

Industry/TSTF Standard Technical Specification Change Traveler

Add Action for More Than One [D]RPI Inoperable

Classification: 3) Improve Specifications

NUREGs Affected: 1430 1431 1432 1433 1434

Description:

Add new Action B to allow 24 hours to restore inoperability of more than one [D]RPI in a group.

Justification:

This change is consistent with Callaway license amendment 61, dated 2/1/91, that allows verification of core peaking factors and SDM to satisfy the Action requirements, providing the non-indicating rods have not been moved.

The additional time to restore an inoperable [D]RPI is appropriate because the proposed Action would require that the control rods be under manual control, that RCS Tavg be monitored and recorded hourly, and that rod position be verified indirectly every 8 hours using the moveable incore detectors, thereby assuring that the rod alignment and rod insertion LCOs are met. Therefore, the required shutdown margin will be maintained. Given the alternate position monitoring requirement, and other indirect means of monitoring changes in rod position (e.g., alarms on Tavg - Tref deviation), a 24 hour Completion Time to restore all but one [D]RPI per group provides sufficient time to restore Operability while minimizing shutdown transients during the time that the position indication system is degraded.

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NRC Contact: Tjader, Bob 301-314-1187 trt@nrc.gov

Revision History

OG Revision 0

Revision Status: Closed

Revision Proposed by: WOG Mini-Group

Revision Description:
Original Issue

Owners Group Review Information

Date Originated by OG: 10-Oct-96

Owners Group Comments
(No Comments)

Owners Group Resolution: Approved Date: 10-Oct-96

TSTF Review Information

TSTF Received Date: 10-Oct-96 Date Distributed for Review 29-Oct-96

OG Review Completed: BWOG WOG CEOG BWROG

TSTF Comments:

CEOG - Not applicable, accepts
BWOG - Not applicable, accepts
BWROG - Not applicable, accepts

On hold as of 1/14/97 for Westinghouse markups for new revision.

TSTF Resolution: Superceded Date: 14-Jan-97

11/18/98

OG Revision 1**Revision Status: Closed**

Revision Proposed by: WOG

Revision Description:
Minor editorial changes.**Owners Group Review Information**

Date Originated by OG: 14-Jan-97

Owners Group Comments
(No Comments)

Owners Group Resolution: Approved Date: 14-Jan-97

TSTF Review Information

TSTF Received Date: 14-Jan-97 Date Distributed for Review 06-Jan-98

OG Review Completed: BWOG WOG CEOG BWROG

TSTF Comments:

Originally distributed on 4/8/97.

CEOG Comments from 4/24/97: Not applicable, accepts.
WOG only.

TSTF Resolution: Approved Date: 05-Feb-98

NRC Review Information

NRC Received Date: 10-Mar-98 NRC Reviewer:

NRC Comments:

9/24/98 - The Technical Branch recommended rejection. The NRC will consider the TB recommendation and contact D. Buschbaum by 10/15/98 with a status.

11/12/98 - NRC requests changes.

Final Resolution: Superseded by Revision

Final Resolution Date: 16-Nov-98

TSTF Revision 1**Revision Status: Active****Next Action: NRC**

Revision Proposed by: WOG

Revision Description:
Revised the Actions to be consistent with the Callaway amendment. Revised the description and justification. Replaced DRPI with [DJRPI to be consistent with the LCO.**TSTF Review Information**

TSTF Received Date: 16-Nov-98 Date Distributed for Review 16-Nov-98

OG Review Completed: BWOG WOG CEOG BWROG

TSTF Comments:

WOG-only change. Change approved by WOG chairman.

TSTF Resolution: Approved Date: 16-Nov-98

11/18/98

TSTF Revision 1

Revision Status: Active

Next Action: NRC

NRC Review Information

NRC Received Date: 20-Nov-98 NRC Reviewer:

NRC Comments:

11/12/98 - TSTF to provide to NRC by 11/20/98. NRC to approve by 11/30/98.

