UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

November 6, 2008

Mr. Dale E. Young, Vice President
Crystal River Nuclear Plant (NA1B)
ATTN: Supervisor, Licensing & Regulatory Programs
15760 W. Power Line Street
Crystal River, Florida 34428-6708

SUBJECT: CRYSTAL RIVER NUCLEAR PLANT, UNIT NO. 3 - RELIEF REQUEST 07-001-II, REVISION 0, RISK-INFORMED INSERVICE INSPECTION PROGRAM FOR THE FOURTH 10-YEAR INTERVAL (TAC NO. MD7736)

Dear Mr. Young,

By letter dated December 21, 2007, as supplemented by letters dated May 21 and July 10, 2008, Florida Power Corporation (the licensee) submitted Relief Request 07-001-II, Revision 0 (RR 07-001-II) as an enclosure to its Inservice Inspection (ISI) Program Plan for the fourth 10-year ISI interval at the Crystal River Unit 3 (CR3). This submittal requests relief from the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI requirements for the selection and examination of Class 1 piping welds. The licensee had requested and received relief to use a risk-informed ISI (RI-ISI) program for Class 1 piping welds at CR3 for the third 10-year ISI interval. The licensee is requesting the use of an RI-ISI based on the same methodology for the fourth 10-year interval, which began on August 14, 2008.

The Nuclear Regulatory Commission (NRC) staff has evaluated the licensee's RI-ISI relief request for the fourth 10-year interval. The NRC staff finds that the licensee has satisfactorily demonstrated compliance with risk-informed regulatory guidelines and determined that the proposed alternative will provide an acceptable level of quality and safety. Therefore, pursuant to paragraph 50.55a(a)(3)(i) of Title 10 of the *Code of Federal Regulations*, the NRC staff authorizes the use of RR 07-001-II for the fourth 10-year ISI interval.

The NRC staff's safety evaluation is enclosed. If you have any questions regarding this matter, please contact Farideh Saba at (301) 415-1447.

Sincerely,

Thomas H. Boyce, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-302

Enclosure: Safety Evaluation

cc w/enclosure: Distribution via ListServ

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELIEF REQUEST 07-001-II, REVISION 0, RISK-INFORMED INSERVICE INSPECTION PROGRAM FOR THE FOURTH 10-YEAR INTERVAL

FLORIDA POWER CORPORATION

CRYSTAL RIVER NUCLEAR PLANT, UNIT 3

DOCKET NO. 50-302

1.0 INTRODUCTION

By letter dated December 21, 2007 as supplemented by letters dated May 21 and July 10, 2008, Florida Power Corporation (the licensee) submitted Relief Request 07-001-II, Revision 0 (RR 07-001-II) as an enclosure to its Inservice Inspection (ISI) Program Plan for the fourth 10-year ISI interval at the Crystal River Unit 3 (CR3). This submittal requests relief from the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (ASME Code), Section XI requirements for the selection and examination of Class 1 piping welds. The licensee had requested and received relief to use a risk-informed ISI (RI-ISI) program for Class 1 piping welds at CR3 for the third 10-year ISI interval. The licensee is requesting the use of an RI-ISI based on the same methodology for the fourth 10-year interval.

The relief request proposes to use an RI-ISI program developed based on the methodology contained in Electric Power Research Institute Topical Report 112657, Revision B-A, "Revised Risk-Informed Inservice Inspection Evaluation Procedure," (EPRI 112657), instead of a program developed according to the ASME Code requirements for Class 1 piping, Categories B-F and B-J piping welds. The licensee submitted a similar request for relief to implement an RI-ISI program for the remainder of its third interval by letter dated November 10, 2004. The Nuclear Regulatory Commission (NRC, Commission) approved the RI-ISI program for use during the third 10-year interval by letter dated September 20, 2005. The licensee is proposing to use an RI-ISI program based on the same methodology for the fourth 10-year interval that began August 14, 2008.

2.0 REGULATORY REQUIREMENTS

Pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), paragraph 50.55a(g)(4), ASME Code Class 1, 2, and 3 components must meet the requirements, except the design and access provisions and the preservice examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that inservice examination of components and system pressure tests conducted during the first 10-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code

incorporated by reference in 10 CFR 50.55a(b), on the date 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein.

