

September 28, 2006

Mr. Michael Kansler  
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SUBJECT: PILGRIM NUCLEAR POWER STATION - RELIEF REQUEST NO. PRR-10,  
RISK-INFORMED FOURTH 10-YEAR INTERVAL INSERVICE INSPECTION  
PROGRAM PLAN (TAC NO. MC8293)

Dear Mr. Kansler:

By letter dated June 29, 2005, as supplemented by letter dated June 21, 2006, Entergy Nuclear Operations, Inc. (the licensee), submitted a request to extend the Risk-Informed Inservice Inspection (RI-ISI) Program Plan to the fourth 10-year ISI interval applicable to the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, 1998 Edition with the 2000 Addenda, requirements for Class 1 Examination Category B-J and B-F piping welds. The RI-ISI program was approved for use at Pilgrim Nuclear Power Station (Pilgrim) during the second period of the third inspection interval.

The Nuclear Regulatory Commission staff has concluded that the proposed alternatives to the ASME Code requirements in PRR No. 10 are acceptable, and will provide an acceptable level of quality and safety. The results are provided in the enclosed safety evaluation. Pursuant to 10 CFR 50.55a(a)(3)(i), the proposed alternative is authorized for Pilgrim's fourth 10-year ISI interval, which ends on June 30, 2015.

If you have any questions regarding this approval, please contact the Pilgrim Project Manager, James Shea, at 301-415-1388.

Sincerely,

**/RA/**

Richard J. Laufer, Chief  
Plant Licensing Branch I-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-293

Enclosure:  
As stated

cc w/encl: See next page

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\*No major changes to SE dated 09/28/06

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Pilgrim Nuclear Power Station

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RISK-INFORMED INSERVICE INSPECTION PROGRAM FOR FOURTH 10-YEAR INTERVAL  
RELIEF REQUEST NO. PRR-10  
ENTERGY NUCLEAR OPERATIONS, INC.  
PILGRIM NUCLEAR POWER STATION  
DOCKET NO. 50-293

1.0 INTRODUCTION

By letter dated June 29, 2005 (Reference 1), as supplemented by letter dated June 21, 2006 (Reference 2), Entergy Nuclear Operations, Inc. (the licensee) submitted a request to extend the Risk-Informed Inservice Inspection (RI-ISI) Program Plan for Pilgrim Nuclear Power Station (Pilgrim) to the fourth 10-year ISI interval. The Pilgrim RI-ISI program was initially submitted to the Nuclear Regulatory Commission (NRC) staff by letter dated December 27, 2000 (Reference 3), during the second period of the third 10-year ISI interval, and supplemented by letters dated January 19, 2001, March 8, 2001, March 27, 2001, and April 11, 2001 (References 4, 5, 6, and 7, respectively). The Pilgrim RI-ISI program was reviewed and approved by the NRC for use in the third 10-year ISI interval in a letter dated May 2, 2001 (Reference 8). The licensee's submittal proposes to extend the same RI-ISI program, as submitted in Reference 3 from the third 10-year ISI interval, to the fourth 10-year ISI interval.

2.0 REGULATORY EVALUATION

Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.55a(g) specifies that inservice inspection of nuclear power plant components shall be performed in accordance with the requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). According to 10 CFR 50.55a(a)(3), alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if (i) the proposed alternatives would provide an acceptable level of quality and safety or (ii) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

The licensee's RI-ISI program, as outlined in References 3 through 7, was developed in accordance with the methodology contained in the Electric Power Research Institute's (EPRI) Report, EPRI TR-112657, Rev. B-A, (Reference 9, the topical) which was reviewed and approved by the NRC staff. The scope of the RI-ISI program is limited to the inspection of ASME Code Class 1 piping (Categories B-F and B-J welds).

### 3.0 TECHNICAL EVALUATION

The licensee is requesting relief to use the proposed RI-ISI program plan in the fourth 10-year ISI interval instead of ASME Code, Section XI requirements for Class 1 piping (Categories B-F and B-J welds).

