October 8, 2008

Mr. J. Randy Johnson
Vice President – Farley
Joseph M. Farley Nuclear Plant
7388 North State Highway 95
Columbia, AL 36319

SUBJECT: JOSEPH M. FARLEY NUCLEAR PLANT, UNITS 1 AND 2, SAFETY EVALUATION FOR FNP-ISI-ALT-03 RELIEF REQUEST FROM ASME CODE REQUIREMENTS (TAC NO. MD8133 AND MD8134)

Dear Mr. Johnson:

By letter dated October 8, 2007, to the U.S. Nuclear Regulatory Commission (NRC) (Agencywide Document Access and Management System (ADAMS) Accession No. ML072820181), Southern Nuclear Operating Company, Inc. (the licensee) submitted Relief Request FNP-ISI-ALT-03, Version 1.0, for Joseph M. Farley Nuclear Plant (FNP), Units 1 and 2. FNP-ISI-ALT-03, Version 1.0, proposed an alternative to selected American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, requirements related to the qualifications for examination of pressure retaining welds in piping at Joseph M. Farley Nuclear Plant, (FNP) Units 1 and 2. Specifically, the licensee proposed using the ASME Code, Section XI, Appendix VIII, Supplement 11, "Qualification Requirements for Full Structural Overlaid Wrought Austenitic Piping Welds," as administered by the Electric Power Research Institute, Performance Demonstration Initiative (PDI) program.

The NRC staff has determined that use of the proposed Performance Demonstration Initiative protocol will provide equivalent flaw detection to that of the ASME Code required technique for the piping welds. Based on the attached safety evaluation, the NRC staff finds that the licensee's proposed Alternative FNP-ISI-ALT-03, Version 1.0, will provide an acceptable level of quality and safety. Therefore, pursuant to Title 10 of the *Code of Federal Regulations*, 50.55a(a)(3)(i), the NRC staff authorizes the use of Alternative FNP-ISI-ALT-03, Version 1.0, at FNP, Units 1 and 2. The effective period of the proposed alternative is the fourth 10-year inservice inspection interval which ends on November 30, 2017.

If you have any questions, please contact the Project Manager, Karl Feintuch via e-mail at Karl.Feintuch@nrc.gov or by phone at 301-415-3079.

Sincerely,

/RA/

Melanie C. Wong, Chief
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-348 and 50-364

Enclosure: Safety Evaluation

cc w/encl: See next page

If you have any questions, please contact the Project Manager, Karl Feintuch via e-mail at Karl.Feintuch@nrc.gov or by phone at 301-415-3079.

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Joseph M. Farley Nuclear Plant, Units 1 & 2
cc:

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SAFETY EVALUATION REPORT BY THE OFFICE OF NUCLEAR REACTOR REGULATION

ALTERNATIVE FNP-ISI-ALT-03, VERSION 1.0

IMPLEMENTATION OF THE EPRI-PDI SUPPLEMENT 11 PROGRAM REQUIREMENTS

JOSEPH M. FARLEY NUCLEAR PLANT UNITS 1 AND 2

SOUTHERN NUCLEAR OPERATING COMPANY

DOCKET NUMBER 50-348 AND 50-364

1.0 INTRODUCTION

By letter dated October 8, 2007 to the U.S. Nuclear Regulatory Commission (NRC) (Agencywide Document Access and Management System (ADAMS) Accession No. ML072820181), Southern Nuclear Operating Company (the licensee), submitted Alternative FNP-ISI-ALT-03, Version 1.0, proposing an alternative to selected American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, requirements related to the qualifications for examination of pressure retaining welds in piping at Joseph M. Farley Nuclear Plant, (FNP) Units 1 and 2. Specifically, the licensee proposed using the ASME Code, Section XI, Appendix VIII, Supplement 11, "Qualification Requirements for Full Structural Overlaid Wrought Austenitic Piping Welds," as administered by the Electric Power Research Institute (EPRI), Performance Demonstration Initiative (PDI) program. The request is for the fourth 10-year inservice inspection (ISI) interval which started December 1, 2007 and is scheduled to end November 30, 2017.