Pursuant to 10 CFR 50.55a(a)(3), alternatives to requirements may be authorized by the NRC if the licensee demonstrates that: (i) the proposed alternatives provide an acceptable level of quality and safety, or (ii) compliance with the specified requirements of 10 CFR 50.55a would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

The proposed program is developed consistent with the NRC-approved RI-ISI process and methodology delineated in EPRI TR 112657, as approved by the NRC for use at CR3 during the third 10-year interval. The ISI program retains the fundamental requirements of the ASME Code, such as inspection methods, acceptance guidelines, pressure testing, corrective measures, documentation requirements and quality control requirements.

The staff reviewed the proposed RI-ISI program based on guidance and acceptance criteria provided in the following documents:

- Electric Power Research Institute, Topical Report 112657, Revision B-A, "Revised Risk-Informed Inservice Inspection Evaluation Procedure," December 1999 (EPRI TR 112657).

- Regulatory Guide 1.174, Revision 1, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant Specific Changes to the Licensing Basis," Revision 1, U.S. NRC, November 2002 (RG 1.174).

- Regulatory Guide 1.178, Revision 1, "An Approach for Plant-Specific, Risk-Informed Decisionmaking for Inservice Inspection of Piping," U.S. NRC, September 2003 (RG 1.178).

- NUREG-0800, Unit 3.9.8, "Standard Review Plan for the Review of Risk-Informed Inservice Inspection of Piping," U.S. NRC, September 2003 (SRP Chapter 3.9.8).

3.0 TECHNICAL EVALUATION

3.1 ASME Code Components Affected

Code Class:	1
Examination Category:	B-F and B-J
Item Number:	B5.10, B5.40, B9.11, B9.21, B9.22, B9.31, B9.32, and B9.40
Description:	Alternate Risk-Informed Selection and Examination Criteria for Examination Category B-F and B-J Pressure Retaining Piping Welds
Component Number:	Pressure Retaining Piping

3.2 Applicable ASME Code Edition and Addenda

The inservice inspection program is based on the ASME Code, Section XI, 2001 Edition through the 2003 Addenda.

3.3 Applicable ASME Code Requirements

As stated in the licensee's letter dated December 21, 2007:

> Table IWB-2500-1, Examination Category B-F, requires volumetric and surface examinations on all welds for Item Numbers B5.10 and B5.40.
>
> Table IWB-2500-1, Examination Category B-J, requires volumetric and surface examinations on a sample of welds for Item Numbers B9.11 and B9.31, volumetric examinations on a sample of welds for Item Number B9.22, and surface examinations on a sample of welds for Item Numbers B9.21, B9.32, and B9.40. The weld population selected for inspection includes the following:
>
> 1. All terminal ends in each pipe or branch run connected to vessels.
>
> 2. All terminal ends and joints in each pipe or branch run connected to other components where the stress levels exceed either of the following limits under loads associated with specific seismic events and operational conditions:
>
>   (a) Primary plus secondary stress intensity range of $2.4S_m$ for ferritic steel and austenitic steel.
>
>   (b) Cumulative usage factor U of 0.4.
>
> 3. All dissimilar metal welds not covered under Examination Category B-F.
>
> 4. Additional piping welds so that the total number of circumferential butt welds, branch connections, or socket welds selected for examination equals 25 % [percent] of the circumferential butt welds, branch connection, or socket welds in the reactor coolant piping system. This total does not include welds exempted by IWB-1220 or welds in Item Number B9.22.
>
> 5. A 10 % sample of PWR [pressurized water reactor] high pressure safety injection system circumferential welds in piping ≥ NPS [nominal pipe size] 1½ and < NPS 4 shall be selected for examination. This sample shall be selected from locations determined by the Owner as most likely to be subject to thermal fatigue.

3.4 Proposed Alternative and Basis for Use

The alternative originally proposed in the licensee's Letter 3F1104-02, dated November 10, 2004, along with the two enhancements noted below, provide an acceptable level of quality and safety as required by 10 CFR 50.55a(a)(3)(i). This original RI-ISI program along with these same two enhancements is currently approved for the CR3 third inspection interval.

The licensee stated that the Fourth Inspection Interval RI-ISI Program will be a continuation of the current application and the consequence evaluation, degradation mechanism assessment,

risk ranking, and element selection steps encompasses the complete living program applied under this program. No changes to the evaluation methodology as currently implemented under EPRI TR-112657 are required as part of this interval update. The following two enhancements will continue to be implemented.

