Reduce THERMAL POWER to ≤ 70% RTP.	1 hour
	AND	
	A.2.1 Verify SDM ~~is ≥ [4.5]% Δk/k.~~ to be within the limits provided in the COLR.	1 hour
	OR	
One regulating CEA trippable and misaligned from its group by > [15 inches].	A.2.2 Initiate boration to restore SDM to within limit.	1 hour
	AND	
	A.3.1 Restore the misaligned CEA(s) to within [7 inches] (indicated position) of its group.	2 hours
	OR	

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.3.2 Align the remainder of the CEAs in the group to within [7 inches] (indicated position) of the misaligned CEA(s) while maintaining the insertion limit of LCO 3.1.7, "Regulating Control Element Assembly (CEA) Insertion Limits."	2 hours
B. One or more shutdown CEAs trippable and misaligned from its group by > [7 inches] and ≤ [15 inches]. OR One shutdown CEA trippable and misaligned from its group by > [15 inches].	B.1 Reduce THERMAL POWER to ≤ 70% RTP. AND B.2.1 Verify SDM ~~is ≥ [4.5]% Δk/k~~ to be within the limits provided in the COLR. OR B.2.2 Initiate boration to restore SDM to within limit. AND B.3 Restore the misaligned CEA(s) to within [7 inches] (indicated position) of its group.	1 hour 1 hour 1 hour 2 hours

(continued)

3.1 REACTIVITY CONTROL SYSTEMS

3.1.6 Shutdown Control Element Assembly (CEA) Insertion Limits (Analog)

LCO 3.1.6 All shutdown CEAs shall be withdrawn to ≥ [129] inches.

APPLICABILITY: MODE 1,
MODE 2 with any regulating CEA not fully inserted.

----------NOTE----------
This LCO is not applicable while performing SR 3.1.5.5.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more shutdown CEAs not within limit.	A.1.1 Verify SDM ~~≥ [4.5]% Δk/k.~~ to be within the limits provided in the COLR.	1 hour
	OR	
	A.1.2 Initiate boration to restore SDM to within limit.	1 hour
	AND	
	A.2 Restore shutdown CEA(s) to within limit.	2 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours

3.1 REACTIVITY CONTROL SYSTEMS

3.1.7 Regulating Control Element Assembly (CEA) Insertion Limits (Analog)

LCO 3.1.7 The power dependent insertion limit (PDIL) alarm circuit shall be OPERABLE, and the regulating CEA groups shall be limited to the withdrawal sequence and to the insertion limits specified in the COLR.

APPLICABILITY: MODES 1 and 2.

----------NOTE----------
This LCO is not applicable while performing SR 3.1.5.5 [or during reactor power cutback operation].

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Regulating CEA groups inserted beyond the transient insertion limit.	A.1.1 Verify SDM ~~≥ [4.5]% Δk/k.~~ to be within the limits provided in the COLR.	1 hour
	OR	
	A.1.2 Initiate boration to restore SDM to within limit.	1 hour
	AND	
	A.2.1 Restore regulating CEA groups to within limits.	2 hours
	OR	
		(continued)

3.1 REACTIVITY CONTROL SYSTEMS

3.1.9 Special Test Exception (STE)—MODES 1 and 2 (Analog)

LCO 3.1.9 During the performance of PHYSICS TESTS, the requirements of

LCO 3.1.4, "Moderator Temperature Coefficient (MTC)";
LCO 3.1.5, "Control Element Assembly (CEA) Alignment";
LCO 3.1.6, "Shutdown Control Element Assembly (CEA) Insertion Limits";
LCO 3.1.7, "Regulating Control Element Assembly (CEA) Insertion Limits";
LCO 3.2.2, "Total Planar Radial Peaking Factor (F^T_{XY})";
LCO 3.2.3, "Total Integrated Radial Peaking Factor (F^T_r)"; and
LCO 3.2.4, "AZIMUTHAL POWER TILT (T_q)"

may be suspended, provided:

a. THERMAL POWER is restricted to the test power plateau, which shall not exceed 85% RTP; and

b. SDM is ~~≥ [4.5]% Δk/k.~~ within the limits provided in the COLR.

