Progress Energy

Crystal River Nuclear Plant
Docket No. 50-302
Operating License No. DPR-72

Ref: 10 CFR 50.55a

May 21, 2008
3F0508-06

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

Subject: Crystal River Unit 3 – Inservice Inspection Program Plan, Ten Year Update Response to Request for Additional Information (TAC No. MD7736)

Reference: Crystal River Unit 3 (CR3) to Nuclear Regulatory Commission (NRC) letter dated December 21, 2007, "Crystal River Unit 3 – Inservice Inspection Program Plan, Ten Year Update"

Dear Sir:

On December 21, 2007, Florida Power Corporation (FPC), doing business as Progress Energy Florida, Inc., submitted the above referenced letter which provided the CR3 Inservice Inspection Program Plan for the fourth ten year interval. On March 27, 2008, the NRC issued a Request for Additional Information (RAI) via email regarding this submittal. In accordance with the provisions of 10 CFR 50.55a, FPC hereby provides the response to this RAI.

This letter contains no new regulatory commitments.

If you have any questions regarding this submittal, please contact Mr. Dennis Herrin, Acting Supervisor, Licensing and Regulatory Programs at (352) 563-4633.

Sincerely,

By J Foster / Barry J. Foster (acting)

Stephen Cahill
Engineering Manager

SJC/dar

Attachment: Response to Request for Additional Information

xc: NRR Project Manager
Regional Administrator, Region II
Senior Resident Inspector

A047
NRR

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PROGRESS ENERGY FLORIDA, INC.

CRYSTAL RIVER UNIT 3

DOCKET NUMBER 50-302 / LICENSE NUMBER DPR-72

Inservice Inspection Program Plan,
Ten Year Update Response to Request for Additional Information
(TAC No. MD7736)

ATTACHMENT

Response to Request for Additional Information

Response to Request for Additional Information Response

On March 27, 2008, the Nuclear Regulatory Commission (NRC) issued a Request for Additional Information (RAI) by email regarding the Crystal River Unit 3 (CR3) Inservice Inspection (ISI) Program Plan, Ten Year Update that was submitted to the NRC by letter dated December 21, 2007. Florida Power Corporation (FPC), doing business as Progress Energy Florida, Inc., hereby provides the following response to this RAI.

NRC Request

By letter dated December 21, 2007, Florida Power Corporation submitted the inservice inspection (ISI) program plan for the fourth ten year interval at Crystal River Unit 3. As part of the fourth interval ISI program, the licensee submitted relief request 07-001-II for the proposed risk-informed ISI (RE-ISI) program. To complete its review of relief request 07-001-II, the NRC staff requests for the following additional information.

1. **On page 1 of the proposed relief request, the licensee stated that the fourth interval ISI program will be based on the ASME Code, 2001 Edition through the 2003 Addenda. However, Title 10, Code of Federal Regulation (10 CFR) part 50.55a(b)(2)(xxiv) prohibits the use of Appendix VIII, the supplements to Appendix VIII, and Article I-3000 of Section XI of the ASME Code, 2002 Addenda through the latest edition and addenda. This limitation is applicable to ultrasonic examinations that are based on the performance demonstration Initiative (PDI) program. (a) Clarify whether Appendix VIII will be used in any of the examinations performed under this relief request. (b) Discuss whether the code of record for the ultrasonic examination needs to be revised specifically for the ultrasonic examination.**

FPC Response

1. (a) Appendix VIII will be used, but in accordance with its recognized restrictions. American Society of Mechanical Engineers (ASME) Section XI provides requirements for performance demonstration for ultrasonic examination procedures, equipment, and personnel in Mandatory Appendix VIII. CR3 recognizes the limitation the Staff has put on the use of Appendix VIII in 10 CFR 50.55a. As such, the Fourth ISI Program Plan submitted references this 10 CFR 50.55a(b)(2)(xxiv) limitation in Table 1.9-1 and further discusses the use of the 2001 Edition, no addenda, for Appendix VIII in Section 2.1, ASME Section XI Examination Requirements.

1 (b) As discussed in the previous paragraph, revisions are not required to the station ISI Program since the issue is already addressed.

