Industry/TSTF Standard Technical Specification Change Traveler

Fuel loading with control rods withdrawn or removed from defueled core cells

Priority/Classification 3) Improve Specifications

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

Description:

The proposed change adds an additional acceptable method of fuel movement when control rods are removed or withdrawn from defueled core cells in accordance with LCO 3.10.6. The proposed change would allow fuel loading if a positive means of assuring fuel assemblies cannot be loaded into a core cell with a withdrawn or removed control rod is in effect. The positive means entails a physical barrier such that even if refueling procedures were violated and an attempt was made to load a fuel assembly into a core cell with a withdrawn or removed control rod the action would be prevented.

This change is needed for those plants which perform fuel shuffles instead of full core offloads during refueling since the current allowance during spiral reload sequence is not applicable. The proposed activities will reduce critical path time caused by the currently required suspension of refueling activities during the time that Control Rod Drive work is being performed.

Justification:

The requirements prohibiting fuel loading were placed in the standard TS as part of the requirements to resolve IE Information Notice No. 83-35, "Fueling Movement with Control Rods Withdrawn at BWRs" (IEN 83-85). IEN 83-85 details instances where fuel assemblies were loaded into core cells while the control rod was withdrawn and discusses that the GE had issued Service Information Letter (SIL) No. 372.

SIL No. 372 discusses a potential event where 8 fuel assemblies are loaded into 2 adjacent core cells where the control rods are withdrawn and no action is taken to recover from the errors. In this SIL, GE identified that the probability of such an event occurring was extremely low but potentially slightly higher than 10-6 per reactor year. To lower the probability of the event further to where it need not be considered credible (i.e., below 10-6 per reactor year), GE recommended that the additional administrative control of prohibiting loading fuel with withdrawn rods be enforced.

The proposed change will provide an additional way to meet the intent of the original GE recommendation. The proposed change will provide the additional allowance to perform fuel loading only if an additional positive means of assuring fuel assemblies cannot be loaded into a core cell with a withdrawn or removed control rod is in effect. The positive means will entail a physical barrier such that, even if refueling procedures were violated and an attempt was made to load a fuel assembly into a core location with a withdrawn or removed control rod, the action would be prevented. This requirement provides sufficient additional restrictions to meet the intent of then GE recommendation to add additional administrative controls to prevent the postulated event from occurring.

Revision History

OG Revision 0 Revision Status: Closed

Revision Proposed by: Grand Gulf

Revision Description:
Original Issue

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Owners Group Review Information

Date Originated by OG: 22-Nov-96

Owners Group Comments
(No Comments)

Owners Group Resolution: Approved Date: 22-Nov-96

TSTF Review Information

TSTF Received Date: 02-Dec-96 Date Distributed for Review 16-May-97

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

TSTF Comments:
WOG - NA

TSTF Resolution: Withdrawn Date: 05-Feb-98

OG Revision 1 Revision Status: Active Next Action: NRC

Revision Proposed by: BWROG

Revision Description:
Editorial changes to Insert

Owners Group Review Information

Date Originated by OG: 03-Nov-97

Owners Group Comments
(No Comments)

Owners Group Resolution: Approved Date: 03-Nov-97

TSTF Review Information

TSTF Received Date: 01-Dec-97 Date Distributed for Review 01-Dec-97

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

TSTF Comments:

Delete the "or removed" in LCO and SR inserts as the Bases incorporate removed control rods with withdrawn control rods.
BWROG Only. Approved.

TSTF Resolution: Approved Date: 05-Feb-98

Incorporation Into the NUREGs

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

NUREG Rev Incorporated:

Affected Technical Specifications

LCO 3.10.6 Multiple Control Rod Withdrawal - Refueling

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LCO 3.10.6 Bases	Multiple Control Rod Withdrawal - Refueling
SR 3.10.6.3	Multiple Control Rod Withdrawal - Refueling
SR 3.10.6.3 Bases	Multiple Control Rod Withdrawal - Refueling
SR 3.10.6.4	Multiple Control Rod Withdrawal - Refueling Change Description: New Surveillance
SR 3.10.6.4 Bases	Multiple Control Rod Withdrawal - Refueling Change Description: New Surveillance

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3.10 SPECIAL OPERATIONS

3.10.6 Multiple Control Rod Withdrawal—Refueling

LCO 3.10.6 The requirements of LCO 3.9.3, "Control Rod Position"; LCO 3.9.4, "Control Rod Position Indication"; and LCO 3.9.5, "Control Rod OPERABILITY—Refueling," may be suspended, and the "full in" position indicators may be bypassed for any number of control rods in MODE 5, to allow withdrawal of these control rods, removal of associated control rod drives (CRDs), or both, provided the following requirements are met:

a. The four fuel assemblies are removed from the core cells associated with each control rod or CRD to be removed;

b. All other control rods in core cells containing one or more fuel assemblies are fully inserted; and

c. Fuel assemblies shall only be loaded in compliance with an approved [spiral] reload sequence.

