June 19, 2000

Mr. J. A. Scalice
Chief Nuclear Officer
and Executive Vice President
Tennessee Valley Authority
6A Lookout Place
1101 Market Street
Chattanooga, Tennessee 37402-2801

SUBJECT: BROWNS FERRY NUCLEAR PLANT UNITS 2 AND 3, RELIEF REQUESTS 2-ISI-10 AND 3-ISI-9, ALTERNATIVES FOR EXAMINATION OF INACCESSIBLE REACTOR PRESSURE VESSEL SUPPORT SKIRT WELDS (TAC NOS. MA6408 AND MA8423)

Dear Mr. Scalice:

By letter dated March 24, 2000, the Tennessee Valley Authority requested relief from certain surface examination requirements of the 1986 Edition of Section XI of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (Code) for the second 10-year inservice inspection interval at Browns Ferry Nuclear Power Plant, Units 2 and 3. The surface examination requirements pertain to the reactor vessel support skirt welds. Instead of the required surface examination from both sides of the skirt welds, the licensee proposed an alternative. The alternative is a surface examination of reactor pressure vessel support skirt welds and a best-effort ultrasonic testing examination of the opposite weld surfaces.

The U.S. Nuclear Regulatory Commission staff has reviewed the request for relief. Based on its evaluation, the staff concludes that the proposed alternative will provide an acceptable level of quality and safety. Pursuant to Title 10, *Code of Federal Regulations*, Part 50, Section 55a(a)(3)(i), the staff authorizes the proposed alternative. The staff's safety evaluation is enclosed.

This completes the staff's activities related to your relief request of March 24, 2000. If you have any questions, please contact the Browns Ferry project manager at 301-415-3026.

Sincerely,

/RA/

Richard P. Correia, Chief, Section 2
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-260 and 50-296

Enclosure: Safety Evaluation

cc w/encl: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

USE OF ALTERNATIVE TO CERTAIN SURFACE INSPECTION REQUIREMENTS

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR POWER PLANT, UNITS 2 AND 3

DOCKET NOS. 50-260 AND 50-296

1.0 INTRODUCTION

The inservice inspection of the American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 components shall be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code (Code) and applicable addenda as required by Title 10, *Code of Federal Regulations* (10 CFR), Section 50.55a(g), except where alternatives have been authorized by the Commission pursuant to 10 CFR 50.55a(a)(3). It is stated, in part, in 10 CFR 50.55a(a)(3), that alternatives to the Code requirements may be used providing the licensee demonstrates that: (i) the proposed alternatives would provide an acceptable level of quality and safety, or (ii) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) shall meet the requirements, except the design and access provisions and the preservice examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that inservice examination of components and system pressure tests conducted during the second 10-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code incorporated by reference in 10 CFR 50.55a(b) on the date 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The components (including supports) may meet the requirements set forth in subsequent editions and addenda of the ASME Code incorporated by reference in 10 CFR 50.55a(b) subject to the limitations and modifications listed therein and subject to Commission approval.

By letter dated March 24, 2000, the Tennessee Valley Authority, the licensee, requested relief from certain surface examination requirements of the 1986 Edition of Section XI of the ASME Code for the second 10-year inservice inspection interval at Browns Ferry Nuclear Power Plant (BFN), Units 2 and 3. The surface examination requirements pertain to the reactor vessel support skirt welds. Instead of the required surface examination from both sides of the skirt welds, the licensee proposed an alternative. The alternative is a surface examination of the

reactor pressure vessel (RPV) support skirt welds and a best-effort ultrasonic testing (UT) examination of the surface of the welds.[1]

2.0 CODE REQUIREMENTS FOR WHICH RELIEF IS REQUESTED

The licensee requested relief from the requirements of the 1986 Edition with no addenda of Section XI of the ASME Code, Table IWB-2500-1, Examination Category B-H, Item B8.10 for the surface or volumetric examination as applicable based on the configuration of the support skirt to vessel welds: RPV-SUPP-2-1-IA and RPV-SUPP-3-1-IA. The weld configuration and examination area are illustrated in the ASME Code, Section XI, Figure IWB-2500-13. This corresponds to Figure 1 of Code Case N-323-1, and is depicted in this safety evaluation as Figure 1 (attached).

