Entergy

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Pilgrim Nuclear Power Station

LETTER NUMBER 2.13.101

December 20, 2013

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

SUBJECT: Response to NRC Request for Additional Information Regarding Relief Request PRR-22 (TAC NO. MF1428)

Pilgrim Nuclear Power Station
Docket No. 50-293
License No. DPR-35

REFERENCES:
1. Entergy Letter to NRC, "Request for Alternative - Implementation of Risk-Informed/Safety Based Inservice Inspection Alternative for Class 1 and 2 Piping Request to Use ASME Code Case N-716", dated April 10, 2013 (PNPS Letter 2.13.030)

2. NRC Letter to Entergy, "Pilgrim Nuclear Power Station - Request for Additional Information Regarding Relief Request PRR-22 (TAC NO. MF1428), dated November 25, 2013 (PNPS Letter 1.13.062)

Dear Sir or Madam:

In Reference 1, Entergy Nuclear Operations, Inc. (Entergy) requested NRC authorization to implement a risk-informed Inservice Inspection (RI-ISI) program based on the American Society of Mechanical Engineers (ASME) Code Case N-716.

In Reference 2, the Nuclear Regulatory Commission (NRC) requested that Entergy provide responses to Request for Additional Information (RAI). The enclosed attachment provides the responses to the RAI.

If you have any questions or require additional information, please contact me at (508) 830-8403.

A047
NRR

Sincerely,

Murray E Williams for

Joseph R. Lynch, Licensing Manager

JRL/mew

Attachment 1 Response to NRC Request for Additional Information Regarding Relief Request PRR-22

cc: Mr. William M. Dean
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Pilgrim Nuclear Power Station

Attachment 1 to Letter 2.13.101

Response to NRC Request for Additional Information Regarding Relief Request PRR-22

(6 Pages)

Pilgrim Response to NRC Request for Additional Information

1. **Regulatory Position 4.1 of Regulatory Guide (RG) 1.178, Revision 1, "An Approach for Plant-Specific Risk-Informed Decision making for Inservice Inspection [ISI] of Piping," states that the results of the licensee's ISI specific analysis should include the degradation mechanisms for each segment used to develop the failure potential of each segment.**

   In Section 3.4.1, "Quantitative Analysis," of PRR–22, it is stated that a review was conducted that verified that the low safety significant piping was not susceptible to water hammer. However, the NRC staff could not find a similar statement about high safety-significant (HSS) piping in PRR–22.

   Confirm that HSS piping that has a degradation mechanism potential (as identified in Table 3.4, Risk Analysis Results," of PRR-22) is not susceptible to water hammer, such that the pipe failure frequency would increase to the high failure potential rank to be used in the change in risk evaluation.

   Pilgrim Response: During the service history review for the initial RI-ISI application, one event was identified, which occurred in 1995 that impacted Class 1 RHR piping during system alignment. Corrective actions included enhanced operator training. One other potential water hammer event occurred in 2011 in the RHR system. Walkdowns were conducted and confirmed that there was no damage to piping or supports. Corrective actions included a procedure enhancement to preclude this type of event going forward.

2. **Regulatory Position 4.1 of RG 1.178, Revision 1, states that the licensee should include reference to NRC-approved topical report on implementing risk-informed ISI (RI-ISI) and supporting documents and variations from the topical reports and supporting documents should be clearly identified.**

   The second commitment identified in Attachment 2 to PRR-22 states, "Upon approval of the RIS_B Program, procedures that comply with the guidelines described in EPRI TR-112657 [Electric Power Research Institute Topical Report] will be prepared to implement and monitor the program." The use of EPRI TR-112657 makes this commitment inconsistent with a similar statement in the first sentence of Section 3.5, "Implementation," of PRR–22.

   Clarify whether the second identified commitment should reflect the use of ASME Code Case N-716 instead of EPRI TR-112657.

   Pilgrim Response: ASME Code Case N-716 is based on EPRI TR-112657 so they are the same. Upon approval of the RIS_B Program, procedures that comply with the guidelines described in code case N-716 and EPRI TR-112657 will be revised and implemented to monitor the program.

Pilgrim Response to NRC Request for Additional Information

3. **The PRR-22 states that the Class 1 Category B-F and B-J piping weld ISI examinations for the first and second inspection periods of the fourth 10-year interval were performed in accordance with your RI-ISI program based on ASME Code Case N-578. The Class 2 Category C-F-1 and C-F-2 piping weld ISI examinations for the first and second inspection periods of the fourth 10-year interval were performed in accordance with the ASME Code Section XI requirements of the 1998 Edition through the 2000 Addenda. The proposed RI-ISI program based on ASME Code Case N-716 will be used to perform the remaining Class 1 and Class 2 piping ISI exams for the third inspection period. Provide details of how the requirements of IWB-2412 will be met with regard to the percentage of exams performed in each period.**

   Pilgrim Response: In the first period of the current interval 41% of the B-F & B-J piping welds were examined and 26% in the second period for a total of 67%. The remaining 33% will be examined in the third period under the RIS_B program. All welds were examined in accordance with the ASME Code Section XI requirements of the 1998 Edition through the 2000 Addenda.

