R08 021025 693

October 25, 2002

10 CFR 50.55a(a)(3)(i)

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Stop: OWFN, P1-35
Washington, D.C. 20555-0001

Gentlemen:

In the Matter of) Docket No. 50-259
Tennessee Valley Authority)

BROWNS FERRY NUCLEAR PLANT, UNIT 1 - AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) SECTION XI INSERVICE INSPECTION (ISI) PROGRAM REQUESTS FOR RELIEF PDI-1 AND PDI-2 - APPROVAL OF RELIEF REQUESTS FOR UNIT 1 ISI PROGRAM

Pursuant to 10 CFR 50.55a(a)(3)(i) TVA is requesting NRC approval of requests for relief PDI-1 and PDI-2, which are enclosed, for BFN Unit 1.

By letter dated February 23, 2001, and supplemented by letters dated July 9 and August 23, 2001, TVA requested approval of two generic ISI Program relief requests (PDI-1 and PDI-2) for applicability to Browns Ferry Units 2 and 3, Sequoyah Units 1 and 2, and Watts Bar Unit 1. These two generic relief requests outline alternatives to meeting specific requirements of Appendix VIII, “Performance Demonstration For Ultrasonic Examination Systems,” of the 1995 Edition through the 1996 Addenda (95A96) of Section XI of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code. The use of Appendix VIII and its related Code requirements is required by the September 22, 1999, revision to the Code of Federal Regulations, Title 10, Part 50, Section 55a, (10 CFR 50.55a).

The NRC Staff approved the use of TVA’s requests for relief, PDI-1 and PDI-2, for BFN Units 2 and 3 in a safety evaluation (SE) transmitted by letter dated September 19, 2001.

In addition, by letter dated August 10, 2001, TVA informed the staff of its intent to update all of its non-destructive examination (NDE) procedures for all TVA nuclear sites (including BFN Units 1, 2, and 3) to comply with the 95A96 requirements of Section XI of the ASME Boiler and Pressure Vessel Codes. This upgrade of NDE procedures was subsequently approved by the staff in a letter dated May 24, 2002. As part of its restart ISI Program for BFN Unit 1, TVA is requesting that approval of relief requests PDI-1 and PDI-2 be extended to include Unit 1 NDE activities.

PDI-1 allows TVA to conduct periodic training for ultrasonic (UT) examination personnel in accordance with the augmented requirements shown in section 10 CFR 50.55a(b)(2)(xiv). As approved, PDI-1 allows TVA exemption from the requirements imposed in the 95A96 Code to perform 10 hours of personnel qualification training shown in the mandatory requirements of ASME Section XI, Appendix VII sub-article VII-4240, “Annual Training.” TVA will continue to perform the mandated eight hours of hands-on training as shown in 10 CFR 50.55a(b)(2)(xiv).

PDI-2 allows TVA to limit the extent of the examination volume for reactor pressure vessel nozzle-to-vessel welds to no more than one-half inch beyond the widest part of the weld. PDI-2 reduces the required weld examination volumes from those shown in the 95A96 Code Section XI, Subsection IWB, Figures IWB-2500-7(a) and (b), [i.e., one-half the vessel shell thickness beyond the widest part of the weld].

PDI-1 and PDI-2 optimize TVA’s ISI/NDE programs by using alternatives that are shown in the Electric Power Research Institute (EPRI) Performance Demonstration Initiative (PDI) Guidelines and other industry initiatives. The proposed alternatives will bring BFN Unit 1 UT examination procedures and the required UT systems and examination personnel qualifications in line with the EPRI PDI Program Description, Revision 1, Change 1; dated December 30, 1996; and in line with the EPRI “Guideline For Implementation of Appendix VIII and 10 CFR 50.55a,” Volume One, Revision 1, dated July 11, 2000. These EPRI PDI guidelines have also been endorsed by NRC in the

September 22, 1999, revision to 10 CFR 50.55a. The use of the allowed provisions of PDI-1 and PDI-2 with Unit 1 UT examinations is appropriate for the associated requirements where TVA is already using the approved 95A96 Code based NDE procedures. This request to use PDI-1 and PDI-2 is part of an overall effort to upgrade the Unit 1 NDE examinations performed in order to provide a technically sound and rigorous set of baseline examination data for future inservice examinations.