APPLICABILITY: MODES 1 and 2 during PHYSICS TESTS.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Test power plateau exceeded.	A.1 Reduce THERMAL POWER to less than or equal to test power plateau.	15 minutes

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. SDM not within limit.	B.1 Initiate boration to restore SDM to within limit.	15 minutes
	AND	
	B.2 Suspend PHYSICS TESTS.	1 hour
C. Required Action and associated Completion Time not met.	C.1 Suspend PHYSICS TESTS.	1 hour
	AND	
	C.2 Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.9.1	Verify THERMAL POWER is equal to or less than the test power plateau.	1 hour
SR 3.1.9.2	Verify SDM ~~is ≥ [4.5]% Δk/k~~.	24 hours

to be within the limits provided in the COLR

BASES

APPLICABLE SAFETY ANALYSES (continued)

The safety analysis (Ref. 6) places limits on allowable THERMAL POWER during PHYSICS TESTS and requires the LHR and the departure from nucleate boiling (DNB) parameter to be maintained within limits. The power plateau of < 85% RTP and the associated trip setpoints are required to ensure [explain]. SDM shall be maintained ~~≥ [4.5]% Δk/k.~~

Within the limits provided in the COLR.

The individual LCOs governing CEA group height, insertion and alignment, ASI, F^T_{xy}, F^T_r, and T_q preserve the LHR limits. Additionally, the LCOs governing Reactor Coolant System (RCS) flow, reactor inlet temperature (T_c), and pressurizer pressure contribute to maintaining DNB parameter limits. The initial condition criteria for accidents sensitive to core power distribution are preserved by the LHR and DNB parameter limits. The criteria for the loss of coolant accident (LOCA) are specified in 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light Water Nuclear Power Reactors" (Ref. 7). The criteria for the loss of forced reactor coolant flow accident are specified in Reference 7. Operation within the LHR limit preserves the LOCA criteria; operation within the DNB parameter limits preserves the loss of flow criteria.

During PHYSICS TESTS, one or more of the LCOs that normally preserve the LHR and DNB parameter limits may be suspended. The results of the accident analysis are not adversely impacted, however, if LHR and DNB parameters are verified to be within their limits while the LCOs are suspended. Therefore, SRs are placed as necessary to ensure that LHR and DNB parameters remain within limits during PHYSICS TESTS. Performance of these Surveillances allows PHYSICS TESTS to be conducted without decreasing the margin of safety.

PHYSICS TESTS include measurement of core parameters or exercise of control components that affect process variables. Among the process variables involved are F^T_{xy}, F^T_r, T_q, and ASI, which represent initial condition input (power peaking) to the accident analysis. Also involved are the shutdown and regulating CEAs, which affect power peaking and are required for shutdown of the reactor. The limits for these variables are specified for each fuel cycle in the COLR.

PHYSICS TESTS meet the criteria for inclusion in the Technical Specifications, since the components and process

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

variable LCOs suspended during PHYSICS TESTS meet Criteria 1, 2, and 3 of the NRC Policy Statement.

LCO

This LCO permits individual CEAs to be positioned outside of their normal group heights and insertion limits during the performance of PHYSICS TESTS such as those required to:

a. Measure CEA worth;

b. Determine the reactor stability index and damping factor under xenon oscillation conditions;

c. Determine power distributions for nonnormal CEA configurations;

d. Measure rod shadowing factors; and

e. Measure temperature and power coefficients.

Additionally, it permits the center CEA to be misaligned during PHYSICS TESTS required to determine the isothermal temperature coefficient (ITC), MTC, and power coefficient.

The requirements of LCO 3.1.4, LCO 3.1.5, LCO 3.1.6, LCO 3.1.7, LCO 3.2.2, LCO 3.2.3, and LCO 3.2.4 may be suspended during the performance of PHYSICS TESTS, provided:

a. THERMAL POWER is restricted to test power plateau, which shall not exceed 85% RTP;

b. SDM shall be ~~≥ [4.5]% Δk/k~~ within the limit provided in the COLR.

APPLICABILITY

This LCO is applicable in MODES 1 and 2 because the reactor must be critical at various THERMAL POWER levels to perform the PHYSICS TESTS described in the LCO section. Limiting the test power plateau to < 85% RTP ensures that LHRs are maintained within acceptable limits.