   Upon approval of PRR-22 no category C-F-1 and C-F-2 piping weld ISI examinations will be scheduled for the third period per code case N-716 methodology as LSS welds do not require inspection.

4. **Section 3.1 (4) of PRR-22 and ASME Code Case N-716 require piping within the break exclusion region greater than 4 inches nominal pipe size for high-energy piping systems to be assigned HSS, and state that this may include Class 3 or Non-class piping. Confirm that Pilgrim has no Class 3 or Non-Class piping that met this criterion.**

   Pilgrim Response: Per Table 3.1 of PRR-22, Pilgrim has no Class 3 or Non- Class piping that met this criterion.

5. **Section 3.1 (5) of PRR-22 and ASME Code Case N-716 require any piping segment whose contribution to core damage frequency is greater than 1E-06 [and in accordance with NRC feedback on previous applications, 1E-07 for large early release frequency based upon a plant-specific probabilistic safety assessment of pressure boundary failures] be classified as HSS, and state this may include Class 3 or Non-Class piping. Confirm that Pilgrim has no Class 3 or Non-Class piping that met this criterion.**

   Pilgrim Response: Per Table 3.1 of PRR-22, Pilgrim has no Class 3 or Non- Class piping that met this criterion.

Pilgrim Response to NRC Request for Additional Information

6. **Section 3.3 (1) of PRR-22 and ASME Code Case N-716 stated that with regard to examination locations selected, examinations shall be prorated equally among systems to shall individually meet the following requirements:**

   (a) A minimum of 25 percent of the population identified as susceptible to each degradation mechanism and degradation mechanism combination shall be selected.

   From reviewing Table 4 of PRR-22, the NRC staff cannot determine if this requirement has been met. Please explain how this requirement is met.

Pilgrim Response: PRR-22, consistent with Code Case N716, requires that 10 percent of the High Safety Significant (HSS) weld population be subject to inspection (2nd statement of first paragraph of Section 3.3 of PRR-22). The succeeding requirements (e.g. 25% of weld with an identified degradation mechanism, two thirds of RCPB inspection be located inside the first isolation valve, inspect 10% of the RCPB welds outside containment, inspect 10% of the welds in the BER region) are used as guidance to determine which welds of the HSS population should be selected in order to develop a robust inspection program based on insights from previous RI-ISI programs and other risk assessments.

Revision 1 to Code Case N716 has been updated to clearly reflect that the goal is to inspect 10% of the HSS population and that the other criteria are guidance as opposed to steadfast requirements.

For the Pilgrim application, 72 of 641 HSS locations were selected for inspection (11 percent). As a final check in the process, a change in risk assessment is conducted to show that the new program meets NRC acceptance criteria, which as documented in PRR-22, it does.

The table below documents the number (and percent) of weld selections for both degradation mechanism (DM) and RCPB welds outside containment, (RCPBoc). As can be seen in the table below, in almost all cases, the Code Case guidance is met. For the DM Case, only one system (FW) did not meet the guidance (18.6% actual vs. 25% guidance). FW has a total of 76 welds and a ten percent inspection requirement would result in the need to inspect 8 HSS locations. All of these selections are welds with an identified degradation mechanism.

With respect to the RCPBoc guidance, using Core Spray as the example, this system has a total of 44 HSS welds and therefore 5 inspections. As can be seen below, 4 inspections were selected from RCPBu welds (i.e. failures that result in a LOCA) and 1 inspection was selected from RCPBoc welds, capturing a different type of risk

Pilgrim Response to NRC Request for Additional Information

In summary, the core intent of N716 (10 percent of the HSS population be inspected) is met and consistent with the intent and guidance contained in N716, allocation of inspection locations was conducted to capture different aspects of risk (e.g. "LOCA" versus "LOCA outside containment") as well as efficiently utilizing inspection resources (e.g. minimizing dose).

System	DM Welds (25%)			HSS/RCPB (10%)			RCPBu (2/3 of RCPB)		RCPBoc (10% of RCPBoc)		
	Total	Selected	% DM	Total	Selected	%	Selected	% RCPB	Total	Selected	% RCPB
CRD - Control Rod Drive											
CS - Core Spray	0	0	na	44	5	11.4%	4	80.0%	11	1	9.1%
FW - Feedwater	43	8	18.6%	76	8	10.5%	6	75.0%	13	2	15.4%
HPCI - High Pressure Coolant Injection	2	1	50.0%	41	5	12.2%	4	80.0%	24	1	4.2%
MS - Main Steam	6	2	33.3%	92	10	10.9%	7	70.0%	19	3	15.8%
RCIC - Reactor Core Isolation Cooler	0	0	Na	36	4	11.1%	3	75.0%	19	1	5.3%
RECIRC - Reactor Recirculation	0	0	Na	70	8	11.4%	8	100.0%	0	0	Na
RHR - Residual Heat Removal	15	4	26.7%	58	6	10.3%	4	66.7%	17	2	11.8%
RPV - RPV Nozzles	4	1	25.0%	36	6	16.7%	6	100.0%	0	0	Na
RWCU - Reactor Water Cleanup	0	0	na	116	11	9.5%	7	63.6%	49	4	8.2%
SBLC - Standby Liquid Control	0	0	na	72	9	12.5%	6	66.7%	30	3	10.0%
Total	70	16	22.9%	640	72	11.2%	55	15.2%	182	17	9.3%

(b) At least 10% of the Reactor Coolant Pressure Boundary (RCPB) welds shall be selected.

