From: "Ellis, Douglas" <dellis1@entergy.com>
To: "Alicia Williamson" <ARW1@nrc.gov>
Date: 12/13/2006 9:02:08 AM
Subject: FW: Pilgrim License Renewal Application Amendment 10

Alicia and Perry - find attached pdf of Pilgrim LRA Amendment 10.

Alicia - The original plus CD of the MACCS2 input files are being sent to you via FedEx because it was the RAI on MACCS2 that prompted the submittal of the CD. I assume you will enter the amendment plus CD as necessary into the NRC document system.

Perry - A copy of the amendment without CD is being mailed to you and others via U.S. Mail.

Doug Ellis, Pilgrim Licensing, 508.830.8160.

-----Original Message-----
From: PNP616_DoNotReply@entergy.com
[mailto:PNP616_DoNotReply@entergy.com]
Sent: Wednesday, December 13, 2006 3:14 AM
To: Ellis, Douglas
Subject: Scan from a Xerox WorkCentre Pro

Please open the attached document. It was scanned and sent to you using a Xerox WorkCentre Pro.

Sent by: Guest [PNP616_DoNotReply@entergy.com]
Number of Images: 25
Attachment File Type: PDF

WorkCentre Pro Location: ESB 2nd Fl Licensing
Device Name: PNP616

For more information on Xerox products and solutions, please visit http://www.xerox.com

CC: "Perry Buckberg" <PHB1@nrc.gov>

Mail Envelope Properties (458007D0.F6C : 3 : 12140)

Subject: FW: Pilgrim License Renewal Application Amendment 10
Creation Date 12/13/2006 9:01:26 AM
From: "Ellis, Douglas" <dellis1@entergy.com>

Created By: dellis1@entergy.com

Recipients
nrc.gov
TWGWPO04.HQGWDO01
ARW1 (Alicia Williamson)

nrc.gov
OWGWPO01.HQGWDO01
PHB1 CC (Perry Buckberg)

Post Office	Route
TWGWPO04.HQGWDO01	nrc.gov
OWGWPO01.HQGWDO01	nrc.gov

Files	Size	Date & Time
MESSAGE	1017	12/13/2006 9:01:26 AM
Scan001.PDF	1765419	
Mime.822	2419219	

Options
Expiration Date: None
Priority: Standard
ReplyRequested: No
Return Notification: None

Concealed Subject: No
Security: Standard

Junk Mail Handling Evaluation Results
Message is eligible for Junk Mail handling
This message was not classified as Junk Mail

Junk Mail settings when this message was delivered
Junk Mail handling disabled by User
Junk Mail handling disabled by Administrator
Junk List is not enabled
Junk Mail using personal address books is not enabled

Block List is not enabled

Entergy

Entergy Nuclear Operations, Inc.
Pilgrim Station
600 Rocky Hill Road
Plymouth, MA 02360

Stephen J. Bethay
Director, Nuclear Assessment

December 12, 2006

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 10

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

LETTER NUMBER: 2.06.094

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 four attachments. Attachment A contains the list of revised regulatory commitments. Attachment B contains the response to the RAI on LRA Section B.1.16.1 Containment Inservice Inspection, conveyed in NRC letter dated November 7, 2006. Attachment C contains the response to the RAIs on LRA Appendix E concerning Severe Accident Mitigation Alternatives, conveyed in NRC letter dated November 28, 2006, and for which a compact disc labeled PNPS MACCS2 Input Files is enclosed. Attachment D contains changes to the LRA stemming from NRC Region I inspection of the LRA.

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 December 12, 2006.

