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*Energy to Serve Your World<sup>SM</sup>*

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50-366

NL-05-1895

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

Edwin I. Hatch Nuclear Plant  
Third and Fourth 10-Year Interval Inservice Inspection (ISI) Programs  
Submittal to Respond to NRC Request for Additional Information

Ladies and Gentlemen:

By letter dated March 30, 2005 Southern Nuclear Operating Company (SNC) submitted relief requests, alternatives, and an exemption request for the Edwin I. Hatch Nuclear Plant Fourth 10-Year Interval ISI program. In response to subsequent discussions with NRC staff, Enclosure 3 of the March 30, 2005 letter, Alternative ISI-ALT-1 was revised. A revised alternative was submitted on August 2, 2005, to replace the version submitted by the March 30, 2005 letter. A Request for Additional Information (RAI) was received from the NRC on September 12, 2005. In response to the RAI, SNC submitted an additional letter NL-05-1778 dated October 5, 2005. A telephone conference was held on October 17, 2005, to discuss the response to the RAI. Additional wording changes were proposed and accepted. A revised RAI response is being submitted as Enclosure 1. A corresponding change was made to ISI-ALT-1 and is being submitted as Enclosure 3. Please note there is no Enclosure 2.

This letter contains no NRC commitments. If you have any questions, please advise.

Sincerely,



H. L. Sumner, Jr.

HLS/PAH/daj

Enclosure: Enclosure 1 - Revised RAI Response to NRC Request for Information of  
September 12, 2005 and Telephone Conference Call on  
October 17, 2005

Enclosure 3 - ISI-ALT-1, Version 4.0

U. S. Nuclear Regulatory Commission

NL-05-1895

Page 2

cc: Southern Nuclear Operating Company  
Mr. J. T. Gasser, Executive Vice President  
Mr. G. R. Frederick, General Manager – Plant Hatch  
RTYPE: CHA02.004

U. S. Nuclear Regulatory Commission  
Dr. W. D. Travers, Regional Administrator  
Mr. C. Gratton, NRR Project Manager – Hatch  
Mr. D. S. Simpkins, Senior Resident Inspector – Hatch

**Enclosure 1 - Revised Response to NRC Request for Information of September 12, 2005  
and Telephone Conference Call on October 17, 2005**

**Edwin I. Hatch Nuclear Plant  
Third and Fourth 10-Year Interval Inservice Inspection (ISI) Programs  
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Enclosure 1  
Revised RAI Response to NRC Request for Information of September 12, 2005  
and Telephone Conference Call on October 17, 2005

**REVISED RAI RESPONSE**

**ISI-ALT-1**

1. The applicable Code requirements being referenced are from an edition and addenda that is before the 2001 Edition of the Code. The licensee should reference the applicable sub-articles and paragraphs from the 2001 Edition of the Code, with the 2003 Addenda.

Response

4<sup>th</sup> interval examinations will be performed per the requirements of ASME Section XI, 2001 Edition through the 2003 Addenda, as amended by 10 CFR 50.55a. However, the NRC amended the use of the 2001 Edition through the 2003 Addenda in paragraph 10 CFR 50.55a(b)(2)(xxiv), which states, "*The use of Appendix VIII and the supplements to Appendix VIII and Article I-3000 of Section XI of the ASME BPV Code, 2002 Addenda through the latest edition and addenda incorporated by reference in paragraph (b)(2) of this section, is prohibited.*" Therefore, when referencing Appendix VIII, the 2001 Code is the latest approved Code. All other references apply to the 2001 Edition through the 2003 Addenda of the Section XI Code.

2. Subarticle I-2210 of the 2001 Edition of the Code with the 2003 Addenda, requires examination of the flanges using Section XI, Appendix III, which has a prescriptive-based procedure and examination criteria for flaw detection and performance-based performance based Appendix VIII qualified personnel and procedures for flaw characterization. The proposed alternative is silent on examinations for detecting flaws. Discuss the examination requirements that will be used for detecting flaws.

Response

I-2210(b) of the 2001 Edition of the Code with the 2003 Addenda requires that ultrasonic examination of reactor vessel-to-flange welds, closure head-to-flange welds, and integral attachment welds shall be conducted in accordance with Article 4 of Section V, except that alternative examination beam angles may be used. These examinations shall be further supplemented by Table I-2000-1.

SNC proposes to use the below listed examination methodology in lieu of the I-2210(b) Section XI Code requirements; however, it should be noted that SNC may use the Section XI requirements, if deemed appropriate at the time of examination. It should also be noted that a discussion on limitations was added for clarity. Actual coverage due to these limitations will be calculated after the examinations are performed, and a relief request will be submitted to the NRC if required. Considerations of alternative examinations will be addressed at that time.

