

Paul A. Harden
Senior Vice President and Chief Operating Officer

August 11, 2017
L-16-355

10 CFR 50.55a

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

SUBJECT:
Beaver Valley Power Station, Unit Nos. 1 and 2
Docket No. 50-334, License No. DPR-66
Docket No. 50-412, License No. NPF-73

Davis-Besse Nuclear Power Station
Docket No. 50-346, License No. NPF-3

Perry Nuclear Power Plant
Docket No. 50-440, License No. NPF-58
Proposed Alternative to Use ASME Code Case N-513-4

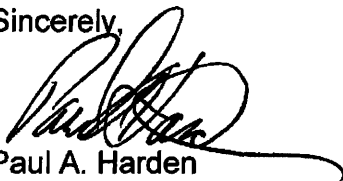
In accordance with the provisions of 10 CFR 50.55a(z)(2), FirstEnergy Nuclear Operating Company (FENOC) hereby requests Nuclear Regulatory Commission (NRC) approval of a proposed alternative to the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," for use at Beaver Valley Power Station, Unit Nos. 1 and 2, Davis-Besse Nuclear Power Station, and Perry Nuclear Power Plant.

Specifically, FENOC requests approval to use ASME Code Case N-513-4, "Evaluation Criteria for Temporary Acceptance of Flaws in Moderate Energy Class 2 or 3 Piping, Section XI, Division 1," with limits on leakage for the evaluation and temporary acceptance of flaws in moderate energy ASME Code Class 2 and Class 3 piping in lieu of the ASME Code, Section XI, requirements in subarticles IWC-3120 and IWC-3130 for ASME Code Class 2 components, and paragraph IWD-3120(b) and article IWD-3400 for ASME Code Class 3 components. The proposed alternative and supporting information are presented in Enclosure A. ASME Code Case N-513-4 and the technical basis for changes in this most recent revision of the code case are provided in Enclosures B and C, respectively. FENOC requests approval of the proposed alternative by August 20, 2018.

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Davis-Besse Nuclear Power Station,
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There are no regulatory commitments contained in this submittal. If there are any questions or if additional information is required, please contact Mr. Thomas A. Lentz, Manager – Fleet Licensing, at (330) 315-6810.

Sincerely,



Paul A. Harden

Enclosures:

- A. 10 CFR 50.55a Request to Use ASME Code Case N-513-4
- B. ASME Code Case N-513-4, Evaluation Criteria for Temporary Acceptance of Flaws in Moderate Energy Class 2 or 3 Piping Section XI, Division 1
- C. Technical Basis for Proposed Fourth Revision to ASME Code Case N-513

cc:

NRC Region I Administrator
NRC Region III Administrator
NRC Resident Inspector – Beaver Valley
NRC Resident Inspector – Davis-Besse
NRC Resident Inspector – Perry
NRC Project Manager – FENOC Fleet
Director BRP/DEP
Site BRP/DEP Representative
Utility Radiological Safety Board

Enclosure A
L-16-355

10 CFR 50.55a Request to Use ASME Code Case N-513-4

(5 Pages Follow)

Proposed Alternative
In Accordance with 10 CFR 50.55a(z)(2)

--Hardship Without a Compensating Increase in Quality and Safety--

1. ASME CODE COMPONENT(S) AFFECTED

Affected components include American Society of Mechanical Engineers (ASME), Boiler and Pressure Vessel Code (Code), Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," moderate energy Class 2 and Class 3 piping systems that meet the operational and configuration limits of ASME Code Case N-513-4, "Evaluation Criteria for Temporary Acceptance of Flaws in Moderate Energy Class 2 or 3 Piping, Section XI, Division 1," Section 1, "Scope," paragraphs 1(a), 1(b), 1(c), and 1(d).

2. APPLICABLE CODE EDITION AND ADDENDA

The applicable ASME Code, Section XI, edition and addenda is specified below for each plant.

