UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

November 21, 2016

Mr. Marty L. Richey
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 2 – RELIEF REQUEST BV2-PZR-01 REGARDING ALTERNATIVE TO REQUIREMENTS FOR COMPONENTS CONNECTED TO THE STEAM SIDE OF THE PRESSURIZER (CAC NO. MF7790)

Dear Mr. Richey:

By letter dated June 3, 2016 (Agencywide Documents Access and Management System Accession No. ML16158A306), FirstEnergy Nuclear Operating Company (the licensee) submitted a request to the U.S. Nuclear Regulatory Commission (NRC) for relief from certain requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (the Code) at the Beaver Valley Power Station, Unit 2. The proposed alternative would allow certain piping, tubing, fittings, valves, and supports to remain as designed and constructed in lieu of upgrading the design and replacing these components with those constructed to ASME Code Class 1 and 2 requirements.

The NRC staff has determined that the proposed alternative to the requirements of 10 CFR 50.55a(c) is authorized for BVPS-2 on the basis that compliance with the ASME Code, Section III design requirements for Class 1 components would result in hardship without a compensating increase in the level of quality and safety pursuant to 10 CFR 50.55a(a)(z)(2). The licensee's proposed alternative provides reasonable assurance that the pressurizer upper level instrument and other lines and associated components, as designed and constructed, will perform their intended safety function. The alternative is authorized for the remaining life of the plant.

All other ASME Code, Section III requirements for which relief was not specifically requested and approved remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

If you have any questions, please contact the Project Manager, Michael L. Marshall, Jr., at (301) 415-2871 or michael.marshall@nrc.gov.

Sincerely,

Stephen S. Koenick, Acting Chief
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-412

Enclosure:
Safety Evaluation

cc w/enclosure: Distribution via Listserv

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST BV2-PZR-01

FIRSTENERGY NUCLEAR OPERATING COMPANY

BEAVER VALLEY POWER STATION, UNIT 2

DOCKET NO. 50-412

1.0 INTRODUCTION

By letter dated June 3, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16158A306), FirstEnergy Nuclear Operating Company (the licensee) submitted a request to the U.S. Nuclear Regulatory Commission (NRC or the Commission) for relief from the requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (the Code), Section III, Class 1 and Class 2, requirements for components connected to the steam side of the pressurizer for the Beaver Valley Power Station, Unit 2 (BVPS-2).

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(z)(2), the licensee submitted Request BV2-PZR-01, Revision 0, for the use of the proposed alternative on the basis that compliance would result in hardship or unusual difficulty, without a compensating increase in the level of quality and safety. The alternative would allow certain piping, tubing, and valves to remain as designed and constructed in lieu of upgrading the design and replacing these components with those constructed to ASME Code Class 1 and Class 2 requirements.

2.0 REGULATORY EVALUATION

The regulations in 10 CFR 50.55a require that components that are part of the reactor coolant pressure boundary meet the requirements for Class 1 components in Section III of the ASME Code, except where alternatives have been authorized by the Commission pursuant to paragraphs (a)(z)(1) or (a)(z)(2) of 10 CFR 50.55a. In proposing alternatives, the licensee must demonstrate that (1) the proposed alternatives provide an acceptable level of quality and safety or (2) compliance would result in hardship or unusual difficulty, without a compensating increase in the level of quality and safety. Section 50.55a of 10 CFR allows the Commission to authorize alternatives upon making the necessary findings.

Enclosure

In addition, 10 CFR 50.55a(c) states, in part:

(1) [...] Components that are part of the reactor coolant pressure boundary must meet the requirements for Class 1 components in Section III of the ASME BPV [Boiler and Pressure Vessel] Code, except as provided in paragraphs (c)(2), through (4) of this section.

(2) [...] Components that are connected to the reactor coolant system and are part of the reactor coolant pressure boundary as defined in § 50.2 need not meet the requirements of paragraph (c)(1) of this section, provided that:

(i) [...] In the event of postulated failure of the component during normal reactor operation, the reactor can be shut down and cooled down in an orderly manner, assuming makeup is provided by the reactor coolant makeup system; [...].