Final Resolution: NRC Action Pending

Final Resolution Date:

Incorporation Into the NUREGs

File to BBS/LAN Date:

TSTF Informed Date:

TSTF Approved Date:

NUREG Rev Incorporated:

Affected Technical Specifications

Bkgnd 3.1.8 Rod Position Indication

LCO 3.1.8 Bases Rod Position Indication

Action 3.1.8 Rod Position Indication
Change Description: Action Note

Action 3.1.8 Bases Rod Position Indication
Change Description: Action Note

Action 3.1.8.A Bases Rod Position Indication

Action 3.1.8.B Rod Position Indication
Change Description: Renamed 3.1.8.C

Action 3.1.8.B Rod Position Indication
Change Description: New Action

Action 3.1.8.B Bases Rod Position Indication
Change Description: New Action

Action 3.1.8.B Bases Rod Position Indication
Change Description: Renamed 3.1.8.C

Action 3.1.8.C Rod Position Indication
Change Description: Renamed 3.1.8.D

Action 3.1.8.C Bases Rod Position Indication
Change Description: Renamed 3.1.8.D

Action 3.1.8.D Rod Position Indication
Change Description: Renamed 3.1.8.E

Action 3.1.8.D Bases Rod Position Indication
Change Description: Renamed 3.1.8.E

11/18/98

SR 3.1.8.1 Bases

Rod Position Indication

11/18/98

3.1 REACTIVITY CONTROL SYSTEMS

3.1.8 Rod Position Indication

LCO 3.1.8 The [Digital] Rod Position Indication ([D]RPI) System and the Demand Position Indication System shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

NOTE

Separate Condition entry is allowed for each inoperable rod position indicator per group and each demand position indicator per bank.

Editorial

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One [D]RPI per group inoperable for one or more groups.	A.1 Verify the position of the rods with inoperable position indicators by using movable incore detectors.	Once per 8 hours <i>indirectly</i>
	<u>OR</u> A.2 Reduce THERMAL POWER to $\leq 50\%$ RTP.	8 hours
<i>Insert ACTION B</i> → B. One or more rods with inoperable position indicators have been moved in excess of 24 steps in one direction since the last determination of the rod's position.	<i>B.1</i> C. Verify the position of the rods with inoperable position indicators by using movable incore detectors.	[4] hours <i>indirectly</i>
	<u>OR</u>	(continued)

INSERT ACTION B

Condition	Required Action	Completion Time
B. More than one [D]RPI per group inoperable	B.1 Place the control rods under manual control <u>AND</u>	Immediately
	B.2 Monitor and Record RCS T_{avg} <u>AND</u>	Once per 1 hour
	B.3 Verify the position of the rods with inoperable position indicators indirectly by using the movable incore detectors <u>AND</u>	Once per 8 hours
	B.4 Restore inoperable position indicators to OPERABLE status such that a maximum of one [D]RPI per group is inoperable.	24 hours

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>ⓐ. (continued) ⓑ</p>	<p>ⓐ.2 ⓑ</p> <p>Reduce THERMAL POWER to \leq 50% RTP.</p>	<p>8 hours</p>
<p>ⓐ One demand position indicator per bank inoperable for one or more banks.</p>	<p>ⓐ.1.1 ⓑ</p> <p>Verify by administrative means all [D]RPis for the affected banks are OPERABLE.</p> <p>AND</p> <p>ⓐ.1.2 ⓑ</p> <p>Verify the most withdrawn rod and the least withdrawn rod of the affected banks are \leq 12 steps apart.</p> <p>OR</p> <p>ⓐ.2 ⓑ</p> <p>Reduce THERMAL POWER to \leq 50% RTP.</p>	<p>Once per 8 hours</p> <p>Once per 8 hours</p> <p>8 hours</p>
<p>ⓐ. Required Action and associated Completion Time not met. ⓑ</p>	<p>ⓐ.1 ⓑ</p> <p>Be in MODE 3.</p>	<p>6 hours</p>

BASES

BACKGROUND
(continued)

The axial position of shutdown rods and control rods are determined by two separate and independent systems: the Bank Demand Position Indication System (commonly called group step counters) and the [Digital] Rod Position Indication (DRPI) System.

The Bank Demand Position Indication System counts the pulses from the Rod Control System that move the rods. There is one step counter for each group of rods. Individual rods in a group all receive the same signal to move and should, therefore, all be at the same position indicated by the group step counter for that group. The Bank Demand Position Indication System is considered highly precise (± 1 step or $\pm \frac{1}{8}$ inch). If a rod does not move one step for each demand pulse, the step counter will still count the pulse and incorrectly reflect the position of the rod.

