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Pilgrim Station
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January 10, 2007

Stephen J. Bethay
Director, Nuclear Assessment

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 11

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

LETTER NUMBER: 2.07.003

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 three attachments. Attachment A contains the list of revised regulatory commitments. Attachment B contains the response to the request for additional information (RAI) on LRA Amendment 8 Attachment C concerning LRA Section 3.6.2 Electrical and Instrumentation and Controls, conveyed in NRC letter dated November 2, 2006. Attachment C contains changes to 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 January 10, 2007.

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

Stephen J. Bethay
Director, Nuclear Safety Assessment

DWE/dl

Attachments: (as stated)
cc: see next page

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Pilgrim Nuclear Power Station

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cc: with Attachments

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ATTACHMENT A to Letter 2.07.003
(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	<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 implement one or more of the following:</p> <p>(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:</p> <ol style="list-style-type: none"> 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. <p>(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).</p> <p>(3) Repair or replace the affected locations before exceeding a CUF of 1.0.</p> <p>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.</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 due to environmentally assisted fatigue.</p>	<p>Letters 2.06.064 and 2.06.081</p>	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 2.06.064 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	<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"> (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 or replace the affected locations before exceeding a CUF of 1.0. <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 June 8, 2010 for submitting the aging management program if PNPS selects the option of managing the affects of aging.</p>	<p>Letters 2.06.064 and 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

#	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/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/ 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
42	Implement the Bolted Cable Connections Program, described in Attachment C of Pilgrim License Renewal Application Amendment 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

ATTACHMENT B to Letter 2.07.003

(2 pages)

Response to Request for Additional Information on LRA Amendment 8 Attachment C
Concerning LRA Section 3.6.2 Electrical and Instrumentation and Controls

RAI 3.6.2-1

In RAI 3.6.2-1, by letter dated August 14, 2006, the staff requested the applicant to provide a basis document including an aging management program (AMP) for cable connections with the 10 elements or provide a justification for why an AMP is not necessary.

In your response, by letter dated September 13, 2006, you stated that electrical cable connections at PNPS are inspected under the maintenance rule program as directed by Entergy procedures and therefore no aging management program (AMP) for license renewal is required at PNPS.

It should be noted that the current licensing bases for all power plants require compliance with the requirements of the maintenance rule 10 CFR 50.65. The Statements of Consideration for the license renewal rule state: The license renewal rule excludes “active, short-lived structures and components” from an aging management review because of the existing regulatory process, existing licensee programs and activities, and the maintenance rule. The staff’s understanding has been that under the license renewal rule, existing programs are not, without some explanation or modification, automatically considered adequate to manage aging effects for license renewal by virtue of being part of the current licensing basis. The Commission formulated the following two principles of license renewal: (1) With the possible exception of the detrimental effects of aging on the functionality of certain plant systems, structures, and components in the period of extended operation and possibly a few other issues related to safety only during extended operation, the regulatory process is adequate to ensure that the licensing bases of all currently operating plants provides and maintains an acceptable level of safety so that operation will not be inimical to public health and safety or common defense and security; and (2) The plant-specific licensing basis must be maintained during the renewal term in the same manner and to the same extent as during the original licensing term.

The 10 CFR 50.24 (a)(3) [sic] requires an applicant to demonstrate that the effects of aging, of components such as cable connections defined in 10 CFR 50.24 (a)(1) [sic], will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation. To demonstrate that the effects of aging will be adequately managed for license renewal, the staff views that an applicant must identify the program relied upon to manage certain aging effects for cable connections. The aging management program for cable connections acceptable to the staff is provided in GALL AMP XI.E6. This AMP states that the aging management program for electrical cable connections (metallic parts) account for the following stressors: thermal cycling, ohmic heating, electrical transients, vibration, chemical contamination, corrosion, and oxidation.

Therefore, the staff requests that the applicant either provide a plant-specific AMP with the AMP elements found in SRP-LR, Appendix A.1, Section A.1.2.3 and SRP-LR Table A.1-1 or an AMP consistent with GALL AMP XI.E6. If you still insist an AMP is not required, explain in detail how the existing program will address the above aging effects and provide a detailed discussion of how each of the 10 elements of the program as described in the SRP sections mentioned above is met by the current program. Also, provide supporting documentation to show that the aging management program elements including appropriate tests are implemented currently and will be continued for the extended period of operation. Without such information, it is not apparent that the staff will be able to present a basis for concluding that actions have been or will be taken to manage the effects of aging during the period of extended operation to ensure the functionality of those structures and components.

RAI 3.6.2-1 Response Clarification

LRA Amendment 8, in response to RAI 3.6.2-1, stated that an XI.E6 program was not required. Based on the November 30, 2006 meeting with the NRC, an alternate plant-specific program, which will be a one-time inspection of a representative sample of cable connections subject to aging management review, will be used at PNPS.