2013 Edition for Beaver Valley Power Station, Unit Nos. 1 and 2.

2007 Edition, through 2008 Addenda, for Davis-Besse Nuclear Power Station

2001 Edition, through 2003 Addenda, for Perry Nuclear Power Plant third ISI interval

2013 Edition for Perry Nuclear Power Plant fourth ISI interval

3. APPLICABLE CODE REQUIREMENT

For ASME Code Class 2 components, subsubarticles IWC-3120 and IWC-3130 of ASME Code, Section XI, require that flaws exceeding the specified acceptance criteria be corrected by repair or replacement activities, or determined to be acceptable by analytical evaluation. For ASME Code Class 3 components, paragraph IWD-3120(b) of ASME Code, Section XI, 2001 Edition through 2003 Addenda and 2007 Edition through 2008 Addenda requires that components exceeding the acceptance standards of Subarticle IWD-3400 be subject to supplemental examination, or to a repair or replacement activity. For ASME Code Class 3 components, paragraph IWD-3120 of ASME Code, Section XI, 2013 Edition states that the requirements of IWC-3120 may be used.

4. REASON FOR REQUEST

Moderately degraded ASME Code Class 2 and 3 piping could require a plant shutdown within the required action statement timeframes to repair observed degradation. ASME Code Case N-513-3, "Evaluation Criteria for Temporary Acceptance of Flaws in Moderate Energy Class 2 or 3 Piping, Section XI, Division 1," provides criteria to allow temporary acceptance of flaws, including through-wall flaws in moderate energy Class 2 or 3 piping without performing repair or replacement activities. Code Case N-513-3, (Revision 3, January 26, 2009) is approved for generic use by licensees in Nuclear

Regulatory Commission (NRC) Regulatory Guide 1.147, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1," Revision 17 (ADAMS Accession No. ML13339A689), with the condition that the repair or replacement activity temporarily deferred under the provisions of this Code Case shall be performed during the next scheduled outage.

ASME Code Case N-513-3 does not address the evaluation of flaws in certain locations of moderate energy piping components, such as elbows, bent pipe, reducers, expanders, and branch tees. ASME Code Case N-513-4, "Evaluation Criteria for Temporary Acceptance of Flaws in Moderate Energy Class 2 or 3 Piping, Section XI, Division 1," (Revision 4, May 7, 2014) contains several revisions to ASME Code Case N-513-3 including expanding the applicability of the code case beyond straight pipe to include elbows, bent pipe, reducers, expanders, and branch tees. ASME Code Case N-513-4, provided in Enclosure B, has not been approved by the NRC for generic use by licensees.

Use of ASME Code Case N-513-4 is proposed to allow temporary acceptance of flaws, including through-wall flaws in moderate energy Class 2 or 3 elbows, bent pipe, reducers, expanders, branch tees, and heat exchanger external tubing or piping without performing repair or replacement activities, and thereby avoid a plant shutdown. Use of this alternative evaluation method in lieu of immediate action for such a degraded condition would allow FirstEnergy Nuclear Operating Company (FENOC) to perform additional extent of condition examinations on the affected systems while allowing time for safe and orderly long-term repair actions if necessary.

Plant shutdown activities result in additional dose and plant risk, requiring use of a system that is in standby during normal operation. Such a shutdown would be inappropriate when an affected ASME Code component (described in Section 1) in a degraded condition is demonstrated to retain adequate margin to fulfill the component's function. Accordingly, compliance with the current code requirements results in a hardship without a compensating increase in the level of quality and safety.

5. PROPOSED ALTERNATIVE AND BASIS FOR USE

Application of the evaluation methods of ASME Code Case N-513-4 to Class 2 and 3 components that meet the operational and configuration limitations of Code Case N-513-4, paragraphs 1(a), 1(b), 1(c), and 1(d) is proposed in lieu of the requirements in IWC-3120, IWC-3130, IWD-3120(b), and IWD-3400 of ASME Code Section XI, as they relate to the evaluation, repair, and replacement of ASME Code Class 2 and 3 moderate energy piping systems with flaws. An ASME Code, Section XI, compliant repair or replacement will be completed at the next scheduled refueling outage or prior to exceeding the allowable flaw size, whichever comes first.

