

UNITED STATES NUCLEAR REGULATORY COMMISSION WASHINGTON, D.C. 20000-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION REGARDING RELIEF REQUESTS FOR THE INSERVICE INSPECTION THIRD 10-YEAR INTERVAL DUQUESNE LIGHT COMPANY OHIO EDISON COMPANY PENNSYLVANIA POWER COMPANY BEAVER VALLEY POWER STATION. UNIT NO.1 DOCKET NO. 50-334

1.0 INTRODUCTION

Inservice inspection (ISI) 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 <u>ASME</u> <u>Boiler and Pressure Vessel (B&PV) Code</u> and applicable addenda as required by 10 CFR 50.55a(g), except where specific relief has been granted by the U.S. Nuclear Regulatory Commission (NRC) staff pursuant to 10 CFR 50.55a(g)(6)(i). Alternatives to the requirements of 10 CFR 50.55a(g) may be used, then authorized by the NRC, if (i) the proposed alternatives would provide an acception level of quality and safety or (ii) compliance with the specified requirements would result is bordship or unusual difficulty without a compensating increase in the level of quality and sate at

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 first 10-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of the Section XI of the ASME Code incorporated by reference in 10 CFR 50.55a(b) twelve months prior to the start of the 10 Cont interval, subject to the limitations and modifications listed therein. The applicable edition of Section XI of the ASME Code for the Beaver Valley Power Station, Unit No. 1 (BVPS-1), third 10-year ISI interval is the 1989 edition.

By letter dated September 17, 1997, the licensee proposed alternatives to the Code requirements within the Third 10-Year Interval Program Plan for BVPS-1. In addition, the licensee submitted additional information/clarification to the NRC staff in support of the third 10-year interval ISI program plan in order to complete the review in its letter dated June 18, 1998.

2.0 EVALUATION

The NRC staff, with technical assistance from its contractor, the Idaho National Engineering and Environmental Laboratory (INEEL), has evaluated the information provided by the licensee in support of its Third 10-year ISI Program Plan and associated requests for relief for BVPS-1. Based on the results of the review, the NRC staff adopts the contractor's recommendations presented in the Technical Evaluation Report (TER) attached.

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ENCLOSURE

The NRC staff determined that there were no deviations from the regulatory requirements or commitments made by the licensee within the Third 10-year ISI Program Plan for BVPS-1.

Request for Relief RR-1-TYP-3-N-521 (Rev 0): This request for relief involves the use of Code Case N-521, Alternative Rules for Deferral of Inspections of Nozzle-to-Vessel Welds, Inside Radius Sections, and Nozzle-to-Safe End Welds of a Pressurized Water Reactor Vessel, Section XI, Division 1.

Section XI, Subsection IWB, Table 2500-1, Examination Categories B-D, Items B3.90, B3.100 require 100% volumetric examination of all nozzle-to-vessel welds and nozzle inside redius sections each interval. At least 25%, but not more than 50% (credited), shall be examined by the end of the first period of the interval. Examination Category B-F, Item Number B5.10 also requires 100% volumetric examination and may be performed coincident with the Code-required vessel nozzle examinations under Category B-D.

The licensee has proposed using Code Case N-521, which defers the examination of these areas until the end of the third 10-year interval. The licensee examined the subject areas during the third period of the second ISI inspection interval and therefore, by deferring the examinations of these areas to the end of the third inspection interval, the licensee will not exceed 10 years between examinations. Furthermore, the licensee meets the other conditions of the Code Case N-521. The NRC staff concludes that the licensee's proposal to use Code Case N-521 as an alternative, provides an acceptable level of quality and safety.

Therefore, the licensee's proposed alternative in request for relief RR-1-TYP-3-N-521 is authorized pursuant to 10 CFR 50.55a(a)(3)(i). The use of Code Case N-521 is authorized for the third 10-year interval at BVPS-1, or until the Code Case is approved for general use by reference in Regulatory Guide 1.147. At that time, the licensee may continue to use the Code Case with limitations, if any, listed in Regulatory Guide 1.147.