2.1 Licensee's Basis for Relief

The reactor pressure vessels (RPVs) at BFN are supported on cylindrical skirts that are welded to the bottom RPV heads as shown in Figure 1. The Code requires that both surfaces of the weld be examined. An examination of the outside weld surface is readily accomplished with minimal, if any, hindrance. However, examination of the inside weld surface is difficult. The only access into the skirt is through an 18-inch opening. Inside the skirt, the weld and bottom RPV head are covered by insulation. The tasks of removing this insulation, preparing the weld surface for examination, and performing the examination are hindered by limited maneuverability in the confined space within the skirt. The confined space also houses the control rod drive mechanisms (CRDMs) that are attached to the bottom RPV head. The CRDMs further contribute to the limited maneuverability. Because of these limitations, the time needed to complete an examination of the weld surface would expose inspection personnel to high radiation dosages. The licensee estimated that the total radiation to personnel involved with preparing and examining the weld surface would total 11.2 rem.

The licensee proposes to perform a best-effort ultrasonic (UT) examination from the outside (accessible) weld surface to detect service related flaws on the inside weld surface. The best-effort UT examination would replace the required inside surface examination. The licensee believes that this alternative would provide an acceptable level of quality and safety.

Furthermore, the licensee's request indicates that there are no known failures of support skirt welds. Based on the limited access and absence of bulletins or reported failures of the inside surface on the support skirt weld, the licensee believes that the benefits derived from this examination do not warrant exposing examiners to the associated high-radiation doses.

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[1]The licensee proposed use of ASME Code Case N-323-1 and a best-effort UT examination from the accessible side of the RPV support skirt welds. The staff has not endorsed Code Case N-323-1 in Regulatory Guide 1.147. Instead of citing Code Case N-323-1, the staff has restated the proposed alternative in autonomous terminology, so as not to connote endorsement of the code case.

2.2 Licensee's Proposed Alternative to Code Requirements

The licensee's proposed alternative is to perform a surface examination of the outside surface (considered the accessible surface) and a best-effort UT examination of the inside surface of the support skirt welds identified as: RPV-SUPP-2-1-IA (BFN Unit 2), and RPV-SUPP-3-1-IA (BFN Unit 3).

3.0 EVALUATION

The licensee has requested approval of alternative examinations for its skirt welds. The alternative is necessitated by the narrow access through the skirt and the obstruction in the confined area inside the skirt under the bottom head. The working area inside the skirt under the bottom head limits maneuverability and exposes examiners to high radiation levels.

The ASME Code specifies different examination requirements for the skirt weld configurations depicted in Figures 1 and 2. The Code requires surface examinations of both the outside and inside welded surfaces for the Figure 1 configuration. The inside examination requires personnel entry to the area inside the skirt. For the Figure 2 configuration, the Code allows (1) a surface examination for the accessible side, and (2) a volumetric examination from the accessible side of the inaccessible side. This does not necessitate personnel entry to the area inside the skirt.

The skirt weld configuration at BFN is shown in Figure 3. This configuration is a hybrid of Figures 1 and 2. Instead of performing surface examinations from both sides of the welds in accordance with the Code requirements applicable to the Figure 1 configuration, the licensee proposes to perform (a) a surface examination on the outside surface (accessible) of the welds and, (b) a best-effort UT examination of the inside surface of the welds, from the outside surface.

This licensee's proposed alternative for its Figure 3 skirt welds is similar to the Code requirements applicable to the Figure 2 configuration. The Figure 3 configuration can, to a significant extent, be volumetrically examined from the outside surface, as is the case for the Figure 2 configuration. The weld volume capable of being examined is through wall and at or near the inside weld surface. Therefore, any crack propagating from the inside weld surface would be detectable. The staff believes that a best-effort examination, in combination with the outside surface examination of the skirt weld will provide reasonable assurance of structural integrity and an acceptable level of quality and safety.

