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December 18, 2018 L-18-261

10 CFR 50, Appendix H

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

SUBJECT: Beaver Valley Power Station, Unit No. 2 Docket No. 50-412, License No. NPF-73 Request for Exemption from Specific Provisions in 10 CFR 50 Appendix H

Pursuant to 10 CFR 50.12, "Specific exemptions," FirstEnergy Nuclear Operating Company (FENOC) is requesting a permanent exemption from a requirement of Appendix H to 10 CFR Part 50, "Reactor Vessel Material Surveillance Program Requirements," for Beaver Valley Power Station, Unit No. 2 (BVPS-2). Appendix H requires, in part, that each capsule withdrawal and associated test results must be the subject of a summary technical report that is to be submitted to the Nuclear Regulatory Commission (NRC) within one year of the date of the capsule withdrawal. An exemption to this requirement is requested for capsule Y, since test information from other capsules that have been withdrawn justifies 40 years of operation and operation of BVPS-2 will permanently cease in October of 2021, before reaching the end of the 40year period of operation.

FENOC is requesting approval of the enclosed exemption request by July 29, 2019, since Appendix H testing and reporting requirements for capsule Y must be completed by October 29, 2019.

There are no regulatory commitments contained in this submittal. If there are any questions or if additional information is required, please contact Mr. Phil H. Lashley, Acting Manager - Nuclear Licensing and Regulatory Affairs, at 330-315-6808.

Sincerely

Richard D. Bologna

Beaver Valley Power Station, Unit No. 2 L-18-261 Page 2 of 2

Enclosure: Exemption Request

cc: NRC Region I Administrator NRC Resident Inspector NRC Project Manager Director BRP/DEP Site BRP/DEP Representative

Exemption Request Page 1 of 8

Subject: Request for Exemption from Specific Provisions in 10 CFR 50, Appendix H, at Beaver Valley Power Station, Unit No. 2

- 1.0 PURPOSE
- 2.0 BACKGROUND
- 3.0 PROPOSED EXEMPTION
- 4.0 JUSTIFICATION OF EXEMPTION
- 5.0 ENVIRONMENTAL ASSESSMENT
- 6.0 CONCLUSION
- 7.0 REFERENCES

1.0 PURPOSE

Pursuant to 10 CFR 50.12, "Specific exemptions," FirstEnergy Nuclear Operating Company (FENOC) is requesting a permanent exemption from a requirement of Appendix H to 10 CFR Part 50, "Reactor Vessel Material Surveillance Program Requirements," for Beaver Valley Power Station, Unit No. 2 (BVPS-2).

2.0 BACKGROUND

10 CFR 50, