Entergy

Entergy Nuclear Operations, Inc.
Pilgrim Nuclear Power Station
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Mike Bellamy
Site Vice President

March 26, 2003

U.S. Nuclear Regulatory Commission
Attention: 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

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

REFERENCE: Entergy letter, Request for Amendment to Technical Specifications Associated With the Refueling Interlocks, Specifications 3/4.10.A and D, dated August 18, 2002

LETTER NUMBER: 2.03.038

Dear Sir or Madam:

By the Reference Entergy Nuclear Operations, Inc. (Entergy) proposed to amend the Pilgrim Station Operating License, DPR-35. Discussions with the NRC staff have identified changes to the proposed amendment to facilitate review and approval of the requested changes. Attached are the supplementary changes to facilitate the review.

The attached supplementary information does not impact Entergy's conclusion in the Reference that the proposed amendment does not involve a significant hazards consideration.

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 26 day of March 2003.

Sincerely,

Robert M. Bellamy

203038

A001

Attachments: 1. Discussion of Changes - 1 page

2. Mark-up of Proposed Technical Specification and Bases Changes – 9 pages

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ATTACHMENT 1

Discussion of Changes

Discussion of Changes

The following changes from those proposed in Reference 1 are made in the proposed Technical Specifications:

1. The requirement for the reactor mode switch to be locked in the "Refuel" position is restored to the LCO statements for operability and the proposed surveillance on mode switch position is withdrawn. The revised requirements are consistent with the current Technical Specification requirements. The proposed wording of the remaining surveillance requirement in Specification 4.10.A.2 is also editorially revised for clarity and to reflect the changes.

2. The proposed replacement of the reference to the Refuel position "one-rod-out" interlock in Specification 3.10.D.1.a with a reference to the "Refueling Interlocks" is revised to instead insert a reference to "position indication." This change does not affect the proposed requirements but is made for clarity in the intent of the allowance.

3. The word "insertable" is removed from the proposed required Action 3.10.A.2.b. This change makes the proposed requirements more restrictive than those previously proposed in that all control rods in core cells containing one or more fuel assemblies will be required to be inserted.

4. The proposed Bases are revised consistent with the proposed changes and the wording of the second sentence of the proposed Specification 3.10.A.1 is editorially corrected.

Reference 1 - Entergy letter, Request for Amendment to Technical Specifications Associated With the Refueling Interlocks, Specifications 3/4.10.A and D, dated August 18, 2002

ATTACHMENT 2

Mark-up of Proposed Technical Specification and Bases Changes

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 1

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.

Insert page 3/4.10-1

A. Refueling Interlocks

1. During in-vessel fuel movement with equipment associated with the interlocks the refueling equipment interlocks shall be operable with the reactor mode switch locked in the "Refuel" position. If one or more required refueling equipment interlocks are 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 with the reactor mode switch locked in the "Refuel" position. If the one-rod-out interlock is inoperable:

   a. Suspend control rod withdrawal immediately.

   AND

   b. Initiate action to fully insert all 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 and any control rod is withdrawn the one-rod-out interlock shall be functionally tested at weekly intervals. The functional test is not required to be performed until 1 hour following withdrawing a control rod.

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.

position indication

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.

Insert B 3/4.10-1

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 with the reactor mode switch locked in the "Refuel" position 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).

Insert B 3/4.10-1 (continued)

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 10 CFR 50.36(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 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

control rod position indication to the Refueling Interlocks

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~~ 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.

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

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, if the surveillance is not current, 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 is not required to be performed until 1 hour after any control rod is withdrawn.