1. In lieu of the evaluation and sample expansion requirements in Section 3.6.6.2, "RISI Selected Examinations" of EPRI TR-112657, Crystal River will utilize the requirements of Subarticle -2430, "Additional Examinations" contained in [ASME] Code Case N-578-1 ["Risk-Informed Requirements for Class 1, 2, or 3 Piping, Method B, Section XI, Division 1" (February 14, 2003)]. The alternative criteria for additional examinations contained in Code Case N-578-1 provide a more refined methodology for implementing necessary additional examinations.

2. To supplement the requirements listed in Table 4-1, "Summary of Degradation-Specific Inspection Requirements and Examination Methods" of EPRI TR-112657, Crystal River will utilize the provisions listed in Table 1, Examination Category R-A, "Risk-Informed Piping Examinations" contained in Code Case N-578-1. To implement Note 10 of this table, paragraphs and figures from the 2001 Edition through the 2003 Addenda of ASME Section XI (Crystal River Unit 3 code of record for the Fourth Inspection Interval) will be utilized which parallel those referenced in the Code Case for the 1989 Edition. Table 1 of Code Case N-578-1 will be used as it provides a detailed breakdown for examination method and categorization of parts to be examined.

The licensee stated that the CR3 RI-ISI Program, as developed in accordance with EPRI TR-112657, requires that 25 percent of the elements that are categorized as "High" risk (i.e., Risk Category 1, 2, and 3) and 10 percent of the elements that are categorized as "Medium" risk (i.e., Risk Categories 4 and 5) be selected for inspection. For this application, the guidance for the examination volume for a given degradation mechanism is provided by the EPRI TR-112657, while the guidance for the examination method and categorization of parts to be examined are provided by the EPRI TR-112657 as supplemented by Code Case N-578-1.

In addition to this risk-informed evaluation, selection, and examination procedure, 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. The VT-2 visual examinations are scheduled in accordance with the CR3 pressure testing program, which remains unaffected by the RI-ISI program.

3.5 Duration of Proposed Alternative

Relief is requested for the fourth 10-Year inspection interval which started on August 14, 2008, and ends on August 13, 2018.

3.6 NRC Staff Evaluation

3.6.1 Engineering Evaluation

The NRC approved the original RI-ISI program for the third 10-year ISI interval at CR3 in a safety evaluation dated September 20, 2005. That safety evaluation discusses the NRC's

detailed review of the original RI-ISI program based on guidance and acceptance criteria provided in the documents that are listed in Section 2, Regulatory Requirements, of this safety evaluation.

In its safety evaluation dated September 20, 2005, the NRC staff concluded that the original RI-ISI program is developed consistent with the NRC-approved RI-ISI process and methodology delineated in EPRI TR 112657. The NRC staff concluded further that the ISI program retains the fundamental requirements of the ASME Code, such as inspection methods, acceptance guidelines, pressure testing, corrective measures, documentation requirements and quality control requirements.

With regard to the RI-ISI program in RR 07-001-II, the NRC staff will not repeat the same evaluation as documented in the September 20, 2005, safety evaluation because the licensee proposed to extend the approved RI-ISI program from the third interval to the fourth interval. Instead, the NRC staff evaluated the differences and changes, if any, of the RI-ISI program between the third interval and the fourth interval. The relevant issues are discussed below.

For the proposed RI-ISI program applicable to the fourth ISI interval, the NRC staff asked the licensee to 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. In its May 21, 2008, letter, the licensee reported that for the fourth interval, the overall scope of the RI-ISI 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 has been maintained as a living program assessing component and configuration changes and major probabilistic risk assessment (PRA) model revisions. For the medium and low risk categories, there have been no RI-ISI category reclassifications due to an updated PRA model and no plant/component modifications that would affect the PRA Model. For the high risk category, the licensee stated that 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 that would result in reclassification of the weld population.

The NRC staff finds that the scope of the RI-ISI program (i.e., the number of the welds) for the third interval is the same as the fourth interval and that there are no significant changes in risk categories.

In the proposed 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. In addition, the licensee references Code Case N-578 (earlier version of Code Case N-578-1) when discussing the original RI-ISI program. The NRC staff noted that Code Cases N-578 and N-578-1 are not listed as approved code cases in the current RG 1.147, Revision 15, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1" (RG 1.1.47).

In its May 21, 2008, letter, the licensee stated that it realizes that the NRC has not yet approved Code Case N-578-1 in RG 1.147, and thus included the two enhancements to the EPRI methodology in RR 07-001-II. This approach is similar to several relief requests recently submitted by other utilities and approved by the NRC on the basis that the proposed alternative

provides an acceptable level of quality and safety. The two enhancements are to use 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 of 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.

