Entergy

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Stephen J. Bethay
Director, Nuclear Assessment

January 16, 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 12

REFERENCE: Entergy letter, License Renewal Application, dated January 25, 2006 (2.06.003)

LETTER NUMBER: 2.07.005

Dear Sir or Madam:

In the referenced letter, Entergy Nuclear Operations, Inc. applied for renewal of the Pilgrim Station operating license. NRC TAC NO. MC9669 was assigned to the application.

This License Renewal Application (LRA) amendment consists of five attachments stemming from discussions with the NRC license renewal staff. Attachment A contains the list of revised regulatory commitments. Attachment B contains responses to requests for information conveyed in NRC letter dated December 29, 2006. Attachment C contains a supplemental response to request for additional information on RAI 4.3.1.2-2 contained in LRA Amendment 9. Attachment D contains the response to a supplemental request for supplemental information on environmentally-assisted fatigue. Attachment E contains the response to request for a commitment to groundwater sampling.

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

I declare under penalty of perjury that the foregoing is true and correct. Executed on January 16, 2007.

Stephen J. Bethay
Director, Nuclear Safety Assessment

DWE/dl
Attachments: (as stated)
cc: see next page

A119

cc: with Attachments

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ATTACHMENT A to Letter 2.07.005
(8 pages)

Revised List of Regulatory Commitments

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 and 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 and 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 and 2.06.057 and 2.06.064 and 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 and 2.06.057 and 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 and 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 and 2.06.057	B.1.10 / Audit Items 165, 320

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	Related LRA Section No./ Comments
7	Enhance Fire Protection Program procedures to state that the diesel engine sub-systems (including the fuel supply line) shall be observed while the pump is running. Acceptance criteria will be enhanced to verify that the diesel engine did not exhibit signs of degradation while it was running; such as fuel oil, lube oil, coolant, or exhaust gas leakage. Also, enhance procedures to clarify that the diesel-driven fire pump engine is inspected for evidence of corrosion in the intake air, turbocharger, and jacket water system components as well as lube oil cooler. The jacket water heat exchanger is inspected for evidence of corrosion or buildup to manage loss of material and fouling on the tubes. Also, the engine exhaust piping and silencer are inspected for evidence of internal corrosion or cracking.	June 8, 2012	Letters 2.06.003 and 2.06.057 and 2.06.064	B.1.13.1 / Audit Items 320, 378
8	Enhance the Fire Protection Program procedure for Halon system functional testing to state that the Halon 1301 flex hoses shall be replaced if leakage occurs during the system functional test.	June 8, 2012	Letters 2.06.003 and 2.06.057	B.1.13.1 / Audit Item 320
9	Enhance Fire Water System Program procedures to include inspection of hose reels for corrosion. Acceptance criteria will be enhanced to verify no significant corrosion.	June 8, 2012	Letters 2.06.003 and 2.06.057	B.1.13.2 / Audit Item 320
10	Enhance the Fire Water System Program to state that a sample of sprinkler heads will be inspected using guidance of NFPA 25 (2002 Edition) Section 5.3.1.1.1. NFPA 25 also contains guidance to repeat this sampling every 10 years after initial field service testing.	June 8, 2012	Letters 2.06.003 and 2.06.057	B.1.13.2 / Audit Item 320
11	Enhance the Fire Water System Program to state that wall thickness evaluations of fire protection piping will be performed on system components using non-intrusive techniques (e.g., volumetric testing) to identify evidence of loss of material due to corrosion. These inspections will be performed before the end of the current operating term and at intervals thereafter during the period of extended operation. Results of the initial evaluations will be used to determine the appropriate inspection interval to ensure aging effects are identified prior to loss of intended function.	June 8, 2012	Letters 2.06.003 and 2.06.057	B.1.13.2 / Audit Item 320
12	Implement the Heat Exchanger Monitoring Program as described in LRA Section B.1.15.	June 8, 2012	Letters 2.06.003 and 2.06.057	B.1.15 / Audit Item 320

#	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 and 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 and 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 and 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 and 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 and 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 and 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 and 2.06.057	B.1.22 / Audit Item 320
20	Implement the One-Time Inspection Program as described in LRA Section B.1.23. This includes destructive or non-destructive examination of one (1) socket welded connection using techniques proven by past industry experience to be effective for the identification of cracking in small bore socket welds. Should an inspection opportunity not occur (e.g., socket weld failure or socket weld replacement), a susceptible small-bore socket weld will be examined either destructively or non-destructively prior to entering the period of extended operation.	June 8, 2012	Letters 2.06.003 and 2.06.057	B.1.23 / Audit Items 219, 320