2.0 REGULATORY EVALUATION

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(g)(4), ASME Code Class 1, 2, and 3 components must meet the requirements set forth in ASME Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plants Components," "to the extent practical within the limitations of design, geometry, and materials of construction of the components." The regulations require that all inservice examinations 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 ASME Code, Section XI, incorporated by reference in 10 CFR 50.55a(b) on the date 12 months prior to the start of the 10-year interval. For JMFNP, the 2001 Edition through the 2003 Addenda to ASME Code, Section XI, is the applicable Section XI edition for the fourth 10-year ISI interval.

Alternatives to requirements may be authorized or relief granted by the NRC pursuant to 10 CFR 50.55a(a)(3)(i), 10 CFR 50.55a(a)(3)(ii), or 10 CFR 50.55a(g)(6)(i). In proposing alternatives or requesting relief, the licensee must demonstrate that: (1) the proposed alternatives provide an acceptable level of safety; (2) compliance would result in hardship or

unusual difficulty without a compensating increase in the level of quality and safety; or (3) conformance is impractical for the facility. Pursuant to 10 CFR 50.55a(g)(4)(iv), ISI items may meet the requirements set forth in subsequent editions and addenda of the ASME Code that are incorporated by reference in 10 CFR 50.55a(b), subject to the limitations and modifications listed therein, and subject to Commission approval. Portions of editions and addenda may be used provided that related requirements of the respective editions and addenda are met.

10 CFR 50.55a(b)(2)(xxiv) prohibits "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." The licensee submitted this request, pursuant to 10 CFR 50.55a(a)(3)(i), as a proposed alternative to the implementation of ASME Code Section XI, Appendix VIII, Supplement 11 for the fourth 10-year ISI interval.

3.0 TECHNICAL REVIEW

3.1 APPLICABLE CODE REQUIREMENTS

The ASME Code of record for the current 10-year ISI interval is the 2001 Edition through the 2003 Addenda of the ASME Code, Section XI.

The licensee requested relief from the requirements of ASME Code, Section XI, Appendix VIII, Supplement 11, 2001 Edition through the 2003 Addenda as amended by 50.55a(b)(2)(xxiv). The specific Supplement 11, paragraphs are:

> Paragraph 1.1(b): The specimen set shall consist of at least three specimens having different nominal pipe diameters and overlay thicknesses. They shall include the minimum and maximum nominal pipe diameters for which the examination procedure is applicable. Pipe diameters within a range of 0.9 to 1.5 times a nominal diameter shall be considered equivalent. If the procedure is applicable to pipe diameters of 24 in. (610 mm) or larger, the specimen set must include at least one specimen 24 inches (610 mm) or larger, but need not include the maximum diameter. The specimen set must include at least one specimen with overlay thickness within -0.1 in. to +0.25 in. (-2.5 mm to + 6 mm) of the maximum nominal overlay thickness for which the procedure is applicable.
>
> Paragraph 1.1(d)(1): All flaws must be cracks in or near the butt weld heat-affected zone, open to the inside surface, and extending at least 75 percent through the base metal wall. Flaws may extend 100 percent through the base metal and into the overlay material; in this case, intentional overlay fabrication flaws shall not interfere with the ultrasonic detection or characterization of the cracking. Specimens containing intergranular stress corrosion cracking (IGSCC) shall be used when available.
>
> Paragraph 1.1(e)(1): At least 20 percent but less than 40 percent of the flaws shall be oriented within ±20 degrees of the pipe axial direction. The remainder shall be oriented circumferentially. Flaws shall not be open to any surface to which the candidate has physical or visual access. The rules of IWA-3300 shall be used to determine whether closely spaced flaws should be treated as single or multiple flaws.

Paragraph 1.1(e)(2): Specimens shall be divided into base and overlay grading units. Each specimen shall contain one or both types of grading units.

