

NRR-DRMAPEm Resource

From: Lamb, John
Sent: Monday, June 3, 2019 7:15 AM
To: Miner, Peter
Cc: Byrne, Robert M; Powers, Michael J; Halter, Mandy; Couture III, Philip
Subject: RAI - Pilgrim Post-Decommissioning Technical Specifications (PDTs) License Amendment Request (LAR) (EPID: L-2018-LLA-0268)

Importance: High

Mr. Miner:

By letter dated September 13, 2018 (Agencywide Documents Access and Management System (ADAMS) No. ML18260A085), as supplemented by letters dated January 10, February 8, and March 14, 2019 (ADAMS Nos. ML19016A135, ML19044A574, and ML19079A158), Entergy Nuclear Operations, Inc. (Entergy, the licensee) submitted a license amendment request (LAR) to revise Pilgrim Nuclear Power Station (Pilgrim) Renewed Facility Operating License and associated Technical Specifications (TS) to Permanently Defueled Technical Specifications (PDTs) consistent with the permanent cessation of reactor operation and permanent defueling of the reactor.

The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed the information provided in the LAR and determined that additional information is required in order to complete its review. The request for additional information (RAI) is included below. The NRC staff held a clarifying call with Entergy on May 28, 2019, to ensure the RAIs were understandable. Entergy will respond to the RAIs within 45 days from the date of this email.

Sincerely,

John G. Lamb

Docket Nos.: 50-293

REQUEST FOR ADDITIONAL INFORMATION (RAI)

NRR-SNPB-01

By letter dated September 13, 2018 (Agencywide Documents Access and Management System (ADAMS) No. ML18260A085), as supplemented by letters dated January 10, February 8, and March 14, 2019 (ADAMS Nos. ML19016A135, ML19044A574, and ML19079A158), Entergy Nuclear Operations, Inc. (Entergy, the licensee) submitted a license amendment request to revise Pilgrim Nuclear Power Station (Pilgrim) Renewed Facility Operating License and associated Technical Specifications (TS) to Permanently Defueled Technical Specifications (PDTs) consistent with the permanent cessation of reactor operation and permanent defueling of the reactor.

Applicable Regulation and Guidance

The requirements of Title 10 of the Code of Federal Regulations (10 CFR) Part 50.36(a)(6), *Decommissioning*, states:

This paragraph applies only to nuclear power reactor facilities that have submitted the certifications required by § 50.82(a)(1) and to non-power reactor facilities which are not authorized to operate. Technical Specifications involving safety limits, limiting safety system settings, and limiting control system settings; limiting conditions for operation; surveillance requirements; design features; and administrative controls will be developed on a case-by-case basis.

10 CFR 50.82(3) allows a licensee to complete decommissioning activities up to 60 years from cessation of power operations.

10 CFR Part 50, Appendix A, Criterion 62 requires, "Criticality in the fuel storage and handling system shall be prevented by physical systems or processes, preferably by use of geometrically safe configurations."

10 CFR 50.68(b)(1) requires, "Plant procedures shall prohibit the handling and storage at any one time of more fuel assemblies than have been determined to be safely subcritical under the most adverse moderation conditions feasible by unborated water."

10 CFR 50.68(b)(2) requires, "The estimated ratio of neutron production to neutron absorption and leakage (k-effective) of the fresh fuel in the fresh fuel storage racks shall be calculated assuming the racks are loaded with fuel of the maximum fuel assembly reactivity and flooded with unborated water and must not exceed 0.95, at a 95 percent probability, 95 percent confidence level. This evaluation need not be performed if administrative controls and/or design features prevent such flooding or if fresh fuel storage racks are not used."

10 CFR 50.68(b)(3) requires, "If optimum moderation of fresh fuel in the fresh fuel storage racks occurs when the racks are assumed to be loaded with fuel of the maximum fuel assembly reactivity and filled with low-density hydrogenous fluid, the k-effective corresponding to this optimum moderation must not exceed 0.98, at a 95 percent probability, 95 percent confidence level. This evaluation need not be performed if administrative controls and/or design features prevent such moderation or if fresh fuel storage racks are not used."

10 CFR 50.68(b)(4) requires, "If no credit for soluble boron is taken, the k-effective of the spent fuel storage racks loaded with fuel of the maximum fuel assembly reactivity must not exceed 0.95, at a 95-percent probability, 95-percent confidence level, if flooded with unborated water. If credit is taken for soluble boron, the k-effective of the spent fuel storage racks loaded with fuel of the maximum fuel assembly reactivity must not exceed 0.95, at a 95 percent probability, 95-percent confidence level, if flooded with borated water, and the k effective must remain below 1.0 (subcritical), at a 95-percent probability, 95-percent confidence level, if flooded with unborated water."

10 CFR 50.36(c)(4) requires, "Design features. Design features to be included are those features of the facility such as materials of construction and geometric arrangements, which, if altered or modified, would have a significant effect on safety and are not covered in categories described in paragraphs (c) (1), (2), and (3) of this section."

Background

On April 7, 2016, the NRC issued Generic Letter (GL) 2016-01, "Monitoring of Neutron-Absorbing Materials in Spent Fuel Pools" (ADAMS Accession No. ML16097A169), to address the degradation of neutron-absorbing materials (NAMs) in wet storage systems for reactor fuel at power and non-power reactors. The generic letter requested that licensees provide information to allow the NRC staff to verify continued compliance through effective monitoring to identify and mitigate any degradation or deformation of NAMs credited for criticality control in spent fuel pools (SFPs).

By letter dated November 3, 2016 (ADAMS Accession No. ML16319A131), as supplemented by letter dated February 8, 2018 (ADAMS Accession No. ML18039A843), Entergy responded to GL 2016-01 for Pilgrim. In Entergy's response to GL 2016-01, as supplemented, the licensee also identified that 2016 testing on the Boraflex installed in the SFP at Pilgrim showed that some of the Boraflex was no longer bounded by the nuclear criticality safety analysis of record. This resulted in the licensee implementing corrective actions to manage Boraflex degradation and maintain subcriticality in the SFP. On September 26, 2018, the NRC issued a letter to Entergy regarding the closeout of GL 2016-01. The letter states that the NRC staff found interim corrective actions taken to be adequate, and that the licensee-identified non-conservative TS would be

resolved per Administrative Letter 98 10, "Dispositioning of Technical Specifications That Are Insufficient to Assure Plant Safety," dated December 29, 1998 (ADAMS Accession No. ML031110108).

Issue

The current and the proposed TS 4.3.1.1.a. both state the following:

4.3.1.1 The spent fuel storage racks are designed and shall be maintained with:

- a. Fuel assemblies having a maximum k-infinity of 1.32 for standard core geometry, calculated at the burnup of maximum bundle reactivity, and an average U-235 enrichment 4.6% average over the axial planar zone of highest average enrichment; and

Because of the degraded neutron absorption capability of the Boraflex in the spent fuel pool racks, the TS maximum allowable infinite lattice multiplication factor (k-inf) of 1.32 will no longer bound the effective multiplication factor (k-eff) of 0.95, to ensure spent fuel pool conditions remain sufficiently sub-critical.

Request for Additional Information

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- a. Provide the controls that ensure the Pilgrim SFP will meet the regulatory requirements for sub-criticality for the entire service life of the Pilgrim SFP.
- b. Provide the analysis that demonstrates those controls will ensure the Pilgrim SFP will meet the regulatory requirements for sub-criticality for the entire service life of the Pilgrim SFP.

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