

November 14, 2001

Mr. Guy G. Campbell, Vice President - Nuclear
FirstEnergy Nuclear Operating Company
5501 North State Route 2
Oak Harbor, OH 43449-9760

SUBJECT: DAVIS-BESSE NUCLEAR POWER STATION, UNIT 1 - REQUEST FOR
ADDITIONAL INFORMATION (RAI) REGARDING THE RELIEF REQUEST
FROM REQUIREMENTS OF THE AMERICAN SOCIETY OF MECHANICAL
ENGINEERS (ASME) CODE, SECTION XI, FOR THE THIRD 10-YEAR
INSERVICE INSPECTION (ISI) INTERVAL (TAC NO. MB1607)

Dear Mr. Campbell:

By letter dated September 19, 2000, the licensee, FirstEnergy Nuclear Operating Company, submitted multiple requests for relief from the requirements of the ASME Code, Section XI, for the Davis-Besse Nuclear Power Station, Unit 1. These relief requests are for the third 10-year ISI interval.

During the review, the Nuclear Regulatory Commission staff and its contractor, Brookhaven National Laboratory, have identified that additional information is needed in order to complete the review. Specific questions are presented in the enclosed RAI.

The enclosed questions have already been discussed with your staff. Please respond to this RAI by November 21, 2001. If you have any questions concerning our review, or additional time is needed to respond to the RAI, please contact me at (301) 415-3154.

Sincerely,

/RA/

Stephen P. Sands, Project Manager, Section 2
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-346

Enclosure: Request for Additional
Information

cc w/encl: See next page

Mr. Guy G. Campbell
FirstEnergy Nuclear Operating Company

Davis-Besse Nuclear Power Station, Unit 1

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TECHNICAL LETTER REPORT
REQUESTS FOR ADDITIONAL INFORMATION
ON THIRD 10-YEAR INSERVICE INSPECTION INTERVAL
REQUEST FOR RELIEF
FOR
FIRSTENERGY NUCLEAR OPERATING COMPANY
DAVIS-BESSE NUCLEAR POWER STATION, UNIT 1
DOCKET NO. 50-346

1. SCOPE

By letter dated September 19, 2000, the licensee, FirstEnergy Nuclear Operating Company, submitted multiple requests for relief from the requirements of the American Society of Mechanical Engineers (ASME) Code, Section XI, for the Davis-Besse Nuclear Power Station, Unit 1. These relief requests are for the third 10-year inservice inspection (ISI) interval. Brookhaven National Laboratory reviewed the information submitted by the licensee and based on this review, the following information for each relief request is required to complete this evaluation.

2. REQUESTS FOR ADDITIONAL INFORMATION

2.1 Request for Relief No. RR-A1 - Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee requested the required surface examination for the reactor vessel inlet and outlet nozzle to pipe welds, and the reactor vessel nozzle to core flood safe end welds be replaced with an ultrasonic examination from the ID which is capable of detecting opposite side surface flaws.

The proposed alternative examination has been proven capable of detecting flaws originating from the outside surface of the piping. The licensee states that Performance Demonstration Initiative (PDI) will include the examination of piping from the inside surface as part of the qualification process for Supplement 12 of Appendix VIII. In order for the proposed alternative to be acceptable, please provide the following:

- (1) It is stated in the basis section of this relief request that the PDI does not address the examination of piping welds from the inside surface. It is licensee's understanding that PDI will include the examination of piping from the inside surface as part of the qualification process for Supplement 12, Requirements for the Coordinated Implementation of Selected Aspects of Supplements 2, 3, 10, and 11, of Appendix VIII. Supplement 12 of Appendix VIII is required by 10 CFR 50.55a to be implemented by November 2002. Once Supplement 12 is implemented, the examination process used at Davis-Besse for examining the piping welds from the inside surface will be qualified in accordance with the PDI requirements. What is the alternative, if PDI is not capable of qualifying piping examinations from the inside surface?
- 2.2 Request for Relief No. RR-A2 - Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee requested that the Code-required 100 percent volumetric examination for the Reactor Vessel Head-to-Flange weld be replaced with an examination along the weld axis in two directions, and a perpendicular examination along the weld axis in only one direction. This will result in approximately 80 percent examination volume required by the Code.

The proposed alternative examination, in conjunction with the required surface examination, has been proved to be capable of detecting flaws in the Head-to-Flange weld. In order for the proposed alternative to be acceptable, please provide the following:

- (1) The licensee has discussed design limitations that involve the transition curvature of the head base material relative to the flange and the positioning of the three lifting lugs as the main reasons for requesting relief from the Code required volumetric examination. The licensee states that because of these limitations, approximately 80 percent of the weld will be examined volumetrically. Provide drawings or sketches to illustrate these limitations. Also, provide the drawing ISI-SK-002 which has been referenced in the basis section.