4.0 CONCLUSION:

The staff concludes that the proposed alternative described above will provide an acceptable level of quality and safety. Pursuant to 10 CFR 50.55a(a)(3)(i), the staff hereby authorizes the proposed alternative as described in Section 3.0 above. The proposed alternative is authorized by law and will not endanger life or property or the common defense and security and is otherwise in the public interest.

Principle Contributor: D. Naujock, NRR

Date: June 19, 2000

Attachment: Figures 1, 2 and 3

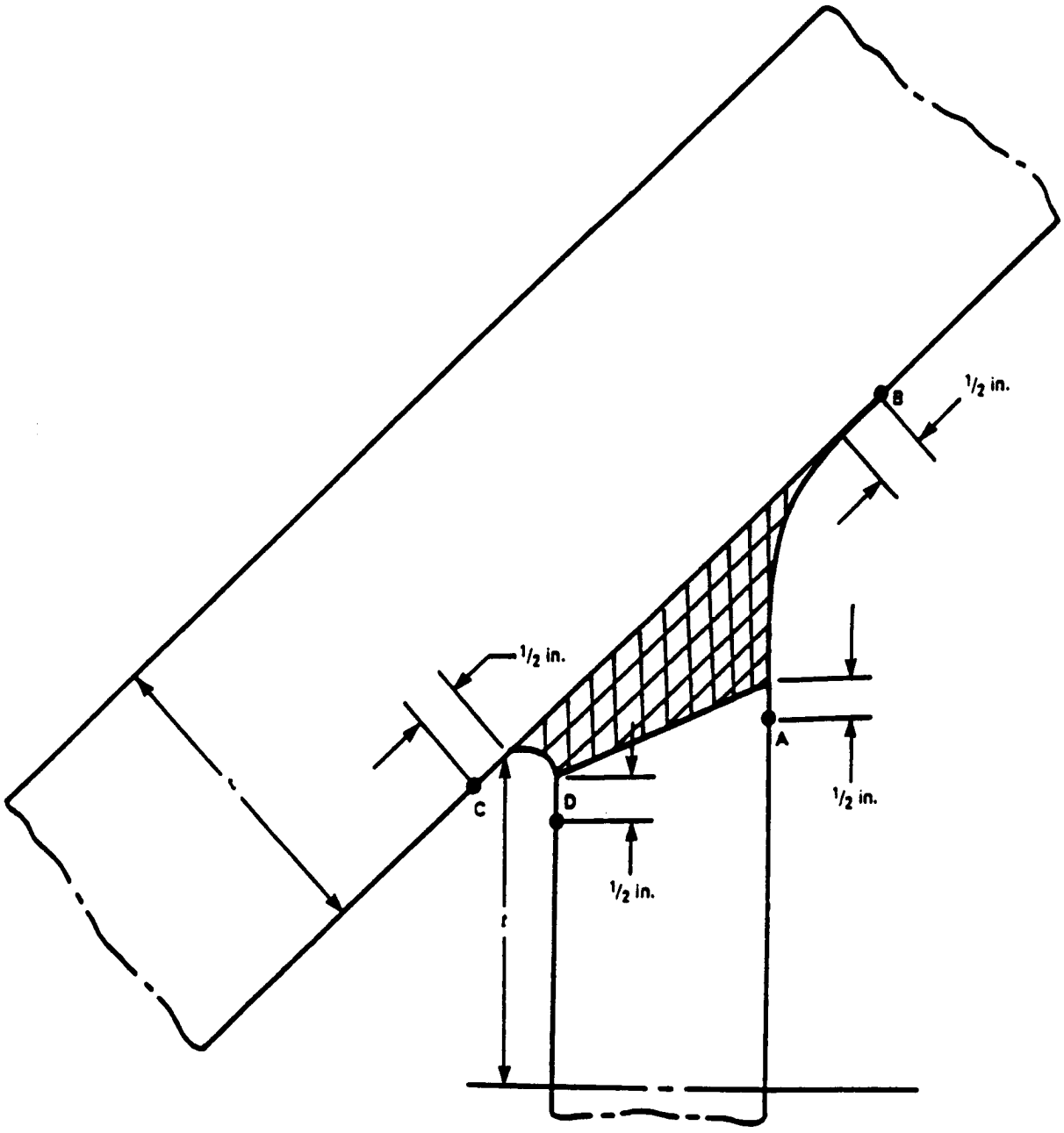

FIGURE 1

(ASME Code, Section XI, Figure IWB-2500-13)