This paragraph listed for completeness; no further information required on this item.

(c) For the RCPB, at least two-thirds of the examinations shall be located between the inside first isolation valve and the reactor pressure vessel.

This paragraph listed for completeness; no further information required on this item.

(d) A minimum of 10% of the welds in that portion of the RCPB that lies outside containment shall be selected.

From reviewing Table 3.3 of PRR-22, the NRC staff cannot determine if this requirement has been met by the welds selected for examination. Please confirm that this requirement is met by the welds selected for examination.

Pilgrim Response to NRC Request for Additional Information

Pilgrim Response: This requirement is met. For example; the Core Spray System has a total of 44 HSS welds and therefore 5 inspections are required. As can be seen in the table above, 4 inspections were selected from RCPBu welds (i.e. failures that result in a LOCA) and 1 inspection was selected from RCPBoc welds, capturing a different type of risk. As stated above in response to (a), Revision 1 to Code Case N716 has been updated to clearly reflect that the goal is to inspect 10% of the HSS population and that the other criteria are guidance as opposed to steadfast requirements

(e) A minimum of 10% of the welds within the break exclusion region (BER) shall be selected.

From reviewing Table 3.3 of PRR-22, it appears that Pilgrim does not have any BER piping. Please confirm that Pilgrim does not have any BER piping.

Pilgrim Response: Per Table 3.1 of PRR-22, Pilgrim has no BER piping.

7. **Please provide a Table similar to Table 4 of PRR-22 that compares the selections of the current RI-ISI program for Class 1 piping welds with the selections of the proposed RIS_B program.**

Pilgrim Response: There is no table similar to Table 4 of PRR-22 that compares the selections of the current Code Case N-578-based RI-ISI program for Class 1 piping welds with the selections of the proposed Code Case N-716-based RIS_B program because the two code cases have different requirements and are not directly comparable. Such a table was not included in PRR-22 because Code Case N716 methodology requires a comparison to the last deterministic ISI program, not the last RI-ISI program.

A general comparison of the Code Case N-578 and N-716 program weld selections could be made by comparing Tables 1 and 2 in NRC-approved Pilgrim relief request PRR-10 (TAC MC8293) to Table 4 of relief request PRR-22.

8. **Of the welds not selected for future examinations in the RIS_B program, have previous examinations of any of these welds identified service induced degradation? If so, what was the degradation mechanism and what was done to mitigate the degradation?**

Pilgrim Response: Of the welds not selected for future examinations in the RIS_B program that were previously in the RI-ISI program, none of the previous examinations identified service induced degradation.

Pilgrim Response to NRC Request for Additional Information

9. **In PRR-22, it is stated that the RIS_B Program is a living program monitored continuously for changes, where this monitoring includes numerous facets. Please confirm that vendor issued communications, such as General Electric-Hitachi Safety Communications are included as part of the reviews done for the living program aspects of the program.**

   Pilgrim Response: The RIS_B Program is a living program monitored continuously for changes which includes the review of vendor issued communications.

10. **Have any of the welds selected for examination in the RIS_B been previously examined and resulted in limited examination coverage (i.e. less than 90%)? If so, please explain why other welds have not been selected to minimize the number of examinations with limited exam coverage.**

    Pilgrim Response: The N716 application, just like the previous N578 application, has examination coverage, as well as previous inspection history, access, potential for degradation and worker exposure as considerations in defining the final inspection population. Additionally, the process contained in N716, like the N578 application, allows for the flexibility to change out an inspection location if full coverage cannot be obtained, a higher than expected dose exists, access has become more restrictive, etc. Considerations in determining if an alternate inspection location is acceptable includes whether other welds have similar or different constraints (e.g. pipe to valve weld versus pipe to pipe, whether the alternate location has previously been inspected, high dose).

    At this point in time, based upon previous inspection insights (e.g. the previous N578 and the previous deterministic programs), only 5 of 72 selections have coverage limitations. Reasons for not selecting alternate locations for these 5 inspections at this time include other locations have no previous inspection history (i.e. no baseline) and similar inspection issues (e.g. pipe to valve weld configuration). [Note: future technology improvements (e.g. research by the EPRI NDE Center) may resolve some or all of these limitations.]

    The HSS population consists of 641 welds. The N716 requirement to inspect 10% of the HSS population would require 65 weld selections. As such, even if the 5 selections with potential limited examination coverage discussed above were not credited, the N716 requirement of 10% of the HSS population would still be met (72 - 5 = 67).