Paragraph 1.1(e)(2)(a)(1): A base grading unit shall include at least 3 in. of the length of the overlaid weld. The base grading unit includes the outer 25 percent of the overlaid weld and base metal on both sides. The base grading unit shall not include the inner 75 percent of the overlaid weld and base metal overlay material, or base metal-to-overlay interface.

Paragraph 1.1(e)(2)(a)(2): When base metal cracking penetrates into the overlay material, the base grading unit shall include the overlay metal within 1 in. (25 mm) of the crack location. This portion of the overlay material shall not be used as part of any overlay grading unit. Paragraph 1.1(e)(2)(a)(3): When a base grading unit is designed to be unflawed, at least 1 in. (25 mm) of unflawed overlaid weld and base metal shall exist on either side of the base grading unit. The segment of weld length used in one base grading unit, shall not be used in another base grading unit. Base grading units need not be uniformly spaced around the specimen.

Paragraph 1.1(e)(2)(b)(1): An overlay grading unit shall include the overlay material and the base metal-to-overlay interference of at least 6 sq. in. (3871 mm2). The overlay grading unit shall be rectangular, with minimum dimensions of 2 in. (50 mm).

Paragraph 1.1(e)(2)(b)(2): An overlay grading unit designed to be unflawed shall be surrounded by unflawed overlay material and unflawed base metal-to-overlay interface for at least 1 in. (25 mm) around its entire perimeter. The specific area used in one overlay grading unit shall not be used in another overlay grading unit. Overlay grading units need not be spaced uniformly about the specimen.

Paragraph 1.1(e)(2)(b)(3): Detection sets shall be selected from Table VIII-S2-1. The minimum detection sample set is 5 flawed base grading units, 10 unflawed base grading units, and 10 unflawed overlay grading units. For each type of grading unit, the set shall contain at least twice as many unflawed as flawed grading units.

Paragraph 1.1(f)(1): The minimum number of flaws shall be 10. At least 30 percent of the flaws shall be overlay fabrication flaws. At least 40 percent of the flaws shall be cracks open to the inside surface.

Paragraph 1.1(f)(3): Base metal cracking used for length sizing demonstrations shall be oriented circumferentially.

Paragraph 1.1(f)(4): Depth sizing specimen sets shall include at least two distinct locations where cracking in the base metal extends into the overlay material by at least 0.1 in. (2.5 mm) in the through-wall direction.

Paragraph 2.2(d): For flaws in base grading units, the candidate shall estimate the length of that part of the flaw that is in the outer 25 percent of the base wall thickness.

Paragraph 2.3: For the depth sizing test, 80 percent of the flaws shall be sized at a specific location on the surface of the specimen identified to the candidate. For the remaining flaws, the regions of each specimen containing a flaw to be sized shall be identified to the candidate. The candidate shall determine the maximum depth of the flaw in each region.

Paragraph 3.1: Examination procedures, equipment, and personnel are qualified for detection when the results of the performance demonstration satisfy the acceptance criteria of Table VIII-S2-1 for both detection and false calls. The criteria shall be satisfied separately by the demonstration results for base grading units and for overlay grading units.

Paragraph 3.2(b): All extensions of base metal cracking into the overlay material by at least 0.1 in. (2.5 mm) are reported as being intrusions into the overlay material.

3.2 COMPONENT(S) FOR WHICH RELIEF IS REQUESTED

The proposed alternative from Supplement 11 requirements applies to Class 1 pressure retaining welds having structural weld overlays subject to examination using procedures, personnel, and equipment qualified to ASME Code, Section XI, Appendix VIII, Supplement 11 criteria.

3.3 LICENSEE'S BASIS FOR PROPOSED ALTERNATIVE AND STAFF EVALUATION

The U.S. nuclear utilities created the PDI program to implement performance demonstration requirements contained in Appendix VIII of Section XI of the ASME Code. PDI has developed into a program for qualifying equipment, procedures, and personnel for examinations of weld overlays in accordance with the ultrasonic testing (UT) criteria of Appendix VIII, Supplement 11. Prior to the Supplement 11 program, EPRI maintained a performance demonstration program for weld overlay qualification under the Tri-party Agreement (Reference 1). Instead of having two programs with similar objectives, the NRC staff recognized the PDI program for weld overlay qualifications as an acceptable alternative to the Tri-party Agreement (Reference 2).