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	Related LRA Section No./ Comments
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 and 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 and 2.06.057	B.1.26 / Audit Item 320
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 and 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 and 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 and 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 and 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 and 2.06.057	B.1.29.3 / Audit Item 320

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	Related LRA Section No./ Comments
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 and 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 and 2.06.057	B.1.31 / Audit Items 257, 320
30	Perform a code repair of the CRD return line nozzle to cap weld if the installed weld repair is not approved via accepted code cases, revised codes, or an approved relief request for subsequent inspection intervals.	June 30, 2015	Letter 2.06.057	B.1.3 / Audit Items 141, 320

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	Related LRA Section No./ Comments
31	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 implement one or more of the following: (1) Refine the fatigue analyses to determine valid CUFs less than 1 when accounting for the effects of reactor water environment. This includes applying the appropriate Fen factors to valid CUFs determined in accordance with one of the following: 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. 2. More limiting PNPS-specific locations with a valid CUF may be added in addition to the NUREG/CR-6260 locations. 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. 4. An analysis using an NRC-approved version of the ASME code of NRC-approved alternative (e.g., NRC-approved code case) may be performed to determine a valid CUF. The determination of Fen will account for operating times with both hydrogen water chemistry and normal water chemistry. (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). (3) Repair or replace the affected locations before exceeding a CUF of 1.0. Should PNPS select the option to manage the aging effects due to environmental-assisted 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.	June 8, 2012 June 8, 2010 for submitting the aging management program if PNPS selects the option of managing the affects of aging due to environmentally assisted fatigue.	Letters 2.06.057 and 2.06.064 and 2.06.081 and 2.07.005	4.3.3 / Audit Items 302, 346
32	Implement the enhanced Bolting Integrity Program described in Attachment C of Pilgrim License Renewal Application Amendment 5 (Letter 2.06.064).	June 8, 2012	Letters 2.06.057 and 2.06.064 and 2.06.081	Audit items 364, 373, 389, 390, 432, 443, 470
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

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	Related LRA Section No./ Comments
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	Letter 2.06.057 and 2.06.089	Audit Items 320, 461
35	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: (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). (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). (3) Repair of replace the affected locations before exceeding a CUF of 1.0. 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.	June 8, 2012 June 8, 2010 for submitting the aging management program if PNPS selects the option of managing the affects of aging.	Letters 2.06.057 and 2.06.064 and 2.06.081	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
37	The BWR Vessel Internals Program includes inspections of the steam dryer. Inspections of the steam dryer will follow the guidelines of BWRVIP-139 and General Electric SIL 644 Rev. 1.	June 8, 2012	Letter 2.06.089	A.2.1.8 / Conference call on September 25, 2006

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	Related LRA Section No./ Comments
38	Enhance the Diesel Fuel Monitoring Program to include periodic ultrasonic thickness measurement of the bottom surface of the diesel fire pump day tank. The first ultrasonic inspection of the bottom surface of the diesel fire pump day tank will occur prior to the period of extended operation, following engineering analysis to determine acceptance criteria and test locations. Subsequent test intervals will be determined based on the first inspection results.	June 8, 2012	Letter 2.06.089	B.1.10 / Audit Item 565
39	Perform a one-time inspection of the Main Stack foundation prior to the period of extended operation.	June 8, 2012	Letter 2.06.094	B.1.23 / Audit Item 581
40	Enhance the Oil Analysis Program by documenting program elements 1 through 7 in controlled documents. The program elements will include enhancements identified in the PNPS license renewal application and subsequent amendments to the application. The program will include periodic sampling for the parameters specified under the Parameters Monitored/Inspected attribute of NUREG-1801 Section XI.M39, Lubricating Oil Analysis. The controlled documents will specify appropriate acceptance criteria and corrective actions in the event acceptance criteria are not met. The basis for acceptance criteria will be defined.	June 8, 2012	Letter 2.06.094	B.1.22 / Audit Items 553 and 589
41	Enhance the Containment Inservice Inspection (CII) Program to require augmented inspection in accordance with ASME Section XI IWE-1240, of the drywell shell adjacent to the sand cushion following indications of water leakage into the annulus air gap.	June 8, 2012	Letter 2.06.094	A.2.1.17 and B.1.16.1
42	Implement the Bolted Cable Connections Program, described in Attachment C of Pilgrim License Renewal Application 11 (Letter 2.07.003), prior to the period of extended operation.	June 8, 2012	Letter 2.07.003	A.2.1.40 and B.1.34
43	Include within the Structures Monitoring Program provisions to ensure groundwater samples are evaluated periodically to assess the aggressiveness of groundwater to concrete, as described in Attachment E of License Renewal Application 12 (Letter 2.07.005), prior to the period of extended operation.	June 8, 2012	Letter 2.07.005	A.2.1.32 and B.1.29.2