Enclosure 1  
Revised RAI Response to NRC Request for Information of September 12, 2005  
and Telephone Conference Call on October 17, 2005

C-1 - Vessel-to-Flange Weld

**Limitations** - This examination will be performed from the outside surface of the vessel. The curvature of the flange limits transducer travel such that scanning can only be performed from the shell side of the weld and as shown in Figure 1 (of ISI-ALT-1) the refueling bellows prevents scanning from the upper portion of the flange surface located above the curvature.

**Examination Requirements** - SNC proposes to use a single side angle beam examination that will be performed using examination procedures, personnel, and equipment qualified through the PDI process in accordance with Appendix VIII, Supplements 4 and 6. Projected coverage for flaws located parallel to weld is shown in Figure 2 of ISI-ALT-1. Since the examination will be from a single side, the requirements of 10 CFR 50.55a(b)(2)(xvi)(A) apply. Therefore, examinations will be conducted with equipment, procedures, and personnel that have demonstrated proficiency with single side examinations. (To demonstrate equivalency to two sided examinations, the demonstration must be performed to the requirements of Appendix VIII as modified by this paragraph and 10 CFR 50.55a(b)(2)(xv) (B) through (G), on specimens containing flaws with non-optimum sound energy reflecting characteristics or flaws similar to those in the vessel being examined). Scanning will be performed as follows:

- Per 10 CFR 50.55a(b)(2)(xv)(G)(1), the clad to base metal interface, including a minimum of 15 percent T (measured from the clad to base metal interface), shall be examined from four orthogonal directions using procedures and personnel qualified in accordance with Supplement 4 to Appendix VIII.
- Per 10 CFR 50.55a(b)(2)(xv)(G)(2), if the clad-to-base-metal-interface procedure demonstrates detectability of flaws with a tilt angle relative to the weld centerline of at least 45 degrees, the remainder of the examination volume is considered fully examined if coverage is obtained in one parallel and one perpendicular direction. This must be accomplished using a procedure and personnel qualified for single-side examination in accordance with Supplement 6. Subsequent examinations of this volume may be performed using examination techniques qualified for a tilt angle of at least 10 degrees.
- Per 10 CFR 50.55a(b)(2)(xv)(G)(3), the examination volume not addressed by 50.55a(b)(2)(xv)(G)(1) is considered fully examined if coverage is obtained in one parallel and one perpendicular direction, using a procedure and personnel qualified for single sided examination when the provisions of § 50.55a(b)(2)(xv)(G)(2) are met.

Enclosure 1  
Revised RAI Response to NRC Request for Information of September 12, 2005  
and Telephone Conference Call on October 17, 2005

HC-2 - Head-to-Flange Weld

Limitations - As shown in Figure 1 (of ISI-ALT-1), the configuration allows scanning from both the head side and the flange side of the weld; however, the short distance from the weld to the flange limits the amount of scanning that can be performed on the flange side of weld.

Examination Requirements – The RPV head is not clad; therefore, when applying Appendix VIII, only Supplement 6 would normally be required. However, instead of using Supplement 6 to perform the examination of the entire examination volume, guidance will be taken from Code Case N-664 (which applies to unclad vessel welds, *excluding flanges*), to perform the examination of the inner 15% of the examination volume per Supplement 4 of Appendix VIII. The outer 85% of the examination volume will be examined using Supplement 6. The application of Code Case N-664 (and thus the use of Supplement 4 for the inner 15% on this *flange configuration*) is considered to be an acceptable practice because the PDI qualification using Supplement 4 clad specimens is considered to be more difficult than the qualification using Supplement 6 specimens. By using this approach, weld HC-2 will be examined using the same requirements as specified above for weld C-1.

Projected coverage for flaws located parallel to weld is shown in Figure 3 of ISI-ALT-1.

3. In the basis section of the submittal, the licensee makes a statement that the vessel flange examination will be eliminated because it does not improve flaw detection. Please provide supporting detail for the statement. Identify the scanning requirements that will be followed. Provide sketches of the examination volume showing the proposed scanning directions and transducer angles.

Response

The referenced statement has been eliminated.

**Enclosure 3 - ISI-ALT-1, Version 4.0**

**Edwin I. Hatch Nuclear Plant  
Third and Fourth 10-Year Interval Inservice Inspection (ISI) Programs  
Submittal to Respond to NRC Request for Additional Information**

**Enclosure 3**  
**SOUTHERN NUCLEAR OPERATING COMPANY (SNC)**  
**ISI-ALT-1, VERSION 4.0**  
**PROPOSED ALTERNATIVE IN ACCORDANCE WITH 10 CFR 50.55a(a)(3)(i)**

**Plant Site-Unit:** Edwin I. Hatch Nuclear Plant-Units 1 and 2.

**Interval-Interval Dates:** 4<sup>th</sup> ISI Interval extending from January 1, 2006 through December 31, 2015.

**Requested Date for Approval and Basis:** Approval is requested by December 1, 2005 to support examinations performed during 1R22 (scheduled for February 2006).

