

**From:** "Sanchez, Edward" <esanch1@entergy.com>  
**To:** "Perry Buckberg" <PHB1@nrc.gov>  
**Date:** 7/30/2007 1:07:47 PM  
**Subject:** Pilgrim LRA Amendment 19

Perry,

Attached is a PDF copy of Pilgrim LRA Amendment 19. Original is in US mail.

Regards,

Ed Sanchez  
Pilgrim Licensing

**Mail Envelope Properties** (46AE1AD0.308 : 17 : 8968)

**Subject:** Pilgrim LRA Amendment 19  
**Creation Date** 7/30/2007 1:06:56 PM  
**From:** "Sanchez, Edward" <esanch1@entergy.com>

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MESSAGE	126	7/30/2007 1:06:56 PM
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Entergy Nuclear Operations, Inc.  
Pilgrim Nuclear Power Station  
600 Rocky Hill Road  
Plymouth, MA 02360

Stephen J. Bethay  
Director, Nuclear Assessment

July 30, 2007

U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, DC 20555-0001

SUBJECT: Entergy Nuclear Operations, Inc.  
Pilgrim Nuclear Power Station  
Docket No. 50-293 License No. DPR-35  
License Renewal Application Amendment 19

REFERENCES: 1. Entergy Letter, License Renewal Application, dated  
January 25, 2006 (TAC MC9669)  
2. NRC Request for additional information for review of the Pilgrim  
License Renewal Application, dated July 26, 2007

LETTER NUMBER: 2.07.064

Dear Sir or Madam:

In Reference 1, Entergy Nuclear Operations, Inc. applied for renewal of the Pilgrim Nuclear Power Station operating license.

Attachment A provides a revised listing of regulatory commitments. Attachment B provides Entergy's response to the request for additional information (RAI) in Reference 2 associated with commitment 31 related to the Pilgrim license renewal application (LRA). Attachment C contains the revision to Commitment 31.

Please contact Mr. Bryan Ford, (508) 830-8403, if you have questions regarding this subject.

I declare under penalty of perjury that the foregoing is true and correct. Executed on July 30, 2007.

Sincerely,

A handwritten signature in cursive script that reads "Stephen J. Bethay".

Stephen J. Bethay  
Director Nuclear Safety Assessment

ERS/dl

Attachments: A: Revised List of Regulatory Commitments  
B: Response to the NRC Request for Additional Information  
Related to Pilgrim LRA Commitment 31  
C: Revision to Pilgrim LRA Commitment 31

Entergy Nuclear Operations, Inc.  
Pilgrim Nuclear Power Station

Letter Number: 2.07.064  
Page 2

cc: with Attachments

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Pilgrim Nuclear Power Station

**ATTACHMENT A to Letter 2.07.064**

(8 pages)

Revised List of Regulatory Commitments

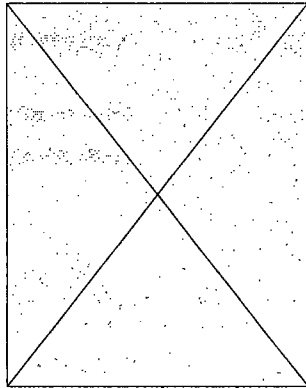
**ATTACHMENT A to Letter Number 2.07.064**

## Revised List of Regulatory Commitments

The following table identifies those actions committed to by Entergy in this document. Any other statements in this submittal are provided for information purposes and are not considered to be regulatory commitments.

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	Related LRA Section No./Comments
1	Implement the Buried Piping and Tanks Inspection Program as described in LRA Section B.1.2.	June 8, 2012	Letters 2.06.003 2.06.057	B.1.2 / Audit Item 320
2	Enhance the implementing procedure for ASME Section XI Inservice Inspection and testing to specify that the guidelines in Generic Letter 88-01 or approved BWRVIP-75 shall be considered in determining sample expansion if indications are found in Generic Letter 88-01 welds.	June 8, 2012	Letters 2.06.003 2.06.057	B.1.6 / Audit Item 320
3	Inspect fifteen (15) percent of the top guide locations using enhanced visual inspection technique, EVT-1, within the first 18 years of the period of extended operation, with at least one-third of the inspections to be completed within the first six (6) years and at least two-thirds within the first 12 years of the period of extended operations. Locations selected for examination will be areas that have exceeded the neutron fluence threshold.	As stated in the commitment.	Letters 2.06.003 2.06.057 2.06.064 2.06.081	B.1.8 / Audit Items 155, 320
4	Enhance the Diesel Fuel Monitoring Program to include quarterly sampling of the security diesel generator fuel storage tank. Particulates (filterable solids), water and sediment checks will be performed on the samples. Filterable solids acceptance criteria will be = 10 mg/l. Water and sediment acceptance criteria will be = 0.05%.	June 8, 2012	Letters 2.06.003 2.06.057 2.06.089	B.1.10 / Audit Items 320, 566
5	Enhance the Diesel Fuel Monitoring Program to install instrumentation to monitor for leakage between the two walls of the security diesel generator fuel storage tank to ensure that significant degradation is not occurring.	June 8, 2012	Letters 2.06.003 2.06.057	B.1.10 / Audit Items 155, 320
6	Enhance the Diesel Fuel Monitoring Program to specify acceptance criterion for UT measurements of emergency diesel generator fuel storage tanks (T-126A&B).	June 8, 2012	Letters 2.06.003 2.06.057	B.1.10 / Audit Items 165, 320