An acceptable RI-ISI program plan is expected to meet the five key principles discussed in Regulatory Guide (RG) 1.178 (Reference 10), Standard Review Plan (SRP) 3.9.8 (Reference 11) and the EPRI TR-112657 (Reference 9), as stated below.

1. The proposed change meets the current regulations unless it is explicitly related to a requested exemption or rule change.
2. The proposed change is consistent with the defense-in-depth philosophy.
3. The proposed change maintains sufficient safety margins.
4. When proposed changes result in an increase in Core Damage Frequency (CDF) or risk, the increases should be small and consistent with the intent of the Commission's Safety Goal Policy Statement.
5. The impact of the proposed change should be monitored by using performance measurement strategies.

The first principle is met in this relief request because an alternative ISI program may be authorized pursuant to 10 CFR 50.55a(3)(i) and therefore, an exemption request is not required.

The second and third principles require assurance that the alternative program is consistent with the defense-in-depth philosophy and that sufficient safety margins are maintained, respectively. Assurance that the second and third principles are met is based on the application of the approved methodology and not on the particular inspection locations selected. As described in Reference 3 and approved by the NRC staff in Reference 8, the RI-ISI is a living program that requires periodic updating and that, as a minimum, risk ranking of piping segments will be reviewed on an ASME period basis. The licensee indicates in References 1 and 2 that no changes in the number and location of inspections were required in accordance with the approved methodology in the topical. The NRC staff also reviewed Reference 13 to ensure that the methodology used to develop the fourth 10-year RI-ISI interval program was unchanged from the methodology approved for use in the third 10-year RI-ISI interval program. This information was confirmed by the licensee in a conference call held on September 20, 2006. Therefore, the second and third principles are met.

The fourth principle requires an estimate of the change in risk, and the change in risk is dependent on the location of inspections in the proposed ISI program compared to the location of inspections that would be inspected using the requirements of ASME Code, Section XI. The topical provides that a change in risk measurement must consider the discontinuance of ASME Code required inspections, as well as any new inspections resulting from the application of its methodology. Although unlikely, it is possible that the number and/or locations of inspections mandated by the updated ASME Code of record could change if a revised ASME inspection program were to be developed for the new ASME Code of record for the fourth 10-year inspection interval. For example, the licensee states in the submittal that for the fourth interval it plans to update its ASME Code of record from the 1989 Edition with no Addenda to 1998

Edition with the 2000 Addenda. The updated ASME Code of record, per section IWB-2500-1, reduces the exempted nominal pipe size (NPS) from 4" to 1", which would potentially result in an increase in the number of in-scope welds. However, in Reference 2, the licensee explains that, despite this apparent decrease in the number of welds exempted from ASME Class 1 scope, it had originally, and continues to use the exemption clause from IWB-1220(a), instead of IWB-2500-1 requirements. The application of this provision of the ASME Code results in no change to ASME Class 1 scope of welds from the third interval to the fourth interval. Considering that estimates of the change in CDF and LERF are calculated in the final phase of the RI-ISI methodology, and are intended only to provide additional assurance that aggregate changes in risk will be acceptable (Reference 9), the needed accuracy of the change in risk calculations does not warrant developing a new risk informed program for the latest ASME Code of record simply to be used as a new baseline and then discarded.

The licensee states in Reference 2 that all major issues and observations from the Boiling Water Reactors Owners Group (BWROG) Peer Review (i.e., Level A, B, and C observations) and weaknesses in the human reliability analysis area identified in the NRC safety evaluation has been addressed and incorporated into the current probabilistic safety assessment model update used for this application, that individual probabilistic risk assessment (PRA) update work packages were independently reviewed in-house, and that the updated PRA model was independently peer-reviewed. The licensee reports in Reference 1 that the RI-ISI program continues to meet EPRI TR-112657 and RG 1.174 risk acceptance criteria. Hence, no deviation from the risk acceptance criteria was identified.

Given the above considerations concerning the new ASME Code of record requirements and the PRA evaluation, the staff finds that the licensee's process provides assurance that the fourth key principle is met.