NRC Request

2. **On page 2, Section 4.0, Reason for Request, of the proposed relief request, the licensee stated that "...This initial RISI program [for the third ISI interval] was developed in accordance with EPRI TR-112657, Revision B-A, as supplemented by [ASME] Code Case N-578..." Code Case N-578 was not approved for use by**

Regulatory Guide 1.147, Revisions 13, 14 and 15 at the time of the licensee's submittal of the RI-ISI program for the third ISI interval. Regulatory Guide 1.147 states that Code Case N-578 is superseded. Although the NRC approved the third interval RI-ISI program, clarify why Code Case N-578 was used.

FPC Response

2. *The original Risk-Informed Inservice Inspection (RI-ISI) Program was prepared, submitted, and approved under a safety evaluation (SE) based on Electric Power Research Institute Technical Results (EPRI TR) 112657 with reference to Code Case N-578. Moving forward into the Fourth ISI Interval, the program methodology remains unchanged under the requirements of the EPRI TR. Two areas of enhancement were addressed in this relief request to use specific portions of the latest Code Case N-578-1. CR3 realizes the NRC has not approved use of this code case in Regulatory Guide (RG) 1.147 yet, and this is the reason for inclusion in the relief request. This approach is similar to several relief requests recently submitted by other utilities and approved by an NRC SE on the basis that the proposed alternative provides an acceptable level of quality and safety.*

NRC Request

3. **On page 3, Section 5.0, Proposed Alternative And Basis for Use, the licensee stated that all ASME Section XI piping components, regardless of risk classification, will continue to receive Code required pressure testing as part of the current ASME Section XI program. Discuss the specific subarticle of the Code to which pressure testing will be conducted.**

FPC Response

3. *The statement from the relief request refers to the system pressure testing program maintained at CR3 in accordance with Section XI. This is an ASME Section XI requirement as endorsed by 10 CFR 50.55a. Within Section XI, pressure testing requirements are governed by IWA-5000, IWB-5000, IWC-5000, and IWD-5000. No relief or alternative to these requirements or the system pressure testing program is being requested under CR3 Relief Request 07-001-II, and therefore, no additional information was provided.*

NRC Request

4. **On page 4 of the relief request, the licensee discussed two enhancements to the RI-ISI program. Both enhancements are related to the use of alternative criteria for additional examinations contained in Code Case N-578-1, "Risk-Informed Requirements for Class 1, 2, or 3 Piping, Method B." The NRC has not approved Code Case N-578-1 in Regulatory Guide 1.147, Revision 15. Justify the use of Code Case N-578-1.**

FPC Response

4. *As stated in the response to Question 2 above, CR3 realizes the NRC has not approved use of Code Case N-578-1 in RG 1.147 yet, and thus the reason for inclusion of the two enhancements to the EPRI methodology in the relief request. This approach is similar to several relief requests recently submitted by other utilities and approved by an NRC SE*

on the basis that the proposed alternative provides an acceptable level of quality and safety. The two enhancements are to utilize Subarticle-2430, Additional Examinations, and Table 1, Examination Category R-A, from Code Case N-578-1.

EPRI TR 112657 has a brief discussion of additional examinations under the context of an evaluation without many details to the evaluation process. Subarticle-2430 of the code case uses a similar method, but it provides a more descriptive process based on postulated failure mode and impact of failure potential. The code case also adds a second expansion process should further flaws or relevant conditions be found in the first expanded scope, as well as providing guidance for returning the components receiving additional examinations back into the normal periodic schedule.

Table 1 of the code case is necessary for categorization and itemization of parts to be examined that the EPRI TR does not provide. The code categories, item numbers, and exam methods are based on the specific degradation mechanisms defined in accordance with TR 112657. No alternatives are needed or requested to the degradation mechanism assessment process, and thus will remain in accordance with the EPRI TR. This enhancement is simply to provide the additional information in Table 1 defining Category R-A and the associated item number requirements.

