

PA-LR

**From:** Ram Subbaratnam  
**To:** bford@entergy.com; Dellis1@entergy.com; fmogole@entergy.com  
**Date:** 9/7/2006 10:34:33 AM  
**Subject:** Final RAI on Section 4.3.2.1 on Pilgrim LRA

Folks:

Please find attached one set of formal RAIs on section 4.3.2.1 from the NRC staff on the Pilgrim LRA. I am sending you an advance copy so that Entergy can work on the lead in responding to the RAIs. As previously agreed upon, your formal response on docket will be due 30 days from the date of receipt of the RAIs in mail.

Thanking you.

Sincerely yours

Ram Subbaratnam  
PM Pilgrim LRA  
US NRC, (301) 415 1478

P.S I owe you two more set of RAIs that will conclude the milestone on issuing Final RAIs (Schedule September 10, 2006). I am planning to send them by COB today.

**CC:** Anissa Coates; Twana Ellis

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**Subject:** Final RAI on Section 4.3.2.1 on Pilgrim LRA  
**Creation Date** 9/7/2006 10:34:33 AM  
**From:** Ram Subbaratnam

**Created By:** RXS2@nrc.gov

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August 25, 2006

Mr. Michael Kansler  
President  
Entergy Nuclear Operations, Inc.  
440 Hamilton Avenue  
White Plains, NY 10601-1839

SUBJECT: REQUESTS FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE  
PILGRIM NUCLEAR POWER STATION LICENSE RENEWAL APPLICATION  
(TAC NO. MC9669)

Dear Mr. Kansler:

By letter dated January 25, 2006, Entergy Nuclear Operations, Inc., submitted an application pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR Part 54), to renew the operating license for Pilgrim Nuclear Power Station for review by the U.S. Nuclear Regulatory Commission (NRC). The NRC staff is reviewing the information contained in the license renewal application and has identified, in the enclosure, areas where additional information is needed to complete the review. These requests for additional information address License Renewal Section: 4.3.1.2 Reactor Vessel Internals.

These questions were discussed with a member of your staff, Bryan Ford, and a mutually agreeable date for this response is within 30 days from the date of this letter. If you have any questions, please contact me at 301-415-1478 or by e-mail at [RXS2@nrc.gov](mailto:RXS2@nrc.gov).

Sincerely,

**/RA/**

Ram Subbaratnam, Project Manager  
License Renewal Branch A  
Division of License Renewal  
Office of Nuclear Reactor Regulation

Docket No. 50-293

Enclosure:  
Requests for Additional Information

cc w/encl: See next page

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Sincerely,

**/RA/**

Ram Subbaratnam, Project Manager  
License Renewal Branch A  
Division of License Renewal  
Office of Nuclear Reactor Regulation

Docket No. 50-293

Enclosure:  
Requests for Additional Information

cc w/encl: See next page.

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OFFICE	PM:RLRA:DLR	PM:CFEB:DCI	LA:RLRA:DLR	BC:REBB:DLR
NAME	RSubbaratnam	Chia-Fu Sheng	YEdmonds	Llund R. Auluck for
DATE	8/25/06	8/24/06	8/24/06	8/25/06

OFFICIAL RECORD COPY

Letter to Michael Kansler from Ram Subbaratnam dated: August 25, 2006

SUBJECT: REQUESTS FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE  
PILGRIM NUCLEAR POWER STATION LICENSE RENEWAL APPLICATION  
(TAC MC9669)

**HARD COPY**

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Duxbury Free Library  
ATTN: Ms. Elaine Winquist  
77 Alden Street  
Duxbury, MA 02332

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6 Green Street  
Kingston, MA 02364

Ms. Mary Lampert  
Duxbury Nuclear Advisory, Chair  
Pilgrim watch, Director  
148 Washington Street  
Duxbury 02332



**REQUESTS FOR ADDITIONAL INFORMATION**  
**PILGRIM LICENSE RENEWAL APPLICATION (LRA)**  
**SECTION: 4.3.1.2 REACTOR VESSEL INTERNALS**

