Entergy

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Mike Bellamy
Site Vice President

August 16 , 2002

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555-0001

SUBJECT: Entergy Nuclear Operations, Inc.
Pilgrim Nuclear Power Station
Docket No. 50-293
License No. DPR-35

Request for Amendment to Technical Specifications
Associated With the Refueling Interlocks, Specifications 3/4.10.A and D

REFERENCE: NUREG-1433, Standard Technical Specifications for General Electric Plants, BWR/4

LETTER NUMBER: 2.02.063

Dear Sir or Madam:

Pursuant to 10 CFR 50.90, Entergy Nuclear Operations, Inc. (Entergy) hereby proposes to amend the Pilgrim Station Operating License, DPR-35. The proposed amendment will provide an alternative required action if the refueling interlocks become inoperable during fuel movement and enhance consistency of Pilgrim's Technical Specifications with the General Electric Boiling Water Reactor Standard Technical Specifications. This change is consistent with changes previously approved by the NRC for other reactor licensees.

Entergy has reviewed the proposed amendment in accordance with 10 CFR 50.92 and concludes it does not involve a significant hazards consideration.

Entergy requests approval of this change prior to March 31, 2003 to support the Pilgrim Refueling Outage that is scheduled to commence on April 19, 2003. Once approved, the amendment will be implemented within 60 days.

Please contact Mr. Bryan Ford, Licensing Manager, at (508) 830-8403, if you have any questions or require additional information.

I declare under penalty of perjury that the foregoing is true and correct. Executed on this 16th day of August 2002.

Sincerely,

Robert M. Bellamy

Enclosure: Evaluation of the Proposed Changes – 10 pages

Attachments:

1. Proposed Technical Specification and Bases Changes – 9 pages: 4 pages (mark-up) plus 5 pages (insertion)
2. List of Regulatory Commitments – 1 page

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ENCLOSURE

Evaluation Of The Proposed Changes

Subject: Refueling Equipment Interlocks

1. DESCRIPTION

2. PROPOSED CHANGES

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1. DESCRIPTION

This letter is a request to amend Facility Operating License DPR-35 for Pilgrim Nuclear Power Station. The proposed changes modify Technical Specifications 3/4.10.A, "Refueling Interlocks," to make the sections consistent with NUREG-1433, Standard Technical Specifications, General Electric Plants, BWR 4, Revision 2, and add an alternative required action if the refueling interlocks become inoperable. Also included, are conforming changes to Specifications 3/4.10.D, "Multiple Control Rod Removal."

The proposed change would allow the plant to perform fuel movements in the reactor vessel should the refueling equipment interlocks become inoperable. Similar TS changes have been approved for Grand Gulf Nuclear Station (Reference 1) and Browns Ferry Nuclear Plant (Reference 2).

Entergy requests approval of this change prior to March 31, 2003 to support the Pilgrim Refueling Outage that is scheduled to commence on April 19, 2003.

2. PROPOSED CHANGES

The proposed changes to Specification 3.10.A and Specification 4.10.A are as follows:

a. Limiting Condition for Operation (LCO) Requirements

The requirements of Specification 3.10.A concerning the equipment required operable and when the equipment is required to be operable is modified to reflect the different functions of the equipment and when these functions are needed.

The current Specification 3.10.A states, "During core alterations when fuel is in the vessel the reactor mode switch shall be locked in the "Refuel" position and the refueling interlocks shall be operable." The proposed Specification 3.10.A divides the requirements into two parts 1) requirements for the refueling equipment interlocks and 2) requirements for the one-rod-out interlock.

1. The proposed requirement for the refueling equipment interlocks in Specification 3.10.A.1 is "During in-vessel fuel movement with equipment associated with the interlocks the refueling equipment interlocks shall be operable."

2. The proposed requirement for the one-rod-out interlock in Specification 3.10.A.2 is "When the reactor vessel head is removed and any control rod is withdrawn the one-rod-out interlock shall be operable."

b. Required Actions

The current Specification 3.10.A has the implied required action of halting the associated activities when the refueling interlocks (i.e., the refueling equipment interlocks and the one-rod-out interlock) are not operable. Consistent with the changes proposed for the LCO requirements, the required actions are proposed to be divided into two parts: 1) requirements for the refueling equipment interlocks and 2) requirements for the one-rod-out interlock. The required actions are then

made consistent with the function being addressed.

1. The proposed requirement in Specification 3.10.A.1 if one or more required refueling equipment interlocks are inoperable is to a) suspend in-vessel fuel movement with equipment associated with the inoperable interlock(s) immediately or b) insert a control rod withdrawal block and verify all control rods are fully inserted.

2. The proposed requirement in Specification 3.10.A.2 if the one-rod-out interlock is inoperable is to a) suspend control rod withdrawal immediately and b) initiate action to fully insert all insertable control rods in core cells containing one or more fuel assemblies immediately.

c. Surveillance Requirements

The current Specification 4.10.A states "Prior to any fuel handling with the head off the reactor vessel, the refueling interlocks shall be functionally tested. They shall be tested at weekly intervals thereafter until no longer required. They shall also be tested following any repair work associated with interlocks."

