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SOUTHERN COMPANY
Energy to Serve Your World

April 22, 2009

Docket No.: 50-364

NL-09-0410

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

Joseph M. Farley Nuclear Plant – Unit 2
Proposed Alternatives for the Fourth ISI Interval

Ladies and Gentlemen:

Pursuant to 10 CFR 50.55a(a)(3)(i), Southern Nuclear Operating Company (SNC) hereby requests NRC approval of proposed alternatives to the specified ASME Boiler and Pressure Vessel Code Section XI requirements.

The details of these requests are contained in the enclosures.

Approval is requested by March 20, 2010.

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

Sincerely,

Mark J Ajluni

M. J. Ajluni
Manager, Nuclear Licensing

MJA/JLS/phr

Enclosures:

1) Proposed Alternative FNP-ISI-ALT-07 Version 1.0, in Accordance with 10 CFR 50.55a(a)(3)(i)
2) Proposed Alternative FNP-ISI-ALT-08 Version 1.0, in Accordance with 10 CFR 50.55a(a)(3)(i)

cc: Southern Nuclear Operating Company
Mr. J. T. Gasser, Executive Vice President
Mr. J. R. Johnson, Vice President – Farley
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RTYPE: CFA04.054

U. S. Nuclear Regulatory Commission
Mr. L. A. Reyes, Regional Administrator
Mr. R. E. Martin, NRR Project Manager – Farley
Mr. E. L. Crowe, Senior Resident Inspector – Farley

Joseph M. Farley Nuclear Plant – Unit 2
Proposed Alternative for the Fourth ISI Interval

Enclosure 1

Proposed Alternative FNP-ISI-ALT-07 Version 1.0,
in Accordance with 10 CFR 50.55a(a)(3)(i)

Enclosure 1

Proposed Alternative FNP-ISI-ALT-07 Version 1.0, in Accordance with 10 CFR 50.55a(a)(3)(i)

Plant Site-Unit: Joseph M. Farley Nuclear Plant (FNP) - Unit 2.

Interval Dates: 4th ISI Interval – December 1, 2007 through November 30, 2017.

It should be noted that alternative FNP-ISI-ALT-01, Version 1.0 changed the Farley-2 ISI interval dates to coincide with the Farley-1 interval dates. This alternative was approved by NRC safety evaluation dated October 17, 2008.

Requested Date for Approval : Approval is requested by March 20, 2010 to support scheduled examinations performed during FNP 2R20 (April 2010).

ASME Code Components Affected: The affected component is the Class 1, Category B-A, Item B1.30, Reactor Pressure Vessel (RPV) shell-to-flange weld APR1-1100-1.

Applicable Code Edition and Addenda: The applicable Code edition and addenda is ASME Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," 2001 Edition with 2003 addenda. In addition, as required by 10 CFR 50.55a, ASME Section XI, 2001 Edition is used for Appendix VIII, "Performance Demonstration for Ultrasonic Examination Systems."

Applicable Code Requirements: IWA-2232 requires that ultrasonic (UT) examinations be conducted in accordance with Appendix I. Appendix I, I-2110(b) 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-441 of the 2001 Edition of Section V through the 2003 Addenda defines the UT scanning criteria for the examination of the reactor vessel-to-flange weld.

Reason for Request: This alternative will allow the use of enhanced Performance Demonstration Initiative (PDI) qualified procedures to perform the examination of the RPV shell-to-flange weld in accordance with ASME Section XI, Division 1, 2001 Edition instead of using the ASME Section V, Article 4 requirements.

Enclosure 1

Proposed Alternative FNP-ISI-ALT-07 Version 1.0, in Accordance with 10 CFR 50.55a(a)(3)(i)

Proposed Alternative:

In lieu of the Article 4 of Section V UT angle beam examination, Southern Nuclear Operating Company (SNC) proposes to use a remote mechanized 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 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. The flange weld will have geometric limitations due to configuration. However, the weld will be examined to the specified requirements to the fullest extent practical (i.e., scanning from four orthogonal directions when achievable).