The PDI program is routinely assessed by the NRC staff for consistency with the current ASME Code and proposed changes. The PDI program does not fully comport with the existing requirements of Supplement 11. PDI presented the differences at public meetings in which the NRC participated (References 3 and 4). The differences are in flaw locations within test specimens and fabricated flaw tolerances. The changes in flaw location permitted using test specimens from the Tri-party Agreement, and the changes in fabricated flaw tolerances provide UT acoustic responses similar to the responses associated with IGSCC. Based on the discussions at these public meetings, the NRC staff determined that the PDI program provides an acceptable level of quality and safety.

Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee requested relief to use the EPRI PDI Program for implementation of Appendix VIII, Supplement 11 requirements. Specifically, relief is requested from Supplement 11, Paragraphs 1.1(b), 1.1(d)(1), 1.1(e)(1), 1.1(e)(2), 1.1(e)(2)(a)(1), 1.1(e)(2)(a)(2), 1.1(e)(2)(a)(3), 1.1(e)(2)(b)(1), 1.1(e)(2)(b)(2), 1.1(e)(2)(b)(3), 1.1(f)(1), 1.1(f)(3), 1.1(f)(4), 2.1, 2.2(d), 2.3, 3.1, and 3.2(b).

The proposed alternative will be implemented through use of the EPRI-PDI program weld overlay examination qualification requirements.

Licensee's basis for the proposed alternative and the NRC staff evaluation of the differences identified in the PDI program with Supplement 11 are as follows:

Paragraph 1.1(b) of Supplement 11 states limitations to the maximum thickness for which a procedure may be qualified. The ASME Code states that "The specimen set must include at least one specimen with overlay thickness within minus 0.10-inch to plus 0.25-inch of the maximum nominal overlay thickness for which the procedure is applicable." The ASME Code requirement addresses the specimen thickness tolerance for a single specimen set, but is confusing when multiple specimen sets are used. The PDI proposed alternative states that "the specimen set shall include specimens with overlays not thicker than 0.10-inch more than the minimum thickness, nor thinner than 0.25-inch of the maximum nominal overlay thickness for which the examination procedure is applicable." The proposed alternative provides clarification on the application of the tolerance. The tolerance is unchanged for a single specimen set; however, the proposed alternative clarifies the tolerance for multiple specimen sets by providing tolerances for both the minimum and maximum thicknesses. The proposed wording eliminates confusion while maintaining the intent of the overlay thickness tolerance. Therefore, the NRC staff finds that this PDI Program alternative maintains the intent of the Supplement 11 requirements and is acceptable.

Paragraph 1.1(d)(1) requires that all base metal flaws be cracks. PDI determined that certain Supplement 11 requirements pertaining to location and size of cracks would be extremely difficult to achieve. For example, flaw implantation requires excavating a volume of base material to allow a pre-cracked coupon to be welded into this area. This process would add weld material to an area of the specimen that typically consists of only base material, and could potentially make ultrasonic examination more difficult and not representative of actual field conditions. In an effort to satisfy the requirements, PDI developed a process for fabricating flaws that exhibit crack-like reflective characteristics. Instead of all flaws being cracks, as required by Paragraph 1.1(d)(1), the PDI weld overlay performance demonstrations contain at least 70% cracks with the remainder being fabricated flaws exhibiting crack-like reflective characteristics. The fabricated flaws are semi-elliptical with tip widths of less than 0.002-inches. The licensee provided further information describing a revision to the PDI Program alternative to clarify when real cracks, as opposed to fabricated flaws, will be used; "Flaws shall be limited to the cases where implantation of cracks produces spurious reflectors that are uncharacteristic of actual flaws." The NRC staff reviewed the flaw fabrication process, compared the reflective characteristics between actual cracks and PDI-fabricated flaws, and found that the fabricated flaws for this application provide assurance that the PDI program meets the intent of the Supplement 11 requirement. Therefore, the NRC staff finds the proposed alternative to the Supplement 11 requirement is acceptable.