The DRPI System provides a highly accurate indication of actual control rod position, but at a lower precision than the step counters. This system is based on inductive analog signals from a series of coils spaced along a hollow tube with a center to center distance of 3.75 inches, which is 6 steps. To increase the reliability of the system, the inductive coils are connected alternately to data system A or B. Thus, if one system fails, the DRPI will go on half accuracy with an effective coil spacing of 7.5 inches, which is 12 steps. Therefore, the normal indication accuracy of the DRPI System is ± 6 steps (± 3.75 inches), and the maximum uncertainty is ± 12 steps (± 7.5 inches). With an indicated deviation of 12 steps between the group step counter and DRPI, the maximum deviation between actual rod position and the demand position could be 24 steps, or 15 inches.

APPLICABLE
SAFETY ANALYSES

Control and shutdown rod position accuracy is essential during power operation. Power peaking, ejected rod worth, or SDM limits may be violated in the event of a Design Basis Accident (Ref. 2), with control or shutdown rods operating outside their limits undetected. Therefore, the acceptance criteria for rod position indication is that rod positions must be known with sufficient accuracy in order to verify the core is operating within the group sequence, overlap, design peaking limits, ejected rod worth, and with minimum SDM (LCO 3.1.6. "Shutdown Bank Insertion Limits." and

(continued)

BASES

APPLICABLE
SAFETY ANALYSES
(continued)

LCO 3.1.7. "Control Bank Insertion Limits"). The rod positions must also be known in order to verify the alignment limits are preserved (LCO 3.1.5. "Rod Group Alignment Limits"). Control rod positions are continuously monitored to provide operators with information that ensures the plant is operating within the bounds of the accident analysis assumptions.

The control rod position indicator channels satisfy Criterion 2 of the NRC Policy Statement. The control rod position indicators monitor control rod position, which is an initial condition of the accident.

LCO

LCO 3.1.8 specifies that one [DRPI System and one Bank Demand Position Indication System be OPERABLE for each control rod. For the control rod position indicators to be OPERABLE requires meeting the SR of the LCO and the following:

- a. The [DRPI System indicates within 12 steps of the group step counter demand position as required by LCO 3.1.5. "Rod Group Alignment Limits";
- b. For the [DRPI System there are no failed coils; and
- c. The Bank Demand Indication System has been calibrated either in the fully inserted position or to the [DRPI System.

The 12 step agreement limit between the Bank Demand Position Indication System and the [DRPI System indicates that the Bank Demand Position Indication System is adequately calibrated, and can be used for indication of the measurement of control rod bank position.

A deviation of less than the allowable limit, given in LCO 3.1.5, in position indication for a single control rod, ensures high confidence that the position uncertainty of the corresponding control rod group is within the assumed values used in the analysis (that specified control rod group insertion limits).

These requirements ensure that control rod position indication during power operation and PHYSICS TESTS is accurate, and that design assumptions are not challenged.

(continued)

BASES

LCO
(continued) OPERABILITY of the position indicator channels ensures that inoperable, misaligned, or mispositioned control rods can be detected. Therefore, power peaking, ejected rod worth, and SDM can be controlled within acceptable limits.

APPLICABILITY The requirements on the DRPI and step counters are only applicable in MODES 1 and 2 (consistent with LCO 3.1.5, LCO 3.1.6, and LCO 3.1.7), because these are the only MODES in which power is generated, and the OPERABILITY and alignment of rods have the potential to affect the safety of the plant. In the shutdown MODES, the OPERABILITY of the shutdown and control banks has the potential to affect the required SDM, but this effect can be compensated for by an increase in the boron concentration of the Reactor Coolant System.

ACTIONS The ACTIONS table is modified by a Note indicating that a separate Condition entry is allowed for each inoperable rod position indicator per group and each demand position indicator per bank. This is acceptable because the Required Actions for each Condition provide appropriate compensatory actions for each inoperable position indicator.

Editorial

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A.1

indirectly

may

Insert B 3.1-49

When one DRPI channel per group fails, the position of the rod can still be determined by use of the in-core movable detectors. Based on experience, normal power operation does not require excessive movement of banks. If a bank has been significantly moved, the Required Action of B.1 or B.2 below is required. Therefore, verification of RCCA position within the Completion Time of 8 hours is adequate for allowing continued full power operation, since the probability of simultaneously having a rod significantly out of position and an event sensitive to that rod position is small.

C.1 or C.2

(continued)

INSERT B 3.1-49

The Required Action may also be satisfied by ensuring at least once per 8 hours that F_Q satisfies LCO 3.2.1, FAH satisfies LCO 3.2.2, and SHUTDOWN MARGIN is within the limits provided in the COLR, provided the nonindicating rods have not been moved.