For a leaking flaw, the allowable leakage rate will be determined by dividing the critical leakage rate by a safety factor of four. The critical leakage rate is determined as the highest leakage rate that can be tolerated and will be based on the allowable loss of inventory or the maximum leakage that can be tolerated relative to room flooding, among others.

The design basis is considered for each leak and evaluated using the FENOC operability determination and functionality assessment process. The evaluation process must consider requirements or commitments established for the system, continued degradation and potential consequences, operating experience, and engineering judgment. As required by the Code Case, the evaluation process considers, but is not limited to, system make-up capacity, containment integrity with the leak not isolated, effects on adjacent equipment, and the potential for room flooding.

During the temporary acceptance period, leaking flaws will be monitored daily as required by paragraph 2(f) of Code Case N-513-4 to confirm the analysis conditions used in the evaluation remain valid. Significant change in the leakage rate is reason to question that the analysis conditions remain valid and would require re-inspection per paragraph 2(f) of the Code Case. Any re-inspection must be performed in accordance with paragraph 2(a) of the Code Case.

The NRC issued Generic Letter, "Guidance for Performing Temporary Non-Code Repair of ASME Code Class 1, 2, and 3 Piping (Generic Letter 90-05)," to address the acceptability of limited degradation in moderate energy piping. The generic letter defines conditions that would be acceptable to utilize temporary non-code repairs with NRC approval. The ASME recognized that relatively small flaws could remain in service without risk to the structural integrity of a piping system and developed Code Case N-513. NRC approval of Code Case N-513 versions in Regulatory Guide 1.147 allows temporary acceptance of partial through-wall or through-wall leaks for an operating cycle provided all conditions of the code case and NRC conditions are met. The code case also requires the owner to demonstrate system operability considering effects of leakage.

The ASME recognized that the limitations in Code Case N-513-3 were preventing needed use in piping components such as elbows, bent pipe, reducers, expanders, and branch tees and external tubing or piping attached to heat exchangers. Code Case N-513-4 was approved by the ASME to expand it for use at these locations and to revise several other areas of the code case. The following list provides a high level overview of the Code Case N-513-4 changes:

1. Revised the maximum allowed time of use from no longer than 26 months to the next scheduled refueling outage.
2. Added applicability to piping elbows, bent pipe, reducers, expanders, and branch tees where the flaw is located more than $(R_o t)^{1/2}$ from the centerline of the attaching circumferential piping weld (where R_o is the outside pipe radius, and t is the evaluation wall thickness).
3. Expanded use to external tubing or piping attached to heat exchangers.
4. Revised to limit the use to liquid systems.
5. Revised to clarify treatment of service level load combinations.
6. Revised to address treatment of flaws in austenitic pipe flux welds.

7. Revised to require minimum wall thickness acceptance criteria to consider longitudinal stress in addition to hoop stress.
8. Other editorial changes to improve clarity.

Significant changes in Code Case N-513-4 when compared to NRC approved Code Case N-513-3 are discussed in Enclosure C, "Technical Basis for Proposed Fourth Revision to ASME Code Case N-513."

The effects of leakage on system operability determinations or the plant flooding analyses are considered as specified in paragraph 1(f) of Code Case N-513-4. The safety factor of four on leakage is based upon Code Case N-705, "Evaluation Criteria for Temporary Acceptance of Degradation in Moderate Energy Class 2 or 3 Vessels and Tanks, Section XI, Division 1," October 12, 2006, which is accepted without condition in Regulatory Guide 1.147, Revision 17. Paragraph 2.2(e) of Code Case N-705 requires a safety factor of two on flaw size when estimating the flaws size from the leakage rate. This corresponds to a safety factor of four on leakage for nonplanar flaws. Although the use of a safety factor for determination of an unknown flaw is considered conservative when the actual flaw size is known, this approach is deemed acceptable based upon the precedent of Code Case N-705. The alternative described herein does not propose to use any portion of Code Case N-705 and that citation of Code Case N-705 is intended only to provide technical basis for the safety factor on leakage.