Consistent with the changes proposed for Specification 3.10.A, the proposed surveillance requirements in Specification 4.10.A are divided into two parts: 1) requirements for the refueling equipment interlocks and 2) requirements for the one-rod-out interlock. The required surveillances are then made consistent with the function being addressed.

1. The proposed requirements in Specification 4.10.A.1 for the refueling equipment interlocks is that prior to in-vessel fuel movement with equipment associated with the refueling equipment interlocks, the interlocks shall be functionally tested. They shall be tested at weekly intervals thereafter until no longer required.

2. The proposed requirements in Specification 4.10.A.2 for the one-rod-out interlock is that when the reactor vessel head is removed the one-rod-out interlock shall be tested as follows:

   a. Prior to withdrawing a control rod the reactor mode switch shall be verified locked in the refuel position. It shall be verified every 12 hours thereafter until no longer required.

   b. Within 1 hour of withdrawing a control rod the one-rod out interlock shall be functionally tested. It shall be tested at weekly intervals thereafter until no longer required.

The proposed changes to Specifications 3.10.D.1.a and 4.10.D.1.a are made for consistency with the proposed changes to Specifications 3.10.A and 4.10.A. The changes are as follows:

1. Deletion of the unnecessary cross-reference to Specification 3.10.A in Specification 3.10.D.1.a and Specification 4.10.D.1.a.

2. Replacement of the reference to the Refuel position "one rod out" interlock with reference to the Refueling Interlocks.

Also included in this submittal for information are the corresponding Bases changes to be made consistent with Technical Specification 5.5.6 (Bases Control Program) following approval of this request.

3. BACKGROUND

The refueling equipment interlocks are described in Section 7.6 of the Updated Final Safety Analysis Report (UFSAR) and in the Bases for TS LCO 3.10.A. UFSAR Sections R.2.3.4 and R.2.3.6 describe the transient analysis assumptions for the control rod removal error and the fuel assembly insertion error during refueling.

The Refueling Interlocks controlled by Specifications 3.10.A and 4.10.A have two functions. The first function is the control of combinations of control rod and fuel movement within the reactor vessel and the second is the control of combinations of control rod movement. These two functions are discussed separately below.

1. Refueling Equipment Interlocks

   Refueling equipment interlocks restrict the operation of the refueling equipment or the withdrawal of control rods to reinforce unit procedures that prevent the reactor from achieving criticality during refueling. The refueling interlock circuitry senses the conditions of the refueling equipment and the control rods. Depending on the sensed conditions, interlocks are actuated to prevent the operation of the refueling equipment or the withdrawal of control rods.

   Circuitry is provided to sense the position of the refueling platform, the loading of the refueling platform fuel grapple, and the full insertion of all control rods. Additionally, inputs are provided for the loading of the refueling platform frame mounted hoist, the loading of the refueling platform monorail mounted hoist, and the full retraction of the fuel grapple. With the reactor mode switch in the shutdown or refuel position, the indicated conditions are combined in logic circuits to determine if all restrictions on refueling equipment operations and control rod insertion are satisfied.

   A control rod not at its full-in position interrupts power to the refueling equipment and prevents operating the equipment over the reactor core when loaded with a fuel assembly. Conversely, the refueling equipment located over the core and loaded with fuel inserts a control rod withdrawal block in the Reactor Manual Control System to prevent withdrawing a control rod.

   The refueling platform has two mechanical switches that open before the platform or

any of its hoists are physically located over the reactor vessel. All refueling hoists have switches that open when the hoists are loaded with fuel. The refueling interlocks use these indications to prevent operation of the refueling equipment with fuel loaded over the core whenever any control rod is withdrawn, or to prevent control rod withdrawal whenever fuel loaded refueling equipment is over the core.

2. Refuel Position One-Rod-Out Interlock

   The refuel position one-rod-out interlock restricts the movement of control rods to reinforce unit procedures that prevent the reactor from becoming critical during refueling operations. During refueling operations, no more than one control rod is permitted to be withdrawn except as allowed by Specification 3.10.D.

   The refuel position one-rod-out interlock prevents the selection of a second control rod for movement when any other control rod is not fully inserted. It is a logic circuit that has redundant channels. It uses the all-rods-in signal (from the control rod full-in position indicators) and a rod selection signal (from the Reactor Manual Control System).

The proposed TS change would allow fuel movement to continue if the refueling interlocks were inoperable provided that a control rod withdraw block is placed in effect and that all control rods are verified to be fully inserted (new required Action 3.10.A.1.b). These new required Actions ensure that fuel loading will not occur with a control rod withdrawn. The approval of this TS change would allow refueling activities to continue in the event of the failure of one or more of the refueling interlocks, while continuing to maintain a sufficient level of protection against inadvertent criticality. The change will be particularly beneficial during outages where refueling operations constitute critical path activities as a contingency provision for unexpected refuel interlock equipment problems.