BASES

ACTIONS
(continued)

A.2

Reduction of THERMAL POWER to $\leq 50\%$ RTP puts the core into a condition where rod position is not significantly affecting core peaking factors (Ref. 3).

The allowed Completion Time of 8 hours is reasonable, based on operating experience, for reducing power to $\leq 50\%$ RTP from full power conditions without challenging plant systems and allowing for rod position determination by Required Action A.1 above.

Insert B50

B.1 and B.2

[, or B.1, as applicable]

These Required Actions clarify that when one or more rods with inoperable position indicators have been moved in excess of 24 steps in one direction, since the position was last determined, the Required Actions of A.1 and A.2 are still appropriate but must be initiated promptly under Required Action B.1 to begin verifying that these rods are still properly positioned, relative to their group positions.

If, within [4] hours, the rod positions have not been determined, THERMAL POWER must be reduced to $\leq 50\%$ RTP within 8 hours to avoid undesirable power distributions that could result from continued operation at $> 50\%$ RTP, if one or more rods are misaligned by more than 24 steps. The allowed Completion Time of [4] hours provides an acceptable period of time to verify the rod positions.

B.1.1 and B.1.2

With one demand position indicator per bank inoperable, the rod positions can be determined by the DRPI System. Since normal power operation does not require excessive movement of rods, verification by administrative means that the rod position indicators are OPERABLE and the most withdrawn rod and the least withdrawn rod are ≤ 12 steps apart within the allowed Completion Time of once every 8 hours is adequate.

(continued)

INSERT B50B.1, B.2, B.3 and B.4

When more than one [D]RPI per group fail, additional actions are necessary to ensure that acceptable power distribution limits are maintained, minimum SDM is maintained, and the potential effects of rod misalignment on associated accident analyses are limited. Placing the Rod Control System in manual assures unplanned rod motion will not occur. Together with the indirect position determination available via movable incore detectors will minimize the potential for rod misalignment. The immediate Completion Time for placing the Rod Control System in manual reflects the urgency with which unplanned rod motion must be prevented while in this Condition.

Monitoring and recording reactor coolant T_{avg} help assure that significant changes in power distribution and SDM are avoided. The once per hour Completion Time is acceptable because only minor fluctuations in RCS temperature are expected at steady state plant operating conditions.

The position of the rods may be determined indirectly by use of the movable incore detectors. The Required Action may also be satisfied by ensuring at least once per 8 hours that F_Q satisfies LCO 3.2.1, $F^N\Delta H$ satisfies LCO 3.2.2, and SHUTDOWN MARGIN is within the limits provided in the COLR, provided the nonindicating rods have not been moved. Verification of control rod position once per 8 hours is adequate for allowing continued full power operation for a limited, 24 hour period, since the probability of simultaneously having a rod significantly out of position and an event sensitive to that rod position is small. The 24 hour Completion Time provides sufficient time to troubleshoot and restore the [D]RPI system to operation while avoiding the plant challenges associated with a shutdown without full rod position indication.

Based on operating experience, normal power operation does not require excessive rod movement. If one or more rods has been significantly moved, the Required Action of C.1 or C.2 below is required.

BASES

ACTIONS
(continued)

0.2 ^(D)

Reduction of THERMAL POWER to $\leq 50\%$ RTP puts the core into a condition where rod position is not significantly affecting core peaking factor limits (Ref. 3). The allowed Completion Time of 8 hours provides an acceptable period of time to verify the rod positions per Required Actions C.1.1 and C.1.2 or reduce power to $\leq 50\%$ RTP.

D.1 ^(E)

If the Required Actions cannot be completed within the associated Completion Time, the plant must be brought to a MODE in which the requirement does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours. The allowed Completion Time is reasonable, based on operating experience, for reaching the required MODE from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE
REQUIREMENTS

SR 3.1.8.1

Verification that the DRPI agrees with the demand position within [12] steps ensures that the DRPI is operating correctly. Since the DRPI does not display the actual shutdown rod positions between 18 and 210 steps, only points within the indicated ranges are required in comparison.

The [18 month] Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for unnecessary plant transients if the SR were performed with the reactor at power. Operating experience has shown these components usually pass the SR when performed at a Frequency of once every [18 months.] Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 13.
 2. FSAR, Chapter [15].
 3. FSAR, Chapter [15].
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