TVA intends to apply the requests for relief during the third period of the first Ten-Year ISI Program Inspection Interval which is currently in effect for Unit 1. The Unit 1 first Ten-Year ISI Inspection Interval will conclude one year following restart of the unit. The current Unit 1 ISI Program was initially developed to meet the ASME Code requirements shown in Section XI of the 1974 Edition with addenda through 1975 Summer Addenda. Approval of PDI-1 and PDI-2 for Unit 1 was not requested with TVA's request for BFN Units 2 and 3 because, at that time, TVA had not made the decision to restart Unit 1.

Enclosure 1 to this letter contains request for relief PDI-1. Enclosure 2 provides request for relief PDI-2. TVA requests NRC review of these requests for relief by March 30, 2003, to support Unit 1 restart activities.

There are no new commitments contained in this letter. If you have any questions, please call me at (256) 729-2636.

Sincerely,

original signed by:

T. E. Abney
Manager of Licensing
and Industry Affairs

cc: See Page 4

Enclosures
cc (Enclosures):
(Via NRC Electronic Distribution)
Mr. Paul E. Fredrickson, Branch Chief
U.S. Nuclear Regulatory Commission
Region II
Sam Nunn Atlanta Federal Center
61 Forsyth Street, SW, Suite 23T85
Atlanta, Georgia 30303-8931

NRC Resident Inspector
Browns Ferry Nuclear Plant
P.O. Box 149
Athens, Alabama 35611

Mr. Kahtan N. Jabbour, Senior Project Manager
U.S. Nuclear Regulatory Commission
One White Flint, North
(MS 08G9)
11555 Rockville Pike
Rockville, Maryland 20852-2739

DTL:JWD:BAB
Enclosures
cc (Enclosures):
A. S. Bhatnagar, PAB 1E-BFN
M. J. Burzynski, BR 4X-C
G. F. Deaton, PEC 2A-BFN
R. G. Jones, POB 2C-BFN
A. L. Ladd, PEC 2A-BFN
J. E. Maddox, LP 6A-C
D. C. Olcsvary, LP 6A-C
C. M. Root, PAB 1G-BFN
K. W. Singer, LP 6A-C
Joseph Valente, CFC 1F-BFN
E. J. Vigluicci, ET 11A-K
R. E. Wiggall, PEC 2A-BFN
NSRB Support, LP 5M-C
EDMS-K

s:/lic/submit/subs/Unit 1 PDI 1 and PDI 2.doc

ENCLOSURE 1

TENNESSEE VALLEY AUTHORITY
BROWNS FERRY NUCLEAR PLANT (BFN)
UNIT 1
FIRST TEN-YEAR INSERVICE INSPECTION (ISI) INTERVAL

REQUEST FOR RELIEF PDI-1

EXECUTIVE SUMMARY:

On September 22, 1999, Title 10, Part 50, Section 55a [10 CFR 50.55a] was amended (as shown in the Federal Register Volume 64, No. 183) to require licensees to comply with the requirements of Appendix VIII, "Performance Demonstration For Ultrasonic Examinations Systems," of Section XI in the 1995 Edition, with the 1996 Addenda (95A96), of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code. The Final Rule also required certain special provisions which were to be incorporated when the licensee implemented the rule change. The 95A96 Section XI Code in the Appendix VIII paragraph VIII-2200 requires personnel to be qualified to perform the ultrasonic examinations (UT) in accordance with Appendix VII. Appendix VII in Sub-subarticle VII-4240 requires UT qualified examiners to complete a minimum of 10 hours documented supplemental technical training each year.

The NRC Staff, as part of the rule change [shown in paragraph 10 CFR 50.55a(b)(2)(xiv)], imposed a minimum of 8 hours of annual hands-on training with specimens that contained known cracks. In addition, this training must be completed no earlier than 6 months prior to performing UT examinations at the licensee's facilities.