Sincerely,

Stephen J. Bethay
Director, Nuclear Safety Assessment

DWE/dl
Attachments: (as stated)
Enclosure: Compact Disc labeled PNPS MACCS2 Input Files
cc: see next page

cc: with Attachments

Mr. Perry Buckberg
Project Manager
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Alicia Williamson
Project Manager
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Susan L. Uttal, Esq.
Office of the General Counsel
U.S. Nuclear Regulatory Commission
Mail Stop O-15 D21
Washington, DC 20555-0001

Sheila Slocum Hollis, Esq.
Duane Morris LLP
1667 K Street N.W., Suite 700
Washington, DC 20006

Mr. Joseph Rogers
Commonwealth of Massachusetts
Assistant Attorney General
Division Chief, Utilities Division
1 Ashburton Place
Boston, MA 02108

Mr. Matthew Brock, Esq.
Commonwealth of Massachusetts
Assistant Attorney General
Environmental Protection Division
One Ashburton Place
Boston, MA 02108

Diane Curran, Esq.
Harmon, Curran, and Eisenberg, L.L.P.
1726 M Street N.W., Suite 600
Washington, DC 20036

Molly H. Bartlett, Esq.
52 Crooked Lane
Duxbury, MA 02332

cc: without Attachments

Mr. James Shea
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Mr. Jack Strosnider, Director
Office of Nuclear Material and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555-00001

Mr. Samuel J. Collins, Administrator
Region I
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

NRC Resident Inspector
Pilgrim Nuclear Power Station

Mr. Robert Walker, Director
Massachusetts Department of Public Health
Radiation Control Program
Schrafft Center, Suite 1M2A
529 Main Street
Charlestown, MA 02129

Ms. Cristine McCombs, Director
Massachusetts Emergency Management Agency
400 Worchester Road
Framingham, MA 01702

Mr. James E. Dyer, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555-00001

ATTACHMENT A to Letter 2.06.094
(7 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	Letter 2.06.003	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	Letter 2.06.003	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 2.06.064 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 2.06.089	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	Letter 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	Letter 2.06.003	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	Letter 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	Letter 2.06.003	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	Letter 2.06.003	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	Letter 2.06.003	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	Letter 2.06.003	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	Letter 2.06.003	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	Letter 2.06.003	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	Letter 2.06.003	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	Letter 2.06.003	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	Letter 2.06.003	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	Letter 2.06.003	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	Letter 2.06.003	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	Letter 2.06.003	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	Letter 2.06.003	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	Letter 2.06.003	B.1.24/ Audit Item 320

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	Related LRA Section No./ Comments
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	Letter 2.06.003	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	Letter 2.06.003	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	Letter 2.06.003	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	Letter 2.06.003	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	Letter 2.06.003	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	Letter 2.06.003	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	Letter 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	Letter 2.06.003	B.1.31/ Audit Items 257, 320

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	Related LRA Section No./ Comments
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
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. (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 2.06.064 and 2.06.081	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 (dated July 19, 2006, 2.06.064).	June 8, 2012	Letters 2.06.064 and 2.06.081	Audit items 364, 373, 389, 390, 432, 443, 470

#	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	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 2.06.064 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

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	Related LRA Section No./ Comments
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
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/ Inspection 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/ Inspection Items 553, 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

ATTACHMENT B to Letter 2.06.094
(4 pages)

Response to Request for Additional Information on LRA
Section B.1.16.1 Containment Inservice Inspection

B.1.16.1 Containment Inservice Inspection (CII)

RAI B.1.16.1:

1. In the Pilgrim Nuclear Power Station (PNPS) aging management program B.1.16.1 of the license renewal application (LRA), the applicant stated: "CII inspections during RFO 15 (April 2005) did not reveal evidence of loss of material. Absence of degradation provides evidence that the program is effective for managing the aging effect." In addition, in the LRA, Amendment 2 (ML061710422) under, "Ongoing Actions to Prevent Drywell Corrosion," PNPS stated, "Functional checks are performed each refueling outage on the flow switch associated with the bellows seal leakage monitoring system." However, the recent NRC Region I inspection team observations indicated that:

   a. The flow switch in the bellows rupture drain had failed its surveillance in December 2005, and has not been fixed or evaluated. In addition, the flow switch also had been failed in 1999.

   b. Monitoring of other drains has been inconclusive and not well documented.

   c. The torus room floor has had water on the floor on multiple occasions.

   Please provide a detailed discussion, including record, corrective actions taken, and preventive action in response to this plant specific operating experience and discuss its impact on the aging management of potential loss of material due to corrosion in the inaccessible area of the Mark I steel containment drywell shell, including the sand pocket region for the period of extended operation.

