

Industry/TSTF Standard Technical Specification Change Traveler

Add new Condition C for 3.2.1 Actions

Classification: 1) Correct Specifications

NUREGs Affected: 1430 1431 1432 1433 1434

Description:

Add new Condition C that would read: "Regulating rod groups sequence or overlap requirements not met." Add Required Action C. 1 that would read: "Restore regulating groups to within limits", and add a Completion Time of 2 hours. Revise Condition A to remove "or sequence or overlap, or any combination, not met. "

Justification:

Required Actions for NUREG Condition A constitute insufficient remedial measures should the regulating group sequence or overlap requirements not be met. Specifically, reactivity considerations associated with these conditions are not addressed by Required Actions A. 1 and A.2. Therefore, Condition C would be added to address these Conditions. Condition C that would read: "Regulating rod groups sequence or overlap requirements not met." Required Action C. 1 that would read: "Restore regulating groups to within limits", with a Completion Time of 2 hours. This Completion Time is reasonable to complete the actions necessary to restore group sequence or overlap to within limits and is consistent with the Completion Time in the WOG and CEOG NUREGs. This time is also consistent with the SDM verification Completion Time of other Specifications.

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Revision History

OG Revision 0

Revision Status: Active

Next Action: EXCEL

Revision Proposed by: ANO

Revision Description:
Original Issue

Owners Group Review Information

Date Originated by OG: 29-Dec-98

Owners Group Comments
(No Comments)

Owners Group Resolution: Approved Date: 19-Mar-99

TSTF Review Information

TSTF Received Date: 19-Mar-99 Date Distributed for Review 17-Jun-99

OG Review Completed: BWOG WOG CEOG BWROG

TSTF Comments:

Applicable to BWOG only. Make Condition C hours to be consistent with CE and WOG. Modify justification.

TSTF Resolution: Approved Date: 07-Jul-99

7/12/99

Incorporation Into the NUREGs

File to BBS/LAN Date:

TSTF Informed Date:

TSTF Approved Date:

NUREG Rev Incorporated:

Affected Technical Specifications

LCO 3.2.1 Bases	Regulating Rod Insertion Limits
Action 3.2.1 Bases	Regulating Rod Insertion Limits
Action 3.2.1.A	Regulating Rod Insertion Limits
Action 3.2.1.A Bases	Regulating Rod Insertion Limits
Action 3.2.1.B Bases	Regulating Rod Insertion Limits
Action 3.2.1.C	Regulating Rod Insertion Limits Change Description: Renamed Action D
Action 3.2.1.C	Regulating Rod Insertion Limits Change Description: New Action
Action 3.2.1.C Bases	Regulating Rod Insertion Limits Change Description: Renamed Action D
Action 3.2.1.C Bases	Regulating Rod Insertion Limits Change Description: New Action
Action 3.2.1.D	Regulating Rod Insertion Limits Change Description: Renamed Action E
Action 3.2.1.D Bases	Regulating Rod Insertion Limits Change Description: Renamed Action E

7/12/99

TSTF-345

Regulating Rod Insertion Limits
3.2.1

3.2 POWER DISTRIBUTION LIMITS

3.2.1 Regulating Rod Insertion Limits

LCO 3.2.1 Regulating rod groups shall be within the physical insertion, sequence, and overlap limits specified in the COLR.

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. Regulating rod groups inserted in restricted operational regions, or sequence or overlap, or any combination, not met.	A.1 Perform SR 3.2.5.1. AND A.2 Restore regulating rod groups to within limits.	Once per 2 hours 24 hours from discovery of failure to meet the LCO
B. Required Action and associated Completion Time of Condition A not met.	B.1 Reduce THERMAL POWER to less than or equal to THERMAL POWER allowed by regulating rod group insertion limits.	2 hours

(continued)

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<INSERT 3.2-1A>

TSTF-345

C. Regulating rod groups sequence or overlap requirements not met.	C.1 Restore regulating rod groups to within limits.	* hour ⁵ ②
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Regulating Rod Insertion Limits
3.2.1

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>^(D) ^(D) Regulating rod groups inserted in unacceptable operational region.</p>	<p>^(D) ^(D) 2.1 Initiate boration to restore SDM to $\geq 1\% \Delta k/k$.</p> <p>AND</p> <p>^(D) ^(D) 2.2.1 Restore regulating rod groups to within restricted operating region.</p> <p>OR</p> <p>^(D) ^(D) 2.2.2 Reduce THERMAL POWER to less than or equal to the THERMAL POWER allowed by the regulating rod group insertion limits.</p>	<p>15 minutes</p> <p>2 hours</p> <p>2 hours</p>
<p>^(E) ^(D) Required Action and associated Completion Time of Condition C not met.</p> <p>^(D)</p>	<p>^(E) ^(D) 2.1 Be in MODE 3.</p>	<p>6 hours</p>

TSTF-345

Regulating Rod Insertion Limits
B 3.2.1

BASES

APPLICABLE
SAFETY ANALYSES
(continued)

d. The CONTROL RODS must be capable of shutting down the reactor with a minimum required SDM with the highest worth CONTROL ROD stuck fully withdrawn (Ref. 1).