(continued)

3.1 REACTIVITY CONTROL SYSTEMS

3.1.1 SHUTDOWN MARGIN (SDM)—T_{avg} > 200°F (Digital)

LCO 3.1.1 SDM shall be ~~≥ [5.0]% Δk/k.~~ within the limits provided in the COLR.

APPLICABILITY: MODES 3 and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. SDM not within limit.	A.1 Initiate boration to restore SDM to within limit.	15 minutes

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.1.1.1 Verify SDM ~~is ≥ [5.0]% Δk/k.~~ to be within the limits provided in the COLR.	24 hours

3.1 REACTIVITY CONTROL SYSTEMS

3.1.2 SHUTDOWN MARGIN (SDM)—T_{avg} ≤ 200°F (Digital)

LCO 3.1.2 SDM shall be ~~≥ [2.0]% Δk/k.~~ within the limits provided in the COLR.

APPLICABILITY: MODE 5.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. SDM not within limit.	A.1 Initiate boration to restore SDM to within limit.	15 minutes

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.1.2.1 Verify SDM ~~is ≥ [2.0]% Δk/k.~~ to be within the limits provided in the COLR.	24 hours

3.1 REACTIVITY CONTROL SYSTEMS

3.1.5 Control Element Assembly (CEA) Alignment (Digital)

LCO 3.1.5 All full length CEAs shall be OPERABLE, and all full and part length CEAs shall be aligned to within [7 inches] (indicated position) of their respective groups.

APPLICABILITY: MODES 1 and 2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more regulating CEAs trippable and misaligned from its group by > [7 inches] and ≤ [19 inches].	A.1 Reduce THERMAL POWER in accordance with Figure 3.1.5-1.	1 hour
	AND	
OR	A.2.1 Verify SDM ~~is ≥ [5.0]% Δk/k.~~ to be within the limits provided in the COLR.	1 hour
One regulating CEA trippable and misaligned from its group by > [19 inches].	OR	
	A.2.2 Initiate boration to restore SDM to within limit.	1 hour
	AND	
	A.3.1 Restore the misaligned CEA(s) to within [7 inches] (indicated position) of its group.	2 hours
	OR	

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.3.2 Align the remainder of the CEAs in the group to within [7 inches] (indicated position) of the misaligned CEA(s) while maintaining the insertion limit of LCO 3.1.7, "Regulating Control Element Assembly (CEA) Insertion Limits."	2 hours
B. One or more shutdown CEAs trippable and misaligned from its group by > [7 inches] and ≤ [19 inches]. OR One shutdown CEA trippable and misaligned from its group by > [19 inches].	B.1 Reduce THERMAL POWER in accordance with Figure 3.1.5-1. AND B.2.1 Verify SDM ~~is ≥ [5.0]% Δk/k~~ to be within the limits provided in the COLR. OR B.2.2 Initiate boration to restore SDM to within limit. AND B.3 Restore the misaligned CEA(s) to within [7 inches] (indicated position) of its group.	1 hour 1 hour 1 hour 2 hours

(continued)

3.1 REACTIVITY CONTROL SYSTEMS

3.1.6 Shutdown Control Element Assembly (CEA) Insertion Limits (Digital)

LCO 3.1.6 All shutdown CEAs shall be withdrawn to ≥ [145] inches.

APPLICABILITY: MODE 1,
MODE 2 with any regulating CEA not fully inserted.

----------NOTE----------
This LCO is not applicable while performing SR 3.1.5.3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more shutdown CEAs not within limit.	A.1.1 Verify SDM ~~≥ [5.0]% Δk/k.~~ to be within the limits provided in the COLR.	1 hour
	OR	
	A.1.2 Initiate boration to restore SDM to within limit.	1 hour
	AND	
	A.2 Restore shutdown CEA(s) to within limit.	2 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours

3.1 REACTIVITY CONTROL SYSTEMS

3.1.7 Regulating CEA Insertion Limits (Digital)

LCO 3.1.7 The power dependent insertion limit (PDIL) alarm circuit shall be OPERABLE, and

a. With the Core Operating Limit Supervisory System (COLSS) in service, the regulating CEA groups shall be limited to the withdrawal sequence, insertion limits, and associated time restraints specified in the COLR.

b. With COLSS out of service, the regulating CEA groups shall be limited to the short term steady state insertion limit and associated time restraints specified in the COLR.