Response to RAI B.1.16.1:

a. On December 28, 2005, the flow switch in the bellows rupture drain (FS-4803) failed to respond acceptably during testing. During the test, water is poured into an upstream test funnel. The water normally flows into the flow switch, actuates the switch, and discharges to the radwaste system. On this occasion, the flow switch did not alarm; the water filled the piping until it overflowed the test funnel. This was caused by blockage of the passages around the perimeter of the baffle of the flow switch. The apparent cause of the blockage was accumulation of crud and corrosion products from the test funnel and associated piping during routine testing.

   Corrective actions

   The flow switch associated with the bellows rupture drain was replaced with a new switch on November 17, 2006.

   Preventive actions

   Flow switches FS-4802 and FS-4806 are the same Peeco flow switches as FS-4803. FS-4802 provides alarming functions for the vessel to drywell bellows rupture. FS-4806 provides alarming functions for fuel pool gate leakage. Maintenance requests were initiated to replace these flow switches.

A preventive maintenance task was established to replace flow switches FS-4802, FS-4803, and FS-4806 every 15 years.

Functional checks of the flow switch in the bellows rupture drain (FS-4803) are performed each refueling outage and repair, if necessary, is tracked under the work management process.

Impact on management of loss of material due to corrosion in the inaccessible areas of the containment drywell shell

If leakage occurred with the flow switch in the bellows rupture drain (FS-4803) failed, leakage would enter the 8" casings where it would be indicated by leakage from the four ¾" refueling bellows rupture tell-tale drains. Daily operator rounds have not detected leakage from these tell-tale drains.

If FS-4803 has failed and leakage is not detected from the ¾" refueling bellows rupture tell-tale drains before the 8" casings fill up and water rises above the ¼" thick form plate that surrounds the ledge, leakage can overflow into the annulus air gap. A sheet metal cover plate shields the sand pocket against leakage from above. Four 4" annulus air gap drain lines direct water from above the sand pocket to the torus room floor. These drains are checked by ISI VT-2 certified inspectors for leakage twice every refuel outage, once after flooding up and again prior to flooding down. No leakage has ever been detected from these drains. Buckets placed under these annulus air gap drains in the 1980's are dry with no evidence of previous water accumulation.

Since leakage has not been detected at the other drains and actions have been taken to preclude recurrence, the temporary inoperability of FS-4803 does not impact management of loss of material due to corrosion in the inaccessible areas of the containment drywell shell for the period of extended operation.

b. The 4" annulus air gap drains located in bays 2, 6, 10 and 14 of the torus room adjacent to the reactor pedestal discharge approximately 6" above the floor (buckets are placed on the floor under the drains). The four drains are examined for leakage twice during every refueling outage as augmented exams under the station's IWE code containment inspection program. They are checked for leakage by VT-2 certified examiners during outages once after flooding the refueling cavity and again prior to draining the refueling cavity at the close of the outage. Leakage, if present, would discharge into the buckets on the floor of the torus room as the drain lines are not directed to floor drains. Because of the buckets under the drains, leakage from the four annulus air gap drains (see response to c.) could not be mistaken for groundwater intrusion in the torus room.

Corrective actions

See Preventive actions below for measures to improve the documentation of drain monitoring activities.

Preventive actions

Surveillance of the four ¾" refueling bellows rupture tell-tale drains on the Reactor Building 74 foot elevation is performed and documented twice daily during reactor building operator rounds when in refueling mode. Visual observation of the tell-tale drains during operator rounds has not detected leakage.

Impact on management of loss of material due to corrosion in the inaccessible areas of the containment drywell shell

Preventive actions discussed above provide additional assurance that leakage into the annulus air gap will be prevented.

c. In September 2006, standing water was observed in torus bays 6, 7, 10 and 13. Although dry, the appearance of the floor in bay 11 indicated it had been wet. Dampness and corrosion was in evidence around the Williams Rock Anchor baseplates at torus saddles 6, 10, 11, 12, 13, 14 & 15. There was no condensation on the torus itself, nor any obvious evidence of process system leakage.