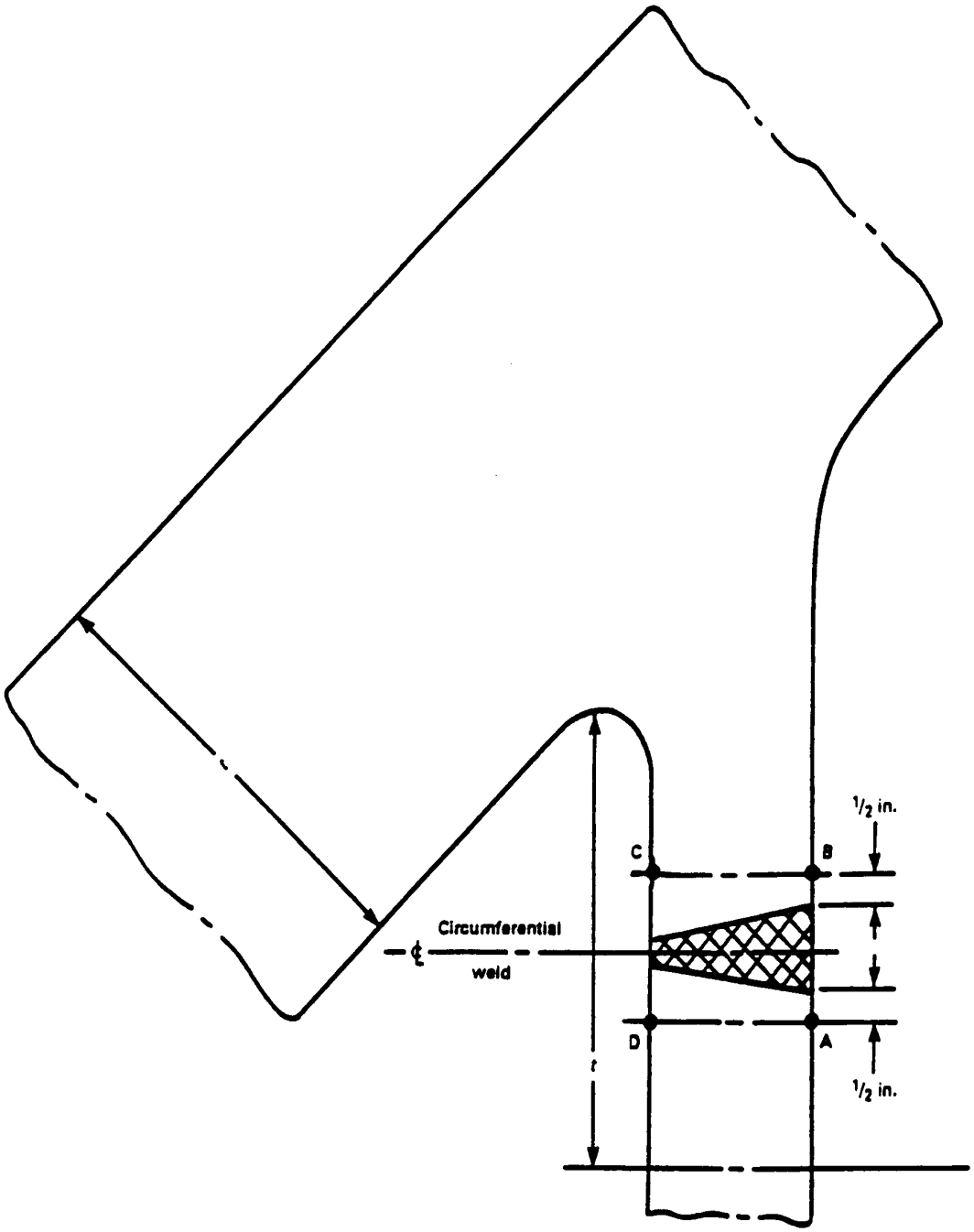

FIGURE 2

(ASME Code, Section XI, Figure IWB-2500-14)