Request for Relief RR-1-TYP-3-B3.120-1, (Rev 0): This request for relief involves the use of a VT-2, visual examination and boric acid walkdown performed every outage as an alternative to the ASME Code Section XI, Paragraph IWB-2500(b), Table IWB-2500-1, Examination Category B-D, Item B3.120, Pressurizer Nozzle Inside Radius Section.

In accordance with ASME Code, 1989 Edition, Section XI, Table IWB-2500-1, Examination Category B-D, Item B3.120 requires 100% volumetric examination of the pressurizer surge nozzle inside radius. Pursuant to 10 CFR 50.55a(a)(3)(ii), the licensee has proposed to conduct VT-2 visual examination and boric acid walkdown every outage in lieu of the Code-required 100% volumetric examination and has committed to perform the Code-required volumetric examination of the inside radius when the insulation is removed for maintenance or other purpose. In order to access the surge nozzle inner radius the licensee must individually remove the 78 heater cables from the pressurizer immersion heaters and its insulation causing excess radiation exposure to personnel. The licensee estimated the total radiation exposure to perform the required volumetric examination to be approximately 54,600 mR. The NRC staff finds that performing the required volumetric examination of the inside radius of the inside radius in accordance

with the Code requirement would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. The NRC staff has determined that the licensee's proposed alternative to conduct VT-2 visual examination and the boric acid walkdown inspection performed each outage, would provide reasonable assurance of structural integrity. Therefore, the alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

Request for Relief RR-1-TYP-3-B3.140-1 (Rev 0): A visual examination (VT-1) of the inside surface of the steam generator nozzle inside radius sections in lieu of the Code-required 100% volumetric examination, Examination Category B-D, Item B3.140.

The geometric configuration of the steam generator inside radius does not lend itself to meaningful interrogation by ultrasonic techniques which makes it impractical to complete the Code-required examination. To achieve the Code-required volumetric examination of the steam generator nozzle inside radius sections, the nozzles would have to be redesigned and modified. Imposition of this requirement would cause a burden on the licensee. The NRC staff has determined that the proposed VT-1 visual examination of the nozzle inside surface will provide reasonable assurance of structural integrity and therefore, relief is granted and the alternative imposed pursuant to 10 CFR 50.55a(g)(6)(i).

Request for Relief RR-1-TYP-3-B5.70-1 (Rev 0): This request for relief involves a limited volumetric examination in lieu of 100% volumetric examination under ASME Code Section XI, Subsection IWB-2500(b), Table IWB-2500-1, Examination Category B-F, Item B5.70, Steam Generator Nozzle Safe End-to-Pipe Welds.

The requirements of the code are impractical because the as cast configuration of the nozzle does not lend itself to meaningful interrogation from the nozzle side of the weld. The licensee attempted various supplemental scan angles during UT examination to improve coverage. However, the licensee's UT exam only covered 70% of the Code-required volume. The Code-required surface examination can be performed on 100% of the required surface. To meet the Code requirements on volumetric examination, the nozzle safe ends and piping would require redesign and modification. Imposition of this requirement would cause a burden on the licensee. Provided that the licensee obtains approximately 70% volumetric coverage, as previously completed, in conjunction with the Code-required surface examinations, the NRC staff has determined that reasonable assurance of the structural integrity of the nozzle to safe end welds will be maintained. Therefore, relief is granted and the alternative imposed pursuant to 10 CFR 50.55a(g)(6)(i).

Request for Relief RR-1-TYP-3-N-524 (Rev D): Use of Code Case N-524 " Attemative Examination Requirements for Longitudinal Welds in Class 1 and 2 Piping Section XI, Division 1."

The licensee has proposed using Code Case N-524 for examination of Class 1 and 2 longitudinal welds. The manufacturing of the pipe longitudinal welds under controlled conditions enhances the material properties of the weld and reduces the residual stresses created by welding. However, the area of the longitudinal weld that intersects the

circumferential field weld is the area that will likely undergo material and configuration changes. Code Case N-524 requires examination at these locations. The licensee has identified all locations requiring examination and has committed to completing these examinations in accordance with the Code-required frequency under Code Case N-524. The NRC staff has determined that the licensee's proposed alternative to use Code Case N-524 will provide an acceptable level of quality and safety by provide. It assurance of structural integrity. Therefore, the licensee's proposed alternative in request for relief RR-1-TYP-3-N-524 is authorized pursuant to 10 CFR 50.55a(a)(3)(i). The use of Code Case N-524 is authorized for the third 10-year interval at BVPS-1, or until the Code Case is approved for general use by reference in Regulatory Guide 1.147. At that time, the licensee may continue to use the Code Case with limitations, if any, listed in Regulatory Guide 1.147.