The locations and extent of the observed conditions are consistent with conditions investigated and evaluated in 1996. At that time, a thorough investigation concluded that the most probable cause of water on the torus room floor was groundwater infiltration by-passing the membrane system that encapsulates the reactor building foundation. A test performed in 1996 demonstrated that water was emerging from the anchor bolt holes for the Williams Rock Anchors at the torus saddles. Buckets under the air gap annulus drains that continue to remain dry ensure that those drains are not contributing to the water observed on the floor.

Corrective actions

None.

Preventive actions

An assessment of the torus saddle anchor bolts in 1999 concluded that active corrosion of the embedded anchor bolts was not occurring. These supports and associated bolting are inspected under the Containment Inservice Inspection Program to assure that effects of aging will be managed such that they will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

The feasibility of pressure grouting the torus room floor or correcting the condition of floor surface drainage to allow water to flow to the floor drains is being evaluated.

Impact on management of loss of material due to corrosion in the inaccessible areas of the containment drywell shell

Since the water on the torus room floor is not attributed to refueling cavity leakage or leakage into the annulus air gap, this condition has no impact on management of loss of material due to corrosion in the inaccessible areas of the containment drywell shell for the period of extended operation. Collection buckets under the annulus air gap drains continue to remain dry.

Other Considerations

The ongoing actions to prevent and identify drywell corrosion described in LRA Amendment 2 were assessed and strengthened by addition of an enhancement to assure the drywell shell adjacent to the sand cushion is inspected following indications of water leakage into the annulus air gap.

The condition of the sealant between the shield at the base of the annulus air gap and the drywell shell is uncertain because of its inaccessibility. Also due to inaccessibility, the absence of residual moisture in the sand cushion following leakage cannot be confirmed. For these reasons, augmented inspection of the drywell shell in the sand cushion area is warranted following indications of leakage into the annulus air gap.

If leakage is detected or suspected into the inaccessible area adjacent to the exterior of the drywell shell (the annulus air gap), PNPS will document and evaluate the condition in accordance with the corrective action program. Appropriate corrective actions to correct the cause of the leakage and to address the potential degradation of the drywell shell caused by the condition would be initiated. To assure corrective actions include augmented inspections performed in accordance with ASME Section XI IWE-1240, the Containment Inservice Inspection (CII) Program is enhanced to require augmented inspection of the drywell shell adjacent to the sand cushion following indications of water leakage into the annulus air gap.

This enhancement, License Renewal Commitment 41, requires the following revisions to the LRA.

LRA Section B.1.16.1, Containment Inservice Inspection (CII), is revised to include the following.

Enhancements

The following enhancement will be implemented prior to the period of extended operation.

Attributes Affected	Enhancements
3. Parameters monitored and inspected	Administrative controls are enhanced 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.

LRA Section A.2.1.17, Inservice Inspection – Containment Inservice Inspection (CII) Program, is revised to include the following statement.

"License Renewal Commitment 41 specifies an enhancement to this program."

ATTACHMENT C to Letter 2.06.094

(4 pages)

Response to Request for Additional Information on LRA
Appendix E Concerning
Severe Accident Mitigation Alternatives

NRC RAI 1:

Provide the complete MACCS2 user input file used for the revised calculations described in Entergy's July 5, 2006 response to RAIs. This should include all files necessary to reproduce Entergy's calculations, i.e., the ATMOS, EARLY, CHRONC files, as well as any auxiliary input files containing meteorological data, dose conversion factors, food chain data, and site data. This should be provided in the form of a CD. Also identify and discuss any changes made to the MACCS2 source code.

Response to RAI 1:

A complete set of user prepared files is provided in the enclosed compact disc (CD). The files include ATMOS, EARLY, CHRONC, meteorological data, dose conversion factors, food chain data, and site data with file names ATMBP1Q, EARBP1, CHRBP1, MET01P, DOSDATA, SAMP_A, and SITEP, respectively. In addition, a specific ATMOS file named ATMPS2Q is also included to reflect reduced source terms for the filtered containment vent case (SAMA 2).