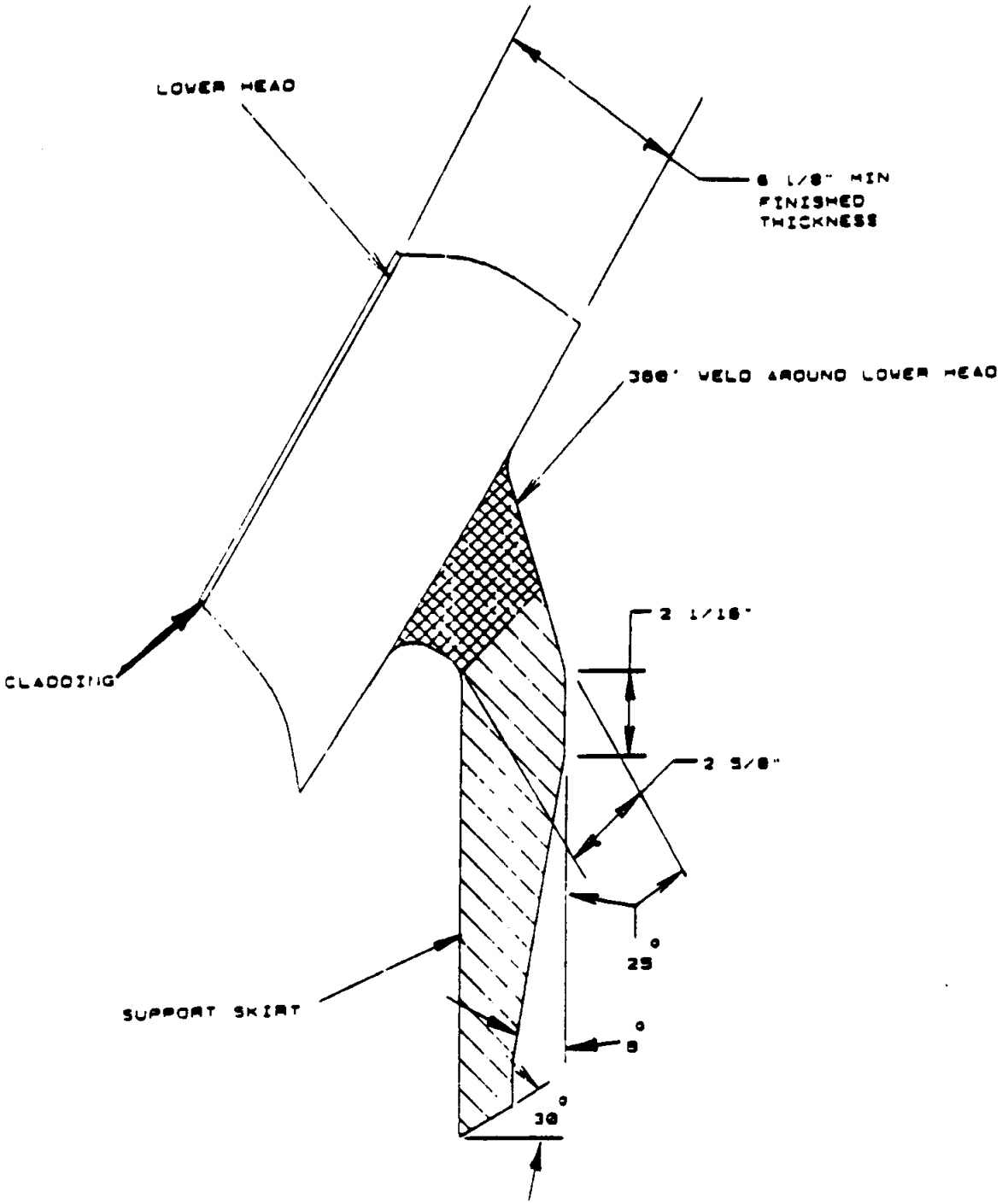

FIGURE 3
(BROWNS FERRY)

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BROWNS FERRY NUCLEAR PLANT

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