Paragraph 1.1(e)(1) requires that at least 20% but not less than 40% of the flaws shall be oriented within ±20 degrees of the axial direction (of the piping test specimen). Flaws contained in the original base metal heat-affected zone satisfy this requirement; however, PDI excludes axial fabrication flaws in the weld overlay material. PDI has concluded that axial flaws in the overlay material are improbable because the overlay filler material is applied in the circumferential direction (parallel to the girth weld); therefore, fabrication anomalies would also be expected to have major dimensions in the circumferential direction. The NRC finds, based upon engineering judgment, that this approach to implantation of fabrication flaws is reasonable for meeting the intent of the Supplement 11 requirement. Therefore, the NRC staff concludes that the PDI application of flaws oriented in the axial direction is acceptable.

Paragraph 1.1(e)(1) also requires that the rules of IWA-3300 shall be used to determine whether closely spaced flaws should be treated as single or multiple flaws. PDI treats each flaw as an individual flaw and not as part of a system of closely spaced flaws. PDI controls the flaws going into a test specimen set such that the flaws are free of interfering reflections from adjacent flaws. In some cases this permits flaws to be spaced closer than what is allowed for classification as a multiple set of flaws by IWA-3300, thus potentially making the performance demonstration more challenging than the existing requirement. Hence, the NRC staff concludes that PDI application for closely spaced flaws is acceptable.

Paragraph 1.1(e)(2) requires that specimens be divided into base metal and overlay grading units. The PDI program adds clarification with the addition of the word “fabrication” and ensures that flaw identification will not be masked by other flaws with the addition of “Flaws shall not interfere with ultrasonic detection or characterization of other flaws.” PDI alternative provides clarification and assurance that the flaws are identified. Therefore, the NRC staff finds the PDI alternative to the Supplement 11 requirement is acceptable.

Paragraph 1.1(e)(2)(a)(1) requires that a base grading unit shall include at least three inches of the length of the overlaid weld, and the base grading unit includes the outer 25% of the overlaid weld and base metal on both sides. The PDI program reduced the criteria to one inch of the length of the overlaid weld and eliminated from the grading unit the need to include both sides of the weld. The proposed change permits the PDI program to continue using test specimens from the existing weld overlay program which have flaws on both sides of the welds. These test specimens have been used successfully for testing the proficiency of personnel for over 16 years. The weld overlay qualification is designed to be a near-side (relative to the weld) examination, and it is improbable that a candidate would detect a flaw on the opposite side of the weld due to the sound attenuation and re-direction caused by the weld microstructure. However, the presence of flaws on both sides of the original weld (outside the PDI grading unit) may actually provide a more challenging examination, as candidates must determine the relevancy of these flaws, if detected. The NRC staff determined, based on engineering judgment, that PDI use of the one inch length of the overlaid weld base grading unit, and elimination from the grading unit the need to include both sides of the weld, as described in the PDI Program alternative, is an acceptable alternative to the Supplement 11 requirements. Therefore, the NRC staff finds the proposed alternative acceptable.

Paragraph 1.1(e)(2)(a)(2) requires, when base metal cracking penetrates into the overlay material, that a portion of the base grading unit shall not be used as part of the overlay grading unit. The NRC staff finds that the PDI program adjusts for the changes in Paragraph 1.1(e)(2)(a)(2) and conservatively states that when base metal flaws penetrate into the overlay

material, no portion of it shall be used as part of the overlay fabrication grading unit. The NRC staff finds that the PDI program also provided clarification by the addition of the term “flaws” for “cracks” and the addition of “fabrication” to “overlay grading unit.” The NRC staff concludes that the PDI Program alternative provides clarification and conservatism and, therefore, is acceptable.