No changes were made to the MACCS2 source code.

NRC RAI 2:

Provide updated versions of Environmental Report Tables E.1-14 through E.1-16, based on the revised reactor core radionuclide inventories.

Response to RAI 2:

Updated Tables E.1-14, E.1-15, and E.1-16 are provided as follows:

Table E.1-14 Updated PNPS Core Inventory (Becquerels)[1]

Nuclide	Inventory	Nuclide	Inventory
Co-58	1.15E+16	Te-131m	2.87E+17
Co-60	1.37E+16	Te-132	2.80E+18
Kr-85	1.88E+16	I-131	1.94E+18
Kr-85m	6.84E+17	I-132	2.85E+18
Kr-87	1.24E+18	I-133	4.07E+18
Kr-88	1.68E+18	I-134	4.45E+18
Rb-86	1.05E+15	I-135	3.83E+18
Sr-89	2.08E+18	Xe-133	4.07E+18
Sr-90	1.84E+17	Xe-135	9.68E+17
Sr-91	2.71E+18	Cs-134	3.97E+17
Sr-92	2.83E+18	Cs-136	8.51E+16
Y-90	1.58E+17	Cs-137	2.38E+17
Y-91	2.54E+18	Ba-139	3.75E+18
Y-92	2.84E+18	Ba-140	3.70E+18
Y-93	3.23E+18	La-140	3.77E+18
Zr-95	3.34E+18	La-141	3.48E+18
Zr-97	3.44E+18	La-142	3.35E+18
Nb-95	3.16E+18	Ce-141	3.36E+18
Mo-99	3.65E+18	Ce-143	3.27E+18
Tc-99m	3.15E+18	Ce-144	2.18E+18
Ru-103	2.77E+18	Pr-143	3.20E+18
Ru-105	1.85E+18	Nd-147	1.43E+18
Ru-106	7.52E+17	Np-239	4.26E+19
Rh-105	1.38E+18	Pu-238	2.96E+15
Sb-127	1.74E+17	Pu-239	7.51E+14
Sb-129	6.06E+17	Pu-240	9.41E+14
Te-127	1.69E+17	Pu-241	1.62E+17
Te-127m	2.27E+16	Am-241	1.65E+14
Te-129	5.68E+17	Cm-242	4.35E+16
Te-129m	1.49E+17	Cm-244	2.35E+15

[1] Derived from Reference E.1-21 for a power level of 2028 MW(t) with an increase of 25% for long half-life nuclides Sr-90, Cs-134, and Cs-137 to reflect the average core exposure at PNPS

Table E.1-15 Updated Base Case Mean PDR and OECR Values

Release Mode	Frequency (/yr)	Population Dose (person-sv)[1]	Offsite Economic Cost ($)	Population Dose Risk (PDR) (person-rem/yr)	Offsite Economic Cost Risk (OECR) ($/yr)
CAPB-1	9.51E-08	5.77E-01	3.82E+06	5.49E-06[2]	3.63E-01
CAPB-2	1.27E-08	1.21E+02	7.18E+06	1.53E-04	9.08E-02
CAPB-3	2.39E-09	1.28E+02	7.31E+06	3.06E-05	1.75E-02
CAPB-4	3.29E-09	1.50E+04	4.93E+09	4.94E-03	1.62E+01
CAPB-5	2.73E-09	1.92E+04	6.15E+09	5.24E-03	1.68E+01
CAPB-6	7.95E-09	1.60E+04	4.35E+09	1.27E-02	3.46E+01
CAPB-7	7.93E-09	1.78E+04	5.25E+09	1.41E-02	4.16E+01
CAPB-8	2.06E-08	4.42E+04	1.68E+10	9.10E-02	3.46E+02
CAPB-9	9.25E-09	2.54E+04	9.26E+09	2.35E-02	8.56E+01
CAPB-10	8.53E-08	4.74E+04	1.72E+10	4.05E-01	1.47E+03
CAPB-11	4.35E-08	3.72E+04	1.29E+10	1.62E-01	5.61E+02
CAPB-12	1.70E-06	1.18E+02	4.85E+06	2.01E-02	8.25E+00
CAPB-13	2.30E-09	8.48E+03	8.36E+08	1.95E-03	1.93E+00
CAPB-14	2.26E-06	1.69E+04	4.96E+09	3.82E+00	1.12E+04
CAPB-15	2.12E-06	4.65E+04	1.80E+10	9.86E+00	3.82E+04
CAPB-16	1.18E-09	1.93E+04	6.28E+09	2.27E-03	7.40E+00
CAPB-17	6.91E-09	5.12E+04	1.98E+10	3.54E-02	1.37E+02
CAPB-18	4.61E-10	2.58E+04	8.43E+09	1.19E-03	3.88E+00
CAPB-19	2.43E-08	5.72E+04	2.11E+10	1.39E-01	5.12E+02
			Totals	**1.46E+01**	**5.26E+04**

