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DUKE POWER

February 27, 1992

U. S. Nuclear Regulatory Commission
ATTEN: Document Control Desk
Washington, D. C. 20555

Subject: McGuire Nuclear Station
Unit 1 and Unit 2
Docket No. 50-369 and 50-370
Request for Approval of Proposed Alternatives to Requirements of 10CFR50.55a, Codes and Standards

Dear Sir;

McGuire Nuclear Station has identified three tubes which will require taper weld plugs. This plugging is required due to performing a tube pull on three tubes in Unit 2 3" steam generator. The preferred repair method is to install a welded plug utilizing an automatic welding process developed by Babcock and Wilcox Nuclear Services (BWNS). However; the analysis performed by BWNS of the welded plug and its attachment weld was to the 1989 edition of Section III of the ASME Code. In addition, the qualification of the weld procedure specification and the welding operator was performed in accordance with the Section XI 1989 edition. This code edition has not been formally approved by the NRC at this time.

BWNS and Duke Power have compared the 1989 code edition with the 1980 code edition which is McGuire's code of record. This assessment confirmed that the 1989 code 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 1980 and 1989 code comparisons is attached.

Pursuant to 10CFR50.55a(a)(3), Duke requests NRC approval of the proposed alternative to utilize the 1989 code edition of Section III Division 1 and Section XI for the steam generator automatic welded plug and attachment weld process to be used at McGuire. In order to support the start-up of unit 2, Duke requests NRC approval of this submittal by March 9, 1992.

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A decision to pull the three tubes from the Unit 2 "C" steam generator was not made until February 13, 1992. At that time, the standard manual welding technique of installing the plugs was the repair method selected. However; during the planning phase for this activity, it became apparent that one of the plugs to be welded would be extremely difficult to perform manually. The area where the plug was to be installed is very close to the outside wall of the steam generator, thus making the manual welding process extremely tedious, and burdensome. Given the complexity of the manual technique to be used, it is likely that the weld may not pass the first time it is done. If it does need to be redone, this would result in a significant additional occupational exposure to personnel involved in this activity. In addition, Duke believes that the automatic weld process will provide a higher quality weld than if it was done manually per the 1980 code edition. Accordingly, a decision to utilize the BWNS automatic welding process was recently made.

Currently unit 2 is scheduled to enter mode 4 on march 10, 1992. To ensure that the installation of the welded plugs does not impact our restart schedule, we will need to begin the installation of the plugs by February 29, 1992. Therefore, NRC approval of this alternate method is requested by March 9, 1992.

By a August 23, 1991 letter, Duke made a similar request for Oconee Nuclear Station Unit 1. NRC Approval was provided by a September 13, 1991 NRC letter. In support of the request for Oconee, by a September 6,1991 letter, BWNS submitted to the NRC a stress analysis and a fatigue analysis of the Inconel 690 plug and the Inconel 82 fillet weld. The stress analysis and the fatigue analysis were reviewed by the NRC staff and they concurred with the conclusions of the analyses. In support of the effort for McGuire Nuclear Station, a stress analysis and a fatigue analysis was performed by BWNS. For both analyses, the same methodology as was used for Oconee is utilized for McGuire. The results of the stress analysis and fatigue analysis for McGuire met acceptance criteria.

As stated above, one of the plugs to be welded is extremely intricate. This weld would be simplified if the BWNS automatic welding technique could be employed, which should assure a higher quality weld the first time, thus avoiding the occupational exposure associated with redoing the weld. Further, a reduction in occupational exposure of the personnel involved can be realized if the automatic welding process is used, with an estimated savings of about 1800 mrem.

Briefly, the tube end and its associated weld is removed using a hole drill containing an integral spotface cutter. The steam generator tubesheet nominal hole diameter is 0.765". The tube end and its attachment flush weld are machined to a final maximum hole size as qualified in the weld procedure qualification record. The tube end is machined to a depth of approximately 3/4 inch. The hole drill also contains a spotface cutter to clean up the clad surface for welding. The spotface depth varies as required to completely clean up the surface and maintain the 0.125" minimum clad thickness for welding. The final machined hole is shown in the attached figures.

A remote weld plug is positioned in the hole and a one pass weld is performed. The basic welding process consists of a 360 degree automatic TIG weld using ERNiCr-3 filler material. The weld procedure qualification records shows that the minimum weld throat dimension specified in the stress report was achieved.