**ATTACHMENT A to Letter Number 2.07.064**



COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	Related LRA Section No./Comments
<p>Fire Protection Program procedures to state diesel engine sub-systems (including the fuel line) shall be observed while the pump is running. Acceptance criteria will be enhanced to ensure that the diesel engine did not exhibit signs of deterioration while it was running; such as fuel oil, coolant, or exhaust gas leakage. Also, update procedures to clarify that the diesel-driven fire pump engine is inspected for evidence of</p>	<p>June 8, 2012</p>	<p>Letters 2.06.003 2.06.057 2.06.064</p>	<p>B.1.13.1 / Audit Items 320, 378</p>

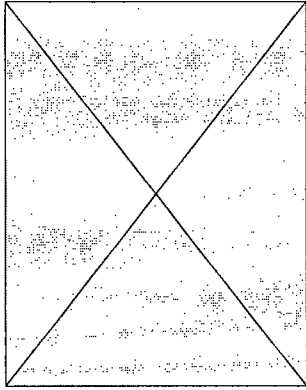
## ATTACHMENT A to Letter Number 2.07.064

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	Related LRA Section No./Comments
13	Enhance the Instrument Air Quality Program to include a sample point in the standby gas treatment and torus vacuum breaker instrument air subsystem in addition to the instrument air header sample points.	June 8, 2012	Letters 2.06.003 2.06.057	B.1.17 / Audit Item 320
14	Implement the Metal-Enclosed Bus Inspection Program as described in LRA Section B.1.18.	June 8, 2012	Letters 2.06.003 2.06.057	B.1.18 / Audit Item 320
15	Implement the Non-EQ Inaccessible Medium-Voltage Cable Program as described in LRA Section B.1.19. Include developing a formal procedure to inspect manholes for in-scope medium voltage cable.	June 8, 2012	Letters 2.06.003 2.06.057	B.1.19 / Audit items 311, 320
16	Implement the Non-EQ Instrumentation Circuits Test Review Program as described in LRA Section B.1.20.	June 8, 2012	Letters 2.06.003 2.06.057	B.1.20 / Audit Item 320
17	Implement the Non-EQ Insulated Cables and Connections Program as described in LRA Section B.1.21.	June 8, 2012	Letters 2.06.003 2.06.057	B.1.21 / Audit Item 320
18	Enhance the Oil Analysis Program to periodically change CRD pump lubricating oil. A particle count and check for water will be performed on the drained oil to detect evidence of abnormal wear rates, contamination by moisture, or excessive corrosion.	June 8, 2012	Letters 2.06.003 2.06.057	B.1.22 / Audit Item 320
19	Enhance Oil Analysis Program procedures for security diesel and reactor water cleanup pump oil changes to obtain oil samples from the drained oil. Procedures for lubricating oil analysis will be enhanced to specify that a particle count and check for water are performed on oil samples from the fire water pump diesel, security diesel, and reactor water cleanup pumps.	June 8, 2012	Letters 2.06.003 2.06.057	B.1.22 / Audit Item 320
20	Implement the One-Time Inspection Program as described in LRA Section B.1.23.	June 8, 2012	Letters 2.06.003 2.06.057 2.07.023	B.1.23 / Audit Items 219, 320
21	Enhance the Periodic Surveillance and Preventive Maintenance Program as necessary to assure that the effects of aging will be managed as described in LRA Section B.1.24.	June 8, 2012	Letters 2.06.003 2.06.057	B.1.24 / Audit Item 320
22	Enhance the Reactor Vessel Surveillance Program to proceduralize the data analysis, acceptance criteria, and corrective actions described in LRA Section B.1.26.	June 8, 2012	Letters 2.06.003 2.06.057	B.1.26 / Audit Item 320