Paragraph 1.1(e)(2)(a)(3) requires that for unflawed base grading units, at least one inch of unflawed overlaid weld and base metal shall exist on either side of the base grading unit. This is to minimize the number of false identifications of extraneous reflectors. The PDI program stipulates that unflawed overlaid weld and base metal exists on all sides of the grading unit and flawed grading units must be free of interfering reflections from adjacent flaws which addresses the same concerns as the ASME Code. Hence, the NRC staff concludes that the PDI application of the variable flaw-free area adjacent to the grading unit meets the intent of the Supplement 11 requirements and is, therefore, acceptable.

Paragraph 1.1(e)(2)(b)(1) requires that an overlay grading unit shall include the overlay material and the base metal-to-overlay interface of at least six square inches. The overlay grading unit shall be rectangular, with minimum dimensions of two inches. The PDI program reduces the base metal-to-overlay interface to at least one inch (in lieu of a minimum of two inches) and eliminates the minimum rectangular dimension. This criterion is necessary to allow use of existing examination specimens that were fabricated in order to meet NRC Generic Letter 88-01 (Tri-party Agreement, July 1984). This criterion may be more challenging to meet than that of the ASME Code because of the variability associated with the shape of the grading unit. Based on engineering judgment, the NRC staff concludes that PDI application of the grading unit is an acceptable alternative to the Supplement 11 requirements and is acceptable.

Paragraph 1.1(e)(2)(b)(2) requires that unflawed overlay grading units shall be surrounded by unflawed overlay material and unflawed base metal-to-overlay interface for at least one inch around it’s entire perimeter. The PDI program redefines the area by noting unflawed overlay fabrication grading units shall be separated by at least one inch of unflawed material at both ends and sufficient area on both sides to preclude interfering reflections from adjacent flaws. The NRC staff determined that the relaxation in the required area on the sides of the specimens, while still ensuring no interfering reflections, may provide a more challenging demonstration than required by ASME Code because of the possibility for having a parallel flaw on the opposite side of the weld. Therefore, based on engineering judgment, the NRC staff concludes that the PDI application is an acceptable alternative to the Supplement 11 requirements.

Paragraph 1.1(e)(2)(b)(3) requirements are retained in the PDI program. In addition, the PDI program requires that initial procedure qualification contain three times the number of flaws required for a personal qualification. To qualify new values of essential variables, the equivalent of at least one personal qualification is required. The NRC staff concludes that the PDI additions enhance the ASME Code requirements and are, therefore, acceptable because it provides for a more stringent qualification criteria.

Paragraph 1.1(f)(1) requirements are retained in the PDI program, with the clarification change of the term “flaws” for “cracks.” In addition, the PDI program includes the requirements that sizing sets shall contain a distribution of flaw dimensions to verify sizing capabilities. The PDI program also requires that initial procedure qualification contain three times the number of flaws

required for a personal qualification. To qualify new values of essential variables, the equivalent of at least one personal qualification is required. The NRC staff concludes that PDI additions enhance the ASME Code requirements and are, therefore, acceptable because it provides a more stringent qualification criteria.

Paragraphs 1.1(f)(3) and 1.1(f)(4) requirements are clarified by the PDI program by replacing the term “cracking” with “flaws” because of the use of alternative flaw mechanisms. The NRC staff concludes that this clarification in the PDI program meets the intent of the ASME Code requirements and is acceptable.

Paragraphs 2.1 and 2.2(d) requirements are clarified by the PDI program by the addition of the terms “metal” and “fabrication”. These terms were added to clarify the description of the grading units present in a specimen. Metal was added to base to read base metal and fabrication was added to overlay to read overlay fabrication. The NRC staff determined that the clarifications provide acceptable classification of the terms they are enhancing. Therefore, the NRC staff concludes that the PDI program meets the intent of the ASME Code requirements and is acceptable.