1. 1 sv = 100 rem
2. 5.49E-06 (person-rem/yr) = 9.51E-08 (/yr) x 5.77E-01 (person-sv) x 100 (rem/sv)

Table E.1-16 Updated Summary of Offsite Consequence Sensitivity Results

	Population Dose (person-sv)			Offsite Economic Cost ($)		
Release Mode	Base Case	2–hr delayed evacuation	Lower speed of evacuation	Base Case	2–hr delayed evacuation	Lower speed of evacuation
CAPB-1	5.77E-01	5.77E-01	5.77E-01	3.82E+06	3.82E+06	3.82E+06
CAPB-2	1.21E+02	1.21E+02	1.21E+02	7.18E+06	7.18E+06	7.18E+06
CAPB-3	1.28E+02	1.28E+02	1.28E+02	7.31E+06	7.31E+06	7.31E+06
CAPB-4	1.50E+04	1.51E+04	1.51E+04	4.93E+09	4.93E+09	4.93E+09
CAPB-5	1.92E+04	1.93E+04	1.93E+04	6.15E+09	6.15E+09	6.15E+09
CAPB-6	1.60E+04	1.61E+04	1.61E+04	4.35E+09	4.35E+09	4.35E+09
CAPB-7	1.78E+04	1.79E+04	1.79E+04	5.25E+09	5.25E+09	5.25E+09
CAPB-8	4.42E+04	4.49E+04	4.50E+04	1.68E+10	1.68E+10	1.68E+10
CAPB-9	2.54E+04	2.55E+04	2.56E+04	9.26E+09	9.26E+09	9.26E+09
CAPB-10	4.74E+04	4.77E+04	4.79E+04	1.72E+10	1.72E+10	1.72E+10
CAPB-11	3.72E+04	3.75E+04	3.76E+04	1.29E+10	1.29E+10	1.29E+10
CAPB-12	1.18E+02	1.18E+02	1.19E+02	4.85E+06	4.85E+06	4.85E+06
CAPB-13	8.48E+03	8.48E+03	8.49E+03	8.36E+08	8.36E+08	8.36E+08
CAPB-14	1.69E+04	1.69E+04	1.69E+04	4.96E+09	4.96E+09	4.96E+09
CAPB-15	4.65E+04	4.67E+04	4.69E+04	1.80E+10	1.80E+10	1.80E+10
CAPB-16	1.93E+04	1.94E+04	1.95E+04	6.28E+09	6.28E+09	6.28E+09
CAPB-17	5.12E+04	5.14E+04	5.17E+04	1.98E+10	1.98E+10	1.98E+10
CAPB-18	2.58E+04	2.59E+04	2.61E+04	8.43E+09	8.43E+09	8.43E+09
CAPB-19	5.72E+04	5.75E+04	5.78E+04	2.11E+10	2.11E+10	2.11E+10

ATTACHMENT D to Letter 2.06.094
(4 pages)

Changes to the LRA
Stemming from NRC Region I Inspection of the LRA

Inspection item 526:

LRA Section B.1.15, attribute 4, Detection of Aging Effects, is revised as follows (underlined words added):

4. Detection of Aging Effects

Loss of material is the aging effect managed by this program. Representative tubes within the sample population of heat exchangers will be eddy current tested at a frequency determined by internal and external operating experience to ensure that effects of aging are identified prior to loss of intended function. Visual inspections of accessible heat exchangers will be performed on the same frequency as eddy current inspections.