Basis for Clarification

Based on the November 30, 2006 meeting with the NRC, the Pilgrim Bolted Cable Connections Program will be a one-time inspection of a representative sample of cable connections subject to aging management review.

Switchyard connections are not addressed in this program. Since these connections operate at a much higher voltage (>35 kV), they are addressed separately as part of the switchyard commodity types. Cable connections for medium and low voltage levels are included in this program. As discussed during the November 30, 2006 NEI-NRC meeting, bolted connections are the main concern. High load bolted connections are included in this program.

For low load connections, thermal cycling, ohmic heating, and electrical transients are not potential stressors. In addition, vibration, chemical contamination, corrosion and oxidation are not a concern for low load connections located in a controlled environment. Low load in-scope field instrumentation connections, such as those for pressure transmitters, RTDs, and flow transmitters, are not subject to AMR because the in-scope instrumentation located in a harsh environment is typically EQ. The non-EQ sensitive instrument circuit (high radiation and neutron monitoring) connections are included in the XI.E2 program. Connections associated with circuits that do not have an intended function, such as general lighting, are not subject to AMR.

Refer to Attachment C of this LRA amendment for changes to the LRA stemming from this clarification.

ATTACHMENT C to Letter 2.07.003
(5 pages)

Changes to the LRA

LRA Section 3.6.2.1, Aging Effects Requiring Management, is revised to add the following:

- Loosening of Bolted Connections

LRA Section 3.6.2.1, Aging Management Programs, is revised to add the following AMP:

- Bolted Cable Connections Program

LRA Table 3.6.1, Item 3.6.1-13, is revised as shown below (strike-outs deleted, underlined text added).

Item Number	Component	Aging Effect / Mechanism	AMP	Further Evaluation Recommended	Discussion
3.6.1-13	Cable Connections metallic parts	Loosening of bolted connections due to thermal cycling, ohmic heating, electrical transients, vibration, chemical contamination, corrosion, and oxidation	Electrical Cable Connections Not Subject To 10 CFR 50.49 Environmental Qualification Requirements	No	<p>NUREG-1801 aging effect is not applicable to Pilgrim. Cable connections outside of active devices are taped or sleeved for protection. Operating experience with metallic parts of electrical cable connections at PNPS indicated no aging effects requiring management.</p> <p><u>PNPS is providing a plant specific program (Bolted Cable Connections Program) as an alternate to the NUREG-1801, XI.E6 program.</u></p>

LRA Table 3.6.2-1 is revised as shown below (strike-outs deleted, underlined text added).

Component Type	Intended Function	Material	Environment	AERM	AMP	NUREG-1801, Vol.2 Item	Table 1 Item	Notes
Cable Connections (metallic parts)	CE	Various metals used for electrical connections	Indoor and Outdoor	<p>None</p> <p><u>Loosening of Bolted Connections</u></p>	<p>None</p> <p><u>Bolted Cable Connections Program</u></p>	<u>VI.A-1 (LP-12)</u>	<u>3.6.1-13</u>	<p>†</p> <p><u>E</u></p>

Notes for Table 3.6.2-1

No changes required.

LRA Appendix A is revised to add the following:

A.2.1.40 BOLTED CABLE CONNECTIONS PROGRAM

The Bolted Cable Connections Program will focus on the metallic parts of the cable connections. This sampling program provides a one-time inspection to verify that the loosening of bolted connections due to thermal cycling, ohmic heating, electrical transients, vibration, chemical contamination, corrosion, and oxidation is not an aging issue that requires a periodic aging management program. A representative sample of the electrical cable connection population subject to aging management review will be inspected or tested. Connections covered under the EQ program, or connections inspected or tested as part of a preventive maintenance program are excluded from aging management review. The factors considered for sample selection will be application (medium and low voltage), circuit loading (high loading), and location (high temperature, high humidity, vibration, etc.). The technical basis for the sample selection will be documented.

This program will be implemented prior to the period of extended operation. License renewal commitment 42 governs implementation of this program.

LRA Appendix B is revised to add the following:

B.1.34 BOLTED CABLE CONNECTIONS PROGRAM

Program Description

Cable connections are used to connect cable conductors to other cables or electrical devices. Connections associated with cables within the scope of license renewal are considered for this program. The most common types of connections used in nuclear power plants are splices (butt or bolted), crimp-type ring lugs, connectors, and terminal blocks. Most connections involve insulating material and metallic parts. This program for electrical cable connections (metallic parts) accounts for loosening of bolted connections due to thermal cycling, ohmic heating, electrical transients, vibration, chemical contamination, corrosion, and oxidation. This program does not apply to the high voltage switchyard connections.