ATTACHMENT B to Letter 2.07.005
(3 pages)
Response to Requests for Information Conveyed in NRC Letter Dated December 29, 2006

RAI Regarding Response to RAI 2.3.3.9-8:

The staff considers the response to Pilgrim RAI 2.3.3.9-8 incomplete.

Clarification of RAI 2.3.3.9-8 Response:

During the conference call on December 12, 2006, it was recognized by the NRC license renewal staff that the fire suppression system for the three transformers adjacent to the Turbine Building was addressed in the Branch Technical Position 9.5-1 Appendix A response (Boston Edison Company letter dated March 9, 1977) and related staff safety evaluation report (dated December 21, 1978).

Upon further consideration, automatic water spray systems to the main transformer, auxiliary transformer, and shutdown transformer are conservatively included in scope and subject to aging management review. The LRA is revised to add the following line items to Table 3.3.2-9:

Piping	Pressure boundary	Carbon steel	Air – indoor (int)	Loss of material	System walkdown	VII.I-8 (A-77)	3.3.1-58	A
Nozzle	Pressure boundary	Carbon steel	Air – outdoor (ext)	Loss of material	System walkdown	VII.I-9 (A-78)	3.3.1-58	A
Nozzle	Pressure boundary	Carbon steel	Air – indoor (int)	Loss of material	System walkdown	VII.I-8 (A-77)	3.3.1-58	A
Valve body	Pressure boundary	Carbon steel	Air – outdoor (ext)	Loss of material	System walkdown	VII.I-9 (A-78)	3.3.1-58	A

RAI Regarding Response to RAI 2.4.3-1:

The NRC staff feels RAI 2.4.3-1 trash racks and traveling screens require aging management programs; request that Entergy justify the RAI 2.4.3-1 jib crane being considered out of scope of license renewal.

Clarification of Response to RAI 2.4.3-1:

The trash racks and traveling screens are located in the flow path of seawater entering the Intake Structure. The jib crane is located on the Intake Structure, above the trash racks.

The trash racks are removable nonsafety-related components, constructed of epoxy coated steel, installed into the openings provided for the racks in the non-Class 1 portion of the Intake Structure. The traveling screens are removable nonsafety-related components, constructed of epoxy coated steel frames, fiberglass baskets, and stainless steel basket mesh, carrying chain, sprockets, shafts, and bushings. The screens are installed in the openings provided for the screens in the non-Class 1 portion of the Intake Structure. Failure of the trash racks and traveling screens will not prevent accomplishment of the safety functions of the salt service water (SSW) system for the following reasons. A concrete baffle in front of the traveling screens protrudes down to below the surface of the seawater, arresting the transport of floating debris. The sluice gate openings into the SSW system pumps bays are below the surface of the water and above the floor of the Intake Structure. In addition, during a design basis accident the

required flow through the Intake Structure to support operation of the SSW pumps is less than two percent of the normal flow through the traveling screens. At the required SSW flow rate, the Intake Structure design features described above prevent the transport of debris to the suction of the SSW pumps. Therefore, the traveling screens have no license renewal intended function and are not within the scope and subject to aging management review.

The jib crane, also referred to as the trash rack rake, was installed to enable the mechanical removal of significant waterborne material (e.g. seaweed) from the trash racks. The usefulness of the trash rack rake has been limited, mostly due to the maintenance effort that became necessary relatively soon after initial use. Since then, the use of the trash rack rake has been discontinued and the removal of waterborne materials from the trash racks has been accomplished by divers. The installation of the trash rack rake was reported in the annual 10 CFR 50.59 report for 1993 (Boston Edison Company letter dated June 30, 1994). This modification did not affect the Class 1 portion of the Intake Structure or Class 1 systems. Therefore, the jib crane is not within the outside the subject to aging management for license renewal.

RAI on Commitment to the Boiling Water Reactor Vessel Internals Program (BWRVIP):

The staff requires the applicant to make a commitment to boiling water reactor vessel and internals program, BWRVIP-94 and BWRVIP-76.

Response to RAI on Commitment to the BWRVIP:

Pilgrim is committed to BWRVIP-76 and BWRVIP-94.