NRC Request

5. By letter dated November 10, 2004, the licensee submitted the RI-ISI program for the third ISI interval. In that submittal, the licensee included two regulatory commitments. However, these two regulatory commitments are not included in relief request 07-001-II. (a) Discuss whether the same regulatory commitments need to be included in the proposed Relief Request 07-001-II. (b) Discuss the inspection results of the welds that were examined under the RI-ISI program in the third ISI interval, including any problems encountered during the examinations. (c) Discuss whether all the welds that are required to be examined in the third ISI interval have been examined.

FPC Response

5. (a) The initial CR3 RI-ISI plan commitments referenced in the question above (identified in Reference 2) deal with thermal stratification, cycling, and stripping (TASCS) degradation assessment and the transition from use of traditional Section XI methodology to perform examinations and the RI-ISI methodology. The first of these, Commitment 3F1104-02-1 is as follows:

> *"The methodology used in the CR-3 RI-ISI application for assessing TASCS potential conforms to the updated criteria described in the EPRI letter to NRC dated March 28, 2001. Final materials reliability program (MRP) guidance on the subject of TASCS will be incorporated into the CR-3 RI-ISI application if warranted." (Implementation was identified in the letter to occur "once final guidance is approved by the NRC.")*

The evaluation of TASCS for the fourth interval is consistent with the latest approved RI-ISI degradation mechanism assessment requirements and will be maintained throughout

the interval. Changes in methodology will be addressed as subsequent interval programs or as revisions to the current interval RI-ISI relief request. New augmented requirements will be addressed as dictated through new generic and/or licensing communications. The RI-ISI Program is required to be and is maintained as a living program throughout the interval, and as such, no additional commitments are necessary for this prior third interval item.

The second commitment identified in Reference 2, 3F1104-02-2, is as follows:

> *"To ensure the performance of 100% of the required examinations during the current ten-year ISI interval, 64.6% of the inspection locations selected for examination per the RI-ISI process will be examined over the remainder of the third ISI interval." (Implementation was identified in the letter to occur "over the remainder of the third ISI Interval.")*

During the third interval, the methodology used to perform examinations was being transitioned from traditional Section XI methods to RI-ISI. The purpose of this commitment was to recognize the "phase in" to the RI-ISI methodology during the third interval. For the fourth interval, the transition to RI-ISI methodology is complete. As such, this commitment is no longer relevant.

5. (b) *For the RI-ISI examinations completed during the third interval, no recordable indications or flaws were detected and no additional or successive examinations were required as a result of performing the RI-ISI exams. Unrelated to the credited RI-ISI examinations, five of the dissimilar metal welds associated with the RI-ISI weld population were mitigated via weld overlay during R15. Pre-service exams revealed no recordable indications on these overlays. The resultant welds are still bound by the risk impact assessment, since the failure potential was reduced from that realized as unmitigated dissimilar metal welds.*

Also during an augmented inspection performed outside of the RI-ISI Program, a rejectable indication was found on the Decay Heat drop line during an augmented outage in March 2008. As a result, this dissimilar metal weld was mitigated via a weld overlay. The Decay Heat weld was inspected during R12 prior to the implementation of the Risk Informed Program at CR3. Since this weld was inspected during the third interval, it was included and credited in the RI-ISI program for the third interval. The subsequent augmented inspection performed in March 2008 was driven by MRP-139.

5. (c) *For the RI-ISI examinations completed during the third interval, no recordable indications or flaws were detected and no additional or successive examinations were required as a result of performing the RI-ISI exams. The final RI-ISI examinations required for the third interval were completed during Refueling Outage 15 (R15) in Fall 2007, and no further examinations are required prior to the interval end date on August 13, 2008.*

NRC Request

6. (a) For the proposed RI-ISI program applicable to the fourth ISI interval, discuss whether any new welds have been added to or removed from the RI-ISI program that was approved by the NRC for the third ISI interval and the reason for their addition or removal. (b) Provide the listing of the welds that are covered under relief request 07-001-II.

FPC Response

6. (a) The CR3 RI-ISI Program is a Class 1 piping application. For the fourth interval, the overall scope of the program is similar to the third interval. No new systems or expansions/contractions of the methodology have been made that affect how the program is scoped. However, the RI-ISI program is required to and has been maintained as a living program assessing component and configuration changes and major PRA model revisions.

