ATTACHMENT 2

TECHNICAL LETTER REPORT ON THE SECOND TEN-YEAR INTERVAL INSERVICE INSPECTION PROGRAM PLAN THROUGH REVISION 2 FOR TENNESSEE VALLEY AUTHORITY BROWNS FERRY NUCLEAR PLANT, UNIT 2 DOCKET NUMBER: 50-260

1.0 INTRODUCTION

In a letter dated February 22, 1994, the licensee, Tennessee Valley Authority (TVA), submitted Revision 2 to the Inservice Inspection (ISI) Program Plan for the Browns Ferry Nuclear Plant, Unit 2 (BFN-2) second 10-year ISI interval, which began in May 1991. The licensee stated that the revision was submitted to make needed editorial and administrative changes, and to incorporate new requests for relief from the requirements of *American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI.* By letter dated October 20, 1994, the NRC issued a request for additional information (RAI) regarding the Program Plan and the new requests for relief. The licensee provided the requested information in a letter dated January 6, 1995. The Idaho National Engineering Laboratory (INEL) has evaluated the subject Program Plan Revision, and additional requests for relief, in the following section.

2.0 EVALUATION

The Code of record for the second 10-year interval at BFN-2 is the 1986 Edition of ASME Section XI. The information provided by the licensee in support of the program plan revision, including three new requests for relief, has been evaluated and the bases for disposition are documented below.

A. Evaluation of the *Browns Ferry Nuclear Plant, Unit 2, Second 10-Year Interval ISI Program*, through Revision 2

(1) Successive Examinations of Class 1 Piping Welds: The 1986 Edition of ASME Section XI, Article IWB-2000, Paragraph IWB-2420(a), states:

"The sequence of component examinations established during the first inspection interval shall be repeated during each successive inspection interval, to the extent practical."

This results in a 10-year schedule for component examinations that must be repeated throughout the service life of the facility. Nondestructive examination (NDE) baselines for selected components are generally established either prior to (preservice) or during the initial interval. These include the observation of any fabrication flaws or metallurgical anomalies that may, over time, affect structural integrity. Subsequent examinations in later intervals are intended to monitor these conditions, detect new flaw initiation, and generally provide information on any service-induced degradation that might negatively impact component integrity.

Note 6 of Section 8.1 of the licensee's program makes the following statement:

"Approximately 90% of the B-J welds, within practical limits of accessibility, shall be examined during the life of the plant. All carbon steel or low alloy (similar) RPV nozzle-to-safe end welds plus additional welds to comprise a 25% sample shall be examined each interval."

In practice, this means that only a portion of the initially selected components will be reexamined during each inspection interval. Responding to this issue in the RAI, the licensee made reference to the 1974, Summer 1975 Addenda of ASME Section XI, IWB-2420, "Successive Inspections", part (c) of which requires that a similar percentage of components not previously examined during earlier inspection intervals be selected for subsequent intervals.

The licensee has committed to examine all Class 1 pipe-to-safe end welds during each inspection interval. Typically, because of the higher residual and transient stress levels, and inherent metallurgical anomalies found at these welds, it is believed they are more susceptible to inservice degradation than most other primary piping welds. Therefore, the selection of welds for the BFN-2 second 10-year interval appears to be adequate to detect a significant pattern of degradation that might negatively impact system integrity.

(2) There have been numerous editorial and administrative changes made since the last review of the program. Since these changes do not affect the technical content of the program, they will not be discussed in this evaluation.

B. Request for Relief ISI-2-1: Examination Category B-H, Item B8.10, Reactor Pressure Vessel (RPV) Support Skirt Integral Attachment Weld

Note: As a result of the October 20, 1994 RAI, this request for relief was withdrawn by the licensee in the January 6, 1995 submittal.

C. Request for Relief ISI-2-2: Examination Category B-G-1, Item B6.40, Pressure-Retaining Bolting Greater than 2-in. in Diameter

Note: As a result of the October 20, 1994 RAI, this request for relief was withdrawn by the licensee in the January 6, 1995 submittal.

D. Request for Relief ISI-2-3: Examination Category B-D, Item B3.90, RPV Nozzle-to-Vessel Weld

Code Requirement: Category B-D, Item B3.90 requires a 100% volumetric examination, as defined by applicable Figures IWB-2500-7 (a) through (d), for RPV nozzle-to-vessel welds.

Licensee's Code Relief Request: The licensee requested relief from the volumetric requirement for the BFN-2 N6 nozzle-to-vessel head weld.

Licensee's Basis for Requesting Relief (as stated):

"The nozzle to head contour limits the accessible volume of examination performed from the outside surface to 60%."

Licensee's Proposed Alternative: The licensee did not propose an alternative to the required examination.

