July 18, 2007

Mr. James H. Lash
Site Vice President
FirstEnergy Nuclear Operating Company
Beaver Valley Power Station
Mail Stop A-BV-SEB1
P.O. Box 4, Route 168
Shippingport, PA 15077

SUBJECT: BEAVER VALLEY POWER STATION, UNIT NOS. 1 AND 2 - RELIEF REQUEST NO. BV3-PT-2 REGARDING HYDROSTATIC PRESSURE TESTING (TAC NOS. MD2938 AND MD2939)

Dear Mr. Lash:

By letter dated September 1, 2006, FirstEnergy Nuclear Operating Company (the licensee), requested approval of an alternative to the hydrostatic pressure testing of Class 1 pressure retaining piping and valves requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, for Beaver Valley Power Station, Unit No. 1 (BVPS-1) third interval inservice inspection (ISI) program and Unit No. 2 (BVPS-2) second 10-year ISI program. The licensee proposed to perform: (1) a system leakage test in accordance with ASME Code Case N-498-1, "Alternative Rules for 10-year System Hydrostatic Testing for Class 1, 2, 3 Systems," which requires that the boundary subject to test pressurization during the system leakage test extend to all Class 1 pressure retaining components within the system boundary, and (2) alternative visual examinations of certain Safety Injection System and Residual Heat Removal System components and piping during the system leakage test.

The Nuclear Regulatory Commission (NRC) staff has concluded that compliance with the ISI Code of Record would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety, and that the proposed alternative provides reasonable assurance of structural integrity. Therefore, pursuant to Section 50.55a(a)(3)(ii) of Part 50 of Title 10 of the *Code of Federal Regulations* (10 CFR), the staff authorizes the ISI program alternative for the third 10-year ISI interval of BVPS-1 and the second 10-year interval of BVPS-2.

All other requirements of the ASME Code, Section XI for which relief has not been specifically requested remain applicable, including third party review by the Authorized Nuclear Inservice Inspector.

Sincerely,

/RA/

Mark G. Kowal, Chief
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-334 and 50-412

Enclosure:
As stated

cc w/encl: See next page

All other requirements of the ASME Code, Section XI for which relief has not been specifically requested remain applicable, including third party review by the Authorized Nuclear Inservice Inspector.

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Division of Operating Reactor Licensing
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Docket Nos. 50-334 and 50-412

Enclosure:
As stated

cc w/encl: See next page

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ACCESSION NUMBER: ML071730281 *Input received. No substantive changes made.

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DATE	6/25/07	6/25/07	05/30/2007	07/12/07	7/18/07

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REGARDING THE INTERVAL INSERVICE INSPECTION PROGRAMS

FOR RELIEF REQUEST NO. BV3-PT-2

FIRSTENERGY NUCLEAR OPERATING COMPANY

FIRSTENERGY NUCLEAR GENERATION CORP.

OHIO EDISON COMPANY

THE TOLEDO EDISON COMPANY

BEAVER VALLEY POWER STATION, UNIT NOS. 1 AND 2

DOCKET NOS. 50-334 AND 50-412

1.0 INTRODUCTION

By letter dated September 1, 2006, Agencywide Document Access and Management System (ADAMS) accession number ML0624902024, FirstEnergy Nuclear Operating Company (licensee), requested approval of an alternative to the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, for Beaver Valley Power Station, Unit No. 1 (BVPS-1) third interval inservice inspection (ISI) program and Unit No. 2 (BVPS-2) second 10-year ISI program. The ASME Code, Section XI requires system hydrostatic testing of Class 1 pressure retaining piping and valves once per 10-year interval. In lieu of this requirement, the licensee proposed to perform a system leakage test, in accordance with ASME Code Case N-498-1 "Alternative Rules for 10-year System Hydrostatic Testing for Class 1, 2, 3 Systems," which requires that the boundary subject to test pressurization during the system leakage test extend to all Class 1 pressure retaining components within the system boundary. However, the normal system alignment of valves in the Class 1 segment of the safety injection (SI) system (accumulator discharge) and the residual heat removal (RHR) system (return line to the loop) prevents pressurization to the test pressure without making temporary provisions for use of an external pressurization source. Therefore, the licensee's proposed alternative modifies ASME Code Case N-498-1 in that the system leakage test for a small segment of piping in the Class 1 pressure boundary is performed at a pressure of 660 pounds per square inch gauge (psig) for BVPS-1 and at 640 psig for BVPS-2 in lieu of the 10-year system hydrostatic test for the reactor coolant system (RCS).