6. (b) The following table provides a listing of the welds covered in the RI-ISI Program and a summary of the changes to the RI-ISI populations for CR3 as part of the living program process:

RISK CATEGORY	3rd INTERVAL POPULATION	4th INTERVAL POPULATION	ITEMS AFFECTING CHANGES
High **1** **2** **3**	 0 61 0	 0 61 0	▪ RI-ISI welds associated with Dissimilar Metal Welds on the Pressurizer and the Decay Heat Drop line have been mitigated via weld overlay. This places the welds in a more conservative category. The PRA calculations are still bounding for this classification. ▪ There have been no other changes to the Risk Informed population which would result in reclassification of the weld population.
Medium **4** **5**	 341 13	 341 13	▪ There have been no RI-ISI Category Reclassifications due to an updated PRA Model. ▪ There have been no Plant / Component Modifications that would affect the PRA Model for this category of the RI-ISI Population.
Low **6** **7**	 108 16	 108 16	▪ There have been no RI-ISI Category Reclassifications due to an updated PRA Model. ▪ There have been no Plant / Component Modifications that would affect the PRA Model for this category of the RI-ISI Population.
Total	**539**	**539**	

NRC Request

7. In light of industry experience with primary stress corrosion cracking (PWSCC) in the dissimilar metal welds that are made of Alloy 82/182, provide the following information. (a) Identify all Alloy 82/182 dissimilar metal butt welds and discuss whether they are part of the RI-ISI program and are covered in the proposed relief request or whether they are covered as part of an augmented inspection separate from the RI-ISI program. (b) Discuss how inspection of these welds is credited

within the RI-ISI program. (c) Discuss the inspection strategy of the Alloy 82/182 dissimilar metal butt welds with respect to the requirements of the RI-ISI program.

FPC Response

7. (a) There are a total of 10 Alloy 82/182 dissimilar metal welds in the RI-ISI program that have been identified with the potential for PWSCC degradation mechanism at CR3. All of these were evaluated for failure potential and consequence of failure and were classified into the appropriate RI-ISI categories. The population breaks down as follows:

System	Risk Category	Degradation	Total
RC[1]	2	PWSCC, TT[2], TASCS	2
RC	2	PWSCC	6
CF[3]	2	PWSCC, TT	2

[1] *Reactor Coolant*
[2] *Thermal Transient*
[3] *Core Flood*

7. (b) All previous category B-F welds are included within the RI-ISI program, ranked, and subject to the element selection criteria of EPRI TR 112657. Inclusion of these welds in the RI-ISI Program will ensure that these locations receive for-cause examinations focused on the detection of the degradation mechanisms identified.

7. (c) In addition to the RI-ISI Program, CR3 recognizes the recent industry experience regarding Alloy 600 with 82/182 material and the affects of PWSCC. As such, CR3 maintains a separate augmented inspection program implementing the requirements of MRP-139, EPRI Materials Reliability Program, "Primary System Piping Butt Weld Inspection and Evaluation Guideline". The inspection method and frequency of the MRP-139 requirements will be followed under this augmented ISI Program. If a weld is also selected in the RI-ISI Program (once per interval), the examination to be credited for RI-ISI will be performed using any additional methods required for all degradation mechanisms identified at that location, and credit will be taken for both RI-ISI and augmented inspection.

NRC Request

8. Confirm that the fourth ISI interval ends on August 15, 2018.

FPC Response

8. The fourth ISI interval will not end on August 15, 2018. Per the requirements of ASME Section XI IWA-2432 and as documented in Section 1.1 of the CR3 Fourth Interval ISI Program Plan submitted, the interval begins on August 14, 2008, and ends on August 13, 2018. Modifications to this date are allowed per Section XI IWA-2430(d) and (e) and are available for implementation throughout the interval.

References:

1. CR3 to NRC letter, 3F1207-04, dated December 21, 2007, "Crystal River Unit 3 – Inservice Inspection Program Plan, Ten Year Update"
2. CR3 to NRC letter, 3F1104-02, dated November 10, 2004, "Crystal River Unit 3 – Third 10-Year Inservice Inspection Program – Request for Approval of Risk-Informed Inservice Inspection Program for Class 1, ASME Code, Category B-J and B-F Piping Welds"