1.

Insert 3.10-16A

APPLICABILITY: MODE 5 with LCO 3.9.3, LCO 3.9.4, or LCO 3.9.5 not met.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more of the above requirements not met.	A.1 Suspend withdrawal of control rods and removal of associated CRDs. AND A.2 Suspend loading fuel assemblies. AND	Immediately Immediately (continued)

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INSERT 3.10-16A

OR

2. Fuel assemblies shall only be loaded when a positive means of assuring fuel assemblies cannot be loaded into a core cell associated with a withdrawn ~~or removed~~ control rod or removed CRD is in effect.

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ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.3.1 Initiate action to fully insert all control rods in core cells containing one or more fuel assemblies. OR A.3.2 Initiate action to satisfy the requirements of this LCO.	Immediately Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.10.6.1	Verify the four fuel assemblies are removed from core cells associated with each control rod or CRD removed.	24 hours
SR 3.10.6.2	Verify all other control rods in core cells containing one or more fuel assemblies are fully inserted.	24 hours
SR 3.10.6.3	----------NOTE---------- (3) 1. Only required to be met during fuel loading. ---------- (Insert 3.10-17A) Verify fuel assemblies being loaded are in compliance with an approved [spiral] reload sequence. (Insert 3.10-17B)	24 hours

INSERT 3.10-17A

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2. Not required to be met if SR 3.10.6.4 is satisfied for LCO 3.10.6.c.2 requirements.

INSERT 3.10-17B

SR 3.10.6.4	----------NOTES---------- 1. Only required to be met during fuel loading. 2. Not required to be met if SR 3.10.6.3 is satisfied for LCO 3.10.6.c.1 requirements. --- Verify a positive means of assuring fuel assemblies cannot be loaded into a core cell associated with a withdrawn or ~~removed~~ control rod or removed CRD is in effect.	24 hours

BASES

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APPLICABLE SAFETY ANALYSES (continued)

cell. With no fuel assemblies in the core cell, the associated control rod has no reactivity control function and is not required to remain inserted. Prior to reloading fuel into the cell, however, the associated control rod must be inserted to ensure that an inadvertent criticality does not occur, as evaluated in the Reference 1 analysis.

As described in LCO 3.0.7, compliance with Special Operations LCOs is optional, and therefore, no criteria of the NRC Policy Statement apply. Special Operations LCOs provide flexibility to perform certain operations by appropriately modifying requirements of other LCOs. A discussion of the criteria satisfied for the other LCOs is provided in their respective Bases.

LCO

As described in LCO 3.0.7, compliance with this Special Operations LCO is optional. Operation in MODE 5 with either LCO 3.9.3, "Control Rod Position," LCO 3.9.4, "Control Rod Position Indication," or LCO 3.9.5, "Control Rod OPERABILITY—Refueling," not met, can be performed in accordance with the Required Actions of these LCOs without meeting this Special Operations LCO or its ACTIONS. If multiple control rod withdrawal or removal, or CRD removal is desired, all four fuel assemblies are required to be removed from the associated cells. Prior to entering this LCO, any fuel remaining in a cell whose CRD was previously removed under the provisions of another LCO must be removed. "Withdrawal" in this application includes the actual withdrawal of the control rod as well as maintaining the control rod in a position other than the full-in position, and reinserting the control rod.

When fuel is loaded into the core with multiple control rods withdrawn, special spiral reload sequences are used to ensure that reactivity additions are minimized. Spiral reloading encompasses reloading a cell (four fuel locations immediately adjacent to a control rod) on the edge of a continuous fueled region (the cell can be loaded in any sequence). Otherwise, all control rods must be fully inserted before loading fuel.

Insert B3.10-27A

(continued)

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INSERT B 3.10-27A

Alternately, a positive means of assuring fuel assemblies cannot be loaded into a core cell associated with a withdrawn or removed control rod or removed CRD will be in effect.