Compliance with the Appendix VII requirements and the imposed 10 CFR 50.55a(b)(2)(xiv) requirements equates to a total of 26 hours of annual training for TVA's UT examiners. This rigorous literal compliance with both of the requirements results in unnecessarily excessive training costs which provide for little or no additional benefit in terms of increased safety above that provided by the 8-hour hands-on training sessions. Thus, TVA is submitting this relief request to request continued performance of only the sessions of annual 8 hours of the hands-on training on the basis that the annual training provides a equivalent level

of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), TVA requests that relief be granted from meeting the requirements of ASME Section XI Appendix VII, Sub-subarticle VII-4240.

SYSTEM/COMPONENT(S) FOR WHICH RELIEF IS REQUESTED:

Not applicable.

ASME SECTION XI CODE EDITION/ADDENDA:

The applicable ASME Section XI Code Editions and Addenda include the 1995 Edition with 1996 Addenda as delineated in 10 CFR 50.55a(b)(2). The Browns Ferry Unit 1 ISI Program ASME Section XI Code Editions and Addenda of Record for performance of NDE is the 1995 Edition with Addenda through the 1996 Addenda.

CODE REQUIREMENTS:

The ASME Section XI 1995 Edition with the 1996 Addenda (95A96) requires the use of the mandatory Appendix VIII, Performance Demonstration of Ultrasonic Examination Systems. Appendix VIII's Sub-subarticle VIII-2200, "Personnel Requirements," states: "Personnel shall meet the requirements of Appendix VII and shall be qualified in accordance with VIII-3000." In turn, Appendix VII, Sub-subarticle VII-4240 (of the 95A96 Code), "Annual Training," states: "Supplemental training is required on an annual basis to impart knowledge of new developments, material failure modes, and any pertinent technical topics as determined by the Employer. The extent of this training shall be a minimum of 10 hours per year."

As part of the accelerated implementation of the 95A96 Appendix VIII requirements shown in the Final Rule in paragraph 10 CFR 50.55a(b)(2)(xiv), all personnel qualified for performing UT examinations must receive 8 hours of annual hands-on training on specimens that contain cracks. This training must be completed no earlier than 6 months prior to performing UT examinations at a licensee's facility.

REQUIREMENT FROM WHICH RELIEF IS REQUESTED:

Relief is requested, in accordance with 10 CFR 50.55a(a)(3)(i), from meeting the provisions of sub-subarticle VII-4240, "Annual Training." These provisions will be implemented during the first Ten-Year ISI interval for Browns Ferry Unit 1.

BASIS FOR RELIEF:

10 CFR 50.55a was amended in the Federal Register (Volume 64, No. 183, dated September 22, 1999) to require the use of the 1995 Edition, with the 1996 Addenda of Section XI for Appendix VIII qualification requirements. Appendix VIII, paragraph VIII-2200 requires NDE personnel to meet the requirements of Appendix VII of Section XI. Appendix VII includes Subarticle VII-4240, which requires a minimum of 10 hours of supplemental annual technical training.

10 CFR 50.55a(b)(2)(xiv) requires that all personnel qualified for performing ultrasonic examinations in accordance with Appendix VIII shall receive 8 hours of annual hands-on training on specimens that contain cracks. This training must be completed no earlier than 6 months prior to performing ultrasonic examinations at a licensee's facility.

Paragraph 2.4.1.1.1 in the Federal Register contained the following statements:

"The NRC had determined that this requirement [i.e., 10 hours of training on an annual basis] was inadequate for two reasons. The first reason was that the training does not require laboratory work and examination of flawed specimens. Signals can be difficult to interpret and, as detailed in the regulatory analysis for this rulemaking, experience and studies indicate that the examiner must practice on a frequent basis to maintain the capability for proper interpretation. The second reason is related to the length of training and its frequency. Studies have shown that an examiner's capability begins to diminish after 6 months if skills are not maintained. Thus, the NRC had determined that 10 hours of annual training is not sufficient practice to maintain skills, and that an examiner must practice on a more frequent basis to maintain the proper skill level."... "The PDI program has adopted a requirement for 8 hours of training, but it is required to be hands-on practice. In addition, the training must be taken no later than 6 months prior to performing examinations at a licensee's facility. PDI believes that 8 hours will be acceptable relative to an examiner's abilities in this highly specialized skill area because personnel can gain knowledge of new developments, material failure modes, and other pertinent technical topics through other means. Thus, the NRC has decided to adopt in the final rule the PDI position on this matter. These changes are reflected in [section] 50.55a(b)(2)(xiv) of the final rule change."