BWRVIP-94 is the overall requirement for BWRVIP, and Entergy procedure ENN-DC-135, BWRVIP Inspection Program, reflects this requirement. As stated in correspondence between the BWRVIP chairman and the NRC, Entergy is committed to the BWRVIP which includes the requirements of BWRVIP-76 and BWRVIP-94.[1,2]

Additionally, BWRVIP-76 is already included in the PNPS vessel internals program described in LRA Appendix B.1.8, BWR Vessel Internals. The BWR Vessel Internals Program at PNPS is consistent with the program described in NUREG-1801, Section XI.M9, BWR Vessel Internals, which specifies inspections in accordance with the applicable and approved BWRVIP guidelines. Specifically, the scope of the AMP invokes the guidelines of BWRVIP-76 for inspection and evaluation of the core shroud.

[1]Letter 97-461 from Carl Terry (BWRVIP Chairman) to Brian Sheron (NRC), "BWRVIP Utility Commitments to the BWRVIP," dated May 30, 1997
[2]Letter 97-870 from Carl Terry (BWRVIP Chairman) to Brian Sheron (NRC), "BWRVIP Utility Commitments to the BWRVIP," dated October 30, 1997

RAI on One-Time Inspection of CASS Components:

Discuss the validity of using one-time inspections to assess reduction of fracture toughness in cast austenitic stainless steel (CASS) components.

Response to RAI on One-Time Inspection of CASS Components:

The LRA is revised to replace the aging management program of "One-Time Inspection" with "Inservice Inspection" for "valve bodies < 4" NPS" and aging effect "reduction of fracture toughness". The affected line item is now consistent with Table 3.1.1, Item 55.

LRA Section B.1.23, Program Description, where small bore piping in the reactor coolant system is discussed, is revised by replacing the phrase "cracking and reduction of fracture toughness are not occurring or are so insignificant" with "cracking is not occurring or is insignificant..."

RAI B.1.3-2 on Exception to NUREG-1800 Section XI.M6:

Discuss RAI B.1.3-2 exception to NUREG-1800 AMP XI.M6.

Response to RAI B.1.3-2 on Exception to NUREG-1800 Section XI.M6:

The exception was included in the response to RAI B.1.3-2 provided in Attachment C of LRA Amendment 7 (Letter 2.06.079). As a result of discussions held during the conference call on December 12, 2006 with the NRC license renewal staff, Entergy stated and the NRC staff agreed that the exception to NUREG-1800 Section XI.M6 need not be deleted.

ATTACHMENT C to Letter 2.07.005
(2 pages)

Supplemental Response to the Request for Additional Information
on Response to RAI 4.3.1.2-2 Contained in LRA Amendment 9

Request for Supplemental Information on Response to RAI 4.3.1.2-2:

The loose part assessment provided in your October 6, 2006 response to RAI 4.3.1.2-2 is incomplete because it did not address the impact on the structural integrity of surrounding and downstream piping and components due to broken pieces other than big ring-type pieces. Please supplement your response by also addressing broken thermal sleeve pieces which may escape into the flow and damage inner thermal sleeve and downstream piping and components.

Response to Request for Supplemental Information on Response to RAI 4.3.1.2-2:

The October 6, 2006 response to RAI 4.3.1.2-2, in Attachment D of LRA Amendment 9 (Letter 2.06.089), in item (5) stated:

> "The thermal sleeve is not pressure boundary so its failure would not compromise the pressure boundary. Failure of the thermal sleeve would be detected as a change in differential pressure of the affected jet pumps. There would be some slight movement but the thermal sleeve would remain within the nozzle. The movement of the riser pipe is restricted by the shroud. In addition, the cracks are at the outer end of the outer thermal sleeve. A full circumferential failure would not allow inward movement because the inner end of the outer thermal sleeve is welded to the nozzle and this would restrain movement."

The response is supplemented as follows.

Failure of the thermal sleeve by cracking until loose parts were generated is considered highly unlikely. There is no operating experience of cracking to this extent. Cracking of the thermal sleeve to the point of separation would relieve the stress and limit further stress corrosion cracking. Nonetheless, the improbable generation of loose parts would not result in safety concerns. The following analysis of loose parts in the reactor internals was provided in BWRVIP-06-A.