APPLICABILITY: MODES 1 and 2.

----------NOTE----------
This LCO is not applicable while conducting SR 3.1.5.3 [or during reactor power cutback operation].

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Regulating CEA groups inserted beyond the transient insertion limit with COLSS in service.	A.1.1 Verify SDM ~~≥ [5.0]% Δk/k~~ to be within the limits provided in the COLR.	1 hour
	OR	
	A.1.2 Initiate boration to restore SDM to within limit.	1 hour
	AND	
	A.2.1 Restore regulating CEA groups to within limits.	2 hours
	OR	
		(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Regulating CEA groups inserted beyond the short term steady state insertion limit with COLSS out of service.	D.1.1 Verify SDM ~~≥ [5.0]% Δk/k~~ to be within the limits provided in the COLR.	1 hour
	OR	
	D.1.2 Initiate boration to restore SDM to within limit.	1 hour
	AND	
	D.2.1 Restore regulating CEA groups to within limits.	2 hours
	OR	
	D.2.2 Reduce THERMAL POWER to less than or equal to the fraction of RTP allowed by CEA group position and short term steady state insertion limit specified in the COLR.	2 hours
E. PDIL alarm circuit inoperable.	E.1 Perform SR 3.1.7.1.	1 hour AND Once per 4 hours thereafter
F. Required Actions and associated Completion Times not met.	F.1 Be in MODE 3.	6 hours

3.1 REACTIVITY CONTROL SYSTEMS

3.1.10 Special Test Exceptions (STE)—MODES 1 and 2 (Digital)

LCO 3.1.10 During performance of PHYSICS TESTS, the requirements of:

LCO 3.1.4, "Moderator Temperature Coefficient (MTC)";
LCO 3.1.5, "Control Element Assembly (CEA) Alignment";
LCO 3.1.6, "Shutdown Control Element Assembly (CEA) Insertion Limits";
LCO 3.1.7, "Regulating Control Element Assembly (CEA) Insertion Limits";
LCO 3.1.8, "Part Length CEA Insertion Limits";
LCO 3.2.2, "Planar Radial Peaking Factors (Fxy)"; and
LCO 3.2.3, "AZIMUTHAL POWER TILT (Tq)"

may be suspended, provided:

a. THERMAL POWER is restricted to the test power plateau, which shall not exceed 85% RTP; and

b. SDM is ~~≥ [5.0]% Δk/k.~~ within the limits provided in the COLR.

APPLICABILITY: MODES 1 and 2 during PHYSICS TESTS.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Test power plateau exceeded.	A.1 Reduce THERMAL POWER to less than or equal to the test power plateau.	15 minutes

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. SDM is not within limit.	B.1 Initiate boration to restore SDM to within limit. AND B.2 Suspend PHYSICS TESTS.	15 minutes 1 hour
C. Required Action and associated Completion Time not met.	C.1 Suspend PHYSICS TESTS. AND C.2 Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.10.1	Verify THERMAL POWER equal to or less than the test power plateau.	1 hour
SR 3.1.10.2	Verify SDM ~~is ≥ [5.0]% Δk/k.~~	24 hours

to be within the limits provided in the COLR.

BASES (continued)

ACTIONS

A.1, A.2.1, A.2.2, A.3.1, and A.3.2

A CEA may become misaligned, yet remain trippable. In this condition, the CEA can still perform its required function of adding negative reactivity should a reactor trip be necessary.

If one or more regulating CEAs are misaligned by [7 inches] and ≤ [19 inches] but trippable, or one regulating CEA misaligned by > [19 inches] but trippable, continued operation in MODES 1 and 2 may continue, provided, within 1 hour, the power is reduced in accordance with Figure 3.1.5-1, and SDM is ~~≥ [5.0]% Δk/k~~ within the limits provided in the COLR and within 2 hours the misaligned CEA(s) is aligned within [7 inches] of its group or the misaligned CEA's group is aligned within [7 inches] of the misaligned CEA(s).