- 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 10 CFR 50.55a(b)(2)(xv)(G)(1) 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-sided examinations when the provisions of 10 CFR 50.55a(b)(2)(xv)(G)(2) are met.

For code coverage determination, single-sided examination results will be used. This single-sided examination was demonstrated to be equivalent to a two sided examination during the PDI qualification process. The single-sided demonstration was performed to the requirements of Appendix VIII 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.

The examinations are scheduled to be performed during FNP 2R20 (April 2010).

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 sizes 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.

The use of Appendix VIII criteria for detection and sizing of flaws, as allowed by this alternative, will be equal to, or will exceed, the criteria established by the requirements of Article 4 of Section V. Therefore, the use of this proposed alternative instead of the requirements of Article 4 of Section 5 will continue to provide an acceptable level of quality and safety, and approval is requested pursuant to 10 CFR 50.55a(a)(3)(i).

Duration of Proposed Alternative:

The proposed alternative is applicable for the 4th Inservice Inspection Interval for FNP Unit 2.

Precedents:

This alternative is similar to and closely follows the content and statements made in the Duke Energy Company request for Oconee, McGuire, and Catawba Nuclear Stations, submitted initially in a letter to the NRC dated July 14, 2004 and approved by the staff in a letter dated October 20, 2004. In addition, this alternative is similar to and closely follows the content and statements made by Tennessee Valley Authority's (TVA) request for Browns Ferry, Sequoyah, and Watts Bar Nuclear Plants, submitted initially in a letter to the NRC dated February 23, 2005 and approved by the staff in a letter dated August 2, 2005.

In addition, SNC submitted ISI-GEN-ALT-06-01 on June 29, 2006 for Farley-1 which is similar to and closely follows this alternative. The NRC approved the alternative in a SER dated September 20, 2006.

References:

The referenced ADAMS numbers for the Duke and TVA Safety Evaluations are ML042810601 and ML051730487, respectively.

The references for the NRC approval of the Farley-1 alternative are TAC Nos. MD2479, MD2480, and MD2481.

Status:

Awaiting NRC approval.

Joseph M. Farley Nuclear Plant – Unit 2
Proposed Alternative for the Fourth ISI Interval

Enclosure 2

Proposed Alternative FNP-ISI-ALT-08 Version 1.0,
in Accordance with 10 CFR 50.55a(a)(3)(i)

Enclosure 2

Proposed Alternative FNP-ISI-ALT-08 Version 1.0, in Accordance with 10 CFR 50.55a(a)(3)(i)

Plant Site-Unit: Joseph M. Farley Nuclear Plant (FNP) - Unit 2.

Interval Dates: 4th ISI Interval – December 1, 2007 through November 30, 2017.

It should be noted that alternative FNP-ISI-ALT-01, Version 1.0 changed the Farley-2 ISI interval dates to coincide with the Farley-1 interval dates. This alternative was approved by NRC safety evaluation dated October 17, 2008.

Requested Date for Approval : Approval is requested by March 20, 2010 to support scheduled examinations performed during FNP 2R20 (April 2010).

ASME Code Components Affected: The affected components are the Class 1, Category B-F, Item B5.10, Reactor Pressure Vessel (RPV) nozzle to safe-end dissimilar metal (DSM) butt welds and the adjacent Category B-J, Item B9.11, austenitic safe-end welds. Lists of welds are provided in Figures 1 and 2.

Applicable Code Edition and Addenda: The applicable Code edition and addenda is ASME Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," 2001 Edition through the 2003 addenda. In addition, as required by 10 CFR 50.55a, ASME Section XI, 2001 Edition is used for Appendix VIII, "Performance Demonstration for Ultrasonic Examination Systems."