**ASME Code Components Affected:** Category B-A, reactor pressure vessel (RPV) shell-to-flange weld C-1 (Item B1.30) and head-to-flange weld HC-2 (Item B1.40).

**Applicable Code Edition and Addenda:** Fourth interval examinations will be performed per the requirements of ASME Section XI, 2001 Edition through the 2003 Addenda, as amended by 10 CFR 50.55a.

The NRC amended the use of the 2001 Edition through the 2003 Addenda in paragraph 10 CFR 50.55a(b)(2)(xxiv), which states, "*The use of Appendix VIII and the supplements to Appendix VIII and Article I-3000 of Section XI of the ASME BPV Code, 2002 Addenda through the latest edition and addenda incorporated by reference in paragraph (b)(2) of this section, is prohibited.*" Therefore, when referencing Appendix VIII, licensees are limited to using the 2001 Code; however, other references apply to the 2001 Edition through the 2003 Addenda.

**Applicable Code Requirements:** These welds are currently required to be examined per Appendix I, I-2100(b) of the 2001 Edition of ASME Section XI through the 2003 Addenda, which requires that the examination be conducted in accordance with Article 4 of Section V, except that alternative beam angles may be used. Additionally, there is a requirement to supplement the Section V examinations with Table I-2000-1. Section T-472.1 of the 2001 Edition of Section V with the 2003 Addenda defines the ultrasonic scanning criteria for the examination of reactor vessel-to-flange welds and closure head-to-flange welds. These are:

- (T-472.1.1) The beam angle shall be appropriate for the configuration being examined and that the beam angle shall be capable of detecting the calibration reflectors, over the required angle beam paths.
- (T472.1.2) When scanning for reflectors parallel to the weld seam, the angle beam shall be directed at approximate right angles to the weld axis from both sides of the weld (i.e., from two directions) on the same surface when possible. The search unit shall be manipulated so that the ultrasonic energy passes through the required volume of weld and adjacent base material.



**Enclosure 3**  
**SOUTHERN NUCLEAR OPERATING COMPANY (SNC)**  
**ISI-ALT-1, VERSION 4.0**  
**PROPOSED ALTERNATIVE IN ACCORDANCE WITH 10 CFR 50.55a(a)(3)(i)**

- (T-472.1.3) When scanning for reflectors transverse (perpendicular) to the weld seam, the angle beam shall be directed essentially parallel to the weld axis. The search unit shall be manipulated so that the ultrasonic energy passes through the required volume of weld and adjacent base material. The search unit shall be rotated 180 degrees and the examination repeated.
- (T-472.2) Welds that cannot be fully examined from two directions using the angle beam techniques shall also be examined if possible with a straight beam technique.
- (T-472.3) Welds that cannot be examined from at least one side (edge) using the angle beam technique shall be noted in the examination report. For flange welds, the weld may be examined with a straight beam or low angle longitudinal waves from the flange surface provided the examination volume can be covered.

**Reason for  
Request:**

10 CFR 50.55a required that ASME Section XI, Appendix VIII, Supplement 4, "Qualification Requirements For The Clad/Base Metal Interface of Reactor Vessel," and Supplement 6, "Qualification Requirements For Reactor Vessel Welds Other Than Clad/Base Metal Interface," be implemented for most of the RPV welds by November 22, 2000. However, the RPV shell-to-flange weld and head-to-flange weld examinations were not included in this requirement. The use of this alternative will allow the use of Performance Demonstration Initiative (PDI) qualified procedures to perform the examination of these welds in lieu of Article 4 of Section V requirements.

**Proposed  
Alternative and  
Basis for Use:**

**Proposed Alternative**

In lieu of the Article 4 of Section 5 angle beam examination, SNC proposes to use an angle beam examination that will be performed using examination procedures, personnel, and equipment qualified in accordance with Appendix VIII, Supplements 4 and 6, as amended by the conditions set forth in 10 CFR 50.55a. Examination of each weld is described below: (See Figure 1)

**C-1 - Vessel-To-Flange Weld**

The Section XI required examination volume will be scanned for flaws from the outside of the vessel using a 60-degree refracted longitudinal wave; however, the curvature of the flange surface above the weld will limit transducer travel such that examinations can only be performed from the shell side. Additionally, the refueling bellows prevents examinations from being performed from the vertical portion of the flange surface located directly above the curvature. The projected single side coverage for flaws located parallel to the weld is shown in Figure 2.