Xenon redistribution in the core starts to occur as soon as a CEA becomes misaligned. Reducing THERMAL POWER in accordance with Figure 3.1.5-1 (in the accompanying LCO) ensures acceptable power distributions are maintained (Ref. 6). For small misalignments (< [19 inches]) of the CEAs, there is:

a. A small effect on the time dependent long term power distributions relative to those used in generating LCOs and limiting safety system settings (LSSS) setpoints;

b. A small effect on the available SDM; and

c. A small effect on the ejected CEA worth used in the accident analysis.

With a large CEA misalignment (≥ [19 inches]), however, this misalignment would cause distortion of the core power distribution. This distortion may, in turn, have a significant effect on:

a. The available SDM;

b. The time dependent, long term power distributions relative to those used in generating LCOs and LSSS setpoints; and

c. The ejected CEA worth used in the accident analysis.

(continued)

BASES

ACTIONS

A.1, A.2.1, A.2.2, A.3.1, and A.3.2 (continued)

Therefore, this condition is limited to the single CEA misalignment, while still allowing 2 hours for recovery.

In both cases, a 2 hour time period is sufficient to:

a. Identify cause of a misaligned CEA;

b. Take appropriate corrective action to realign the CEAs; and

c. Minimize the effects of xenon redistribution.

In this condition, an additional allowance must be made for the worth of the affected CEA when calculating the available SDM. With one or more misaligned CEAs, SDM must be verified for CEAs at the existing nonaligned positions. SDM is calculated by performing a reactivity balance calculation according to procedure, considering the listed effects in SR 3.1.1.1. This is necessary since the OPERABLE CEAs must still meet the single failure criterion. If additional negative reactivity is required to provide the necessary SDM, it must be provided by increasing the RCS boron concentration. One hour allows sufficient time to perform the SDM calculation and make any required boron adjustment to the RCS.

B.1, B.2.1, B.2.2, and B.3

If one or more shutdown CEAs are misaligned by > [7 inches] and ≤ [19 inches] but trippable, or one shutdown CEA misaligned by > [19 inches] but trippable, continued operation in MODES 1 and 2 may continue, provided, within 1 hour, the power is reduced in accordance with Figure 3.1.5-1, and SDM is ~~≤ [5.0% Δk/k]~~, and within 2 hours the misaligned CEA(s) is aligned within [7 inches] of its group.

within the limits provided in the COLR

C.1, C.2.1, and C.2.2

If one or more part length CEAs are misaligned by > [7 inches] and ≤ [19 inches] or one part length CEA misaligned by > [19 inches], continued operation in MODES 1

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

The safety analysis (Ref. 6) places limits on allowable THERMAL POWER during PHYSICS TESTS and requires that the LHR and the departure from nucleate boiling (DNB) parameter be maintained within limits. The power plateau of < 85% RTP and the associated trip setpoints are required to ensure [explain]. ~~SDM shall be maintained ≥ [5.0]% Δk/k.~~

The individual LCOs governing CEA group height, insertion and alignment, ASI, total planar radial peaking factor, total integrated radial peaking factor, and T_q, preserve the LHR limits. Additionally, the LCOs governing Reactor Coolant System (RCS) flow, reactor inlet temperature (T_c), and pressurizer pressure contribute to maintaining DNB parameter limits. The initial condition criteria for accidents sensitive to core power distribution are preserved by the LHR and DNB parameter limits. The criteria for the loss of coolant accident (LOCA) are specified in 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light Water Nuclear Power Reactors" (Ref. 7). The criteria for the loss of forced reactor coolant flow accident are specified in Reference 7. Operation within the LHR limit preserves the LOCA criteria; operation within the DNB parameter limits preserves the loss of flow criteria.

During PHYSICS TESTS, one or more of the LCOs that normally preserve the LHR and DNB parameter limits may be suspended. The results of the accident analysis are not adversely impacted, however, if LHR and DNB parameters are verified to be within their limits while the LCOs are suspended. Therefore, SRs are placed as necessary to ensure that LHR and DNB parameters remain within limits during PHYSICS TESTS. Performance of these Surveillances allows PHYSICS TESTS to be conducted without decreasing the margin of safety.