The related Surveillance Requirement (SR) 4.10.A.1 has a weekly frequency. Should the weekly SR interval become due shortly before the completion of fuel movement activities, it would be beneficial to have the option afforded by this change to apply the new 3.10.A.1 required Actions, rather than halting refueling activities to perform the SR, if fuel movement was critical path for the outage. This would reduce the risk associated with halting and resuming fuel bundle movements.

4. TECHNICAL ANALYSIS

The requirements of Specification 3.10.A concerning the equipment required operable and when the equipment is required to be operable is modified to reflect the different functions of the equipment and when these functions are needed. The proposed changes make the Specifications consistent with NUREG-1433, Standard Technical Specifications, General Electric Plants, BWR 4, Revision 2, and an alternative required action if the refueling interlocks become inoperable is added.

The current Specification 3.10.A states, "During core alterations when fuel is in the vessel the reactor mode switch shall be locked in the "Refuel" position and the refueling interlocks shall be operable." The proposed Specification 3.10.A divides the requirements into two parts 1) requirements for the refueling equipment interlocks and 2) requirements for the one-rod-out interlock.

Consistent with the changes proposed for Specification 3.10.A, the surveillance requirements in Specification 4.10.A are proposed to be divided into two parts: 1) requirements for the refueling equipment interlocks and 2) requirements for the one-rod-out interlock. The required surveillances are then made consistent with the function being addressed.

The justifications for the individual changes are discussed below.

1. Refueling Equipment Interlocks – Specifications 3.10.A.1 and 4.10.A.1

   a. LCO Requirements

      The proposed requirement for the refueling equipment interlocks in Specification 3.10.A.1 are "During in-vessel fuel movement with equipment associated with the interlocks the refueling equipment interlocks shall be operable."

      To prevent criticality during refueling, the refueling interlocks ensure that fuel assemblies are not loaded with any control rod withdrawn. To prevent these conditions from developing, the refueling interlocks are required to be operable. The inputs are combined in logic circuits which provide refueling equipment or control rod blocks to prevent operations that could result in criticality during refueling operations. Therefore, the proposed requirement is consistent with the required function of the equipment.

   b. Required Actions

      The current Specification 3.10.A has the implied required action of halting the associated activities when the refueling interlocks (i.e., the refueling equipment interlocks and the one-rod-out interlock) are not operable. Consistent with the changes proposed for the LCO requirements, the proposed required actions in LCO 3.10.A.1 are divided into two parts: a) suspend in-vessel fuel movement with equipment associated with the inoperable interlock(s) immediately or b) insert a control rod withdrawal block and verify all control rods are fully inserted.

      With one or more of the required refueling equipment interlocks inoperable (does not include the one-rod-out interlock addressed in Specification 3.10.A.2), the unit must be placed in a condition in which the Specification does not apply or the interlocks are not needed. This can be performed by ensuring fuel assemblies are not moved in the reactor vessel or by ensuring that the control rods are inserted and cannot be withdrawn.

      The proposed Specification 3.10.A.1.a requires that in-vessel fuel movement with the affected refueling equipment must be immediately (i.e., in a time frame consistent with safety) suspended. This action ensures that operations are not performed with equipment that would potentially not be blocked from unacceptable operations (e.g., loading fuel into a cell with a control rod withdrawn). Suspension of in-vessel fuel movement shall not preclude completion of movement of a component to a safe position. This action is consistent with the implied requirements of the current Specification 3.10.A.

Alternately, the proposed Specification 3.10.A.1.b requires that a control rod withdrawal block be inserted and that all control rods subsequently verified to be fully inserted. This action ensures that control rods cannot be inappropriately withdrawn because an electrical or hydraulic block to control rod withdrawal is in place. Like Specification 3.10.A.1.a these actions ensure that unacceptable operations are blocked (e.g., loading fuel into a cell with the control rod withdrawn). This alternative action is consistent the actions previously approved for Grand Gulf Nuclear Station (Reference 1) and Browns Ferry Nuclear Plant (Reference 2).

c. Surveillance Requirements

The proposed requirement in Specification 4.10.A.1 for the refueling equipment interlocks is that prior to in-vessel fuel movement with equipment associated with the refueling equipment interlocks, the interlocks shall be functionally tested. They shall be tested at weekly intervals thereafter until no longer required.

The proposed surveillance requirement is consistent with the current requirements with the removal of the requirement to perform the testing following any repair work associated with the interlocks. This post maintenance test requirement is more appropriately controlled by procedures required by Technical Specification 5.4.1.a and removal from the Technical Specifications is consistent with NUREG-1433.

2. One-rod-out Interlock – Specifications 3.10.A.2 and 4.10.A.2

a. LCO Requirements

The proposed requirements for the one-rod-out interlock in Specification 3.10.A.2 is "When the reactor vessel head is removed with the reactor mode switch in the Refuel position and any control rod is withdrawn the one-rod-out interlock shall be operable." The proposed requirement is different from the current requirement in that it only requires the one-rod-out interlock to be operable when a control rod is withdrawn and the vessel head is removed.