Applicable Code Requirements: Examination Category B-F, Item B5.10, "RPV nozzle to safe-end DSM butt welds" and Examination Category B-J, Item B9.11, "austenitic safe-end welds" specify volumetric examination. IWA -2232 requires that ultrasonic (UT) examinations be performed per Appendix I. Appendix I, I-2220 requires that ultrasonic examination procedures, equipment, and personnel be qualified by performance demonstration in accordance with Appendix VIII. Instead of the Appendix VIII qualification requirements, Southern Nuclear Operating Company (SNC) is using NRC approved Code Case N-695, "Qualification Requirements for Dissimilar Metal Piping Welds" and NRC approved Code Case N-696, "Qualification Requirements for Appendix VIII Piping Examinations Conducted From the Inside Surface."

Code Case N-695 provides an alternative to the Appendix VIII, Supplement 10 requirements for the qualification requirements of DSM welds. Paragraph 3.3(c) indicates examination procedures, equipment, and personnel are qualified for depth-sizing when the Root Mean Square (RMS) error of the flaw depth measurements, as compared with the true depths, does not exceed 0.125 inches.

Code Case N-696 provides an alternative to the Appendix VIII, Supplement 2 and 10 qualification requirements for piping welds that are conducted from the inside surface. Paragraph 3.3(d) indicates examination procedures, equipment, and personnel are qualified for depth-sizing when the RMS error of the flaw depth measurements, as compared to the true depths, does not

exceed 0.125 inches.

Reason for Request:

This alterative is needed because:

1. To date, the examination vendor for Farley has not met the required root mean square error (RMSE) of 0.125 inches for depth sizing.

2. The examination vendor for the FNP reactor vessel nozzle examinations has qualified for detection of axial flaws in accordance with Appendix VIII, Supplements 10 and 2, as demonstrated through the Electric Power Research Institute (EPRI) Performance Demonstration Initiative (PDI) Program, for DSM nozzle-to-safe-end and austenitic safe-end welds examined from the inside diameter (ID) surface provided the surface is machined or ground smooth with no exposed root reinforcement or counter-bore. However, surface roughness may be present that could call into question the UT qualifications demonstrated for detection of axial flaws.

Note: The examination vendor has qualified for detection of circumferential flaws in accordance with Appendix VIII, Supplements 10 and 2, as demonstrated through the EPRI PDI Program, for DSM nozzle-to-safe end and austenitic safe-end welds examined from the ID surface.

Proposed Alternative

(1) Variation to 0.125 RMSE

SNC proposes to use a RMSE of 0.189 inches instead of the 0.125 inches required for Supplement 10, a RMSE of 0.367 inches instead of the 0.125 inches required for Supplement 2, and a RMSE of 0.245 inches instead of the 0.125 inches for Supplements 10 and 2 combined. In the event an indication is detected that requires depth sizing, the difference between the required RMSE and the demonstrated RMSE will be added to the measured through-wall extent for comparison with applicable ASME Section XI acceptance criteria. If the examination vendor demonstrates an improved depth sizing RMSE prior to the examination, the excess of that improved RMSE over the 0.125 inch RMSE requirement, if any, will be added to the measured value for comparison with applicable acceptance criteria.

(2) Inside Diameter UT Examinations Supplemented by Eddy-Current

SNC proposes using surface geometry profiling software (profilometry) in conjunction with a focused immersion ultrasonic transducer positioned to permit accurate profile data across the examination volume, to help the examiner confirm locations where the raw data indicates lack of transducer contact due to problematic surface geometry. Subsequently, eddy current examination will be used to supplement ultrasonic examination where there is sufficient surface roughness to call into question the applicability of the ultrasonic examination qualification to detect axial flaws. The ultrasonic examinations, supplemented by eddy current examinations and profilometry,

will be conducted to the maximum extent practical and are subject to third party review by the Authorized Nuclear Inservice Inspector. It is anticipated that all six DSM nozzle-to-safe-end welds and all six safe-end welds could be examined using this process.

The following eddy current techniques will be utilized:

- Up to two plus point probes applied circumferentially on the inside surface in scan increments of 0.08 inches circumferentially (for axial flaws) and 0.25 inches axially.

- Automated systems for data collection and analysis.

The target flaw size for the eddy current procedure is 0.28 inches long, well within the ASME Code linear flaw acceptance standards of 0.45 inches for austenitic material, and 0.625 inches for ferritic material (defined for the outside surface in the Code Tables).