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BASES (continued)

APPLICABILITY

Operation in MODE 5 is controlled by existing LCOs. The exceptions from other LCO requirements (e.g., the ACTIONS of LCO 3.9.3, LCO 3.9.4, or LCO 3.9.5) allowed by this Special Operations LCO are appropriately controlled by requiring all fuel to be removed from cells whose "full in" indicators are allowed to be bypassed.

ACTIONS

A.1, A.2.1, and A.2.2

If one or more of the requirements of this Special Operations LCO are not met, the immediate implementation of these Required Actions restores operation consistent with the normal requirements for refueling (i.e., all control rods inserted in core cells containing one or more fuel assemblies) or with the exceptions granted by this Special Operations LCO. The Completion Times for Required Action A.1, Required Action A.2.1, and Required Action A.2.2 are intended to require that these Required Actions be implemented in a very short time and carried through in an expeditious manner to either initiate action to restore the affected CRDs and insert their control rods, or initiate action to restore compliance with this Special Operations LCO.

SURVEILLANCE REQUIREMENTS

SR 3.10.6.1, SR 3.10.6.2, and ~~SR 3.10.6.3~~

Periodic verification of the administrative controls established by this Special Operations LCO is prudent to preclude the possibility of an inadvertent criticality. The 24 hour Frequency is acceptable, given the administrative controls on fuel assembly and control rod removal, and takes into account other indications of control rod status available in the control room.

Insert B 3.10-28A

REFERENCES

1. FSAR, Section [15.1.13].

INSERT B 3.10-28A

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SR 3.10.6.3 and SR 3.10.6.4

SR 3.10.6.3 and SR 3.10.6.4 provide alternate methods of meeting the requirements of LCO 3.10.6.c when loading fuel assemblies (loading includes incore fuel shuffle since the fuel assembly being moved must be loaded into the new position). Each of these surveillances are to ensure the periodic verification of the administrative controls established by this Special Operations LCO to preclude the possibility of an inadvertent criticality. SR 3.10.6.3 requires that an approved spiral reload sequence be used when this SR is relied upon to meet the LCO 3.10.6.c requirements. Alternately, a positive means of assuring fuel assemblies cannot be loaded into any core cell with a withdrawn or removed control rod (SR 3.10.6.4) may be used to meet LCO 3.10.6.c.

SR 3.10.6.3 requires the compliance to an approved spiral reload sequence whenever control rod(s) are withdrawn or removed in accordance with this LCO and the possibility exists that fuel assemblies could be loaded in to a core cell with withdrawn or removed control rod(s). SR 3.10.6.3 requires that when loading fuel into the core with multiple control rods withdrawn, special spiral reload sequences are used to ensure that reactivity additions are minimized. Spiral reloading encompasses reloading a cell (four fuel locations immediately adjacent to a control rod) on the edge of a continuous fueled region (the cell can be loaded in any sequence). This SR in not required to be met when SR 3.10.6.4 is satisfied for LCO 3.10.6.c.2 requirements.

SR 3.10.6.4 provides an alternate method to assure that an unacceptable reactivity addition does not occur during fuel loading when control rod(s) are withdrawn or removed in accordance with this LCO. As a backup to refueling procedures this surveillance verifies the LCO 3.10.6.c.2 requirement that a positive means of assuring fuel assemblies cannot be loaded into a core cell with a withdrawn or removed control rod is in effect. The positive means entails a physical barrier such that even if refueling procedures were violated and an attempt was made to load a fuel assembly into a core cell with a withdrawn or removed control rod the action would be prevented (e.g., multiple control rod blade guides are placed in the core cell or a mechanical blocking device is placed in a core cell such that all four fuel assembly locations are blocked from fuel insertion). This requirement provides sufficient additional restrictions considering the plant condition because with no fuel assemblies in the core cell, the associated control rod has no reactivity control function and any fuel loading error other than loading the fuel assembly into a core cell with a withdrawn or removed control rod is bounded by the analyzed fuel assembly mispositioning events. This SR is not required to be met when SR 3.10.6.3 is satisfied for LCO 3.10.6.c.1 requirements.

The 24 hour Frequency of these surveillance is acceptable, given the administrative controls on fuel assembly movement and control rod removal.