NUREG-1801, XI.E4, "Metal Enclosed Bus," manages the aging effects for the connections associated with metal enclosed bus. XI.E4 manages the aging effects from thermal cycling, ohmic heating, electrical transients, vibration, chemical contamination, corrosion, and oxidation on the metallic parts of metal enclosed bus (MEB) connections. Therefore, MEB connections are not included in this program.

Circuits exposed to appreciable ohmic or ambient heating during operation may experience loosening related to repeated cycling of connected loads or cycling of the ambient temperature environment. Bolted connectors, splices, and terminal blocks may loosen if subjected to significant thermally induced stress and cycling.

The design of these connections will account for the stresses associated with ohmic heating, thermal cycling, and dissimilar metal connections. Therefore, these stressors/mechanisms should not be a significant aging issue. However, confirmation of the lack of aging effects will be required.

This sampling program provides for one-time inspections that will be completed prior to the period of extended operation. The factors considered for sample selection are application (medium and low voltage), circuit loading (high loading), and location (high temperature, high humidity, vibration, etc.). The technical basis for the sample selection will be documented. If an unacceptable condition or situation is identified in the selected sample, the corrective action program will be used to evaluate the condition and determine appropriate corrective action.

None of the connections in this program are subject to the environmental qualification requirements of 10 CFR 50.49. This plant-specific aging management program has been developed as an alternate to NUREG-1801, XI.E6, to provide additional assurance that electrical cable connections will perform their intended function for the period of extended operation.

Evaluation and Technical Basis

1. *Scope of Program:* Non-EQ connections associated with cables in-scope of license renewal are part of this program. This program does not include the high voltage (> 35kV) switchyard connections. In-scope connections are evaluated for applicability of this program. The criteria for including connections in the program are that the connection is a bolted connection and is not covered under the EQ program or an existing preventive maintenance program.

2. *Preventive Actions*: This one-time inspection program is a condition monitoring program; therefore, no actions are taken as part of this program to prevent or mitigate aging degradation.

3. *Parameters Monitored/Inspected*: This program will focus on the metallic parts of the cable connections. The one-time inspection verifies that the loosening of bolted connections due to thermal cycling, ohmic heating, electrical transients, vibration, chemical contamination, corrosion, and oxidation is not an aging effect that requires a periodic aging management program.

4. *Detection of Aging Effects*: A representative sample of electrical connections within the scope of license renewal and subject to aging management review will be inspected or tested prior to the period of extended operation to verify there are no aging effects requiring management during the period of extended operation. The factors considered for sample selection will be application (medium and low voltage), circuit loading (high loading), and location (high temperature, high humidity, vibration, etc.). The technical basis for the sample selection will be documented. Inspection methods may include thermography, contact resistance testing, or other appropriate methods including visual inspection based on plant configuration and industry guidance. The one-time inspection provides additional confirmation to support industry operating experience that shows electrical connections have not experienced a high degree of failures, and that the existing installation and maintenance practices are effective.

5. *Monitoring and Trending*: Trending actions are not included as part of this program because this is a one-time inspection program.

6. *Acceptance Criteria*: The acceptance criteria for each inspection/surveillance are defined by the specific type of inspection or test performed for the specific type of cable connection. Acceptance criteria ensure that the intended functions of the cable connections can be maintained consistent with the current licensing basis.

7. *Corrective Actions*: If the inspection or test acceptance criteria are not met, the corrective action program will be used to perform an evaluation that will consider extent of condition, the indications of aging effects, possible changes to the one-time inspection program, such as increased frequency and sample size. As discussed in the appendix to NUREG-1801, the requirements of 10 CFR Part 50 Appendix B are acceptable to address the corrective actions. The Pilgrim Corrective Action Program, which is implemented in accordance with the 10 CFR 50 Appendix B requirements, applies to the Bolted Cable Connections Program.

8. *Confirmation Process*: This attribute is discussed in Section B.0.3.

9. *Administrative Controls*: This attribute is discussed in Section B.0.3.

10. *Operating Experience*: Operating experience has shown that loosening of connections and corrosion of connections could be a problem without proper installation and maintenance activities. Industry operating experience supports performing this one-time inspection program in lieu of a periodic testing program. This one-time inspection program will verify that the installation and maintenance activities are effective.

The Bolted Cable Connections Program is a new program. Plant and industry operating experience was considered when this program was developed. Industry operating experience that forms the basis for the program is described in the operating experience element of the NUREG-1801 Section XI.E6 program description. Pilgrim-specific operating

experience is consistent with the operating experience in the NUREG-1801 Section XI.E6 program description.

Conclusion

The Bolted Cable Connections Program will be effective for managing aging effects since it will incorporate proven monitoring techniques, acceptance criteria, corrective actions, and administrative controls. The Bolted Cable Connections Program will provide reasonable assurance that applicable cable connections will continue to perform their intended function consistent with the current licensing basis for the period of extended operation.