The examinations are scheduled to be performed during FNP 2R20 outage (April 2010).

Basis for Use:

(1) Variation to 0.125 RMSE

The proposed alternative assures that the DSM nozzle-to-safe-end welds and the subject austenitic safe-end welds will be fully examined by procedures, personnel and equipment qualified by demonstration in all aspects except depth sizing. In the event that an indication is detected that requires depth sizing, a process will be used where the difference between the required RMSE and vendor demonstrated RMSE will be added to the measured through-wall depth for comparison with the Section IWB-3500 acceptance criteria. This process will assure that there is reasonable assurance of structural integrity and thus, will provide an acceptable level of quality and safety. Permission is requested to use this process in accordance with 10 CFR 50.55a(a)(3)(i).

(2) Inside Diameter UT Examinations Supplemented by Eddy-Current

The eddy current technique was first used in the V. C. Summer reactor vessel primary nozzle examinations of 2000. The procedure was refined by applying it to the V. C. Summer hot leg dissimilar metal weld section removed from service. The removed section had a number of primary water stress corrosion cracking flaws along with non-relevant indications resulting from metallurgical interface and surface geometry. Using these actual flaws and geometric conditions in the removed section to refine the technique, the vendor developed reliable flaw-screening criteria which allowed for the successful use of the procedure in the V. C. Summer 2002 and 2003 examinations.

Subsequently, the technique was successfully blind tested for the Swedish

authority SQC Kvalificeringscentrum AB (SQC NDT Qualification Center) under the program, "Qualification of Equipment, Procedure and Personnel for Detection, Characterization and Sizing of Defects in Areas in Nozzle to Safe End Welds at Ringhals Unit 3 and 4," Hakan Soderstrand 7-10-03. The important qualification parameters for eddy current in the SQC blind tests (Ref. SQC Qualification Report No. 019AN03) were as follows:

- Defect types: fatigue and stress corrosion cracks, surface initiated
- Tilt: +/-10 degrees; Skew: +/-10 degrees
- Detection target size: IDSCC 6mm (0.25 inches) long
- Flaw Location: within l0mm (13/32 inch)
- Length of the planar flaw within a 70% confidence interval: +/-(3/8 inch)
- False call rate: less than or equal to 20% for the personnel qualification tests

As noted in the Precedents section below, Comanche Peak submitted and received approval for this technique.

The use of ultrasonic profilometry and eddy current examination, with procedures and personnel qualified through the SQC blind tests to supplement Appendix VIII qualified ultrasonic procedures and personnel, provides additional assurance that surface-breaking flaws (that may be present) will be detected in the presence of potential surface roughness. This process will assure that there is reasonable assurance of structural integrity and thus, will provide an acceptable level of quality and safety. Permission is requested to use this process in accordance with 10 CFR 50.55a(a)(3)(i).

Duration of Proposed Alternative:

The proposed alternative is applicable for the 4th Inservice Inspection Interval for FNP Unit 2.

Precedents:

Use of the combined qualification requirements for Supplements 2 and 10 prior to availability of Code Case N-696, and the concept of adding the difference between the required RMS error value and the demonstrated RMS error value to the measured indication depth, were separately approved for V.C. Summer Station by NRC letter dated February 3, 2004.

The proposed alternative was approved for profilometry and eddy current for the V. C. Summer Station by NRC letter dated November 21, 2006.

This alternative is similar to and closely follows the content and statements made in the Comanche Peak Nuclear Power Plant request submitted initially in a letter to the NRC dated July 10, 2008 and approved by the staff in a letter dated September 18, 2008.

References:

The referenced ADAMS numbers for the V. C. Summer Station are ML040340450 (2004 SER) and ML063070540 (2006 SER).