Fuel cladding damage does not occur when the core is operated outside the conditions of these LCOs during normal operation. However, fuel cladding damage could result if an accident occurs with the simultaneous violation of one or more of the LCOs limiting the regulating rod position, the APSR position, the AXIAL POWER IMBALANCE, and the QPT. This potential for fuel cladding damage exists because changes in the power distribution can cause increased power peaking and correspondingly increased local linear heat rates (LHRs).

The SDM requirement is met by limiting the regulating and safety rod insertion limits such that sufficient inserted reactivity is available in the rods to shut down the reactor to hot zero power with a reactivity margin that assumes that the maximum worth rod remains fully withdrawn upon trip (Ref. 4). Operation at the SDM based regulating rod insertion limit may also indicate that the maximum ejected rod worth could be equal to the limiting value.

Operation at the regulating rod insertion limits may cause the local core power to approach the maximum linear heat generation rate or peaking factor with the allowed QPT present.

The regulating rod and safety rod insertion limits ensure that the safety analysis assumptions for SDM, ejected rod worth, and power distribution peaking factors remain valid (Refs. 3, 5, and 6).

The regulating rod insertion limits LCO satisfies Criterion 2 of the NRC Policy Statement.

LCO

Regulating rod Group Physical Insertion

The limits on CONTROL ROD sequence, ^{and} including group overlap, and insertion positions as defined in the COLR, must be maintained because they ensure that the resulting power distribution is within the range of analyzed power distributions and that the SDM and ejected rod worth are maintained.

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(continued)

Regulating Rod Insertion Limits
B 3.2.1

BASES

ACTIONS
(continued)

violated. The area between the boundaries of acceptable operation and unacceptable operation, illustrated on the regulating rod insertion limit figures in the COLR, is the restricted region. The actions required when operation occurs in the restricted region are described under Condition A. The actions required when operation occurs in the unacceptable region are described under Condition C.

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A.1

Operation with the regulating rods in the restricted region shown on the regulating rod insertion figures specified in the COLR (or with any group sequence or overlap outside the limits specified in the COLR) potentially violates the LOCA LHR limits ($F_0(Z)$ limits), or the loss of flow accident DNB peaking limits ($F_{\Delta H}^N$ limits). The design calculations assume no deviation in nominal overlap between regulating rod groups. However, deviations of 5% of the core height above or below the nominal overlap may be typical and do not cause significant differences in core reactivity, in power distribution, or in rod worth, relative to the design calculations. The group sequence must be maintained because design calculations assume the regulating rods withdraw and insert in a predetermined order.

For verification that $F_0(Z)$ and $F_{\Delta H}^N$ are within their limits, SR 3.2.5.1 is performed using the Incore Detector System to obtain a three dimensional power distribution map. Verification that $F_0(Z)$ and $F_{\Delta H}^N$ are within their limits ensures that operation with the regulating rods inserted into the restricted region does not violate the ECCS or DNB criteria (Ref. 7). The required Completion Time of 2 hours is acceptable in that it allows the operator sufficient time for obtaining a power distribution map and for verifying the power peaking factors. Repeating SR 3.2.5.1 every 2 hours is acceptable because it ensures that continued verification of the power peaking factors is performed as core conditions (primarily regulating rod insertion and induced xenon redistribution) change.

Monitoring the power peaking factors $F_0(Z)$ and $F_{\Delta H}^N$ does not provide verification that the reactivity insertion rate on the rod trip or the ejected rod worth limit is maintained, because worth is a reactivity parameter rather than a power peaking parameter. However, if the COLR figures do not show

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TSTF-345

The actions required when operation occurs with the regulating rod group sequence or overlap requirements are not met are described under Condition C.

Regulating Rod Insertion Limits
B 3.2.1

BASES

ACTIONS

A.1 (continued)

that a rod insertion limit is ejected rod worth limited, then the ejected rod worth is no more limiting than the SDM based rod insertion limit in the core design (Ref. 8). Ejected rod worth limits are independently maintained by the Required Actions of Conditions A and B.

A.2

Indefinite operation with the regulating rods inserted in the restricted region, or in violation of the group sequence or overlap limits, is not prudent. Even if power peaking monitoring per Required Action A.1 is continued, reactivity limits may not be met and the abnormal regulating rod insertion or group configuration may cause an adverse xenon redistribution, may cause the limits on AXIAL POWER IMBALANCE to be exceeded, or may adversely affect the long term fuel depletion pattern. Therefore, power peaking monitoring is allowed for up to 24 hours after discovery of failure to meet the requirements of this LCO. This required Completion Time is reasonable based on the low probability of an event occurring simultaneously with the limit out of specification in this relatively short time period. In addition, it precludes long term depletion with abnormal group insertions or configurations, thereby limiting the potential for an adverse xenon redistribution.