The current requirement requires the one-rod-out interlock to be operable during core alterations. As discussed in Technical Specification Section 1.0, Definitions, core alterations can only occur when the vessel head is removed. Therefore, the proposed requirement of when the reactor vessel head is removed is consistent with the current requirement. The other change proposed is an additional proposed restriction on when the one-rod-out interlock is required to be operable of when any control rod is withdrawn. This change makes the operability requirements of the interlock consistent with the function of the one-rod-out interlock (i.e., to control combinations of control rod movement). Therefore, the proposed requirement is consistent with the required function of the equipment.

b. Required Actions

The Specification 3.10.A has the implied required action of halting the associated activities when the refueling interlocks (i.e., the refueling equipment interlocks and the one-rod-out interlock) are not operable. Consistent with the changes proposed for the LCO requirements, the required actions are proposed to be divided into two parts 1) requirements for the refueling equipment interlocks and 2) requirements for the one-rod-out interlock. The required actions are then made consistent with the function being addressed.

The proposed requirements in Specification 3.10.A.2 if the one-rod-out interlock is inoperable is to suspend control rod withdrawal immediately and initiate action to fully insert all insertable control rods in core cells containing one or more fuel assemblies immediately. The proposed actions are more restrictive than the current requirements by requiring that all insertable control rods in core cells containing one or more fuel assemblies be inserted immediately. The proposed actions provide the appropriate actions if the one-rod-out interlock is inoperable by removing the potential for more than one control rod to be removed from core cells containing one or more fuel assemblies.

c. Surveillance Requirements

Consistent with the changes proposed for the Specification 3.10.A, the surveillance requirements in Specification 4.10.A are proposed to be divided into two parts 1) requirements for the refueling equipment interlocks and 2) requirements for the one-rod-out interlock. The required surveillances are then made consistent with the function being addressed.

Currently, Specification 4.10.A for the one-rod-out interlock requires a functional test of the interlock prior to use of the interlock, weekly during use of the interlock, and following repair work on the interlock. The proposed surveillance requirements in Specification 4.10.A.2 when the one-rod-out interlock is required to be operable is as follows:

Proposed Specification 4.10.2.a will require that prior to withdrawing a control rod the reactor mode switch be verified locked in the refuel position. It shall be verified every 12 hours thereafter until no longer required. This surveillance requirement is more restrictive than the current requirements because although Specification 3.10.A required the reactor mode switch to be locked in the refuel position it did not require any periodic verification. The frequency of 12 hours is sufficient in view of other administrative controls utilized during refueling operations to ensure safe operation.

Proposed Specification 4.10.2.b will require that within 1 hour of withdrawing a control rod the one-rod out interlock be functionally tested. It shall be tested at weekly intervals thereafter until no longer required. This requirement is less restrictive than the current requirement in that it allows a control rod to be withdrawn for up to 1 hour prior to performing the functional test of the interlock and does not require a functional test following maintenance. The allowance to withdraw a control rod prior to performing the testing is to allow the withdrawn

control rod to provide a rod out signal to the circuitry for the test and is acceptable in view of other administrative controls utilized during refueling operations to ensure safe operation. The post maintenance test requirement is removed since it is more appropriately controlled by procedures required by Technical Specification 5.4.1.a and removal from Technical Specifications is consistent with NUREG-1433.

3. Changes to Specifications 3.10.D.1.a and 4.10.D.1.a

Two changes are proposed for Specification 3.10.D.1.a and Specification 4.10.D.1.a for consistency with the proposed changes to Specifications 3.10.A and 4.10.A. These changes do not change the current requirements.

The first change proposed is the deletion of the unnecessary cross-reference to Specification 3.10.A in Specification 3.10.D.1.a and Specification 4.10.D1.a. These cross-references are not correct with the proposed changes and did not provide any additional requirements. Removal of these cross-references does not result in a change in the requirements.

The second change is to replace the reference to the refuel position "one rod out" interlock with reference to the Refueling Interlocks. This change is made for clarity. Allowing bypass of the one-rod-out interlock by putting in a dummy control rod full-in indication had the affect of bypassing that specific rod in all of the interlocks. With the proposed change of separating the one-rod-out interlock from the other refueling interlocks it is clearer to identify that the allowance is to bypass the refueling interlocks. This change is consistent with the allowance in NUREG-1433, LCO 3.10.6, Multiple Control Rod Withdrawal – Refueling, to bypass the control rod position indication.

5. REGULATORY SAFETY ANALYSIS

5.1 No Significant Hazards Consideration

Entergy Nuclear Operations, Inc. (Entergy) proposes changes to Technical Specifications 3/4.10.A, "Refueling Interlocks," to make the sections consistent with NUREG-1433, Standard Technical Specifications, General Electric Plants, BWR 4, Revision 2, and add an alternative required action if the refueling interlocks become inoperable. Entergy has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of Amendment," as discussed below:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

   Response: No

   The refueling interlocks function to prevent prompt reactivity excursions during refueling. Criticality and, therefore, subsequent prompt reactivity excursions are prevented during the insertion of fuel, provided all control

rods are fully inserted during the fuel insertion and during control rod movement provided the other control rods in core cells containing one or more fuel assemblies are fully inserted. The refueling interlocks accomplish this by preventing loading of fuel into the core with any control rod withdrawn, by preventing withdrawal of a rod from the core during fuel loading, or preventing multiple control rod withdrawal. The proposed requirements ensure that these functions can be performed when required. Therefore, the probability of an accident previously evaluated is not significantly increased.