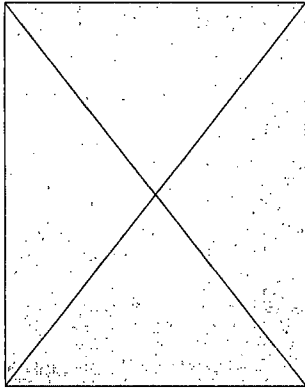
## ATTACHMENT A to Letter Number 2.07.064

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	Related LRA Section No./Comments
23	Implement the Selective Leaching Program in accordance with the program as described in LRA Section B.1.27.	June 8, 2012	Letters 2.06.003 2.06.057	B.1.27 / Audit Item 320
24	Enhance the Service Water Integrity Program procedure to clarify that heat transfer test results are trended.	June 8, 2012	Letters 2.06.003 2.06.057	B.1.28 / Audit Item 320
25	Enhance the Structures Monitoring Program procedure to clarify that the discharge structure, security diesel generator building, trenches, valve pits, manholes, duct banks, underground fuel oil tank foundations, manway seals and gaskets, hatch seals and gaskets, underwater concrete in the intake structure, and crane rails and girders are included in the program. In addition, the Structures Monitoring Program will be revised to require opportunistic inspections of inaccessible concrete areas when they become accessible.	June 8, 2012	Letters 2.06.003 2.06.057	B.1.29.2 / Audit Items 238, 320
26	Enhance Structures Monitoring Program guidance for performing structural examinations of elastomers (seals, gaskets, seismic joint filler, and roof elastomers) to identify cracking and change in material properties.	June 8, 2012	Letters 2.06.003 2.06.057	B.1.29.2 / Audit Item 320
27	Enhance the Water Control Structures Monitoring Program scope to include the east breakwater, jetties, and onshore revetments in addition to the main breakwater.	June 8, 2012	Letters 2.06.003 2.06.057	B.1.29.3 / Audit Item 320
28	Enhance System Walkdown Program guidance documents to perform periodic system engineer inspections of systems in scope and subject to aging management review for license renewal in accordance with 10 CFR 54.4(a)(1) and (a)(3). Inspections shall include areas surrounding the subject systems to identify hazards to those systems. Inspections of nearby systems that could impact the subject systems will include SSCs that are in scope and subject to aging management review for license renewal in accordance with 10 CFR 54.4(a)(2).	June 8, 2012	Letters 2.06.003 2.06.057	B.1.30 / Audit Items 320, 327
29	Implement the Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel (CASS) Program as described in LRA Section B.1.31.	June 8, 2012	Letters 2.06.003 2.06.057	B.1.31 / Audit Items 257, 320



## ATTACHMENT A to Letter Number 2.07.064

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	Related LRA Section No./Comments
33	PNPS will inspect the inaccessible jet pump thermal sleeve and core spray thermal sleeve welds if and when the necessary technique and equipment become available and the technique is demonstrated by the vendor, including delivery system.	As stated in the commitment.	Letter 2.06.057	Audit Items 320, 488
34	Within the first 6 years of the period of extended operation and every 12 years thereafter, PNPS will inspect the access hole covers with UT methods. Alternatively, PNPS will inspect the access hole covers in accordance with BWRVIP guidelines should such guidance become available.	June 8, 2018	Letters 2.06.057 2.06.089	Audit Items 320, 461
35	<p>At least 2 years prior to entering the period of extended operation, for reactor vessel components, including the feedwater nozzles, PNPS will implement one or more of the following:</p> <ol style="list-style-type: none"> <li>(1) Refine the fatigue analyses to determine valid CUFs less than 1. Determine valid CUFs based on numbers of transient cycles projected to be valid for the period of extended operation. Determine CUFs in accordance with an NRC-approved version of the ASME code or NRC-approved alternative (e.g., NRC-approved code case).</li> <li>(2) Manage the effects of aging due to fatigue at the affected locations by an inspection program that has been reviewed and approved by the NRC (e.g., periodic non-destructive examination of the affected locations at inspection intervals to be determined by a method acceptable to the NRC).</li> <li>(3) Repair or replace the affected locations before exceeding a CUF of 1.0.</li> </ol> <p>Should PNPS select the option to manage the aging effects due to fatigue during the period of extended operation, details of the aging management program such as scope, qualification, method, and frequency will be submitted to the NRC at least 2 years prior to the period of extended operation.</p>	<p>June 8, 2012</p> <p>June 8, 2010 for submitting the aging management program if PNPS selects the option of managing the affects of aging.</p>	<p>Letters 2.06.057 2.06.064 2.06.081</p>	Audit Item 345
36	To ensure that significant degradation on the bottom of the condensate storage tank is not occurring, a one-time ultrasonic thickness examination in accessible areas of the bottom of the condensate storage tank will be performed. Standard examination and sampling techniques will be utilized.	June 8, 2012	Letter 2.06.057	Audit Items 320, 363