In a letter dated April 3, 2000 (ADAMS Accession No. ML091190189), Westinghouse Electric Company issued its Nuclear Safety Advisory Letter (NSAL), "NSAL-00-006: Pressurizer Upper Level Instrument Safety Classification." This letter identified an issue where a break in the instrument lines for the upper (steam side) pressurizer level instruments may result in a rapid depressurization of the reactor coolant system sufficient to cause an emergency core cooling system actuation. Westinghouse NSAL 07-09, Revision 01, "Safety Classification of Small Lines Connected to the Pressurizer Steam Space," expanded the scope of the aforementioned letter to include all instrument and other small lines connected to the pressurizer steam space. In these letters, Westinghouse indicated that the aforementioned instrument lines should be classified as ASME Code Class 1. Given that a break in these lines would not result in a shutdown and cooldown "in an orderly manner," the licensee determined that the existing affected ASME Code Class 2 instrument and other lines and associated components connected to the pressurizer steam space should be classified as ASME Code Class 1, in accordance with 10 CFR 50.55a(c). The licensee has determined that these existing affected Class 2 lines are not in compliance with 10 CFR 50.55a(c). The licensee stated that the piping, fittings, tubing, valves, and supporting elements identified in the request were constructed using the ASME Code, Section III, Subsection NC (Class 2), requirements. Construction as used in Section III, Division 1, included requirements for materials, design, fabrication, examination, testing, inspection, and certification required in the manufacture and installation of items. Pursuant to 10 CFR 50.55a(z)(2), the licensee proposes to allow these lines and valves to remain as designed and constructed as Class 2.

The NRC staff has approved similar requests for relief regarding classification of pressurizer upper level piping and components for the Wolf Creek Nuclear Operating Corporation on May 31, 2005 (ADAMS Accession No. ML051520526), and for the Callaway Plant, Unit 1 on April 29, 2009 (ADAMS Accession No. ML090840102).

3.0 TECHNICAL EVALUATION

3.1 Licensee's Relief Request

The licensee stated that upgrading the piping, tubing, and valves to ASME Code, Section III, Subsection NB (Class 1), would result in a hardship or unusual difficulty, without a compensating increase in the level of quality and safety, because the scope of the change would require significant personnel radiation exposure due to component proximity to the pressurizer. The affected piping, tubing, and valves are part of the upper pressurizer instrument lines or pressurizer safety valve loop seal drain lines. The affected piping, tubing, and valves are shown in a table on pages 1 and 2 of the licensee's enclosure in the June 3, 2016, submittal.

The licensee proposed alternative is to allow the piping, tubing, and valves identified in the request to remain as designed and constructed to ASME Class 2 and ANSI B31.1 non-nuclear safety (NNS) in lieu of upgrading the current design configuration and replacing these components with components constructed to ASME Section III, Class 1 and Class 2 requirements.

To justify the proposed alternative, the licensee compared the ASME Code, Section III requirements in Subsection NB for Class 1 components to the design rules in Subsection NC for Class 2 components using the applicable editions and addenda of the ASME Code. The licensee also compared ANSI B31.1 Code and ASME, Section III, Subsection NC, for the NNS pipe. The comparison considered each article of Subsections NB, NC, and ANSI B31.1 (covering the areas of materials, design, fabrication and installation, examination, testing, protecting against overpressure, nameplates, stamping, and reports) and determined whether the differences were technical, quality, or administrative requirements. Differences in Section III administrative requirements such as certification and stamping, furnishing of a stress report, and marking of items, were determined to not reduce the quality or safety of the items and would only affect literal compliance with the ASME Code. Minimal differences were identified in quality requirements between Class 1 and Class 2, because most quality requirements are contained in the General Requirements Subsection NCA and are equally applicable to both Class 1 and Class 2. There are no differences in quality requirements that would reduce the quality or safety of the Class 2 and NNS components.