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3.10 SPECIAL OPERATIONS

3.10.6 Multiple Control Rod Withdrawal—Refueling

LCO 3.10.6 The requirements of LCO 3.9.3, "Control Rod Position"; LCO 3.9.4, "Control Rod Position Indication"; and LCO 3.9.5, "Control Rod OPERABILITY—Refueling," may be suspended, and the "full in" position indicators may be bypassed for any number of control rods in MODE 5, to allow withdrawal of these control rods, removal of associated control rod drives (CRDs), or both, provided the following requirements are met:

a. The four fuel assemblies are removed from the core cells associated with each control rod or CRD to be removed;

b. All other control rods in core cells containing one or more fuel assemblies are fully inserted; and

1.

c. Fuel assemblies shall only be loaded in compliance with an approved [spiral] reload sequence.

Insert 3.10-16A

APPLICABILITY: MODE 5 with LCO 3.9.3, LCO 3.9.4, or LCO 3.9.5 not met.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more of the above requirements not met.	A.1 Suspend withdrawal of control rods and removal of associated CRDs. AND A.2 Suspend loading fuel assemblies AND	Immediately Immediately (continued)

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INSERT 3.10-16A

OR

2. Fuel assemblies shall only be loaded when a positive means of assuring fuel assemblies cannot be loaded into a core cell associated with a withdrawn or removed control rod ~~or removed~~ CRD is in effect.

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ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.3.1 Initiate action to fully insert all control rods in core cells containing one or more fuel assemblies. OR A.3.2 Initiate action to satisfy the requirements of this LCO.	Immediately Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.10.6.1	Verify the four fuel assemblies are removed from core cells associated with each control rod or CRD removed.	24 hours
SR 3.10.6.2	Verify all other control rods in core cells containing one or more fuel assemblies are fully inserted.	24 hours
SR 3.10.6.3	NOTE 1. Only required to be met during fuel loading. Verify fuel assemblies being loaded are in compliance with an approved [spiral] reload sequence.	24 hours

Insert 3.10-17A

Insert 3.10-17B

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INSERT 3.10-17A

2. Not required to be met if SR 3.10.6.4 is satisfied for LCO 3.10.6.c.2 requirements.

INSERT 3.10-17B

SR 3.10.6.4	----------NOTES---------- 1. Only required to be met during fuel loading. 2. Not required to be met if SR 3.10.6.3 is satisfied for LCO 3.10.6.c.1 requirements. ----------	
	Verify a positive means of assuring fuel assemblies cannot be loaded into a core cell associated with a withdrawn or ~~removed~~ control rod or removed CRD is in effect.	24 hours

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BASES

APPLICABLE SAFETY ANALYSES (continued)

the cell. With no fuel assemblies in the core cell, the associated control rod has no reactivity control function and is not required to remain inserted. Prior to reloading fuel into the cell, however, the associated control rod must be inserted to ensure that an inadvertent criticality does not occur, as evaluated in the Reference 1 analysis.

As described in LCO 3.0.7, compliance with Special Operations LCOs is optional, and therefore, no criteria of the NRC Policy Statement apply. Special Operations LCOs provide flexibility to perform certain operations by appropriately modifying requirements of other LCOs. A discussion of the criteria satisfied for the other LCOs is provided in their respective Bases.

LCO

As described in LCO 3.0.7, compliance with this Special Operations LCO is optional. Operation in MODE 5 with LCO 3.9.3, "Control Rod Position," LCO 3.9.4, "Control Rod Position Indication," or LCO 3.9.5, "Control Rod OPERABILITY—Refueling," not met, can be performed in accordance with the Required Actions of these LCOs without meeting this Special Operations LCO or its ACTIONS. If multiple control rod withdrawal or removal, or CRD removal is desired, all four fuel assemblies are required to be removed from the associated cells. Prior to entering this LCO, any fuel remaining in a cell whose CRD was previously removed under the provisions of another LCO must be removed. "Withdrawal" in this application includes the actual withdrawal of the control rod as well as maintaining the control rod in a position other than the full-in position, and reinserting the control rod.

When loading fuel into the core with multiple control rods withdrawn, special spiral reload sequences are used to ensure that reactivity additions are minimized. Spiral reloading encompasses reloading a cell (four fuel locations immediately adjacent to a control rod) on the edge of a continuous fueled region (the cell can be loaded in any sequence). Otherwise, all control rods must be fully inserted before loading fuel.