Request for Relief RR-1-TYP-3-B-G-1 (Rev 0): This request for relief involves the use of VT-1 visual examination as an alternative to the Code requirements, Section XI, Table IWB-2500-1, Examination Category B-G-1, item B6.10, Reactor Vessel Closure Head Nuts.

The 1989 Edition of the ASME Code, Table IWB-2550-1, Examination Category B-G-1, for closure head nut examination, did not provide any examination requirement or acceptance standards. However, examination requirement and acceptance standards for closure head nuts were provided in the 1989 Addenda to the Code. The licensee proposes to use the 1989 Addenda, for Examination Category B-G-1, which requires a visual VT-1 examination on the closure head nuts. Moreover, the acceptance criteria for VT-1 visual examination has included evaluation of crack-like indications and other relevant conditions such as localized corrosion, deformation of part, and other degradations requiring corrective action. Hence, it can be concluded that the VT-1 visual examination provides a more comprehensive assessment of the condition of the closure head nuts. Based on the examination requirement and acceptance criteria provided in the 1989 Addenda, the NRC staff finds that the alternative proposed by the licensee provides an acceptable level of quality and safety by providing assurance of structural integrity. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the NRC staff authorizes the licensee's alternative for the third 10-year interval for closure head nut examination.

Request for Relief RR-1-TYP-3-RH-E-1-1 (Rev 0): Relief from the Code-required 100% volumetric examination, Examination Category C-A, Items C1.10 and C1.20, Residual Heat Removal Heat Exchanger (RHR) Circumferential Welds.

Pursuant to 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from 100% volumetric examination of RHR Heat Exchanger circumferential welds RH-H-1A(1E)-C-1 and C-2. The welded support plates and nozzle reinforcing saddles limit examination coverage of the subject welds to 84% of the volume for weld RH-E-1A-C-1 and 80% for weld RH-E-1A-C-2. The Code-required 100% examination is, therefore, impractical to achieve. To achieve the Code-required volumetric examination coverage, the area of concern would have to be redesigned and modified. Imposition of this requirement would cause a burden on the licensee. The licensee has performed the examination to the maximum extent practical. The licensee's proposed alternative will provide reasonable assurance that structural integrity will be maintained

provided, as a minimum, an equivalent volume, i.e., 84% for RH-E-1A-C-1 and 80% for RH-E-1A-C-2, is achieved for successive examinations. Based upon the impracticality of meeting the Code-required coverage and the examination completed, relief is granted and the alternative imposed pursuant to 10 CFR 50.55a(g)(6)(i).

Request for Relief RR-1-TYP-3-C6.10-1 (Rev 0): Relief from Code-required surface examination, Examination Category C-G, Item C6.10, Pump Casing Welds.

The licensee has requested relief from performing surface examination of Recirculating Spray Pump casing welds identified as RS-P-2A (2B)-C-10 through 27 and Safety Injection pump casing welds identified as SI-1A(1B)-C-1 through 20 since the subject welds are inaccessible, being located beneath the finished floor elevation within the pump sump. Performance of the Code-required surface examination would require pump disassembly and reassembly, which would risk damage to the pump impeller, alignment, bearing, and tie rod. Disassembly of the pumps for the sole purpose of performing the Code-required surface examination would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. However, the alternative includes the performance of the Code-required examination if the casing is removed for maintenance. Based on the results of periodic inservice tests and leak detection, the NRC staff has determined that reasonable assurance for continued operational readiness is provided and, therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), the alternative is authorized for the third 10-year interval for Recirculating Spray and Safety Injection pump casing welds at BVPS-1.