3.2 NRC Staff Evaluation

Regarding the valve design aspects related to the relief request, the licensee indicated that while the requirements for Class 1 small valves are considerably different than the requirements for Class 2 small valves, the affected valves were evaluated to the Class 1 requirements and found to meet all of the technical requirements found in NB-3500. Regarding the material examination facets of the affected piping and components, the later provisions of NB-2501(a) in the Summer 1983 Addenda exempted ≤ 1-inch seamless pipe, tubes, and fittings from the examination requirements of NB-2500. Thus, there are no technical differences between Class 1 and Class 2 rules. Given this information, had the design and construction of these systems been completed at a later date, the current Class 2 configuration would meet the Class 1 material examination requirements of NB-2500. Based on these considerations, the staff finds that for the affected Class 2 valves and material examination requirements, the

Class 2 requirements provide an equivalent level of safety to Class 1 requirements provided in the ASME Code.

The licensee states that NNS piping meets the requirements of ASME Section III, Subsection NC-3600, for pipe design and has been analyzed to Class 2 requirements. The licensee also states that NNS socket welds were examined by liquid penetration method per NC-5250 during the fall 2015 refueling outage, and a visual examination of the NNS piping was also performed, confirming heat numbers associated with Class 1 piping. The staff reviewed the piping and instrument drawing for the NNS piping part and found that the NNS piping is the drain line located downstream from the isolation valve. The isolation valve is normally closed and the NNS piping does not contain any flow. On this basis, the staff determined that no increase in quality and safety would be realized by considering the NNS piping as Class 2 piping.

The Class 2 piping and instrument piping (including tubing) identified in the relief request were designed and analyzed in accordance with the 1971 Edition with the Winter 1972 Addenda of Section III of the ASME Code. A provision added in the Summer 1975 Addendum to the 1974 Edition in subparagraph NB-3630(d) allowed Class 2 rules to be used for Class 1 design for piping less than or equal to 1 inch in size. Based on this provision, the affected piping and instrument piping technically meet the design requirements of the Code Class 1 rules. Therefore, the staff finds that the design rules used for the affected Class 2 piping provide an equivalent level of safety to Class 1 design requirements for the affected piping and tubing.

Furthermore, the NRC staff concludes that the licensee has demonstrated that the compliance with ASME Code, Section III, Class 1 requirements for the lines and associated components described in the alternative would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety because the scope of the change would require substantial time and radiation exposure to upgrade the current design configuration and replace the affected piping, tubing, and valves with components constructed to ASME Section III, Class 1 and Class 2 requirements.

4.0 CONCLUSION

The NRC concludes that the proposed alternative to the requirements of 10 CFR 50.55a(c) is authorized for BVPS-2 on the basis that compliance with the ASME Code, Section III design requirements for Class 1 components would result in hardship without a compensating increase in the level of quality and safety pursuant to 10 CFR 50.55a(a)(z)(2). The licensee's proposed alternative provides reasonable assurance that the pressurizer upper level instrument and other lines and associated components, as designed and constructed, will perform their intended safety function. The alternative is authorized for the remaining life of the plant.

Principal Contributor: Kaihwa Hsu
Taylor Lamb

Date: November 21, 2016

If you have any questions, please contact the Project Manager, Michael L. Marshall, Jr., at (301) 415-2871 or michael.marshall@nrc.gov.

Sincerely,

/RA/

Stephen S. Koenick, Acting Chief
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-412

Enclosure:
Safety Evaluation

cc w/enclosure: Distribution via Listserv

DISTRIBUTION:

PUBLIC LPLI-2 R/F
RidsRgn1MailCenter Resource
RidsACRS_MailCTR Resource
JBowen, OEDO
RidsNrrDorlLpl1-2 Resource
RidsNrrPMBeaverValley Resource
RidsNrrLALRonewicz Resource
RidsNrrDeEmcb Resource
KHsu, NRR

ADAMS Accession No.: ML16257A621 *by e-mail

OFFICE	DORL/LPLI-2/PM	DORL/LPLI-2/LA	DE/EMCB/BC*	DORL/LPLI-2/BC	DORL/LPLI-2/PM
NAME	TLamb	LRonewicz	JQuichocho	SKoenick	MMarshall
DATE	09/27/2016	09/23/2016	10/17/2016	11/16/2016	11/21/2016

OFFICIAL RECORD COPY