The refueling interlocks addressed by these specifications do not mitigate the consequences of any accident. Therefore, consequences of an accident previously evaluated are not significantly increased.

2. Does the proposed change create the possibility of a new or different kind of accident for any accident previously evaluated?

   Response: No

   The proposed change does not involve a change to the plant design. The refueling interlocks function to prevent prompt reactivity excursions during refueling. The proposed requirements ensure that these functions can be performed when required. As a result, the proposed changes do not affect any of the parameters or conditions that could contribute to the initiation of any new or different kind of accident. Therefore, this proposed changes does not create the possibility of a new or different kind of accident form any accident previously evaluated.

3. Does the change involve a significant reduction in a margin of safety?

   Response: No

   The refueling interlocks function to prevent prompt reactivity excursions during refueling. Criticality and, therefore, subsequent prompt reactivity excursions are prevented during the insertion of fuel, provided all control rods are fully inserted during the fuel insertion and during control rod movement provided the other control rods in core cells containing one or more fuel assemblies are fully inserted. The refueling interlocks accomplish this by preventing loading of fuel into the core with any control rod withdrawn, by preventing withdrawal of a rod from the core during fuel loading, or preventing multiple control rod withdrawal. The proposed requirements ensure that these functions can be performed when required. Therefore, the proposed changes do not involve a significant reduction in the margin of safety.

Based on the above, Entergy concludes that the proposed license amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and accordingly a finding of "no significant hazards consideration" is justified.

6. ENVIRONMENTAL CONSIDERATION

The proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant change in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

7. REFERENCES

1. NRC Letter to Entergy Operations, Inc, Grand Gulf Nuclear Station, Unit 1 – Issuance of Amendment, RE: Refueling Equipment Interlocks, (TAC No. M95490), dated May 7, 1999.

2. NRC Letter to Tennessee Valley Authority, Browns Ferry Nuclear Plant, Unit 1, 2 and 3 – Issuance of Amendments Regards Fuel Movement with Inoperable Refueling Equipment Interlocks and Use of Control Rod Withdrawal Blocks and Control Rods Inserted, (TAC Nos. MB2590, MB2591, and MB2592), dated March 6, 2002.

ATTACHMENT 1

Marked-up pages Exhibiting the Proposed Changes to the Technical Specification and the Associated Technical Specification Bases

LIMITING CONDITION FOR OPERATION

3.10 CORE ALTERATIONS

Applicability:

Applies to the fuel handling and core reactivity limitations during refueling and core alterations.

Objective:

To ensure that core reactivity is within the capability of the control rods and to prevent criticality during refueling.

Specification:

A. Refueling Interlocks

During core alterations when fuel is in the vessel the reactor mode switch shall be locked in the "Refuel" position and the refueling interlocks shall be operable.

Insert

B. Core Monitoring

During core alterations when fuel is in the vessel two SRM's shall be operable, one in the core quadrant where fuel or control rods are being moved and one in an adjacent quadrant. For an SRM to be considered operable, the following conditions shall be satisfied:

1. The SRM shall be inserted to the normal operating level. (Use of special moveable, dunking type detectors during initial fuel loading and major core alterations in place of normal detectors is permissible as long as the detector is connected to the normal SRM circuit.)

SURVEILLANCE REQUIREMENTS

4.10 CORE ALTERATIONS

Applicability:

Applies to the periodic testing of those interlocks and instrumentation used during refueling and core alterations.

Objective:

To verify the operability of instrumentation and interlocks used in refueling and core alterations.

Specification:

A. Refueling Interlocks

Prior to any fuel handling with the head off the reactor vessel, the refueling interlocks shall be functionally tested. They shall be tested at weekly intervals thereafter until no longer required. They shall also be tested following any repair work associated with the interlocks.

B. Core Monitoring

Prior to making any alterations to the core the SRM's shall be functionally tested and checked for neutron response. Thereafter, while required to be operable, the SRM's will be checked daily for response.

A. Refueling Interlocks

1. During in-vessel fuel movement with equipment associated with the interlocks the refueling equipment interlocks shall be operable. If one or more require refueling equipment interlocks is inoperable:

   a. Suspend in-vessel fuel movement with equipment associated with the inoperable interlock(s) immediately.

   OR

   b. Insert a control rod withdrawal block AND verify all control rods are fully inserted.

2. When the reactor vessel head is removed and any control rod is withdrawn the one-rod-out interlock shall be operable. If the one-rod-out interlock is inoperable:

   a. Suspend control rod withdrawal immediately.