**4.3.1.2 Reactor Vessel Internals**

**RAI 4.3.1.2-1**

Control rod drive (CRD) return line nozzle-to-end cap weld: Regarding the CRD return line nozzle-to-end cap weld repair, your Project Report LRPD-06, "Pilgrim NPS License Renewal Project - Time-Limited Aging Analyses, Mechanical Fatigue," Response 2.4 refers to Relief Request PRR-36 and concludes, "This relief did not involve any analyses based on time-limited assumptions and therefore is not a TLAA." PRR-36 was submitted by letters dated October 1, 3, and 8, 2004, and July 12, 2004, for relief from certain American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) requirements pertaining to the repair of the nozzle-to-end cap weld with a detected flaw and the associated non-destructive examinations. Alternatively, PRR-36 proposed to use ASME Code Case N-504-2, "Alternative Rules for Repair of Class 1, 2, and 3 Austenitic Stainless Steel Piping," with modifications to perform the repair. The request was approved in a safety evaluation (SE) dated February 25, 2005. ASME Code Case N-504-2 (g)(2) requires a flaw evaluation be performed on the repaired component such that "The evaluation should demonstrate that the requirements of IWB-3640...are satisfied for the design life of the repair, considering potential flaw growth due to fatigue and the mechanism believed to have caused the flaw. The flaw growth evaluation shall be performed in accordance with Appendix C." Explain how Entergy meets the ASME Code Case N-504-2 requirement on performing a flaw evaluation that considers fatigue and the mechanism believed to have caused the flaw. If applicable, you may provide a document showing that the weld overlay region adjacent to the interface is in the compressive stress zone.

**RAI 4.3.1.2-2**

Reactor recirculation nozzle thermal sleeves regarding the flaws on reactor recirculation nozzle thermal sleeves, LRPD-06 Response 2.4 refers to a flaw growth analysis in NEDC-30730 and concludes, "The NRC reviewed and accepted the analysis as documented in an SER (Ref. 4.2.21). As this analysis is only based on 18 months, it is not a TLAA." The cited SE was issued on December 4, 1984. As you stated, the crack growth analysis is for 18 months. One of the six criteria specified in 10 CFR 54.3(a) for classifying an analysis as a TLAA is the analysis "[i]nvolve time-limited assumptions defined by the current operating term, for example, 40 years." The meaning of a crack growth analysis based on 18 months is that the structural integrity of reactor recirculation nozzle thermal sleeves is not only a concern for the extended period of operation but also a concern for the remaining period of operation under the current 40-year license. Therefore, Entergy needs to consider this as a TLAA and address the following:

For the License Renewal Application:

- (1) Confirm whether Report PMA86-07, "Pilgrim Nuclear Power Station Recirculation Inlet Thermal Sleeve Mock Up Fabrication and Evaluation," dated October 1986 had been reviewed by NRC staff.

ENCLOSURE

- (2) Identify the SE which accepts use of hydrogen water chemistry as the mitigating method and as the basis for Entergy to operate with the flaws on the thermal sleeves beyond 1987.
- (3) Provide an analysis of the inspection results on these thermal sleeves obtained from 1987 to date.
- (4) Provide the end-of-extended-period-of-operation (60 years) flaw length of the circumferential through-wall flaw which was 32 percent circumference in 1987 (per the December 4, 1984, SE for the worst flaw among the detected recirculation nozzle thermal sleeve cracks) and perform a stability analysis for this flaw.
- (5) If the stability analysis of effort (4) shows that the predicted end-of-extended-period-of-operation through-wall flaw length does not meet the ASME Code Section XI margin, provide an impact evaluation on operation and structural integrity of other components due to a broken thermal sleeve piece of a reasonable size.
- (6) Provide an inspection plan for these detected thermal sleeve flaws in the extended period of operation.

For current operation till the end of the 40-year operation:

- (7) Discuss the adequacy of the inspection plan for recirculation nozzle thermal sleeves for the remaining period of 40-year operation.
- (8) Provide the end of the 40-year operation flaw length of the circumferential through-wall flaw which was 32 percent circumference in 1987 and perform a stability analysis for this flaw.