Enclosure 2

**Proposed Alternative FNP-ISI-ALT-08 Version 1.0,
in Accordance with 10 CFR 50.55a(a)(3)(i)**

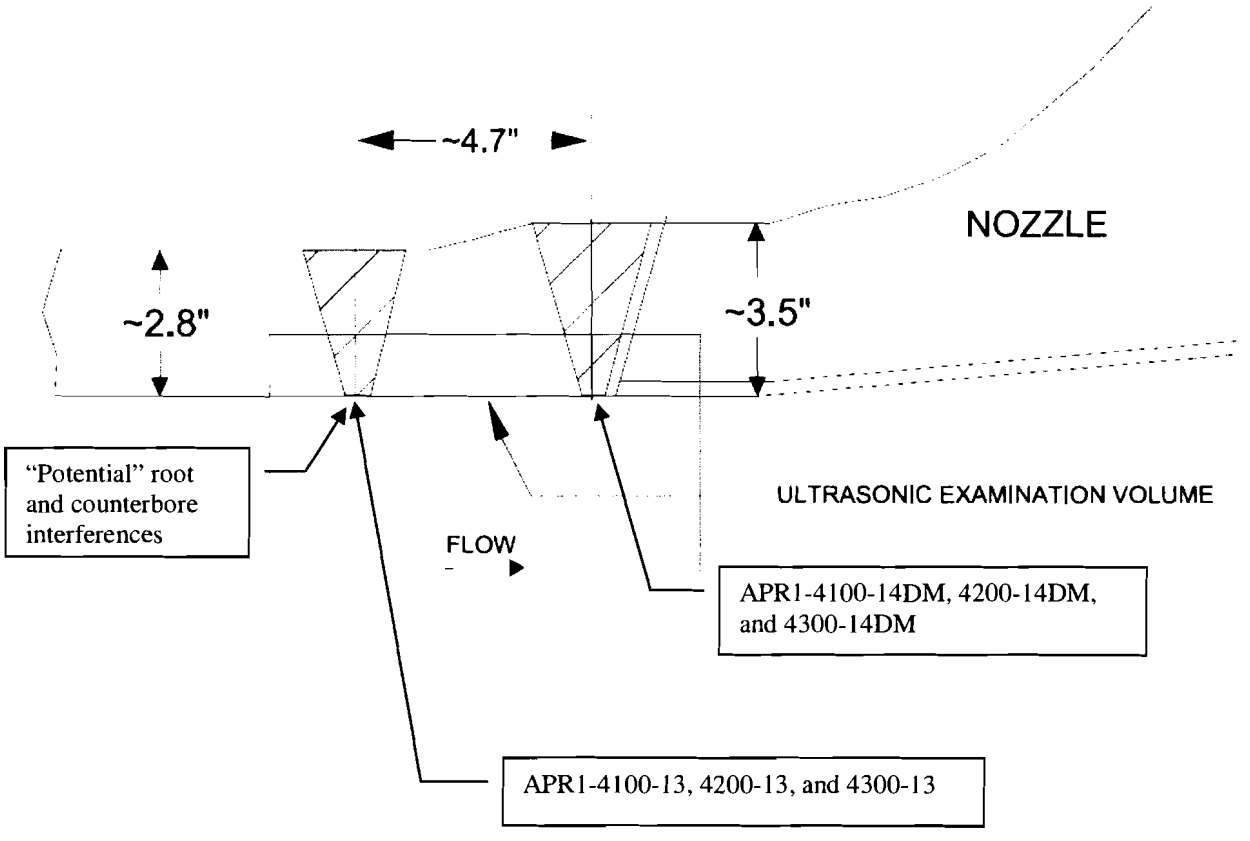
The referenced ADAMS number for the Comanche Peak Nuclear Plant is ML082490050.

Status: Awaiting NRC approval.

Enclosure 2

Proposed Alternative FNP-ISI-ALT-08 Version 1.0,
in Accordance with 10 CFR 50.55a(a)(3)(i)

FIGURE 1
FARLEY-2 INLET NOZZLE WELDS



Enclosure 2

**Proposed Alternative FNP-ISI-ALT-08 Version 1.0,
in Accordance with 10 CFR 50.55a(a)(3)(i)**

**FIGURE 2
FARLEY-2 OUTLET NOZZLE WELDS**