   AND

   b. Initiate action to fully insert all insertable control rods in core cells containing one or more fuel assemblies immediately.

A. Refueling Interlocks

1. Prior to in-vessel fuel movement with equipment associated with the refueling equipment interlocks, the interlocks shall be functionally tested. They shall be tested at weekly intervals thereafter until no longer required.

2. When the reactor vessel head is removed the one-rod-out interlock shall be tested as follows:

   a. Prior to withdrawing a control rod the reactor mode switch shall be verified locked in the refuel position. It shall be verified every 12 hours thereafter until no longer required.

   b. Within 1 hour of withdrawing a control rod the one-rod out interlock shall be functionally tested. It shall be tested at weekly intervals thereafter until no longer required.

LIMITING CONDITIONS FOR OPERATION

3.10 CORE ALTERATIONS (Cont)

B. Core Monitoring (Cont)

2. The SRM shall have a minimum of 3 cps except as specified in 3 and 4 below.

3. Prior to spiral unloading, the SRM's shall have an initial count rate of ≥ 3 cps. During spiral unloading, the count rate on the SRM's may drop below 3 cps.

4. During spiral reload, each control cell shall have at least one assembly with a minimum exposure of 1000 MWD/ST.

C. Spent Fuel Pool Water Level

Whenever irradiated fuel is stored in the spent fuel pool, the pool water level shall be maintained at or above 33 feet.

D. Multiple Control Rod Removal

1. Any number of control rods and/or control rod drive mechanisms may be removed from the reactor pressure vessel provided that at least the following requirements are satisfied until all control rods and control rod drive mechanisms are reinstalled and all control rods are fully inserted in the core.

a. The reactor mode switch is operable and locked in the Refuel position ~~per Specification 3.10.A~~, except that the ~~Refuel position "one rod out" interlock~~ may be bypassed, as required, for those control rods and/or control rod drive mechanisms to be removed, after the fuel assemblies have been removed as specified below.

Refueling Interlocks

SURVEILLANCE REQUIREMENTS

4.10 CORE ALTERATIONS (Cont)

B. Core Monitoring (Cont)

Spiral Reload

During spiral reload, SRM operability will be verified by using a portable external source every 12 hours until the required amount of fuel is loaded to maintain 3 cps. As an alternative to the above, up to two fuel assemblies will be loaded in different cells containing control blades around each SRM to obtain the required 3 cps. Until these assemblies have loaded, the cps requirement is not necessary.

C. Spent Fuel Pool Water Level

Whenever irradiated fuel is stored in the spent fuel pool, the water level shall be recorded daily.

D. Multiple Control Rod Removal

1. Within 4 hours prior to the start of removal of control rods and/or control rod drive mechanisms from the core and/or reactor pressure vessel and at least once per 24 hours thereafter until all control rods and control rod drive mechanisms are reinstalled and all control rods are fully inserted in the core, verify that:

a. The reactor mode switch is operable and locked in the Refuel position ~~per Specification 3.10.A~~.

BASES:

3.10 CORE ALTERATIONS

A. Refueling Interlocks

The refueling interlocks are designed to back up procedural core reactivity controls during refueling operations. The interlocks prevent an inadvertent criticality during refueling operations when the reactivity potential of the core is being altered.

To minimize the possibility of loading fuel into a cell containing no control rod, it is required that all control rods are fully inserted when fuel is being loaded into the reactor core. This requirement assures that during refueling the refueling interlocks, as designed, will prevent inadvertent criticality.

Insert

The refueling interlocks reinforce operational procedures that prohibit taking the reactor critical under certain situations encountered during refueling operations by restricting the movement of control rods and the operation of refueling equipment.

The refueling interlocks include circuitry which senses the condition of the refueling equipment and the control rods. Depending on the sensed condition, interlocks are actuated which prevent the movement of the refueling equipment or withdrawal of control rods (rod block).

Circuitry is provided which senses the following conditions:

1. All rods inserted.

2. Refueling platform positioned near or over the core.

3. Refueling platform hoists are fuel-loaded (fuel grapple, frame mounted hoist, monorail mounted hoist).

4. Fuel grapple not full up.

5. Service platform hoist fuel-loaded.

6. One rod withdrawn.

When the mode switch is in the "Re-fuel" position, interlocks prevent the refueling platform from being moved over the core if a control rod is withdrawn and fuel is on a hoist. Likewise, if the refueling platform is over the core with fuel on a hoist, control rod motion is blocked by the interlocks. When the mode switch is in the refuel position only one control rod can be withdrawn. The refueling interlocks, in combination with core nuclear design and refueling procedures, limit the probability of an inadvertent criticality. The nuclear characteristics of the core assure that the reactor is subcritical even when the highest worth control rod is fully withdrawn. The combination of refueling interlocks for control rods and the refueling platform provide redundant methods of preventing inadvertent criticality even after procedural violations. The interlocks on hoists provide yet another method of avoiding inadvertent criticality.