JUSTIFICATION FOR GRANTING RELIEF:

Implementation of the requirements contained in Appendix VII, in addition to the mandated requirements in the final Rule, will result in redundant training systems. This will result in unnecessary costs and expenses and inefficient use of examination personnel time. Performance of the annual training in accordance with the requirements of 10 CFR 50.55a(b)(2)(xiv)will ensure that UT examiner's performance skills are maintained and also provide a degree of exposure for examiners to the industry and technical information. This exposure along with the maintenance of their other professional duties will be sufficient to ensure that their technical proficiency is maintained. The use of the Final Rule requirements in lieu of the annual training requirements of ASME Section XI Appendix VII Sub-subarticle VII-4240 will simplify record keeping, satisfy needs for maintaining skills, and provide an acceptable level of quality and safety.

This request for relief is consistent with one submitted by TVA letter dated February 23, 2001, for Browns Ferry Units 2 and 3, Sequoyah Units 1 and 2, and Watts Bar Unit 1. The request was approved by NRC letter dated September 19, 2001.

ALTERNATIVE EXAMINATIONS:

Annual hands-on ultrasonic training will be conducted in accordance with the requirements shown in 10 CFR 50.55a(b)(2)(xiv)in lieu of the requirements of Section XI, Appendix VII, paragraph VII-4240.

IMPLEMENTATION SCHEDULE:

Upon approval by the NRC Staff, the provisions of this request will be implemented during the first Ten-Year ISI interval for Browns Ferry Unit 1. The first Ten-Year Inservice Inspection Interval for BFN Unit 1 will end one year following restart of the unit.

ENCLOSURE 2

TENNESSEE VALLEY AUTHORITY
BROWNS FERRY NUCLEAR PLANT (BFN)
UNIT 1
AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)
SECTION XI INSERVICE INSPECTION (ISI) PROGRAM

FIRST TEN-YEAR INSERVICE INSPECTION INTERVAL

REQUEST FOR RELIEF PDI-2

EXECUTIVE SUMMARY:

TVA's current ISI programs' Code requirements for the examination volumes of the Class 1 reactor vessel pressure-retaining nozzle-to-vessel welds (Examination Category B-D, Items No. B3.90 - Inspection Program B) are shown in Figures IWB-2500-7(a) and IWB-2500-7(b) of the applicable ASME Section XI Codes. These figures require that licensees perform examinations of the weld volumes and the adjacent vessel or nozzle base metal material regions to the extent of a length equivalent to one-half (½) the vessel shell thickness (t_s)[i.e., $t_s/2$] beyond the end of the weld's boundary.

The extent of the examination volume for a given nozzle-to-vessel weld dictates the exam time and the amount of radiation dose exposure of the personnel involved. Historical improvements in the ultrasonic examination techniques and the qualifications of the examiners in accordance with the Section XI Appendix VIII has reduced the necessity of having the nozzle-to-vessel weld exam volumes be as large as currently required in Figures IWB-2500-7(a) and (b). TVA proposes to reduce the required examination volume's extent (next to the widest part of the weld) from one-half of the shell thickness to one-half (½) inch beyond the boundary of the weld.

The reduction of the exam volume in lieu of the current ASME Section XI Code required examination volumes will result in a reduction of examination time and the associated examination personnel radiation exposure while maintaining an acceptable level of quality and safety. Except for the proposed reduced examination volumes, TVA will continue to perform the volumetric examinations in accordance with the other specific aspects and requirements of the ASME Code for these exams. Accordingly, pursuant to 10 CFR

50.55a(a)(3)(i), relief is requested to use the reduced examination volumes in lieu of the requirements shown in ASME Section XI Figures, IWB-2500-7(a) and (b).

SYSTEM/COMPONENT(S) FOR WHICH RELIEF IS REQUESTED:

ASME Class 1 equivalent (TVA Class A) Reactor Pressure Vessel Pressure-Retaining Nozzle-To-Vessel welds.