Since the examination will be from a single side, the requirements of 10 CFR 50.55a(b)(2)(xvi)(A) apply. Therefore, examinations will be conducted with equipment, procedures, and personnel that have demonstrated proficiency with single side examinations. (To demonstrate equivalency to two sided examinations, the demonstration must be performed to the requirements of Appendix VIII as modified

**Enclosure 3**  
**SOUTHERN NUCLEAR OPERATING COMPANY (SNC)**  
**ISI-ALT-1, VERSION 4.0**  
**PROPOSED ALTERNATIVE IN ACCORDANCE WITH 10 CFR 50.55a(a)(3)(i)**

by this paragraph and 10 CFR 50.55a(b)(2)(xv) (B) through (G), on specimens containing flaws with non-optimum sound energy reflecting characteristics or flaws similar to those in the vessel being examined). Examination of the Section XI required volume will be performed as follows:

Per 10 CFR 50.55a(b)(2)(xv)(G)(1), the clad to base metal interface, including a minimum of 15 percent T (measured from the clad to base metal interface), shall be examined from four orthogonal directions using procedures and personnel qualified in accordance with Supplement 4 to Appendix VIII.

Per 10 CFR 50.55a(b)(2)(xv)(G)(2), if the clad-to-base-metal-interface procedure demonstrates detectability of flaws with a tilt angle relative to the weld centerline of at least 45 degrees, the remainder of the examination volume is considered fully examined if coverage is obtained in one parallel and one perpendicular direction. This must be accomplished using a procedure and personnel qualified for single-side examination in accordance with Supplement 6. Subsequent examinations of this volume may be performed using examination techniques qualified for a tilt angle of at least 10 degrees.

Per 10 CFR 50.55a(b)(2)(xv)(G)(3), the examination volume not addressed by 50.55a(b)(2)(xv)(G)(1) is considered fully examined if coverage is obtained in one parallel and one perpendicular direction, using a procedure and personnel qualified for single sided examination when the provisions of § 50.55a(b)(2)(xv)(G)(2) are met.

**HC-2 – Closure Head-To-Flange Weld**

The Section XI required examination volume will be scanned for flaws using a 60-degree refracted longitudinal wave. Examinations will be performed from both the head and flange side of the weld; however, the short distance from the weld to the flange limits the examination on the flange side of weld. The RPV head is not clad; therefore, when applying Appendix VIII, only Supplement 6 would normally be required. However, instead of using Supplement 6 to perform the examination of the entire examination volume, guidance will be taken from Code Case N-664 (which applies to unclad vessel welds, *excluding flanges*), to perform the examination of the inner 15% of the examination volume per Supplement 4 of Appendix VIII. The outer 85% of the examination volume will be examined using Supplement 6. The application of Code Case N-664 (and thus the use of Supplement 4 for the inner 15% on this *flange configuration*) is considered to be an acceptable practice because the PDI qualification using Supplement 4 clad specimens is considered to be more difficult than the qualification using Supplement 6 specimens. By using this approach, weld HC-2 will be examined using the same requirements as specified above for weld C-1. The projected coverage for flaws located parallel to the weld is shown in Figure 3.

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**ISI-ALT-1, VERSION 4.0**  
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**Basis for Use**

Appendix VIII requirements were developed to ensure the effectiveness of UT examinations within the nuclear industry by means of a rigorous, item-specific performance demonstration. The performance demonstration (through PDI) was conducted on RPV mockups containing flaws of various size and allocations. The demonstration established the capability of equipment, procedures, and personnel to find flaws that could be detrimental to the integrity of the RPV. The performance demonstration showed that for the detection of flaws in RPV welds, the UT techniques

were equal to or surpassed the requirements of the Section V, Article 4 of the ASME Code. Additionally, the PDI qualified sizing techniques is considered to be more accurate than the techniques used in Article 4 of Section V.

Although Appendix VIII is not required for the RPV shell-to-flange weld and RPV head-to-flange weld, the use of Appendix VIII criteria for detection and sizing of flaws in these welds will be equal to or will exceed the requirements established by Article 4 of Section V. Therefore, the use of this proposed alternative will continue to provide an acceptable level of quality and safety, and approval is requested pursuant to 10 CFR 50.55a(a)(3)(i).

<b>Duration of Proposed Alternative:</b>	The proposed alternative is applicable for the 4 <sup>th</sup> Inservice Inspection Interval, extending from January 1, 2006 through December 31, 2015.
<b>Precedents:</b>	NA
<b>References:</b>	None
<b>Status:</b>	Awaiting NRC approval.