An appropriate sample population of heat exchangers will be determined based on operating experience prior to inspections. The sample population of heat exchangers will be determined based on the materials of construction of the heat exchanger tubes and the associated environments as well as the type of heat exchanger (for example, shell and tube type). At least one heat exchanger of each type, material and environment combination will be included in the sample population. Inspection can reveal loss of material that could result in degradation of the heat exchangers. Fouling is not addressed by this program.

Inspection items 553 and 589:

LRA Section B.1.22 is amended as follows (underlined words added, strike-outs deleted):

NUREG-1801 Consistency

The Oil Analysis Program at PNPS is consistent with the program described in NUREG-1801, Section XI.M39, Lubricating Oil Analysis, with ~~an exception~~ exceptions and enhancements.

Exceptions to NUREG-1801

The Oil Analysis Program at PNPS is consistent with the program described in NUREG-1801, Section XI.M39, Lubricating Oil Analysis, with the following ~~exception~~ exceptions.

Attributes Affected	Exception
3. Parameters Monitored/Inspected	Flash point is not determined for sampled oil.[1]
3. Parameters Monitored/Inspected	Neutralization number and fuel dilution are not monitored for every oil sample.[2]

1. Analyses of filter residue or particle count, viscosity, total acid/base (neutralization number), water content, and metals content provide sufficient information to verify the oil is suitable for continued use.

2. The parameters monitored regularly (presence of moisture, abnormal wear products, and changes in viscosity) are those directly related to age-related degradation of components containing lube oil. As noted in the Mechanical Tools, aging effects are not observed in fuel oil and lubricating oil systems unless moisture or other contaminants are present. Therefore,

monitoring and trending of particle count, water content and viscosity in lubricating oil provide reasonable assurance that effects of aging will be managed such that applicable components will continue to perform their intended function consistent with the current licensing basis for the period of extended operation.

Enhancements

The following enhancements will be initiated prior to the period of extended operation.

Attributes Affected	Enhancements
1. Scope of Program	The Oil Analysis Program will be enhanced to periodically change CRD pump lubricating oil. A particle ~~count~~ check and ~~check~~ analysis for water will be performed on the drained oil to detect evidence of abnormal wear rates, contamination by moisture, or excessive corrosion.
3. Parameters Monitored/Inspected	Procedures for security diesel and reactor water cleanup pump oil changes will be enhanced to obtain oil samples from the drained oil. Procedures for lubricating oil analysis will be enhanced to specify that a particle ~~count~~ check and ~~check~~ analysis for water are performed on oil samples from the fire water pump diesel, security diesel, and reactor water cleanup pumps.
6. Acceptance Criteria	The Oil Analysis Program will be enhanced to proceduralize the acceptance criteria and corrective actions described in this program description.

License renewal commitment 40 is added as follows:

Prior to the period of extended operation, the PNPS Oil Analysis Program will be enhanced 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.

Inspection item 581:

PNPS will perform a one-time inspection of the main stack foundation prior to the period of extended operation. License renewal commitment 39.

Inspection item 583:

The table in the program description of LRA Section B.1.23 is revised to include the following line item for verifying the absence of cracking for miscellaneous items not covered by a fatigue TLAA:

Inspection for mechanical fatigue	One-time inspection activity will confirm that cracking due to fatigue is not occurring or is so insignificant that an aging management program is not warranted.