- 2.3 Request for Relief No. RR-A3 - Pursuant to 10 CFR 50.55a (a)(3)(ii), the licensee requested relief from the removal of insulation from pressure retaining connections during pressure testing. The licensee will implement Code Case N-616 which allows VT-2 examination of bolted connections with corrosive resistant materials without removing the insulation. Where Code Case N-616 will not be applicable, the licensee will perform the VT-2 examination after removing the insulation. However, for Class 1 systems, the VT-2 examination will be performed without being pressurized. For Class 2 systems, the VT-2 examination will be performed with the system pressurized.

The proposed alternative examinations have proved to be effective in detecting leaks from Class 1 and 2 pressure retaining bolted connections. In order for the proposed alternative to be acceptable, please provide the following information:

- (1) The licensee states that similar to several corrosive resistant bolting materials in Code Case N-616, corrosion resistance of 410 series stainless steels (such as SA-193 Grade 6) has been demonstrated in Electric Power Research Institute (EPRI) Reports NP-5769 and TR-104748. It is not clear if this relief request is applicable to bolted connections made out of stainless steel 410 series, in addition to Code Case N-616 materials. If it is applicable, clarify if the Nuclear Regulatory Commission has previously approved this stainless steel bolt material to be corrosive resistant.
- (2) The licensee references 60 insulated Class 1 bolted connections. Of these, how many will have the provisions of Code Case N-616 and EPRI Reports (if included) implementation (VT-2 examination of ASME Class I and 2 bolting without insulation removal when corrosive resistant bolting material has a chromium content greater than or equal to 10 percent)?
- (3) As part of the basis, the licensee estimates that the removal and replacement of the insulation will result in a 20 man-rem exposure. If not all of the 60 insulated Class 1 bolted connections will have the insulation removed (per Code Case N-616), what is the anticipated decrease in exposure?
- (4) In accordance with IWA-5110, the Examination Category B-P for Class 1 systems requires system pressure test to be performed during each refueling

outage. In accordance with the proposed alternative examination, the licensee requested to perform the VT-2 examination during the pressure test for the Class 1 pressure retaining bolted connections which has a chromium content less than 10 percent, once in each inspection period. Discuss the basis for changing the frequency of VT-2 examination of these Class 1 bolted connections from each refueling outage to each inspection period.

- 2.4 Request for Relief No. RR-A5 - Pursuant to 10 CFR 50.55a (a)(3)(i), the licensee requested relief from Code-required 100 percent volumetric examination for five Pressurizer Nozzle to Vessel Welds, examination category B-D, Item No. B3.110 (Nozzle-to Vessel Welds) and six Steam Generator (Primary Side) Nozzle to Vessel Welds, Examination Category B-D, Item No. B3.130 (Nozzle-to Vessel Welds). The limiting conditions are due to the nozzle configuration and internal cladding which limits the ability to bounce the ultrasonic beam from the inside surface of the vessel. This results in examination of 60-75 percent of the required volume for the above 11 welds.

There is no proposed alternative examinations for these welds. In order for this to be acceptable, please provide the following information:

- (1) Illustrate with sketches and/or drawings how the five specific weld configurations interfere with the scanner's angle beam probes and limit the examination coverages.

- 2.5 Request for Relief No. RR-A6 - Pursuant to 10 CFR 50.55a (a)(3)(ii), the licensee requested relief from the VT-2 examination of welds in the ASME Class 1 Decay Heat Removal Piping between Valves DH11 and DH12 during system leakage test. The licensee discussed three specific options that are available to perform the system leakage test of piping between valves DH11 and DH12. The licensee considers these options will require hardship and a detriment to the quality and safety of the reactor coolant system.

There is no proposed alternative examinations for this piping section. In order for this to be acceptable, please provide the following information:

- (1) Clarify if there are other weld locations of identical size and materials and exposed to similar environmental and operating conditions, which can be pressure tested to establish the leak integrity of this pipe section.

- 2.6 Request for Relief No. RR-A7 - Pursuant to 10 CFR 50.55a (a)(3)(ii), the licensee requested relief from performing system leakage test of the of ASME Class 1 Reactor Coolant System small diameter (≤ 1 inch) vent, drain, and instrument piping. The licensee will perform the system leakage test with the small diameter piping in its normal operating conditions (i.e., the first manual isolation valve in closed position).

There is no proposed alternative examinations for these small bore piping. In order for this to be acceptable, please provide the following information:

- (1) Clarify if there are other small bore piping of identical size and materials and exposed to similar environmental and operating conditions, which can be pressure tested to establish the leak integrity of the pipe section in between the two isolation valves.
- (2) Since most of these small bore piping are not subject to ISI, the licensee should commit to VT-2 or similar visual examination of these small bore piping when leakage in other small bore piping (e.g., non-isolable portions of the drain and vent connections) is noted.

- 2.7 Request for Relief No. RR-A14 - Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee requested to use Code Case N-639, Alternative Calibration Block Material, when the calibration blocks of the same material specification, product form, and heat treatment condition as the material being examined are not available.