First, large pieces (over three inches in diameter) would become lodged in the jet pump nozzle. Such pieces could interfere with jet pump flow. BWRVIP-06, Section 4.1.1 states: "If blockage of the jet pump assembly or the recirculation pump suction were to occur, recirculation and jet pump flows would be affected and detected by routine operator surveillance. If the effect is detectable, operator action could be expected to bring the plant to a safe condition. Other settling locations would not impact the core flows and therefore would not present a safety concern." Second, small pieces (less than three inches in diameter) could pass through the jet pump nozzle and into the lower plenum.

BWRVIP-06-A addresses loose parts in the lower plenum as follows:

> "In the lower plenum, the vertical component of the flow velocity is less than 10 ft/sec and would be insufficient to cause large parts to be lifted by the flow. Consequently, large loose parts which have been generated from lower plenum components would settle to the bottom head region where they would present no safety concern from the standpoint of fuel channel blockage. Furthermore, the radial component of the flow velocity ranges from 7 ft/sec at the periphery to less than 1 ft/sec at the center and would tend to move the parts inward toward the reactor vessel centerline. This inward movement would be restricted by the "forest" of control rod guide tubes in the lower plenum.

Small parts generated from lower plenum components or which have entered the lower plenum from the downcomer could be lifted by the flow and carried to the fuel bundle inlet orifice and the clearance between control rod guide tubes (about 1 - 6 in.) is large enough to allow a small part to pass between them. The probability of the part negotiating a path through the "forest" of control rod guide tubes and finding its way to a fuel bundle orifice is considered small.

Nevertheless, the vertical velocities in the lower plenum are sufficiently large that the small part might be carried toward a fuel support inlet orifice. The fuel support orifices range in size from about 1.2 to 2.4 inches in diameter, depending on location and specific plant design. Partial flow blockage of a fuel support inlet orifice can lead to initiation of boiling transition or possibly channel instabilities. Due to the higher lift velocities and smaller orifice sizes in peripheral fuel bundles, small parts are more likely to block fuel channels in peripheral bundles than in central ones. Channel instability is less of a concern in this region due to the lower power distribution.

Smaller parts or debris that are able to pass through the inlet orifice could be stopped in the fuel bundle at the lower tie plate or the fuel rod spacer which have smaller clearances than the orifice. Because a blockage of one of these openings is smaller than that required to initiate boiling transition, there is no safety consequence of such small blockages."

BWRVIP-06, Section 4.1.2 states: "access to the CRD guide tube by metallic parts is effectively prevented by the integrity of the guide tube and the core flow patterns which exist in the fuel bundle and bypass regions. Any debris which enters a CRD guide tube is unlikely to have sufficient mechanical strength to interfere with the operation of the CRD."

ATTACHMENT D to Letter 2.07.005
(1 page)

Addition Information on Environmentally-Assisted Fatigue

Supplemental RAI on Environmentally-Assisted Fatigue:

Clarify whether Entergy factored in the oxygen concentrations derived from implementation of normal water chemistry (NWC) in the Fen calculations for those operational periods when NWC was being implemented instead of hydrogen water chemistry.

Response to Supplement RAI on Environmentally-Assisted Fatigue:

For the license renewal application, environmentally assisted fatigue factors (Fens) were estimated based on hydrogen water chemistry oxygen concentration. Prior to the period of extended operation, Pilgrim will perform fatigue analyses and appropriate Fens will be used, accounting for operating times with both hydrogen water chemistry and normal water chemistry. License renewal commitment 31 in Attachment A has been modified to include this action.

ATTACHMENT E to LETTER 2.07.005
(1 page)

Response to Request for Commitment to Groundwater Sampling

Request for a Commitment to Groundwater Sampling:

The NRC license renewal staff requests that a commitment be made for groundwater sampling to determine pH and the impact on concrete.

Response to Request for a Commitment to Groundwater Sampling:

The Structures Monitoring Program, described in LRA Section B.1.29.2, is revised to include enhancement that an engineering evaluation will be conducted periodically (at least once every five years) of groundwater samples to assess the aggressiveness of groundwater to concrete. Samples will be monitored for pH, chlorides, and sulfates. License renewal commitment 43 governs implementation of this program enhancement.

License renewal commitments 25 and 26 pertain to other commitments made to enhance different aspects of the Structures Monitoring Program, and those commitments are not affected by this response or commitment.

LRA Amendment 5 (Letter 2.06.064, dated July 19, 2006) included the addition of the following sentence to LRA Section A.2.1.32, which is a summary description of the Structures Monitoring Program.

"License renewal comments 25 and 26 specify enhancements to this program."

This sentence is changed as follows to include license renewal commitment 43:

"License renewal commitments 25, 26, and 43 specify enhancements to this program."