

PA-LR

**From:** Ram Subbaratnam  
**To:** Dellis1@entergy.com; fmogole@entergy.com  
**Date:** 8/28/2006 2:46:28 PM  
**Subject:** Draft Pilgrim RAIs on Section 4.2.1 - TLAAs on RV Internals, Neutron Fluence

Fred:

As promised here are the draft RAIs for preliminary review and a conference call with the subject experts at Pilgrim. As I understood from you today the subject experts were not available for a call this week and that you had indicated a call after the holidays was possible. Please let me know when your staff are available, so that I can tie up the NRC end.

Thanks.

Ram

**CC:** bford@entergy.com; Christopher Sydnor; Matthew Mitchell

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**Subject:** Draft Pligrim RAIs on Section 4.2.1 - TLAAs on RV Internals, Neutron Fluence  
**Creation Date:** 8/28/2006 2:46:28 PM  
**From:** Ram Subbaratnam  
**Created By:** [RXS2@nrc.gov](mailto:RXS2@nrc.gov)

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# DRAFT

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 on Time Limited Aging Analysis of Reactor Vessel Internals in License Renewal Section: 4.2.1.

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,

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

Mr. Michael Kansler  
President  
Entergy Nuclear Operations, Inc.  
440 Hamilton Avenue  
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Sincerely,

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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DATE	8/ /06	8/ /06	8/ /06	8/ /06

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

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

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Pilgrim watch, Director  
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Duxbury 02332



**REQUESTS FOR ADDITIONAL INFORMATION**  
**PILGRIM LICENSE RENEWAL APPLICATION (LRA)**  
**TIME-LIMITED AGING ANALYSIS (TLAA) OF REACTOR INTERNALS**  
**SECTION: 4.2.1 Neutron Fluence**

**4.2.1 Neutron Fluence**

**RAI 4.2.2-1**

Section 4.2.2 of the Pilgrim Nuclear Power Station (PNPS) License Renewal Application (LRA), "Pressure-Temperature [P-T] Limits," states that in a license amendment request dated December 4, 2002, PNPS requested to use the present P-T limit curves through the end of operating cycle 16, which corresponds to approximately 23 effective full power years (EFPY) of facility operation. The end of operating cycle 16 is expected to occur in 2007. Section 4.2.2 also states that, in this December 4, 2002 submittal, PNPS committed to develop and submit prior to the end of operating cycle 16 an updated P-T limit curves and revised fluence calculations based on an NRC-approved calculation method that conforms to Regulatory Guide 1.190. License Amendment 197 granted this request in 2003. Section 4.2.2 then states that recent fluence calculations that were done per RG 1.190 confirm that the fluence for 54 EFPY is less than the fluence used to calculate the P-T limits that were approved for use only through the end of operating cycle 14. Based on the above statements, you conclude that the current Technical Specification (TS) P-T limit curves remain valid for the period of extended operation.

Please confirm whether the P-T limit curves currently established in the PNPS TS expire at the end of operating cycle 16 (23 EFPY). If the current TS P-T limit curves are valid beyond cycle 16, please provide reference of the staff license amendment authorizing the use of these curves beyond cycle 16 for the current licensed operating period. Indicate whether the current TS P-T limit curves are based on fluence values calculated using the methodology recommended in RG 1.190 or another methodology. If the current TS P-T limit curves are not based on fluence values calculated using the methodology recommended by RG 1.190, confirm whether the fluence calculations correspond to those used to calculate P-T limits that were approved for use through the end of operating cycle 14. Confirm whether the "recent fluence calculations done per RG 1.190" mentioned in Section 4.2.2 are the same as those reported in Section 4.2.1 of PNPS LRA.

**RAI 4.2.2-2**

The staff does not require the P-T limit curves for the extended period of operation to be submitted as part of the applicant's LRA for this TLAA. However, the staff requires NRC approval of the P-T limit curves for the extended period of operation prior to the expiration of the P-T limit curves for 32 EFPY. Section 4.2.2 of LRA states that the P-T limit curve bases for 54 EFPY are bounded by the bases for the current (32 EFPY) P-T limit curves, and, as such, the TLAA for the P-T limits remains valid in accordance with 10 CFR 54.21(c)(1)(i). Please state whether you intend to submit P-T limit curves for NRC approval for the extended licensed period of operation (54 EFPY) and when you plan to submit.

ENCLOSURE

#### RAI 4.2.4-1

Table 4.2-2 of the PNPS LRA lists initial  $RT_{NDT}$  values for the PNPS RV beltline materials. The initial  $RT_{NDT}$  values for Lower Intermediate Shell Plate G-3108-1 (Heat No. C-2921-2) and Lower Intermediate Shell Plate G-3108-3 (Heat No. C-2945-2) are less conservative than the corresponding initial  $RT_{NDT}$  values established in the NRC staff's reactor vessel integrity database (RVID) for these materials. Section 4.2.4 of the PNPS LRA states that, "initial  $RT_{NDT}$  values are from report SIR-00-82, which was submitted in 2001 as part of the PNPS P-T limit change request (Reference 4.2-5)." Reference 4.2-5 points to the April 13, 2001 license amendment issued by the NRC authorizing revised P-T limit curves. However this document only shows revised P-T limit curves and corresponding TS bases and does not document the NRC staff's authorization for using the initial  $RT_{NDT}$  values listed in Table 4.2-2. Please provide additional information that points to where the NRC staff authorized the use of the specific initial  $RT_{NDT}$  values listed in Table 4.2-4 for determining the ART values for the PNPS RV beltline materials.