ATTACHMENT A to Letter Number 2.07.064

Related

## ATTACHMENT A to Letter Number 2.07.064

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	Related LRA Section No./Comments
44	Perform another set of the UT measurements just above and adjacent to the sand cushion region prior to the period of extended operation and once within the first 10 years of the period of extended operation.	As stated in the commitment.	Letter 2.07.010	A.2.1.17 and B.1.16.1
45	If groundwater continues to collect on the torus room floor, obtain samples and test such water to determine its pH and verify the water is non-aggressive as defined in NUREG-1801 Section III.A1 item III.A.1-4 once prior to the period of extended operation and once every five years during the period of extended operation.	As stated in the commitment.	Letters 2.07.010 2.07.027 2.07.029	A.2.1.32 and B.1.29.2
46	Inspect the condition of a sample of the torus hold-down bolts and associated grout and determine appropriate actions based on the findings prior to the period of extended operation.	June 8, 2012	Letter 2.07.027	A.2.1.32 and B.1.29.2
47	Submit to the NRC an action plan to improve benchmarking data to support approval of new P-T curves for Pilgrim.	Sept. 15, 2007	Letter 2.07.027	4.2.2, A.2.2.1.1, and A.2.2.1.2
48	On or before June 8, 2010, Entergy will submit to the NRC calculations consistent with Regulatory Guide 1.190 that will demonstrate limiting fluence values will not be reached during the period of extended operation.	June 8, 2010	Letter 2.07.027	4.2, 4.7.1, A.1.1 and A.2.2.1

**ATTACHMENT B to Letter Number 2.07.064**

(2 pages)

Entergy Response to the NRC Request for Additional Information  
Related to Pilgrim LRA Commitment 31

**ATTACHMENT B to Letter Number 2.07.064****RAI 4.3.3-1:**

The license renewal application (LRA) for the Pilgrim Nuclear Power Station listed several reactor coolant pressure boundary components that did not receive a plant-specific metal fatigue analysis and cumulative usage factor (CUF). The applicant generated LRA Commitment No. 31 to address this issue. In the commitment, the applicant committed to take one of the following options or a combination of options to ensure that the time-limited aging analysis (TLAA) on environmentally-assisted fatigue (EAF) of these components, and any other Class 1 components requiring reanalysis for EAF, will be acceptable under 10 CFR 54.21(c)(1) for the period of extended operation:

- Option (1): either refine the existing fatigue analyses or perform new fatigue analyses using at least one of four sub options under this option.
- Option (2): manage aging by an aging management program for the period of extended operation.
- Option (3): repair or replace the impacted component prior to exceeding a CUF of 1.0.

In order to make a determination on the acceptability of the applicant's TLAA on EAF under the requirements of 10 CFR 54.21(c)(1), the staff requests that the applicant provide additional information on the option(s) that will be used for LRA Commitment No. 31. The applicant is requested to describe the methodology that will be used for the chosen option(s) in sufficient detail for staff review. Specifically, the staff requests that:

- A. If Option (1) is chosen, describe the methodology and the process that will be used to ensure that assumptions, transients, cycles, external loadings,  $F_{en}$  values, and analysis methods are valid for the refined or new fatigue analyses.

In the event the refined analyses performed under Option (1) result in CUFs greater than 1.0, describe the option(s) that may be used in addition to Option (1).

- B. If Option (2) is chosen, describe the AMP in sufficient detail with regard to inspection scope, inspection methods, inspection frequency, and inspection qualification techniques.
- C. If Option (3) is chosen, describe how the repair or replacement activity will be implemented in accordance with applicable repair or replacement requirements of the ASME Code Section XI.

**ATTACHMENT B to Letter Number 2.07.064****RAI 4.3.3-1 Response:**

Pilgrim Nuclear Power Station (PNPS) intends to comply with Commitment 31 by demonstrating, through the implementation of Option (1), that the cumulative usage factors (CUF) of the most fatigue sensitive locations are less than 1.0 throughout the license renewal period, considering both mechanical and environmental effects. The processes that will be used to develop the calculations for Option (1) are established design and configuration management processes. These processes are governed by Entergy's 10 CFR 50 Appendix B Quality Assurance (QA) program and include design input verification and independent reviews ensuring that valid assumptions, transients, cycles, external loadings, analysis methods, and environmental fatigue life correction factors will be used in the refined or new fatigue analyses.