Insert B3.10-27A

(continued)

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INSERT B 3.10-27A

Alternately, a positive means of assuring fuel assemblies cannot be loaded into a core cell associated with a withdrawn or removed control rod or removed CRD will be in effect.

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BASES (continued)

APPLICABILITY

Operation in MODE 5 is controlled by existing LCOs. The exceptions from other LCO requirements (e.g., the ACTIONS of LCO 3.9.3, LCO 3.9.4 or LCO 3.9.5) allowed by this Special Operations LCO are appropriately controlled by requiring all fuel to be removed from cells whose "full in" indicators are allowed to be bypassed.

ACTIONS

A.1, A.2.1, and A.2.2

If one or more of the requirements of this Special Operations LCO are not met, the immediate implementation of these Required Actions restores operation consistent with the normal requirements for refueling (i.e., all control rods inserted in core cells containing one or more fuel assemblies) or with the exceptions granted by this Special Operations LCO. The Completion Times for Required Action A.1, Required Action A.2.1, and Required Action A.2.2 are intended to require that these Required Actions be implemented in a very short time and carried through in an expeditious manner to either initiate action to restore the affected CRDs and insert their control rods, or initiate action to restore compliance with this Special Operations LCO.

SURVEILLANCE REQUIREMENTS

SR 3.10.6.1, SR 3.10.6.2, and SR 3.10.6.3

Periodic verification of the administrative controls established by this Special Operations LCO is prudent to preclude the possibility of an inadvertent criticality. The 24 hour Frequency is acceptable, given the administrative controls on fuel assembly and control rod removal, and takes into account other indications of control rod status available in the control room.

Insert B3.10-28A

REFERENCES

1. FSAR, Section [15.4.1.1].

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INSERT B 3.10-28A

SR 3.10.6.3 and SR 3.10.6.4

SR 3.10.6.3 and SR 3.10.6.4 provide alternate methods of meeting the requirements of LCO 3.10.6.c when loading fuel assemblies (loading includes incore fuel shuffle since the fuel assembly being moved must be loaded into the new position). Each of these surveillances are to ensure the periodic verification of the administrative controls established by this Special Operations LCO to preclude the possibility of an inadvertent criticality. SR 3.10.6.3 requires that an approved spiral reload sequence be used when this SR is relied upon to meet the LCO 3.10.6.c requirements. Alternately, a positive means of assuring fuel assemblies cannot be loaded into any core cell with a withdrawn or removed control rod (SR 3.10.6.4) may be used to meet LCO 3.10.6.c.

SR 3.10.6.3 requires the compliance to an approved spiral reload sequence whenever control rod(s) are withdrawn or removed in accordance with this LCO and the possibility exists that fuel assemblies could be loaded in to a core cell with withdrawn or removed control rod(s). SR 3.10.6.3 requires that when loading fuel into the core with multiple control rods withdrawn, special spiral reload sequences are used to ensure that reactivity additions are minimized. Spiral reloading encompasses reloading a cell (four fuel locations immediately adjacent to a control rod) on the edge of a continuous fueled region (the cell can be loaded in any sequence). This SR in not required to be met when SR 3.10.6.4 is satisfied for LCO 3.10.6.c.2 requirements.

SR 3.10.6.4 provides an alternate method to assure that an unacceptable reactivity addition does not occur during fuel loading when control rod(s) are withdrawn or removed in accordance with this LCO. As a backup to refueling procedures this surveillance verifies the LCO 3.10.6.c.2 requirement that a positive means of assuring fuel assemblies cannot be loaded into a core cell with a withdrawn or removed control rod is in effect. The positive means entails a physical barrier such that even if refueling procedures were violated and an attempt was made to load a fuel assembly into a core cell with a withdrawn or removed control rod the action would be prevented (e.g., multiple control rod blade guides are placed in the core cell or a mechanical blocking device is placed in a core cell such that all four fuel assembly locations are blocked from fuel insertion). This requirement provides sufficient additional restrictions considering the plant condition because with no fuel assemblies in the core cell, the associated control rod has no reactivity control function and any fuel loading error other than loading the fuel assembly into a core cell with a withdrawn or removed control rod is bounded by the analyzed fuel assembly mispositioning events. This SR is not required to be met when SR 3.10.6.3 is satisfied for LCO 3.10.6.c.1 requirements.

The 24 hour Frequency of these surveillance is acceptable, given the administrative controls on fuel assembly movement and control rod removal.