Code Case N-639 allows the use of calibration blocks fabricated from material of similar chemical analysis, tensile properties, and metallurgical structure as the material being examined. In order for this to be acceptable, please provide the following information:

- (1) The licensee mistakenly mentioned vessels greater than 2" in diameter in both the title section and alternative examination. Clarify if the licensee meant this vessels greater than 2" thickness in these two sections of the relief request.

- 2.8 Request for Relief No. RR-A15 - Pursuant to 10 CFR 50.55a(a)(3)(ii), the licensee requested to use the best available techniques, as qualified through the PDI, from the accessible side of the weld on a best effort basis.

Class 1 dissimilar metal welds and austenitic stainless steel welds, and Class 2 stainless steel welds with single side access for ultrasonic examinations result in a reduction in examination coverage of the weld which is greater than 10 percent. The proposed alternative is the best possible method available. In order for this to be acceptable, please provide the following information:

- (1) Identify the Examination Category and the Code Item Number for the Class 1 dissimilar metal welds.
- (2) Clarify if these welds are surface examined for the entire length of the weld.
- (3) The licensee states that the PDI Performance Demonstration Qualification Summary (PDQS) certificates for austenitic piping list the limitation that single side examination is performed on a best effort basis. Clarify these limitations for single side examination and identify the Appendix VIII section that relates to PDQS certificate.
- (4) This relief is requested under 10 CFR 50.55a(a)(3)(ii). Clarify why the Code requirements would result in hardship.

- 2.9 Request for Relief No. RR-B1 - Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee requested to perform an approximately 80 percent of the Code required volumetric examination of the decay heat removal heat exchanger E27-1 and E27-2 shell-to-flange welds.

The proposed alternative examination, in conjunction with the surface examination of the reinforcing plates, has been proved to be capable of detecting flaws in the shell-to-flange welds. In order for the proposed alternative to be acceptable, please provide the following:

- (1) Illustrate with sketches and/or drawings how the specific shell-to-flange weld configurations interfere with the other nearby components and limit the examination coverages.
- (2) Provide Drawing ISI-SK-050 showing the Weld G, as indicated in the Code Requirement section of the relief request.

- 2.10 Request for Relief No. RR-B2 - Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee requested not to use the minimum nominal wall thickness criteria for sampling the Class 2 piping welds. Instead, the licensee proposed a criteria which includes the inspection of C-F category welds and augmented examinations of certain groups of Class 2 welds.

The proposed alternative examination includes both surface and volumetric examination of all C-F welds. In addition, the licensee proposed augmented inspections of piping greater than 4" nominal pipe size (NPS) and wall thickness between 1/5" and 3/8 inch that will receive both surface and volumetric examination. Also, piping with wall thickness less than 1/5 inch will receive surface examination only. In order for the proposed alternative to be acceptable, please provide the following:

- (1) The licensee in its basis for relief categorized two groups of piping, namely one group with wall thickness less than 3/8" and greater than 1/5" and the second group has wall thickness less than 1/5". What are their pipe sizes (NPS) ?
- (2) When the Code criterion is applied, the licensee states that welds requiring examination in three specific systems constitute 93 percent, 26 percent, and 11 percent of the Class 2 welds. Are these percentages based on the total number of Class 2 welds in each individual system or several systems? What is the percentage of Class 2 welds requiring Code-specified inspection based on the total number Class 2 welds in the plant ?
- (3) It is stated that welds requiring examination in the emergency core cooling systems are about 1/3 of the total in the systems. This distribution is such that the requirements of C-F Note 2 can not be met. Clarify this conclusion, preferably with some numbers.
- (4) In the proposed alternative, the last bullet states that welds with wall thickness less than 1/5 inch will receive an augmented surface examination. What is their pipe diameters ?

- (5) Clarify if the licensee intends to apply or has already applied for using the Risk-Informed ISI program for the Class 2 piping welds.

- 2.11 Request for Relief No. RR-B3 - Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee requested for reduction in Code-required examination coverage for the high-pressure injection pump nozzle to casing welds.

The licensee will perform surface examination of these welds to the maximum extent possible. Also, the licensee states that this will be supplemented by the support attachment weld inspection as required by the Code. In order for the proposed alternative to be acceptable, please provide the following:

- (1) The licensee states that the examination of pump casing-to-nozzle welds will be supplemented by the examination of the accessible surfaces of the pump support attachment welds as required by Code Category C-C. Clarify how this will supplement the nozzle-to-casing weld surface examination.

- 2.12 Request for Relief No. RR-E7 - Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee requested for using the provisions applicable to direct visual VT-3 examinations on the same specimen as used to qualify the remote visual examinations.

In order for the proposed alternative to be acceptable, please provide the following:

- (1) What is basis for selecting a chipped paint specimen or an 18 percent neutral gray card as qualifiers for remote visual examinations?
- (2) The licensee states that Subsection IWE of the 1998 Edition of ASME Section XI, no longer requires a VT-3 examination of the containment surfaces. Therefore, the requirements of Table IWA-2210-1 are no longer applicable to IWE containment examinations. If this is the case, then why do we need this relief request. Clarify.