ASME SECTION XI CODE EDITION/ADDENDA:

In addition to the 1995 Edition with the 1996 Addenda (95A96) ASME Section XI Code Appendix VIII requirements dictated by the 10 CFR 50.55a Final Rule, the applicable plant and unit specific ISI Program ASME Section XI Code Edition and Addenda of Record (with incorporated ASME Code Cases) for Browns Ferry Unit 1 is the 1995 Edition with addenda through the 1996 Addenda.

CODE REQUIREMENTS:

In accordance with the Browns Ferry Unit 1 ISI Program, the ASME Section XI Code-of-Record rules for Inservice Inspection of Nuclear Power Plant Components; the requirements for nozzle-to-vessel weld examination volume shown in Section XI, Subsection IWB, Examination Category B-D Full Penetration Welds of Nozzles in Vessels - Inspection Program B, Code Item Number B3.90, with Figures IWB-2500-7(a) and IWB-2500-7(b) are applicable.

In addition, by reference in the applicable ASME Section XI Code paragraphs on Ultrasonic Examinations (UT), i.e., paragraph IWA-2232; Article 4 of ASME Section V is referenced as the requirement to which UT examinations must be conducted on vessel welds greater than two inches in thickness. Paragraph T-441.1.4, “Angle Beam Scanning;” T-441.1.5, “Scanning for Reflectors Oriented Parallel to the Weld,” and T-441.1.6, “Scanning for Reflectors Oriented Transverse to the Weld,” of Article 4 are also applicable.

REQUIREMENT FROM WHICH RELIEF IS REQUESTED:

The specific Code requirement from which relief is requested is the requirement to perform the volumetric examination of the indicated nozzle-to-vessel welds in accordance with the examination volume requirements shown in ASME Section XI Subsection IWB, Figures IWB-2500-7(a) and (b). Pursuant to 10 CFR 50.55a(a)(3)(i), relief is requested to perform the Code examination on a reduced volume of ½ inch beyond the widest part of the boundary of the deposited weld material

in lieu of the requirements of ASME Section XI Figures IWB-2500-7(a) and IWB-2500-7(b). When performing the examinations of nozzle-to-vessel welds, TVA will comply with the special requirements imposed in 10 CFR 50.55a(b)(2)(xv)(K)(1) and 10 CFR 50.55a(b)(2)(xv)(K)(2). These requirements dictate that the examination scanning processes must also be performed in such a manner to detect flaws oriented axially with the nozzle. TVA will continue to perform the required UT examinations in accordance with the Final Rule, except that the exam volume will be reduced.

BASIS FOR RELIEF:

Inservice examination of selected Reactor Pressure Vessel (RPV) nozzle-to-vessel welds at TVA nuclear plants is currently performed in accordance with the requirements of 10 CFR 50.55a, Plant Technical Requirements, and the associated ASME Section XI ISI Program Codes-of-Record Editions and Addenda of the ASME Boiler and Pressure Vessel Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components." The 1995 Edition through the 1996 Addenda of ASME Section XI invokes the examination volume requirements of Figures IWB-2500-7(a) and IWB-2500-7(b). This Code also invokes the examination requirements of ASME Section XI Appendix I, Article I-2000 which in turn reference ASME Section V, Article 4 of the associated Editions and Addenda of Section V.

Under the new required Appendix VIII procedures the required examinations will be performed using procedures developed and qualified in accordance with the mandated requirements of the ASME Code, Section XI, Division 1, 1995 Edition with the 1996 Addenda of Appendix VIII and Supplement 7. These procedures provide for a more rigorous methodology for Ultrasonic Examinations.

JUSTIFICATION FOR GRANTING RELIEF:

The examination volume required by IWB-2500-7(a) and (b) for the reactor vessel pressure retaining nozzle-to-vessel welds extends far beyond the weld and the heat effected zones into the base metal, and is unnecessarily large. This extends examination time significantly, increases the radiation exposure of exam support personnel, and results in no net increase in safety; as the additional area being examined is a base-metal region of the reactor vessel shell or nozzle wall areas where industry experience has shown service-induced cracks are not prone to occurring. In addition, these regions have been extensively examined during the

fabrication and installation periods before the vessels were put in service and during the inservice examinations already performed.