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

With regard to Code Case N-578, the licensee responded that the original RI-ISI program was prepared, submitted, and approved under a safety evaluation based on 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 112657. The NRC staff finds certain parts of N-578 and N-578-1 (as specified in the CR3 RI-ISI program) are acceptable for use at CR3, because they provide requirements for additional examinations that satisfy the acceptance criteria for the ISI program of SRP Chapter 3.9.8.

In the third interval RI-ISI program, the licensee included two regulatory commitments. However, these two regulatory commitments are not included in RR 07-001-II. The NRC staff questioned whether the same regulatory commitments should be included in RR 07-001-II. In its May 21, 2008, letter, the licensee clarified that the first commitment deal with thermal stratification, cycling, and stripping (TASCS) degradation assessment as follows: "The methodology used in the CR3 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 CR3 RI-ISI application if warranted." (Implementation was identified in the letter to occur "once final guidance is approved by the NRC.")

The licensee stated that the evaluation of TASCS for the fourth interval is consistent with the requirements of the latest approved RI-ISI degradation mechanism assessment 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 maintained as a living program throughout the interval and MRP guidance will be incorporated into the RI-ISI program per applicable guidance and EPRI report, and as such, no additional commitments are necessary for this prior third interval item.

The second commitment is to ensure the performance of 100 percent of the required examinations during the current 10-year ISI interval, in which 64.6 percent of the inspection locations selected for examination per the RI-ISI process will be examined 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 the second 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.

The NRC staff finds that the two commitments in the third interval RI-ISI do not need to be included in the fourth interval RI-ISI program because the actions required in the first commitment is implemented during the third RI-ISI interval and already addressed in the fourth RI-ISI program. The second commitment is irrelevant to the fourth interval RI-ISI program because the licensee will implement the RI-ISI program at the beginning of the interval and has sufficient time (10 years) to implement all the required examination.

To predict the success of the RI-ISI program during the fourth interval, the NRC staff asked the licensee to 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. In its May 21, 2008, letter, the licensee reported that no recordable indications or flaws were detected and no additional or successive examinations were required as a result of performing the RI-ISI examinations during the third ISI interval. 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 refueling outage 15 (R15). Pre-service examinations revealed no recordable indications on these overlays. The resultant welds are still bound by the risk impact assessment because the failure potential was reduced from that realized as unrnitigated dissimilar metal welds.

Also during an augmented inspection performed outside of the RI-ISI program in March 2008, a rejectable indication was found on the decay heat drop line. As a result, this dissimilar metal weld was mitigated via a weld overlay. The weld had been inspected during refueling outage R12 in the fall of 2001, prior to the implementation of the RI-ISI program at CR3. Since this weld had been inspected during the third interval, it was included and credited in the RI-ISI program for the third interval. The above augmented inspection, which was performed in March 2008, was driven by the MRP-13, EPRI Materials Reliability Program, "Primary System Piping Butt Weld Inspection and Evaluation Guideline".

The final RI-ISI examinations required for the third interval were completed during R15 in the fall 2007, and no further examinations are required prior to the interval end date on August 13, 2008. The NRC staff finds that the licensee implemented the RI-ISI program during the third interval satisfactorily because the licensee completed its required weld examinations and mitigated problems that were identified.

In light of industry experience with primary stress corrosion cracking (PWSCC) in the dissimilar metal welds that are made of Alloy 82/182, the NRC staff asked the licensee to 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. The NRC staff also asked the licensee to discuss

how inspection of these welds is credited within the RI-ISI program and the inspection strategy of the Alloy 82/182 dissimilar metal butt welds with respect to the requirements of the RI-ISI program.

In its letter dated May 21, 2008, the licensee reported that 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 licensee stated that 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 Alloy 82/182 welds in the RI-ISI Program will ensure that these locations receive for-cause examinations focused on the detection of the degradation mechanisms identified.

In addition to the RI-ISI program, the licensee stated that it recognizes the recent industry experience regarding Alloy 600 with 82/182 material and the effects of PWSCC. As such, CR3 maintains a separate augmented inspection program implementing the requirements of MRP-139, "Material Reliability Program: Primary System Piping Butt Weld Inspection and Evaluation Guideline (MRP-139)," dated July 14, 2005. 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.