1. Refueling Equipment Interlocks

BACKGROUND

Refueling equipment interlocks restrict the operation of the refueling equipment or the withdrawal of control rods to reinforce unit procedures that prevent the reactor from achieving criticality during refueling. The refueling interlock circuitry senses the conditions of the refueling equipment and the control rods. Depending on the sensed conditions, interlocks are actuated to prevent the operation of the refueling equipment or the withdrawal of control rods.

One channel of instrumentation is provided to sense the position of the refueling platform, the loading of the refueling platform fuel grapple, and the full insertion of all control rods, except control rods withdrawn in accordance with LCO 3.10.D or fully inserted and disarmed. Additionally, inputs are provided for the loading of the refueling platform frame mounted hoist, the loading of the refueling platform monorail mounted hoist, the full retraction of the fuel grapple, and the loading of the service platform hoist. With the reactor mode switch in the shutdown or refueling position, the indicated conditions are combined in logic circuits to determine if all restrictions on refueling equipment operations and control rod insertion are satisfied.

A control rod not at its full-in position interrupts power to the refueling equipment and prevents operating the equipment over the reactor core when loaded with a fuel assembly. Conversely, the refueling equipment located over the core and loaded with fuel inserts a control rod withdrawal block in the Control Rod Drive System to prevent withdrawing a control rod.

The refueling platform has two mechanical switches that open before the platform or any of its hoists are physically located over the reactor vessel. All refueling hoists have switches that open when the hoists are loaded with fuel.

The refueling interlocks use these indications to prevent operation of the refueling equipment with fuel loaded over the core whenever any control rod is withdrawn, or to prevent control rod withdrawal whenever fuel loaded refueling equipment is over the core.

To minimize the possibility of loading fuel into a cell containing no control rod, it is required that all control rods are fully inserted when fuel is being loaded into the reactor core. This requirement assures that during refueling the refueling interlocks, as designed, will prevent inadvertent criticality.

APPLICABLE SAFETY ANALYSES

A prompt reactivity excursion during refueling could potentially result in fuel failure with subsequent release of radioactive material to the environment. Criticality and, therefore, subsequent prompt reactivity excursions are prevented during the insertion of fuel, provided all control rods are fully inserted during the fuel insertion. The refueling interlocks accomplish this by preventing loading of fuel into the core with any control rod withdrawn or by preventing withdrawal of a rod from the core during fuel loading.

Refueling equipment interlocks satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

Insert B 3/4.10-1 (continued)

SPECIFICATION 3.10.A.1 REQUIREMENTS

To prevent criticality during refueling, the refueling interlocks ensure that fuel assemblies are not loaded with any control rod withdrawn. To prevent these conditions from developing, the all-rods-in, the refueling platform position, the refueling platform fuel grapple fuel loaded, the refueling platform frame mounted hoist fuel loaded, the refueling platform monorail mounted hoist fuel loaded, the refueling platform fuel grapple fully retracted position, and the service platform hoist fuel loaded inputs are required to be operable. These inputs are combined in logic circuits, which provide refueling equipment or control rod blocks to prevent operations that could result in criticality during refueling operations.

The interlocks are required to be operable during in-vessel fuel movement with refueling equipment associated with the interlocks.

With one or more of the required refueling equipment interlocks inoperable (does not include the one-rod-out interlock addressed in Specification 3.10.A.2), the unit must be placed in a condition in which the Specification does not apply or the interlocks are not needed. This can be performed by ensuring fuel assemblies are not moved in the reactor vessel or by ensuring that the control rods are inserted and cannot be withdrawn.

Therefore, 3.10.A.1.a requires that in-vessel fuel movement with the affected refueling equipment must be immediately (i.e., in a time frame consistent with safety) suspended. This action ensures that operations are not performed with equipment that would potentially not be blocked from unacceptable operations (e.g., loading fuel into a cell with a control rod withdrawn). Suspension of in-vessel fuel movement shall not preclude completion of movement of a component to a safe position.

Alternately, 3.10.A.1.b requires that a control rod withdrawal block be inserted and that all control rods subsequently verified to be fully inserted. This action ensures that control rods cannot be inappropriately withdrawn because an electrical or hydraulic block to control rod withdrawal is in place. Like 3.10.A.1.a these actions ensure that unacceptable operations are blocked (e.g., loading fuel into a cell with the control rod withdrawn).

2. Refuel Position One-Rod-Out Interlock

BACKGROUND

The refuel position one-rod-out interlock restricts the movement of control rods to reinforce unit procedures that prevent the reactor from becoming critical during refueling operations. During refueling operations, no more than one control rod is permitted to be withdrawn except as allowed by Specification 3.10.D.

The refuel position one-rod-out interlock prevents the selection of a second control rod for movement when any other control rod is not fully inserted. It is a logic circuit that has redundant channels. It uses the all-rods-in signal (from the control rod full-in position indicators) and a rod selection signal (from the Reactor Manual Control System).

APPLICABLE SAFETY ANALYSES

A prompt reactivity excursion during refueling could potentially result in fuel failure with subsequent release of radioactive material to the environment.
The refuel position one-rod-out interlock and adequate shutdown margin prevent criticality by preventing withdrawal of more than one control rod. With one control rod withdrawn, the core will remain subcritical, thereby preventing any prompt critical excursion.