The analysis methods for determination of stresses and fatigue usage will be in accordance with an NRC endorsed Edition of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section III Rules for Construction of Nuclear Power Plant Components Division 1 Subsection NB, Class 1 Components, Sub articles NB-3200 or NB-3600 as applicable to the specific component.

PNPS will utilize design transients from PNPS Design Specifications as well as design transient information from typical BWR-3 references to bound all operational transients. The numbers of cycles used for evaluation will be based on the design number of cycles and actual PNPS cycle counts projected out to the end of the license renewal period (60 years).

Environmental effects on fatigue usage will be assessed using methodology consistent with the Generic Aging Lessons Learned Report, NUREG-1801, Rev. 1, (GALL) that states; "The sample of critical components can be evaluated by applying environmental life correction factors ( $F_{en}$  Methodology) to the existing ASME Code fatigue analyses. Formulae for calculating the environmental life correction factors are contained in NUREG/CR-6583 for carbon and low-alloy steels and in NUREG/CR-5704 for austenitic stainless steels."

The Fatigue Monitoring Program currently tracks actual plant transients and evaluates these against the design transients. Current cycle counts show no limits are approached or are expected to be approached for the current license term. The Fatigue Monitoring Program will ensure that the numbers of transient cycles experienced by the plant remain within the analyzed numbers of cycles and hence, the component CUFs remain below the values calculated in the design basis fatigue evaluations. If ongoing monitoring indicates the potential for a condition outside that analyzed above, PNPS may perform further reanalysis of the identified configuration using established configuration management processes as described above.

If Option (2) of revised Commitment 31 becomes necessary, the inspection program submitted for approval by the NRC will be described in terms of the ten elements specified in Branch Technical Position RLSB-1 (NUREG-1800, Appendix A-1). Parameters monitored will be the presence and sizing of cracks. Frequency of inspection and acceptance criteria will be established such that detection of aging effects will occur before there is a loss of the component intended function(s). The method of inspection will be a qualified volumetric technique based on plant-specific and industry-wide operating experience.

If Option (3) becomes necessary, repair or replacement of the affected component(s) will be in accordance with established plant procedures governing repair and replacement activities. These established procedures are governed by Entergy's 10 CFR 50 Appendix B QA program and meet the applicable repair or replacement requirements of the ASME Code Section XI.



**ATTACHMENT C to Letter Number 2.07.064**

## Revision to Pilgrim LRA Commitment 31

As a result of the NRC Request for Additional Information (RAI) in Attachment B to this letter, Entergy hereby revises Commitment 31. This revised commitment is listed in Attachment A to this letter and reads as follows:

31	<p>At least 2 years prior to entering the period of extended operation, for the locations identified in NUREG/CR-6260 for BWRs of the PNPS vintage, PNPS will refine our current fatigue analyses to include the effects of reactor water environment and verify that the cumulative usage factors (CUFs) are less than 1. This includes applying the appropriate Fen factors to valid CUFs determined in accordance with one of the following:</p> <ol style="list-style-type: none"><li>1. For locations, including NUREG/CR-6260 locations, with existing fatigue analysis valid for the period of extended operation, use the existing CUF to determine the environmentally adjusted CUF.</li><li>2. More limiting PNPS-specific locations with a valid CUF may be added in addition to the NUREG/CR-6260 locations.</li><li>3. Representative CUF values from other plants, adjusted to or enveloping the PNPS plant specific external loads may be used if demonstrated applicable to PNPS.</li><li>4. An analysis using an NRC-approved version of the ASME code or NRC-approved alternative (e.g., NRC-approved code case) may be performed to determine a valid CUF.</li></ol> <p>During the period of extended operation, PNPS may also use one of the following options for fatigue management if ongoing monitoring indicates a potential for a condition outside the analysis bounds noted above:</p> <ol style="list-style-type: none"><li>1. Update and/or refine the affected analyses described above.</li><li>2. Implement an inspection program that has been reviewed and approved by the NRC (e.g., periodic nondestructive examination of the affected locations at inspection intervals to be determined by a method acceptable to the NRC).</li><li>3. Repair or replace the affected locations before exceeding a CUF of 1.0.</li></ol>
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