Request for Relief RR-1-TYP-3-APP-I-1 (Rev 0): Use of personnel qualified to Performance Demonstration Initiative (PDI) Program during ultrasonic examination as an alternate requirement to Appendix I, Paragraph I-2300 of ASME Code, Section XI for qualification of UT personnel, for Examination Categories B-G-1 and C-D, Class 1 and 2, Bolts and Studs.

The PDI program based on the criteria of Appendix VIII, Section XI of the ASME Code, requires that ultrasonic equipment, procedures, and examiners be tested on flawed and notched materials and configurations similar to those found in actual plant conditions. The NRC staff has determined that the PDI technique provides an equivalent or better examination than that of the governing standards. Hence, personnel qualified in accordance with the PDI Program provide assurance of an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the licensee's proposed alternative is authorized during the third 10-year interval.

Request for Relief RR-1-TYP-3-UT-1 (Rev 0): Use of Performance Demonstration Initiative (PDI) Program as alternative requirements to Section XI, Subsection IWA-2232, Ultrasonic Examination Requirements.

The PDI program based on the criteria of Appendix VIII, Section XI of the ASME Code, requires that ultrasonic equipment, procedures, and examiners be tested on flawed and notched materials and configurations similar to those found in actual plant conditions. The NRC staff has determined that the PDi Sechnique provides an equivalent or better examination than that of the governing standards. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the licensee's proposed alternative provides an acceptable level of quality and safety, and is authorized during the third 10-year interval.

Request for Relief RR-1-TYP-3-N-509 (Rev 0): Use of Code Case N-509 "Alternative Rules for the Selection and Examination of Class 1, 2, and 3 Integrally Welded Attachments."

The licensee has proposed to use the requirements of Code Case N-509 as an alternative to the Code requirements for the examination of integrally welded attachments on Class 1, 2, and 3 piping and components. The alternative includes supplementing the Code Case with a minimum examination sample of 10% of all integral attachments to non-exempt Class 1, 2, and 3 components. The NRC staff has determined that use of Code Case N-509 with the supplemental sampling provides an acceptable level of quality and safety and therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the licensee's proposed alternative is authorized. The use of Code Case N-509 is authorized for the third 10-year interval at BVPS-1, or until the Code Case is approved for general use by reference in Regulatory Guide 1.147. At that time, the licensee may continue to use the Code Case with limitations, if any, listed in Regulatory Guide 1.147.

3.0 CONCLUSION

The NRC staff has evaluated the licensee's submittal and has concluded that certain inservice examinations could not be performed to the extent required by the Code at BVPS-1. The licensee has submitted information to substantiate its position of impracticality of the Code-required volumetric examination coverage and the burden on the licensee if the Code requirements were imposed, for Relief Request Nos. 1-TYP-3-B3.140-1, 1-TYP-3-B5.70-1, and 1-TYP-3-RH-E-1-1 and therefore, relief is granted and the alternatives imposed pursuant to 10 CFR 50.55a(g)(6)(i). The relief granted is authorized by law and will not endanger life or property or the common defense and is otherwise in the public interest given due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

Pursuant to 10 CFR 50.55a(a)(3)(i), it is concluded that for Relief Request Nos. 1-TYP-3-B-G-1, 1-TYP-3-APP-I-1, 1-TYP-3-UT-1, 1-TYP-3-N-509, 1-TYP-3-N-521, and 1-TYP-3-N-524, the licensee's proposed alternatives will provide an acceptable level of quality and safety and therefore, the proposed alternatives are authorized for the third 10-year interval. Use of Code Cases N-521, N-524 and N-509 is authorized for the third 10-year interval or until the Code Cases are included in Regulatory Guide 1.147. At that time, the licensee may continue to use the Code Cases per the limitations, if any, listed in Regulatory Guide 1.147.

Pursuant to 10 CFR 50.55a(a)(3)(ii), it is concluded that for Relief Request Nos. 1-TYP-3-B3.120-1, and 1-TYP-3-C6.10-1, compliance to Code requirement will result in hardship or unusual difficulty without a compensating increase in the level of quality and safety, and therefore, the proposed alternatives are authorized for the third 10-year interval.

Attachment: TER

Principal Contributor: P. Patnaik

Date: December 29, 1998