Evaluation: The Code requires that 100% of the volume, as defined in applicable Figures IWB-2500-7 (a) through (d), of all RPV nozzle-to-vessel welds be examined during each interval. The licensee submitted a recent examination report[1], including drawings that depict cross-sectional geometry and completed examination percentages, for the N6 nozzle-to-head weld at BFN-2. Based on the geometry of the weld, the INEL has determined that it is impractical for the licensee to complete the required examination volume. A considerable burden would result if the licensee was required to redesign and replace the nozzle for the sole purpose of increasing volumetric examination coverage.

The licensee stated that approximately 60% of the volume of this weld could be examined. While the limited volumetric examination does not meet Code requirements, an adequate level of inspection occurred to provide reasonable assurance of detection of a pattern of degradation that, if present, might impact the overall structural integrity of the weld. Therefore, pursuant to 10 CFR 50.55a(g)(6)(i), it is recommended that relief be granted.

E. Request for Relief ISI-2-4: Examination Category B-F, Item B5.130, Pressure-Retaining Dissimilar Metal Welds and Examination Category B-J, Items B9.10 and B9.30, Pressure-Retaining Welds in Piping

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1) The examination report and drawings are not included in this evaluation.

Code Requirement: Category B-F, Item B5.130 and Category B-J, Items 9.10 and 9.30, require 100% volumetric and surface examinations, as defined by applicable Figures IWB-2500-8,-9,-10 or-11, for all B-F and selected B-J welds, nominal pipe size (NPS) 4-inch and larger.

Licensee's Code Relief Request: The licensee requested relief from the 100% volumetric requirement for the welds listed below.

Licensee's Basis for Requesting Relief (as stated):

"In some cases it is not possible to perform the volumetric ultrasonic examination from both sides of the weld due to configuration or permanent features such as: piping supports; or fire retardant insulation in the adjacent wall penetration. Attached is a detailed description of the limitations for each weld listed and a summary of the scans performed."

Portions of the following table were excerpted from the licensee's submittal:

Weld Number	Code Category	UT Coverage	Configuration	Material
DCS-2-03	B-J	37.4%	Valve-to-bellows	Stainless steel
DCS-2-12	B-J	37.4%	Valve-to-bellows	Stainless steel
TCS-2-422	B-F	86.5%	Pipe-to-valve	Dissimilar metal
GMS-2-10	B-J	86%	Valve-to-pipe	Carbon steel
DRHR-2-03	B-J	52%	Valve-to-penetration	Stainless steel
TRWCU-2-02	B-J	52%	Valve-to-valve	Stainless steel

Licensee's Proposed Alternative: The licensee did not propose an alternative to the required examinations.

Evaluation: The Code requires that "essentially 100%" of the inner one-third of Class 1 piping welds and dissimilar metal welds be volumetrically examined. This requirement is further clarified by Code Case N-460 (found in Revision 11 of Regulatory Guide 1.147) as meaning "greater than 90%" of the required weld volume. The licensee, in response to the RAI, submitted further information[2] to describe specific limitations that restrict volumetric examination for each of the welds listed above. The INEL has determined that it is impractical for the licensee to meet the required volumetric coverage for the subject welds due to geometrical configurations and, in some cases, the material acoustic properties of the components. A considerable burden would result if the licensee is required to redesign and replace these components solely for the purpose of increasing the examination coverage.

Many of the weld examinations were supplemented with other ultrasonic techniques, e.g., refracted longitudinal and extended beam path scans, to maximize the examination coverage. In addition, these limited weld examinations are part of a larger sample of welds where complete Code-required coverage was attained. While the examination coverage of the subject welds was less than 100%, an adequate level of inspection occurred to provide reasonable assurance of detection of a pattern of degradation that, if present, might impact the overall structural integrity of the components. Therefore, pursuant to 10 CFR 50.55a(g)(6)(i), it is recommended that relief be granted as requested.

3.0 CONCLUSION

Based on the review of the *Browns Ferry Nuclear Plant, Surveillance Instruction 2-SI-4.6.G, Inservice Inspection Program Unit 2, Revision 2*, no deviations from regulatory requirements or commitments were identified, with

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2) Licensee submitted drawings and photographs that are not included in this evaluation.

the exception of successive examination requirements, as stated by the Code, for Class 1 piping welds.

As a result of the October 20, 1994, RAI, Requests for Relief ISI-2-1 and ISI-2-2 were withdrawn from the program by the licensee in a submittal dated January 6, 1995.

The licensee determined that conformance with certain Code requirements is impractical for BFN-2 and submitted supporting information. The INEL has reviewed the licensee's submittal and recommends that, pursuant to 10 CFR 50.55a(g)(6)(i), relief be granted as requested for ISI-2-3 and ISI-2-4.