The NRC staff finds that the licensee has implemented a separate augmented inspection program for the Alloy 82/182 welds within the framework of the RI-ISI program. The NRC staff finds that the licensee has addressed the potential for PWSCC of the Alloy 82/182 welds by augmented inspections. However, the NRC staff notes that MRP-139 specifies the examination schedule for PWSCC category F welds that have non-PWSCC resistant material, and that are cracked and reinforced by full structural weld overlay, such as the Alloy 82/182 weld in the CR3 decay heat drop line. The MRP-139 guidance stipulates that the weld will be examined once in the next 5 years. If no additional indications are detected or no growth in the existing cracks is detected, the examination of the weld will be continued with the existing ASME Code examination program or the approved alternative (i.e., the RI-ISI program). The NRC staff notes further that the inspection schedule of the Category F welds may need to follow additional requirements per future NRC actions or ASME Code requirements.

The licensee stated that the fourth interval ISI program will be based on the ASME Code, 2001 Edition through the 2003 Addenda. The NRC staff noted that 10 CFR 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 editions and addenda. This limitation is applicable to ultrasonic examinations that are based on the Performance Demonstration Initiative program. The NRC staff questioned whether Appendix VIII will be used in any of the examinations performed under this relief request and whether the code of record for the ultrasonic examination needs to be revised specifically for the ultrasonic examination.

In its May 21, 2008, letter, the licensee responded that Appendix VIII will be used, but in accordance with its recognized restrictions. ASME Section XI provides requirements for performance demonstration for ultrasonic examination procedures, equipment, and personnel in Mandatory Appendix VIII. The licensee recognizes the limitation the NRC staff has put on the

use of Appendix VIII in 10 CFR 50.55a. As such, the Fourth ISI Program Plan (the main ISI program) 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* of the ISI program plan. The NRC staff finds that the licensee has addressed the limitation of 10 CFR 50.55a(b)(2)(xxiv) regarding ultrasonic examinations in the Fourth ISI Program Plan.

In the proposed relief request, 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. In its May 21, 2008, letter, the licensee clarified that the system pressure testing will be performed per requirements of IWA-5000, IWB-5000, IWC-5000, and IWD-5000 of the ASME Code, Section XI. The NRC staff finds that the licensee follows the ASME Code, Section XI requirements in performing pressure tests.

The NRC staff finds that the there are no significant changes in the RI-ISI program between the third interval and fourth interval. The licensee has addressed the Alloy 82/182 dissimilar metal welds with either weld overlay and augment inspections satisfactorily.

3.6.2 Risk-Informed Evaluation

The licensee is requesting relief that would permit continued use of a RI-ISI program for the fourth 10-year ISI interval instead of the ASME Section XI program. An acceptable RI-ISI program plan is expected to meet the five key principles of risk-informed decisionmaking, discussed in Regulatory Guides 1.174 and 1.178. These principles are:

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 and/or large early release frequency, 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), 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. The licensee, in its letters dated December 21, 2007, and July 10, 2008, described that CR3's RI-ISI evaluation, ranking, and element selection methodology was developed in accordance with EPRI TR 112657. The licensee's application of the risk-informed method approved by the NRC for the third interval remains unchanged for the fourth interval. Therefore, the NRC staff concludes that the method applied by the licensee continues to be acceptable. 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. Therefore, the second and third principles are met.

The fourth principle requires an estimate of the change in risk. The change in risk is dependent on the number and location of inspections in the proposed ISI program compared to the number and location of inspections that would be inspected using the requirements of ASME Section XI that was replaced by the original RI-ISI program. In its July 10, 2008, letter, the licensee described its PRA update program and confirmed that the RI-ISI program is a living program requiring feedback of new relevant information to ensure the appropriate identification of high safety significant piping locations. Further, the licensee described its fall 2007 review of the consequence of segment failures, the likelihood of failures, and service history since the implementation of its RI-ISI program in the third interval. The review of the consequence of failure included a review of plant changes and PRA changes. The licensee reported that the highest conditional core damage probabilities (CCDPs) and conditional large early release probabilities (CLERPs) in the high consequence category remain unchanged and that no segments were expected to move from medium to high consequences. The licensee also reported that there were no changes to the degradation mechanism assessment evaluation or its results. The licensee concluded that the RI-ISI change in risk analysis results from the third interval remains valid, and therefore the change in risk associated with implementing the proposed program remains below the acceptance guidelines.

