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SOUTHERN COMPANY
Energy to Serve Your World℠

June 27, 2007

Docket Nos.: 50-348
50-364

NL-07-1179

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

Joseph M. Farley Nuclear Plant Units 1 and 2
Additional Request Regarding the NRC Approved Alternative for
Application of Pressurizer Nozzle Full-Structural Weld Overlays

Ladies and Gentlemen:

By letter dated August 10, 2006, as supplemented by letters dated October 20, 2006, January 3, 2007, and February 21, 2007, Southern Nuclear Operating Company (SNC) submitted a proposed alternative ISI-GEN-ALT-06-03 to use a full-structural weld overlay to repair pressurizer dissimilar metal welds on a contingency and preemptive basis for the Farley Nuclear Plant (FNP) and the Vogtle Electric Generating Plant (VEGP). The NRC granted approval by letter dated March 8, 2007. Subsequently, by letter dated March 15, 2007, SNC requested approval to change the interpass temperature measurement frequency defined in the approved alternative. This change was authorized by NRC letter dated April 3, 2007 (Reference: TAC Numbers MD2794, MD2795, MD2796 and MD2797).

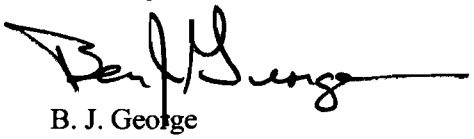
This approved alternative has expired for VEGP, but remains in effect through November 30, 2007 for FNP. SNC intends to use this approved alternative to install preemptive overlays over the FNP-1 pressurizer dissimilar metal welds during the Fall 2007 refueling outage. Additionally, in the unlikely event that there is a through-wall leak in one of the FNP-1 or FNP-2 pressurizer dissimilar metal welds, this alternative would be used to perform a contingency overlay.

For the installation of the FNP overlays, either contingency or preemptive, SNC requests approval to revise the 48-hour hold time requirements defined in section 3(a)2, section 3(a)3, and Appendix 4 section 3.0(a) of ISI-GEN-ALT-06-03. Currently, when ambient temperature temperbead welding is used, the non-destructive examinations (NDEs) are required to be conducted at least 48 hours after the completed overlay has returned to ambient temperature. SNC proposes changing this requirement to allow performance of the NDEs 48 hours after the third weld layer is completed. The technical basis for this change is provided in the enclosure to this letter. A precedent for this change was established by the NRC staff in their April 6, 2007 safety evaluation approval for Arkansas Nuclear One, Unit 1 (Reference: TAC Number MD4019).

In order to support the application of the pressurizer weld overlays on FNP-1 during the upcoming refueling outage scheduled to start on September 29, 2007, SNC requests approval of this change by August 24, 2007.

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

Sincerely,



B. J. George
Manager, Nuclear Licensing

BJG/JLS/daj

Enclosure: Justification for Use of a 48-Hour Hold Time After the Third Weld Layer is Completed

cc: Southern Nuclear Operating Company
Mr. J. T. Gasser, Executive Vice President
Mr. J. R. Johnson, Vice President – Farley
Mr. D. H. Jones, Vice President – Engineering
RTYPE: CFA04.054; LC# 14592

U. S. Nuclear Regulatory Commission
Dr. W. D. Travers, Regional Administrator
Ms. K. R. Cotton, NRR Project Manager – Farley
Mr. E. L. Crowe, Senior Resident Inspector – Farley

Enclosure

Joseph M. Farley Nuclear Plant Units 1 and 2
Additional Request Regarding the NRC Approved Alternative for
Application of Pressurizer Nozzle Full-Structural Weld Overlays

Justification for Use of a 48-Hour Hold Time After the Third Weld Layer is Completed

Enclosure
Joseph M. Farley Nuclear Plant Units 1 and 2
Additional Request Regarding the NRC Approved Alternative for
Application of Pressurizer Nozzle Full-Structural Weld Overlays
Justification for Use of a 48-Hour Hold Time After the Third Weld Layer is Completed

American Society of Mechanical Engineers (ASME) Code, Section XI, Code Case N-638-1 requires (when ambient temperbead welding is used over ferritic materials) that surface and ultrasonic examinations be performed when the completed weld has been at ambient temperature for least 48 hours. This delay was provided to allow sufficient time for hydrogen cracking to occur (if it is to occur) in the heat affected zone (HAZ) of ferritic materials prior to performing examinations, to ensure detection by non-destructive examinations (NDEs). However, based on research and industry experience, the Electric Power Research Institute (EPRI) has provided a technical basis for starting the 48-hour hold after completion of the third temperbead weld layer rather than waiting for the weld overlay to cool to ambient temperature. Weld layers beyond the third layer are not designed to provide tempering to the ferritic HAZ during ambient temperature temperbead welding. EPRI has documented their technical basis in Technical Update report 1013558, "Repair and Replacement Applications Center: Temperbead Welding Applications 48-Hour Hold Requirements for Ambient Temperature Temperbead Welding" (ADAMS Accession No. ML070670060). The technical data provided by EPRI in their report is based on testing performed on SA-508, Class 2 low-alloy steels, which is the material of the Farley Nuclear Plant pressurizer nozzles. After evaluating all of the issues relevant to hydrogen cracking such as microstructure of susceptible materials, availability of hydrogen, applied stresses, temperature, and diffusivity and solubility of hydrogen in steels, EPRI concluded that: "...[t]here appears to be no technical basis for waiting the 48 hours after cooling to ambient temperature before beginning the NDE of the completed weld. There should be no hydrogen present, and even if it were present, the temperbead welded component should be very tolerant of the moisture..." EPRI also notes that over 20 weld overlays and 100 repairs have been performed using temperbead techniques on low alloy steel components over the last 20 years. During this time, there has never been an indication of hydrogen cracking by the non-destructive examinations performed after the 48-hour hold or by subsequent ISI examinations.

In addition, ASME C&S Connect for Code Case N-638-4 contains background material consisting of a Technical Basis Paper to support the 48-hour hold time alternative. The Technical Basis Paper (ADAMS Accession No. ML070790679) points out that the introduction of hydrogen to the [ferritic] HAZ is limited to the first weld layer since this is the only weld layer that makes contact with the [ferritic] base material. While the potential for the introduction of hydrogen to the [ferritic] HAZ is negligible during subsequent weld layers, these layers provide a heat source that accelerates the dissipation of hydrogen from the [ferritic] HAZ in non-water backed applications. The Technical Basis Paper concludes that there is sufficient delay time to facilitate the detection of potential hydrogen cracking when NDE is performed 48 hours after completion of the third weld layer.

Furthermore, the solubility of hydrogen in austenitic materials such as Alloy 52M is much higher than that of ferritic materials while the diffusivity of hydrogen in austenitic materials is lower than that of ferritic materials. As a result, hydrogen in the ferritic HAZ tends to diffuse into the austenitic weld metal, which has a much higher solubility for hydrogen. This diffusion process is enhanced by heat supplied in subsequent weld layers.

Based on this information, SNC concludes that performing NDE 48 hours after the third weld layer is installed 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, SNC requests approval for this change.