Restoration of regulating groups to within their limits is required within

B.1

region

positioned

If the regulating rods cannot be restored within the acceptable operating limits shown on the figures in the COLR within the required Completion Time (i.e., Required Action A.2 not met), then the limits can be restored by reducing the THERMAL POWER to a value allowed by the regulating rod insertion limits in the COLR. The required Completion Time of 2 hours is sufficient to allow the operator to complete the power reduction in an orderly manner and without challenging the plant systems. Operation for up to 2 hours more in the restricted region shown in the COLR is acceptable, based on the low probability of an event occurring simultaneously with the limit out of specification in this relatively short time period. In addition, it precludes long term depletion with abnormal group insertions,

regulating rod position

(continued)

T-300

Regulating Rod Insertion Limits
B 3.2.1

BASES

ACTIONS

B.1 (continued)

~~or configurations and limits the potential for an adverse xenon redistribution.~~

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ⓓ 2.1

Operation in the unacceptable region shown on the figures in the COLR corresponds to power operation with an SDM less than the minimum required value or with the ejected rod worth greater than the allowable value. The regulating rods may be inserted too far to provide sufficient negative reactivity insertion following a reactor trip and the ejected rod worth may exceed its initial condition limit. Therefore, the RCS boron concentration must be increased to restore the regulating rod insertion to a value that preserves the SDM and ejected rod worth limits. The RCS boration must occur as described in Section B 3.1.1. The required Completion Time of 15 minutes to initiate boration is reasonable, based on limiting the potential xenon redistribution, the low probability of an accident occurring in this relatively short time period, and the number of steps required to complete this Action. This period allows the operator sufficient time for aligning the required valves and for starting the boric acid pumps. Boration continues until the regulating rod group positions are restored to at least within the restricted operational region, which restores the minimum SDM capability and reduces the potential ejected rod worth to within its limit.

ⓓ 2.1

The required Completion Time of 2 hours from initial discovery of a regulating rod group in the unacceptable region until its restoration to within the restricted operating region shown on the figures in the COLR allows sufficient time for borated water to enter the RCS from the chemical addition and makeup systems, thereby allowing the regulating rods to be withdrawn to the restricted region. Operation in the restricted region for up to an additional 2 hours is reasonable, based on limiting the potential for an adverse xenon redistribution, the low probability of an accident occurring in this relatively short time period, and the number of steps required to complete this Action.

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TSTF-345

C.1

Operation with the regulating rod groups out of sequence or with the group overlap limits exceeded may represent a condition beyond the assumptions used in the safety analyses. The design calculations assume no deviation in nominal overlap between regulating rod groups. However, small deviations in group overlap, as allowed by the COLR, may occur and would not cause significant differences in core reactivity, in power distribution, or rod worth, relative to the design calculations. Group sequence must be maintained because design calculations assume the regulating rods withdraw and insert in a predetermined order. The Completion Time of ~~1 hour~~ is intended to restrict operation in this condition because of the potential severity associated with gross violations of group sequence or overlap requirements. The ~~1 hour~~ Completion Time is based on operating experience which supports the restoration time without unnecessarily challenging unit operation and the low probability of an event occurring simultaneously with the limit out of specification.

2 hour

2 hours

Regulating Rod Insertion Limits
B 3.2.1

BASES

ACTIONS
(continued)

DA.2.2

The SDM and ejected rod worth limit can also be restored by reducing the THERMAL POWER to a value allowed by the regulating rod insertion limits in the COLR. The required Completion Time of 2 hours is sufficient to allow the operator to complete the power reduction in an orderly manner and without challenging the plant systems. Operation for up to 2 hours more in the restricted region shown in the COLR is acceptable, based on the low probability of an event occurring simultaneously with the limit out of specification in this relatively short time period. In addition, it precludes long term depletion with abnormal group insertions or configurations and limits the potential for an adverse xenon redistribution.

EAI

Required Actions and associated Completion Times of Conditions C or D are not met

If the ~~regulating rods cannot be restored to within the acceptable operating limits for the original THERMAL POWER, or if the power reduction cannot be completed within the required Completion Time,~~ then the reactor is placed in MODE 3, in which this LCO does not apply. This Action ensures that the reactor does not continue operating in violation of the peaking limits, the ejected rod worth, the reactivity insertion rate assumed as initial conditions in the accident analyses, or the required minimum SDM assumed in the accident analyses. The required Completion Time of 6 hours is reasonable, based on operating experience regarding the amount of time required to reach MODE 3 from RTP without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.2.1.1

This Surveillance ensures that the sequence and overlap limits are not violated. A Surveillance Frequency of 12 hours or 4 hours, depending on whether the CONTROL ROD drive sequence alarm is OPERABLE or not, is acceptable because little rod motion occurs in 4 hours due to fuel burnup, and the probability of a deviation occurring simultaneously with an inoperable sequence monitor in this relatively short time frame is low. Also, the Frequency

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