In addition to monitoring industry experience, the licensee states in its relief request that the fourth 10-year RI-ISI interval program was updated in accordance with NEI-04-05, "Living Program Guidance To Maintain RI-ISI Programs For Nuclear Plant Piping Systems" (Reference 12), and thus continues to be a living program. Maintenance of a living program is also unaffected by the relocation of inspections and, therefore, the fifth key principle is met.

Based on the above discussion, the NRC staff finds that the five key principles of risk-informed decision making are ensured by the licensee's proposed fourth 10-year RI-ISI interval program plan, and therefore the proposed program for the fourth 10-year ISI inspection interval is acceptable.

### 3.0 CONCLUSION

Based on the information provided in the licensee's submittals, the NRC staff has determined that the proposed alternative provides an acceptable level of quality and safety, and therefore the proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(i) for the fourth 10-year ISI interval at Pilgrim.



#### 4.0 REFERENCES

6. Letter from S.J. Bethay, Entergy Nuclear Operations, Inc. to U.S. Nuclear Regulatory Commission, *Pilgrim Fourth Ten-Year Inservice Inspection Program Plan, and the Associated Relief Requests for NRC Approval*, dated June 29, 2005. [ADAMS accession number ML051920157]
7. Letter from S.J. Bethay, Entergy Nuclear Operations, Inc. to U.S. Nuclear Regulatory Commission, *Response to NRC Request for Additional Information Regarding Pilgrim Relief Request, PRR-10, Risk-Informed ISI for Class 1, B-F and B-J Welds (TAC NO. MC8293)*, dated June 21, 2006. [ADAMS accession number ML061860086]
8. Letter from J.F. Alexander, *Entergy Nuclear Generation Company* to U.S. Nuclear Regulatory Commission, *Pilgrim Risk-Informed Inservice Inspection Program*, dated December 27, 2000. [ADAMS accession number ML010080122]
9. Letter from J.F. Alexander, Entergy Nuclear Generation Company to U.S. Nuclear Regulatory Commission, *Additional Information Related to Pilgrim Risk-Informed Inservice Inspection Program*, dated January 19, 2001. [ADAMS accession number ML010300186]
10. Letter from J.F. Alexander, Entergy Nuclear Generation Company to U.S. Nuclear Regulatory Commission, *Update to the Pilgrim Risk-Informed Inservice Inspection Program*, dated March 8, 2001. [ADAMS accession number ML010790228]
11. Letter from J.F. Alexander, Entergy Nuclear Generation Company to U.S. Nuclear Regulatory Commission, *Clarification Concerning Pilgrim Risk-Informed Inservice Inspection Program*, dated March 27, 2001. [ADAMS accession number ML010930372]
12. Letter from J.F. Alexander, Entergy Nuclear Generation Company to U.S. Nuclear Regulatory Commission, *Implementation of Interim Thermal Fatigue Management Guideline (MRP-24) for Pilgrim Risk-Informed Inservice Inspection Program*, dated April 11, 2001. [ADAMS accession number ML011070578]
13. Letter from U.S. Nuclear Regulatory Commission to M. Bellamy, Entergy Nuclear Generation Company, *Pilgrim Nuclear Power Station - Relief Request Regarding Approval of Alternative Risk-informed Inservice Inspection Program for the Third Inspection Interval (TAC NO. MB0841)*, dated May 2, 2001. [ADAMS accession number ML011020131]
14. EPRI TR-112657, Revision B-A, *Revised Risk-Informed Inservice Inspection Evaluation Procedure, Final Report*, December 1999.
15. NRC Regulatory Guide 1.178, *An Approach for Plant-Specific Risk-Informed Decision Making: Inservice Inspection of Piping*, September 2003.
16. NRC NUREG-0800, Chapter 3.9.8, *Standard Review Plan for Trial Use for the Review of Risk-Informed Inservice Inspection of Piping*, September 2003.



17. NEI 04-05, *Living Program Guidance To Maintain Risk-Informed Inservice Inspection Programs For Nuclear Plant Piping Systems*, April 2004.
18. EPRI - Pat O'Regan, Report # RISI-2, *Pilgrim Nuclear Power Station Risk-Informed Inservice Inspection (RI-ISI) Periodic Update Review*, Revision B, August 30, 2004.

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Date: September 28, 2006