The change in risk method used by the licensee and endorsed in the NRC's September 20, 2005 letter is the "Simplified Risk Quantification Method," described in Section 3.7 of EPRI TR 112657. The method uses bounding estimates based on the highest possible CCDP and CLERP in the high and medium consequence categories. The NRC staff concurs that, with no changes to the highest estimates in the high category, with no medium consequence segments moving to high, and with no change in the degradation mechanism assessment, there would be no change in the original change in risk estimates. The original change in risk estimates satisfied the guidelines in EPRI TR 112657; therefore, principle four of risk-informed decisionmaking that any increase should be small and consistent with the intent of the Commission's Safety Goal Policy Statement is met.

The fifth principle of risk-informed decisionmaking requires that the impact of the proposed change should be monitored by using performance measurement strategies. The licensee's RI-ISI program approved in NRC's safety evaluation dated September, 20, 2005, included a brief discussion of the licensee monitoring program. The licensee's letter dated July 10, 2008, included a comprehensive RI-ISI update report that was developed in the fall of 2007, illustrating that the monitoring program has been fully implemented. Thus, the program continues to be a living program and satisfies the fifth principle.

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

4.0 CONCLUSION

On the basis of its review of the licensee's proposed RI-ISI program in RR 07-001-II the NRC staff concludes that the RI-ISI program provides an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the NRC authorizes application of the proposed RI-ISI program in RR 07-001-II for the fourth 10-year ISI interval at CR3.

All other ASME Code, Section XI requirements for which relief was not specifically requested and approved in this relief request remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: John Tsao
Stephen Dinsmore

Date: Novernber 6, 2008

Mr. Dale E. Young, Vice President
Crystal River Nuclear Plant (NA1B)
ATTN: Supervisor, Licensing & Regulatory Programs
15760 W. Power Line Street
Crystal River, Florida 34428-6708

November 6, 2008

SUBJECT: CRYSTAL RIVER NUCLEAR PLANT, UNIT NO. 3 - RELIEF REQUEST 07-001-II, REVISION 0, RISK-INFORMED INSERVICE INSPECTION PROGRAM FOR THE FOURTH 10-YEAR INTERVAL (TAC NO. MD7736)

Dear Mr. Young,

By letter dated December 21, 2007, as supplemented by letters dated May 21 and July 10, 2008, Florida Power Corporation (the licensee) submitted Relief Request 07-001-II, Revision 0 (RR 07-001-11) as an enclosure to its Inservice Inspection (ISI) Program Plan for the fourth 10-year ISI interval at the Crystal River Unit 3 (CR3). This submittal requests relief from the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI requirements for the selection and examination of Class 1 piping welds. The licensee had requested and received relief to use a risk-informed ISI (RI-ISI) program for Class 1 piping welds at CR3 for the third 10-year ISI interval. The licensee is requesting the use of an RI-ISI based on the same methodology for the fourth 10-year interval, which began on August 14, 2008.

The Nuclear Regulatory Commission (NRC) staff has evaluated the licensee's RI-ISI relief request for the fourth 10-year interval. The NRC staff finds that the licensee has satisfactorily demonstrated compliance with risk-informed regulatory guidelines and determined that the proposed alternative will provide an acceptable level of quality and safety. Therefore, pursuant to paragraph 50.55a(a)(3)(i) of Title 10 of the *Code of Federal Regulations*, the NRC staff authorizes the use of RR 07-001-II for the fourth 10-year ISI interval.

The NRC staff's safety evaluation is enclosed. If you have any questions regarding this matter, please contact Farideh Saba at (301) 415-1447.

Sincerely,
/RA/
Thomas H. Boyce, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-302

Enclosure: Safety Evaluation

cc w/enclosure: Distribution via ListServ

DISTRIBUTION:
PUBLIC LPL2-2 R/F RidsNrrPMFSaba RidsNrrLACSola
RidsNrrDorlLpl2-2 RidsNrrDciCpnb RidsOgcRp
RidsRgn2MailCenter RidsNrrDorlDpr John Tsao
Stephen Dinsmore RidsNrrDraApla RidsAcrsAcnw_MailCTR
ADAMS Accession Number: ML082600006 NRR-028

OFFICE	LPL2-2/PM	LPL2-2/LA	CPNB/BC*	APLA/BC*	OGC	LPL2-2/BC
NAME	FSaba	CSola	TChan	MRubin	RHolmes (NLO)	TBoyce
DATE	10/21/08	10/20/08	10/20/08	10/20/08	10/28/08	11/6/08

* by memorandum **OFFICIAL RECORD COPY**