Entergy

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February 23, 2007

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

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

Response to NRC Request for Additional Information Regarding Technical Specifications Changes for Single Control Rod Withdrawal Allowances (TAC MC9018)

REFERENCE:

1. Technical Specifications Amendment Request for Single Control Rod Withdrawal Allowances, TS 3/4.14 "Special Operations", dated October 18, 2005
2. NRC Request for Additional Information Regarding Technical Specifications Changes for Single Control Rod Withdrawal Allowances (TAC MC9018), dated January 24, 2007

LETTER NUMBER: 2.07.018

Dear Sir or Madam:

Attachment 1 to this letter contains Entergy responses to the NRC Request for Additional Information (Reference 2) regarding changes to Pilgrim Technical Specifications proposed in Reference 1. The attached response does not invalidate the No Significant Hazards Determination included in the original application (Reference 1).

This letter contains no commitments.

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

I declare under penalty of perjury that the foregoing is true and correct.

Executed on the 23rd of February 2007.

Sincerely,

Kevin H. Bronson
Site Vice President

ERS/dl
Attachment: 1. Entergy Responses to NRC RAIs

A001

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Entergy Response to NRC Request for Additional Information Regarding Technical Specification Changes for Single Control Rod Withdrawal

NRC RAI #1

The proposed new Pilgrim Technical Specifications (TSs), TS 3/4.14.C, "Single Control rod Withdrawal - Hot Shutdown," and TS 3/4.14.D, "Single Control rod Withdrawal - Cold Shutdown," were modeled after the Special Operations Section of the Improved Standard Technical Specifications (ISTS), NUREG - 1433 revision 3 section 3.10.3 and 3.10.4 respectively. Your custom TS require certain scram functions of the average power range monitors (APRM) to be operable while in the refuel mode. Please explain why these APRM functions are not required when Pilgrim operates under the proposed Special Operations TS requirements.

Entergy Response

The proposed requirements specified under LCO 3.14.C and 3.14.D provide adequate controls, including defense in depth, to preclude unacceptable reactivity excursions.

As required by LCO 3.3.A.1, the core is designed with adequate shutdown margin to ensure the core remains subcritical even with the highest worth control rod fully withdrawn. This is described in the safety design basis in Pilgrim UFSAR section 3.6 "Nuclear Design" which states: "The core shall be capable of being rendered subcritical at any time or at any core conditions with the highest worth control rod fully withdrawn." Consistent with the system safety design basis, LCO 3.3.A.1 requires that at all times when fuel is in the reactor vessel shutdown margin shall be sufficient to hold the core subcritical in the most reactive condition during the operating cycle with the strongest operable control rod fully withdrawn and all other operable control rods fully inserted. The primary method of ensuring safety when complying with these LCO requirements is that only one control rod can be withdrawn. To ensure that a second control rod cannot be inadvertently withdrawn, the proposed LCOs require that a control rod withdrawal block be in place following the withdrawal of the first control rod. Therefore, the primary method of ensuring safety during activities performed in compliance with the proposed LCOs is the plant design, which ensures the reactor will remain shutdown under the proposed conditions.

The proposed LCOs provide a second layer of defense in depth to the design of the system. The second layer is provided by either ensuring adequate neutron monitoring and control or ensuring that any potential control rod withdrawal error could not occur in an area of high reactivity worth with respect to the withdrawn rod. In both of these cases, the proposed Special Operations LCOs impose appropriate neutron monitoring requirements.

During Core Alterations two source range monitors (SRMs) are required by LCOs 3.14.C and 3.14.D for redundant monitoring of potential reactivity changes during control rod movement to provide the Operator with early indication of unexpected subcritical multiplication that could be indicative of an approach to criticality. The SRMs provide the only on-scale monitoring of neutron flux levels while operating under the proposed LCOs. Furthermore, the reactor protection system "IRM – high flux" and "IRM-inoperative" scram functions are required to be operable in accordance with LCO 3.14.C

requirement 5.a and LCO 3.14.D requirement 4.a when the functioning of RPS is required by the proposed LCOs. During an unexpected approach to criticality the IRMs will generate a scram signal and terminate the event well before the APRMs come on-scale. Therefore, under the circumstances controlled by these Special Operations LCOs the APRMs would remain downscale providing no indication or protective function and would not be required for plant safety in these conditions.

NRC RAI #2

Explain or provide the basis for why it is acceptable for Pilgrim to withdraw a control rod under the proposed new TS, while all other control rods in a five by five array centered on the control rod being withdrawn are disarmed.

Entergy Response

When these NUREG 1433 Special Operations LCOs were developed it was recognized that it may not be possible to perform certain tests or maintenance activities that these Special Operations LCOs are intended to accommodate while meeting all of the requirements imposed by LCO 3.14.C.5.a, or LCO 3.14.D.4.a. Therefore, alternate requirements LCO 3.14.C.5.b and LCO 3.14.D.4.b are provided to accommodate withdrawal of a single inoperable control rod while still ensuring adequate shutdown margin is maintained so that criticality is precluded.

These alternatives provide back-up protection and are a defense in depth measure to preclude the inadvertent withdrawal of a second control rod within proximity to the withdrawn, inoperable control rod at the center of the 5x5 array. A fully inserted and disarmed 5x5 control rod array provides a minimum separation between the withdrawn control rod and all other armed control rods to prevent a challenge to shutdown margin if a second control rod is withdrawn. The withdrawal of a second control rod is a highly improbable event, requiring two concurrent failures; 1. The Operator erroneously selects and initiates withdrawal of a second control rod (a procedure violation) and 2. The one-rod-out interlock or other control rod withdrawal block required to be operable fails, thereby enabling withdrawal of the second control rod. By requiring that all control rods in a 5x5 array, centered on the inoperable control rod to be withdrawn are fully inserted and disarmed, in addition to the required one-rod-out interlock or other required control rod withdrawal block, the conditions that could lead to a challenge to shutdown margin are precluded from occurring. Therefore, scram capability for the withdrawn control rod at the array center is unnecessary.

The 5x5 array is based on engineering judgment and historical precedent providing additional defense in depth to the other requirements that preclude inadvertent multiple control rod withdrawals.