Enclosure

2.0 REGULATORY REQUIREMENTS

Section 50.55a(g) of Part 50 of Title 10 of the *Code of Federal Regulations* (10 CFR) requires that ISI of ASME Code Class 1, 2, and 3 components are performed in accordance with Section XI of the ASME Code and applicable addenda, except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). According to 10 CFR 50.55a(a)(3), alternatives to the requirements of paragraph 50.55a(g) may be used, when authorized by the Nuclear Regulatory Commission (NRC), if an applicant demonstrates that the proposed alternatives would provide an acceptable level of quality and safety or if the specified requirement 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 ISI 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 Section XI of the ASME Code, incorporated by reference in 10 CFR 50.55a(b) 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The ISI Code of Record for the third 10-year inspection interval of BVPS-1 and the second 10-year inspection interval of BVPS-2, is the 1989 Edition of the ASME Code, Section XI.

3.0 TECHNICAL EVALUATION

3.1 System/Component(s) Affected

BVPS-1:

- Components and piping between check valve 1SI-48 and check valve 1SI-51 (associated with 'A' Safety Injection Accumulator)
- Components and piping between check valve 1SI-49 and check valve 1SI-52 (associated with 'B' Safety Injection Accumulator) and Motor-Operated Valve (MOV)-1RH-720A (RHR outlet)
- Components and piping between check valve 1SI-50 and check valve 1SI-53 (associated with 'C' Safety Injection Accumulator) and MOV-1RH-720B (RHR outlet)

BVPS-2:

- Components and piping between check valve 2SIS-148 and check valve 2SIS-151 (associated with 'A' Safety Injection Accumulator)
- Components and piping between check valve 2SIS-147 and check valve 2SIS-145 (associated with 'B' Safety Injection Accumulator) and MOV-2RHS-720A (RHR outlet)

- Components and piping between check valve 2SIS-142 and check valve 2SIS-141 (associated with 'C' Safety Injection Accumulator) and MOV-2RHS-720B (RHR outlet)

3.2 ASME Code Requirements

Table IWB-2500-1, Category B-P, Item B15.51 requires hydrostatic testing of Class 1 pressure retaining piping once per ten-year interval. Code Case N-498-1 (referenced in the BVPS Ten-Year Inservice Inspection Program) allows a system leakage test in lieu of the ten-year hydrostatic testing. Note 2 of Table IWB-2500-1 and Paragraph (a)(2) of N-498-1 require that the test pressurization boundary extend to all Class 1 components.

Paragraph IWB-5221(a) states, "The system leakage test shall be conducted at a test pressure not less than the nominal operating pressure associated with 100% rated power."

3.3 Licensee's Basis for Request

Normal reactor coolant pressure at 100% rated power is approximately 2235 psig. The components and piping are isolated from the reactor coolant pressure boundary by a check valve and, therefore, are not exposed to a pressure of 2235 psig. The components and piping are pressurized to approximately 660 psig for BVPS-1 and 640 psig for BVPS-2 during normal plant operation from the passive safety injection accumulators. In order to meet the test pressure requirement of the applicable Code requirement, use of an external pressurization source would be required or use of temporary hose to connect the RCS to the affected segment of piping is required. Since the check valve would be part of the test boundary, a pressure differential would be required between the RCS and the subjected segment of piping to maintain check valve closure. Maintaining the differential pressure and ensuring no test fluid intrusion into the RCS to affect reactivity is considered to be unusually difficult to meet with no compensating increase in the level of quality and safety.