The reduction of UT examination volumes adjacent to the widest part of the weld from one-half of the vessel wall thickness to one-half (½) inch beyond the weld boundary eliminates base metal material volume to be examined that was extensively examined during construction and preservice examinations, where applicable; and, eliminates areas which are not located in the high-stressed areas of the weld geometry. The high-stressed areas of the various nozzle-to-vessel weld configurations and areas where flaws are most likely to initiate are adequately addressed and contained in the examination volume defined by the area ½ inch beyond the weld boundary.

In addition, use of these proposed examination boundaries will be conducted in conjunction with TVA's programmatic implementation of the mandated use of ASME Section XI, Appendix VIII. TVA will implement these requirements in accordance with the requirements shown in ASME Section XI Appendix VIII of the 1995 Edition with the 1996 Addenda, as amended by the Final Rule and as required in paragraphs 10 CFR 50.55a(b)(2)(xiv), (xv), and (xvi); and in 10 CFR 50.55a(g)(6)(ii)(C). TVA will comply with these requirements through the use of the Electric Power Research institute (EPRI) Performance Demonstration Initiative (PDI) program document, "PDI Program Description," Revision 1, Change 1, as allowed in the discussion on the Final Rule published in the Federal Register, Volume 64, No. 183, page 51390, (See Section 2.7), dated September 22, 1999. These procedures will ensure that the performance-based UT methodologies used and the techniques will be qualified and examination personnel will be certified by a performance demonstration.

The use of the reduced examination volumes in lieu of the identified ASME Section XI referenced requirements could reduce on-vessel examination time by as much a 12 hours of outage critical path schedule time, which translates to cost savings in the order of $14,400 for the actual exam costs and some reduction of examination support personnel radiation exposure. An equivalent reduction in the outage duration translates to a replacement power cost savings of from approximately $225,000 to $350,000, depending upon the circumstances of the outage. The personnel radiation exposure is dependent upon the choice of RPV examination

equipment (i.e., automated versus manual) and by the degree of plant RPV contamination and/or decontamination conducted prior to the exam.

Similar relief has been submitted by TVA for Browns Ferry Units 2 and 3, Sequoyah Units 1 and 2, and Watts Bar Unit 1 power plants by letters dated February 23, July 9, and August 23, 2001. TVA's request for relief was subsequently approved by NRC letter dated September 19, 2001.

In conclusion, use of the reduced examination volume requirements in conjunction with the application of the Appendix VIII implementing PDI program will provide sufficient assurance that RPV nozzle-to-vessel welds have remained free of service induced flaws or identify such flaws prior to failure. The application of the PDI techniques will enhance quality of the UT examinations and ensure plant safety and pressure boundary reliability. Therefore, the proposed alternative provides for an acceptable level of quality and safety and, pursuant to 10 CFR 50.55a(a)(3)(i), relief to use the reduced examination volumes may be granted.

ALTERNATIVE EXAMINATIONS:

TVA will perform the examinations of the RPV nozzle-to-vessel welds as follows:

1. Ultrasonic examinations of the RPV nozzle-to-vessel welds in accordance with the requirements of ASME Section XI Appendix VIII with examination volumes to include regions up to ½ inch beyond the weld boundary.

2. In accordance with the requirements shown in ASME Section XI Appendix VIII of the 1995 Edition with the 1996 Addenda, as amended by the Final Rule and as required in paragraphs 10 CFR 50.55a(b)(2)(xiv), (xv), and (xvi); and in 10 CFR 50.55a(g)(6)(ii)(C) through the use of the EPRI PDI program document, "PDI Program Description," Revision 1, Change 1, as allowed in the discussion on the Final Rule published in the Federal Register.

3. Continued periodic system pressure tests of the RPV per ASME Section XI requirements of Table IWB-2500-1, for Category B-P items.

IMPLEMENTATION SCHEDULE:

Upon approval by the NRC Staff, TVA will implement the provisions of this request during the current first Ten-Year Inservice Inspection Interval for Browns Ferry Unit 1 and conduct the next scheduled RPV nozzle-to-vessel weld examinations accordingly. The first Ten-Year Inservice Inspection Interval for BFN Unit 1 will end one year following restart of the unit.