



Entergy Operations

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U. S. Nuclear Regulatory Commission
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Subject: Arkansas Nuclear One - Unit 1
Docket No. 50-313
License No. DPR-51
Request for Approval to Use
Alternative to Requirements of
10CFR50.55a, "Codes and Standards"

Gentlemen:

Eddy current testing of explosively expanded steam generator tube plugs at another utility has revealed indications in those plugs. Therefore, Entergy Operations has identified thirty-seven (37) existing explosively expanded steam generator tube plugs at Arkansas Nuclear One, Unit 1 (ANO-1) to be repaired during the current tenth refueling outage (1R10). This repair is being performed as a preventative measure to avoid potential in-cycle concerns.

The preferred repair method is to install a welded plug utilizing an automatic welding process developed by Babcock and Wilcox Nuclear Services (BWNS). This process entails a robotic milling of the tube end into the cladding and tube sheet. The plug would then be inserted and a fillet weld deposited around the circumference of the plug.

BWNS performed the analysis of the welded plug and its attachment weld utilizing the 1989 Edition of the ASME Code, Section III. Also, the qualification of the weld procedure specification and the welding operator was performed in accordance with Section XI of the 1989 Edition of the ASME Code. A Federal Register notice which proposed to amend 10CFR50.55a to incorporate all Editions and Addenda up to the 1989 Edition of the ASME Code for Sections III and XI was published on January 31, 1991. However, this proposed amendment to 10CFR50.55a has not yet been approved.

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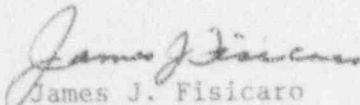
A comparison has been made between the 1989 Code Edition with the 1980 Edition, Winter 1981 Addenda of the Code, which is ANO-1's Code of record. This assessment confirmed that the 1989 Edition meets the technical requirements and addresses all concerns for automatic welding of tube plugs by providing specific guidance with respect to automatic welding. The details of the Code comparison are attached.

While Entergy Operations has been contemplating the use of the BWNS automatic welding process for the current ANO-1 refueling outage, Entergy Operations only recently became aware that BWNS' repair process was qualified to a version of the Code which has not yet been approved by the NRC and therefore, the need to request Code relief. Therefore, as allowed by 10CFR50.55a(a)(3)(i), Entergy Operations requests approval of the 1989 Edition of the ASME Code, Section III, Division 1 and Section XI for use with the steam generator automatic welded plug process to be used at ANO-1. In order to support the startup of ANO-1, Entergy Operations requests approval of this request by April 9, 1992.

Duke Power submitted a similar request for approval to use the 1989 Edition of the Code for steam generator automatic welded plugging for Oconee, Unit 1 on August 23, 1991. The NRC granted approval of the request in a Safety Evaluation Report transmitted to Duke Power on September 13, 1991.

If you have any questions, or require additional information with regards to this submittal, please contact my office.

Very truly yours,


James J. Fisicaro
Director, Licensing

JJF/RWC/sj
Attachments

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COMPARISON OF THE 1980 EDITION, WINTER 1981
ADDENDA AND THE 1989 EDITION OF THE ASME CODE

The Code of record of Arkansas Nuclear One, Unit 1 (ANO-1) is the 1980 Edition, Winter 1981 Addenda of the ASME Code. Automatic welding of tube plugs was not addressed in Section XI until the 1986 Addenda. This addenda has not been approved, to date, by the NRC. The Babcock and Wilcox Nuclear Services (BWNS) automatic welding process was designed in accordance with Section III of the 1989 Edition of the Code and the automatic welding process was qualified to Section XI of the 1989 Edition of the Code, which to date, has also not been approved by the NRC. A Federal Register notice which proposed to amend 10CFR50.55a to incorporate all Editions and Addenda up to the 1989 Edition of Sections III and XI was published on January 31, 1991, but has not yet been approved.

The manual welding procedure for steam generator tube plugging given in the 1980 Edition, Winter 1981 Addenda, Section XI of the Code includes the following areas of emphasis: Materials; qualification procedures that follow the field procedures for tube preparation; essential variables which include dimensional concerns such as tube size, spacing, extension, proximity and tube thickness; restricted access method for testing the welds; and maintenance records.

The 1986 Addenda of the Code, Section XI prescribes requirements for weld qualification the same as previous Code editions did, except that specific requirements are given for the qualification of automated welding processes for tube plugging. Thus, the 1986 Addenda updated the Code to incorporate current welding experience and technology, and expanded in detail on the requirements and essential variables associated with an automated welding process for tube plugging. The requirements for weld procedure and weld operator qualifications (e.g., five consecutive acceptable welds, qualification mockup simulation, examination requirements and final inspection requirements) are essentially the same. The 1989 Edition of the Code gives more details such that interpretation of the requirements has been minimized.

The 1987 Addenda of the Code, Section III revised an overly conservative design rule that had existed in previous Editions of the Code. The specific change was in regard to the required adjustment factor on the allowable primary and secondary stress intensities when using fillet welds for structural attachments. The overly conservative factor of 1/2 applied to the allowed stress for a fillet weld was removed. This stress allowable factor was removed to allow the designer to justify the specific configuration being used rather than impose a conservative factor that enveloped all welding techniques and designs.

Additionally, Article NB-3123.2 of Section III (1987 Addenda) states that a fillet weld must be evaluated for cyclic considerations. A stress intensification factor of 4.0 was used in that evaluation. Based on the actual weld geometry and repeatability of the welding process, the 4.0 factor is considered to be conservative with respect to the weld quality.

This 4.0 factor is multiplied times the calculated normal operating stress range to determine the fatigue usage factor of the fillet weld. The fatigue cycles evaluated correspond to those that would be experienced during a 40-year life for the steam generator. The fatigue usage factor calculated has a significant margin to the allowed value. Additionally, the welding procedure qualification for the weld plug shows significant margin with respect to the specified minimum weld size.