Finally, by a March 1, 1990 letter, NRC provided approval of our use of Inconel 690 as a plug material. In sum, we have concluded that the proposed alternative would provide an equivalent level of quality and safety as that provided by the 1980 edition of the code. Further, that an undue burden and hardship would result if the proposed alternative is not approved.

If you have any questions regarding this matter, please contact Paul Guill at (704)-875-4002.

Very truly yours,

Tony L. McConnell for

Ted C. McMeekin

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Master File:1.3.2.11
MNS-RC File:801.01
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ATTACHMENT
MCGUIRE NUCLEAR STATION
COMPARISON OF 1980 AND 1989 CODE EDITIONS:

McGuire's code of record for ASME Section XI is the 1980 edition Winter addenda. Automatic welding of tube plugs is not addressed in ASME Section III and it was not addressed in Section XI until the 1986 addenda. The BWNS GTAW Automatic welding process was designed and qualified to the 1989 edition of the codes which has not been approved. For evaluation purposes, the Section XI 1989 Code requirements for Welding Qualification and Operator Qualification were compared to the section XI 1980 winter addenda for manual welding on the tube plugs.

The manual welding procedure for Tube Plugging given in the 1980 winter addenda Section XI 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 as well as those listed in ASME Section XI;
- restricted access;
- method for testing the welds;and
- maintenance records

In qualifying both the procedure and operators, the use of 5 consecutive welds and the methods of testing the welds are the same. The 1989 Section XI code addresses each of the above areas and in general provides more detailed guidance. An example of this is that the 1989 code gives actual permissible variances for tube size, extension. Both require that the materials used are accepted by the codes. Alloy 690 has been accepted for use as plug material by an NRC letter dated March 1, 1990.

The 1987 addenda of 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 (see NB-3123.2). The overly conservative factor of 1/2 applied to the allowable 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.

FIGURE 1

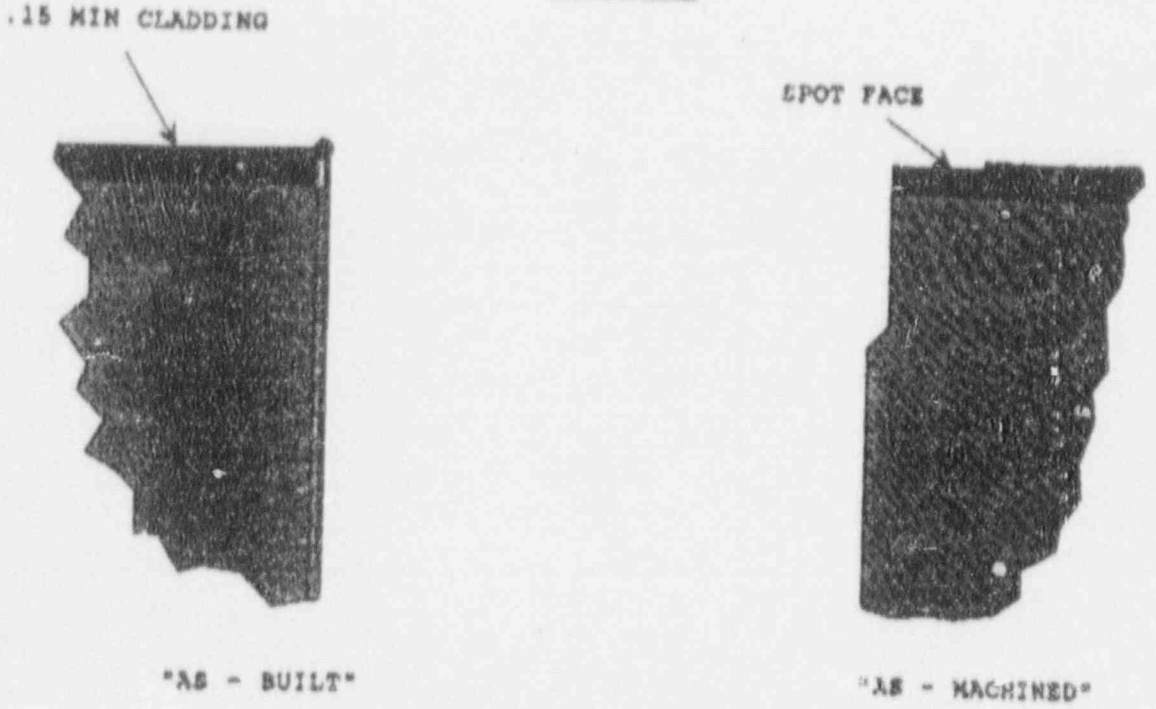

FIGURE 2