#### RAI 4.2.4-2

The %Cu and chemistry factor (CF) values for Lower Shell Axial Welds 2-338A, B, and C from LRA Table 4.2-2 are less conservative than the corresponding %Cu and CF values that were established in the staff's RVID for these welds. Please supplement Section 4.0 of the OC LRA with the following information:

- (a) verification of whether the %Cu and CF values listed Table 4.2-1 are valid for the above welds,
- (b) justification for the use of these chemistry data for the above welds, including the source of the data, and a specific reference for the documentation/analysis demonstrating that these chemistry data represent the best available estimate of the weld chemistries.

#### RAI 4.2.4-3

Lower Intermediate / Upper Shell Circumferential Weld 3-339B (Heat No. 13253) is listed in the NRC staff's RVID. However this weld is not represented in LRA Table 4.2-2 (or LRA Table 4.2-1). Please resolve this discrepancy.

#### RAI 4.2.5-1

Section 4.2.5 of the PNPS LRA addresses the TLAA for the RV Circumferential Weld Examination Relief. Table 4.2-3 of the LRA, compares the limiting RV circumferential weld parameters for PNPS to those used in the NRC evaluation of the BWRVIP-05 report, "BWR Vessel and Internals Project, BWR Reactor Pressure Vessel Shell Weld Inspection Recommendations." The PNPS limiting RV circumferential weld parameters are based on Lower Intermediate / Lower Shell Circumferential Weld 1-334 (Heat No. 21935), which is the only circumferential weld represented in LRA Table 4.2-2. However, as discussed in RAI 4.2.4-3, the NRC staff's RVID also lists Lower Intermediate / Upper Shell Circumferential Weld 3-339B (Heat No. 13253) as one of the RV welds for PNPS. Furthermore, the chemistry and CF data for this weld are more limiting than for the Circumferential weld 1-334. Please explain why this TLAA did not address Lower Intermediate / Upper Shell Circumferential Weld 3-339B (Heat No. 13253).

#### RAI 4.2.5-2

Table 4.2-2 of the PNPS LRA reports a CF value of 172 for the Lower Intermediate / Lower Shell Circumferential Weld 1-334 (Heat No. 21935). The last column in Table 4.2-3 of the LRA is based on this weld. Please explain why the PNPS 54 EFPY beltline circumferential weld is listed as having a CF value of 171 in Table 4.2-3 of the PNPS LRA as opposed to 172. If the CF value of 171 was reported in error, state the correct CF value.

#### RAI 4.2.5-3

The NRC staff requires that a request for relief from the RV circumferential shell weld examination requirements for the extended licensed period of operation be submitted prior to the beginning of the extended period of operation. Please state whether you intend to apply for relief from the RV circumferential weld examination requirements for the extended licensed period of operation. State when you plan to submit this relief request.

#### RAI 4.2.5-4

In the July 28, 1998 SER on BWRVIP-05, the NRC staff concluded that the failure frequency of RV circumferential shell welds in BWRs was sufficiently low to justify elimination of the ISI requirements for these welds. However, the staff also indicated that examination of the RV circumferential shell welds would need to be performed if the corresponding volumetric examinations of the RV axial shell welds revealed the presence of an age-related degradation mechanism. Confirm whether or not previous volumetric examinations of the RV axial shell welds have shown any indication of cracking or other age-related degradation mechanisms in the welds.

#### RAI 4.2.6-1

Section 4.2.6 of the PNPS LRA states that mean  $RT_{NDT}$  value for the limiting RV axial shell weld at the end of the extended period of operation (54 EFPY) is within the limit for the mean  $RT_{NDT}$  value assumed in the analysis performed by the NRC staff in the BWRVIP-05 supplemental SER. Based on this comparison, you conclude that the TLAA has been projected to the end of the period of extended operation in accordance with 10 CFR 54.21(c)(1)(ii). Please indicate how you arrived at this conclusion, taking into consideration the axial weld conditional failure probability at PNPS.

#### RAI 4.2.6-2

The limiting axial weld failure probability calculated by the NRC staff in the BWRVIP-05 SER is based on the assumption that "essentially 100 percent" (e.g. greater than 90 percent) examination coverage of all reactor vessel axial welds can be achieved in accordance with ASME Code, Section XI requirements.

Please state whether your ISI examinations achieve "essentially 100 percent" (e.g. greater than 90 percent) overall examination coverage for the RV axial welds for the duration of the current licensed operating period. If not, please reference the NRC staff's SER granting relief for limited scope axial weld examination coverage. If less than 90 percent overall examination coverage is achieved for the RV axial welds then please revise this TLAA to account for the effects of the limited scope examination coverage.