3.4 Licensee's Proposed Alternative

In lieu of performing the 10-year system hydrostatic test, the licensee plans to perform a system leakage test each refueling outage at a lower pressure than what is specified in ASME Code Case N-498-1, and proposes alternative visual examination of SI system and RHR system components and piping identified in section 3.1 during the system leakage test.

4.0 STAFF EVALUATION

The Code of Record, 1989 Edition ASME Code, Section XI, Table IWB-2500-1, Category B-P, Item B15.51 requires hydrostatic testing of Class 1 pressure retaining piping once per 10-year interval. The licensee adopted Code Case N-498-1 in their 10-year ISI program which allows a system leakage test in lieu of the Code-required system hydrostatic test. However, NRC approved a later revision (Code Case N-498-4) of the licensee's proposed Code Case N-498-1 in Regulatory Guide 1.147 "Inservice Inspection Code Case Acceptability," Revision 14, which also accepts a system leakage test conducted at or near the end of each inspection interval, prior to reactor startup in lieu of the 10-year system hydrostatic test for Class 1 system. The system leakage test is required to be performed at a test pressure not less than the nominal

operating pressure of the RCS corresponding to 100% rated reactor power and must include all Class 1 components within the RCS boundary. However, several SI and RHR piping line segments are connected to the RCS through self-actuating check valves, which does not allow normal RCS pressure to be used to pressurize these segments. In order to test the subject piping segments to normal operating RCS pressure corresponding to 100% rated power (approximately 2235 psig), the licensee would have to use an external pressurization source or use temporary hoses as jumpers in those line segments. Either of these methods would challenge double isolation valve protection for the RCS boundary, when fuel is present in the reactor core. In addition, pressurizing these segments to normal RCS pressures may result in test fluid intrusion into the RCS, which may cause a reactivity excursion. Therefore, to require the licensee to comply with the Code Case N-498-1 in pressurizing the piping segments of SI and RHR between the isolation valves to normal operating RCS pressure would result in a considerable hardship. As an alternative to pressurizing the subject line segments to approximately 2235 psig (RCS pressure at 100% rated power), the licensee has proposed to perform system leakage test at 660 psig for BVPS-1 and at 640 psig for BVPS-2, the normal operating pressure of the SI system accumulators and the peak pressure during accident condition. Therefore, testing at 2235 psig would not provide a compensating increase in the level of quality and safety.

The licensee's proposed alternative represents the highest test pressures that can be obtained without the modifications, and are intended to test the subject pipe segments to conditions similar to those that may be experienced during postulated design-basis events. It is expected that the proposed test pressures will be sufficient to produce detectable leakage from significant service-induced degradation sources, if any, and verify that connections in these piping segments that may have been opened during the outage have been properly secured. The licensee will also pressurize to nominal operating pressure for at least 4 hours for insulated components, 10 minutes for non-insulated components, and maintain at that pressure prior to and during the VT-2 visual examination. The NRC staff has determined that the licensee's proposed alternative would provide reasonable assurance of operational readiness, since testing is done in normal operating condition of the valves, and structural integrity of the subject pipe segments is verified by the low pressure system leakage test, and therefore, is acceptable.

5.0 CONCLUSION

The NRC staff has concluded that to require the licensee to pressurize the subject piping segments in accordance with Code Case N-498-1 during the system leakage test, would require modifications that would result in hardship to the licensee without a compensating increase in the level of quality and safety. Based on the NRC staff's evaluation, the licensee's proposed alternative provides a reasonable assurance of operational readiness and structural integrity. Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), the proposed alternative is authorized for the third 10-year ISI interval of BVPS-1 and the second 10-year ISI interval of BVPS-2.

All other requirements of the ASME Code, Section XI for which relief has not been specifically requested remain applicable, including a third party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: P. Patnaik

Date: July 18, 2007