The leakage rate limit provides quantitative measurable limits, which ensure the operability of the system and early identification of issues that could erode defense-in-depth and lead to adverse consequences.

In summary, FENOC will apply ASME Code Case N-513-4 to evaluation of Class 2 and 3 components that are within the scope of the Code Case. Code Case N-513-4 utilizes technical evaluation approaches that are based on principles that are accepted in other ASME Code documents already acceptable to the NRC. The application of this code case, in concert with safety factors on leakage limits, will maintain acceptable structural and leakage integrity while minimizing plant risk and personnel exposure by minimizing the number of plant transients that could be incurred if degradation is required to be repaired based on ASME Code, Section XI acceptance criteria only.

6. DURATION OF PROPOSED ALTERNATIVE

This relief request may be applied during the inservice inspection intervals set out for each plant below or until such time as the NRC approves Code Case N-513-4 in Regulatory Guide 1.147 or other document during the interval. If the proposed alternative is applied to a flaw near the end of the 10-year inservice inspection interval specified for the plant and the next refueling outage is in the subsequent interval, the proposed alternative can continue to be applied to the flaw until the next refueling outage.

- Beaver Valley Power Station, Unit No. 1, fifth 10-year inservice inspection interval is currently scheduled to begin on August 29, 2018 and end on August 28, 2028.

- Beaver Valley Power Station, Unit No. 2, fourth 10-year inservice inspection interval is currently scheduled to begin on August 29, 2018 and end on August 28, 2028.
- Davis-Besse Nuclear Power Station fourth 10-year inservice inspection interval began on September 21, 2012 is currently scheduled to end on September 20, 2022.
- Perry Nuclear Power Plant third 10-year inservice inspection interval began on May 18, 2009 and is currently scheduled to end on May 17, 2019.
- Perry Nuclear Power Plant fourth 10-year inservice inspection interval is currently scheduled to begin on May 18, 2019 and end on May 17, 2029.

7. PRECEDENT

Exelon Generation Company, LLC (Exelon) submitted a similar request to use ASME Code Case N-513-4 at Braidwood Station, Units 1 and 2; Byron Station, Unit Nos. 1 and 2; Calvert Cliffs Nuclear Power Plant, Units 1 and 2; Clinton Power Station, Unit No. 1; Dresden Nuclear Power Station, Units 2 and 3; LaSalle County Station, Units 1 and 2; Limerick Generating Station, Units 1 and 2; Nine Mile Point Nuclear Station, Units 1 and 2; Oyster Creek Nuclear Generating Station; Peach Bottom Atomic Power Station, Units 2 and 3; Quad Cities Nuclear Power Station, Units 1 and 2; R. E. Ginna Nuclear Power Plant; and Three Mile Island Nuclear Station, Unit 1. Exelon requested use of the code case for the evaluation and temporary acceptance of flaws in moderate energy Class 2 and 3 piping in lieu of the same ASME Code requirements referenced herein. A September 16, 2016 NRC letter authorized use of ASME Code Case N-513-4 at each plant (ADAMS Accession Number ML16230A237).

8. REFERENCE

1. Letter from D. T. Gudger of Exelon to the NRC Document Control Desk, "Proposed Alternative to Utilize Code Case N-513-4, 'Evaluation Criteria for Temporary Acceptance of Flaws in Moderate Energy Class 2 or 3 Piping Section XI, Division 1'," dated January 28, 2016 (Accession No. ML16029A003)