The refuel position one-rod-out interlock satisfies Criterion 3 of 10CFR50.36(c)(2)(ii).

SPECIFICATION 3.10.A.2 REQUIREMENTS

To prevent criticality, the refuel position one-rod-out interlock ensures no more than one control rod may be withdrawn. Therefore, the one-rod-out interlock must be operable when any control rod is withdrawn (except as allowed by Specification 3.10.D). The reactor mode switch must be locked in the refuel position to support the operability of the interlock.

With the refueling position one-rod-out interlock inoperable, the refueling interlocks may not be capable of preventing more than one control rod from being withdrawn. This condition may lead to criticality. Therefore, control rod withdrawal must be immediately suspended, and action must be immediately initiated to fully insert all insertable control rods in core cells containing one or more fuel assemblies. Action must continue until all such control rods are fully inserted. Control rods in core cells containing no fuel assemblies do not affect the reactivity of the core and, therefore, do not have to be inserted.

BASES:

3.10 CORE ALTERATIONS (Cont)

C. Spent Fuel Pool Water Level

To ensure there is adequate water to shield and cool the irradiated fuel assemblies stored in the pool, a minimum pool water level is established. The minimum water level of 33 feet is established because it would be a significant change from the normal level (-1 foot) and is well above the level to assure adequate cooling.

D. Multiple Control Rod Removal

These specifications ensure maintenance or repair of control rods or rod drives will be performed under conditions that limit the probability of inadvertent criticality. The requirement that the fuel assemblies in the cell controlled by the control rod be removed from the reactor core before the ~~interlock~~ control rod position indication to the Refueling Interlocks can be bypassed ensures withdrawal of another control rod does not result in inadvertent criticality. Each control rod essentially provides reactivity control for the fuel assemblies in the cell associated with the control rod. Thus, removal of an entire cell (fuel assemblies plus control rod) results in a lower reactivity potential of the core.

BASES:

4.10 CORE ALTERATIONS

A. Refueling Interlocks

INSERT

~~Complete functional testing of all refueling interlocks before any refueling outage will provide positive indication that the interlocks operate in the situations for which they were designed. By loading each hoist with a weight equal to the fuel assembly, positioning the refueling platform, and withdrawing control rods, the interlocks can be subjected to valid operational tests. Where redundancy is provided in the logic circuitry, tests can be performed to assure that each redundant logic element can independently perform its functions.~~

B. Core Monitoring

Requiring the SRM's to be functionally tested prior to any core alteration ensures the SRM's will be operable at the start of that alteration. The daily response check of the SRM's ensures their continued operability.

Insert B 3/4.10-3

SPECIFICATION 4.10.A.1 REQUIREMENTS

Performance of a functional test demonstrates that each required refueling equipment interlock will function properly when a simulated or actual signal indicative of a required condition is injected into the logic. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable functional test of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions.

The function test may be performed by any series of sequential, overlapping, or total channel steps so that the entire channel is tested.

The weekly frequency is based on engineering judgment and is considered adequate in view of other indications of refueling interlocks and their associated input status that are available to unit operations personnel.

SPECIFICATION 4.10.A.2 REQUIREMENTS

Proper functioning of the refueling position one-rod-out interlock requires that the reactor mode switch to be in the Refuel position. During control rod withdrawal, improper positioning of the reactor mode switch could, in some instances, allow improper bypassing of required interlocks. Therefore, this surveillance imposes an additional level of assurance that the refueling position one-rod-out interlock will be operable when required. By "locking" the reactor mode switch in the proper position (i.e., removing the reactor mode switch key from the console while the reactor mode switch is positioned in refuel), an additional administrative control is in place to preclude operator errors from resulting in unanalyzed operation. The frequency of 12 hours is sufficient in view of other administrative controls utilized during refueling operations to ensure safe operation.

Performance of a functional test demonstrates the associated refuel position one-rod-out interlock will function properly when a simulated or actual signal indicative of a required condition is injected into the logic. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable functional test of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions. The functional test may be performed by any series of sequential, overlapping, or total channel steps so that the entire channel is tested. The weekly frequency of testing is considered adequate because of demonstrated circuit reliability, procedural controls on control rod withdrawals, and visual and audible indications available in the control room to alert the operator to control rods not fully inserted. To perform the required testing, the applicable condition may be required to be entered (i.e., a control rod must be withdrawn from its full-in position). Therefore, 4.10.A.2.b states the functional test is not required to be performed until 1 hour after any control rod is withdrawn.

ATTACHMENT 2

LIST OF REGULATORY COMMITMENTS

List of Regulatory Commitments

The following table identified those actions committed to by Pilgrim in this document. Any other statements in this submittal are provided for information purposes and are not considered to be regulatory commitments.

REGULATORY COMMITMENT	DUE DATE
Implement Refueling Interlocks Amendment.	60 days following approval of the amendment.