Inspection item 586:

Confirmation of the screening results for nonsafety-related SSCs connected to safety-related SSCs review of AMRM-30, Aging Management Review of Nonsafety-related Systems and Components Affecting Safety-related Systems, is being performed to assure that all components up to the seismic or equivalent anchor are represented in the summary tables. As a result of this effort, the following components are added to the summary tables:

Table 3.3.2-14-15: Heating Ventilation and Air Conditioning Systems

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Fan housing	Pressure boundary	Carbon steel	Air – indoor (ext)	Loss of material	System Walkdown	VII.F2-2 (A-10)	3.3.1-56	A
Fan housing	Pressure boundary	Carbon steel	Air – indoor (int)	Loss of material	System Walkdown	V.B-1 (E-25)	3.2.1-32	E

Table 3.3.2-14-33: Standby Liquid Control System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Tank	Pressure boundary	Stainless steel	Air – indoor (ext)	None	None	VII.J-15 (AP-17)	3.3.1-94	A
Tank	Pressure boundary	Stainless steel	Air – indoor (int)	None	None			G

Additional Clarification:

LRA Table 3.3.2-3, Reactor Building Closed Cooling Water System (RBCCW) Summary of Aging Management Evaluation, is revised to add the following line items to address the Fuel Pool heat exchangers, Reactor Water Cleanup System (RWCU) demineralizer non-regeneration heat exchangers, and Recirculation pump seal water coolers, which were inadvertently omitted from the summary table.

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Heat exchanger (tubes)	Pressure boundary	Stainless steel	Treated water (ext)	Loss of material	Water Chemistry Control – Closed Cooling Water	VII.C2-10 (A-52)	3.3.1-50	D
Heat exchanger (tubes)	Pressure boundary	Stainless steel	Treated water (ext)	Loss of material – wear	Heat Exchanger Monitoring			H

Heat exchanger (tubes)	Pressure boundary	Stainless steel	Treated water > 140°F (ext)	Loss of material	Water Chemistry Control – Closed Cooling Water	VII.C2-10 (A-52)	3.3.1-50	D
Heat exchanger (tubes)	Pressure boundary	Stainless steel	Treated water > 140°F (ext)	Cracking	Water Chemistry Control – Closed Cooling Water	VII.E3-2 (A-68)	3.3.1-46	D
Heat exchanger (tubes)	Pressure boundary	Stainless steel	Treated water > 140°F (ext)	Loss of material – wear	Heat Exchanger Monitoring			H
Heat exchanger (tubes)	Pressure boundary	Stainless steel	Treated water > 270°F (ext)	Loss of material	Water Chemistry Control – Closed Cooling Water	VII.C2-10 (A-52)	3.3.1-50	D
Heat exchanger (tubes)	Pressure boundary	Stainless steel	Treated water > 270°F (ext)	Cracking	Water Chemistry Control – Closed Cooling Water	VII.E3-2 (A-68)	3.3.1-46	D
Heat exchanger (tubes)	Pressure boundary	Stainless steel	Treated water > 270°F (ext)	Cracking – fatigue	One-time Inspection	VII.E3-14 (A-62)	3.3.1-2	C
Heat exchanger (tubes)	Pressure boundary	Stainless steel	Treated water > 270°F (ext)	Loss of material – wear	Heat Exchanger Monitoring			H

LRA Section B.1.15, Heat Exchanger Monitoring, Program Description, third paragraph, is revised as follows (underlined words added, strike-outs deleted):

> Representative tubes within the sample population of heat exchangers will be eddy current tested at a frequency determined by internal and external operating experience to ensure that effects of aging are identified prior to loss of intended function. Along with each eddy current test, visual inspections will be performed on accessible heat exchanger heads, covers and tube sheets to monitor surface condition for indications of loss of material. The ~~sample~~ population of heat exchangers includes the RHR heat exchangers, RHR pump seal cooler heat exchangers, core spray pump motor thrust bearing lube oil coolers, HPCI gland seal condenser, HPCI turbine lube oil cooler, RCIC lube oil cooler, recirculation pump motor generator set fluid coupling oil and bearing coolers, CRD pump oil coolers, recirculation pump motor lube oil coolers, clean up recirculation pump lube oil coolers and stuffing box cooler, fuel pool heat exchangers, CRD pump thrust bearing coolers, recirculation pump seal water coolers, clean up demineralizer non-regeneration heat exchangers, and EDG lube oil coolers.