Paragraph 2.3 requires that, for depth sizing tests, 80% of the flaws shall be sized at a specific location on the surface of the specimen identified to the candidate. This requires detection and sizing tests to be performed separately. The PDI revised the weld overlay program to allow sizing to be conducted either in conjunction with, or separately from, the flaw detection test. If performed in conjunction with detection and the detected flaws do not meet the Supplement 11 range criteria, additional specimens will be presented to the candidate with the regions containing flaws identified. Each candidate will be required to determine the maximum depth of the flaw in each region. For separate sizing tests, the regions of interest will also be identified and the maximum depth and length of each flaw in the region will similarly be determined. In addition, PDI stated that grading units are not applicable to sizing tests, and that each sizing region will be large enough to contain the target flaw, but small enough such that candidates will not attempt to size a different flaw. The NRC staff determined that the above clarification provides a basis for implementing sizing tests in a systematic, consistent manner that meets the intent of Supplement 11. Therefore, the NRC staff concludes that the PDI method is acceptable.

Paragraph 3.1 requires that examination procedures, equipment and personnel (as a complete ultrasonic system) are qualified for detection or sizing of flaws, as applicable, when certain criteria are met. The PDI program allows procedure qualification to be performed separately from personnel and equipment qualification. Historical data indicate that, if ultrasonic detection or sizing procedures are thoroughly tested, personnel and equipment using those procedures have a higher probability of successfully passing a qualification test. In an effort to increase this passing rate, PDI has elected to perform procedure qualifications separately in order to assess and modify essential variables that may affect overall system capabilities. For a procedure to be qualified, the PDI program requires three times as many flaws to be detected (or sized) as shown in Supplement 11 for the entire ultrasonic system. The personnel and equipment are still required to meet the Supplement 11 requirement. Therefore, the PDI program criteria exceeds the ASME Code requirements for personnel, procedures, and equipment qualifications. The NRC staff concludes that the PDI program criteria are acceptable.

Paragraph 3.2(b) requires that all extensions of base metal cracking into the overlay material by at least 0.10-inch are reported as being intrusions into the overlay material. The PDI program omits this criterion because of the difficulty in actually fabricating a flaw with a 0.10-inch minimum extension into the overlay, while still knowing the true state of the flaw dimensions. However, the PDI program requires that cracks be depth-sized to the tolerance specified in the ASME Code which is 0.125-inches. Since the ASME Code tolerance is close to the 0.10-inch value of Paragraph 3.2(b), any crack extending beyond 0.10-inch into the overlay material would be identified as such from the characterized dimensions. The NRC staff determined that reporting of an extension in the overlay material is redundant for performance demonstration testing because of the flaw sizing tolerance. Therefore, the NRC staff concludes that PDI omission of highlighting a crack extending beyond 0.10-inch into the overlay material is acceptable.

4.0 CONCLUSION

The NRC staff has reviewed the licensee's submittal and determined that, in accordance with 10 CFR 50.55a(a)(3)(i), use of the PDI Program will provide an acceptable level of quality and safety. Therefore, the proposed alternative, FNP-ISI-ALT-03, Version 1.0, is authorized in accordance with 10 CFR 50.55a(a)(3)(i) for the fourth 10-year ISI interval at Joseph M. Farley Nuclear Plant Units 1 and 2.

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.

5.0 REFERENCES

1. The Tri-party Agreement is between NRC, EPRI, and the Boiling Water Reactor Owners Group (BWROG), "Coordination Plan for NRC/EPRI/BWROG Training and Qualification Activities of NDE (Nondestructive Examination) Personnel," July 3 1984 (ADAMS Accession No. 8407090122).

2. Letter from William H. Bateman to Michael Bratton, "Weld Overlay Performance Demonstration Administered by PDI as an Alternative for Generic Letter 88-01 Recommendations," January 15, 2002 (ADAMS Accession No. ML020160532).

3. Memorandum from Donald G. Naujock to Terence Chan, "Summary of Public Meeting Held January 31 - February 2, 2002, with PDI Representatives," March 22, 2002 (ADAMS Accession No. ML010940402).

4. Memorandum from Donald G. Naujock to Terence Chan, "Summary of Public Meeting Held June 12 through June 14, 2001, with PDI Representatives," November 29, 2001 (ADAMS Accession No. ML013330156).

Principal Contributor: K. Hoffman

Date: October 8, 2008