PHYSICS TESTS include measurement of core parameters or exercise of control components that affect process variables. Among the process variables involved are total planar radial peaking factor, total integrated radial peaking factor, T_q, and ASI, which represent initial condition input (power peaking) to the accident analysis. Also involved are the shutdown and regulating CEAs, which affect power peaking and are required for shutdown of the reactor. The limits for these variables are specified for each fuel cycle in the COLR.

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

PHYSICS TESTS meet the criteria for inclusion in the Technical Specifications, since the component and process variable LCOs suspended during PHYSICS TESTS meet Criteria 1, 2, and 3 of the NRC Policy Statement.

LCO

This LCO permits individual CEAs to be positioned outside of their normal group heights and insertion limits during the performance of PHYSICS TESTS, such as those required to:

a. Measure CEA worth;

b. Determine the reactor stability index and damping factor under xenon oscillation conditions;

c. Determine power distributions for nonnormal CEA configurations;

d. Measure rod shadowing factors; and

e. Measure temperature and power coefficients.

Additionally, it permits the center CEA to be misaligned during PHYSICS TESTS required to determine the isothermal temperature coefficient (ITC), MTC, and power coefficient.

The requirements of LCO 3.1.4, LCO 3.1.5, LCO 3.1.6, LCO 3.1.7, LCO 3.1.8, LCO 3.2.2, and LCO 3.2.3 may be suspended during the performance of PHYSICS TESTS provided:

a. THERMAL POWER is restricted to test power plateau, which shall not exceed 85% RTP; and

b. SDM shall be within the limit provided in the COLR. ~~≥ [5.0]% Δk/k.~~

APPLICABILITY

This LCO is applicable in MODES 1 and 2 because the reactor must be critical at various THERMAL POWER levels to perform the PHYSICS TESTS described in the LCO section. Limiting the test power plateau to < 85% RTP ensures that LHRs are maintained within acceptable limits.

(continued)

3.1 REACTIVITY CONTROL SYSTEMS

3.1.1 SHUTDOWN MARGIN (SDM)

LCO 3.1.1 SDM shall be within the limits provided in the COLR

~~a. ≥ [0.38]% Δk/k, with the highest worth control rod analytically determined; or~~

~~b. ≥ [0.28]% Δk/k, with the highest worth control rod determined by test.~~

APPLICABILITY: MODES 1, 2, 3, 4, and 5.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. SDM not within limits in MODE 1 or 2.	A.1	Restore SDM to within limits.	6 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1	Be in MODE 3.	12 hours
C. SDM not within limits in MODE 3.	C.1	Initiate action to fully insert all insertable control rods.	Immediately
D. SDM not within limits in MODE 4.	D.1	Initiate action to fully insert all insertable control rods.	Immediately
	AND		(continued)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.1.1	Verify SDM is: ~~a. ≥ [0.88]% Δk/k with the highest worth control rod analytically determined, or~~ ~~b. ≥ [0.28]% Δk/k with the highest worth control rod determined by test.~~ to be within limits	Prior to each in vessel fuel movement during fuel loading sequence AND Once within 4 hours after criticality following fuel movement within the reactor pressure vessel or control rod replacement

3.1 REACTIVITY CONTROL SYSTEMS

3.1.1 SHUTDOWN MARGIN (SDM)

LCO 3.1.1 SDM shall be within the limits provided in the COLR

~~a. ≥ [0.38]% Δk/k, with the highest worth control rod analytically determined; or~~

~~b. ≥ [0.28]% Δk/k, with the highest worth control rod determined by test.~~

APPLICABILITY: MODES 1, 2, 3, 4, and 5.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. SDM not within limits in MODE 1 or 2.	A.1	Restore SDM to within limits.	6 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1	Be in MODE 3.	12 hours
C. SDM not within limits in MODE 3.	C.1	Initiate action to fully insert all insertable control rods.	Immediately
D. SDM not within limits in MODE 4.	D.1	Initiate action to fully insert all insertable control rods.	Immediately
	AND		(continued)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.1.1	Verify SDM is: to be within limits ~~a. ≥ [0.38]% Δk/k with the highest worth control rod analytically determined; or~~ ~~b. ≥ [0.28]% Δk/k with the highest worth control rod determined by test.~~	Prior to each in vessel fuel movement during fuel loading sequence AND Once within 4 hours after criticality following fuel movement within the reactor pressure vessel or control rod replacement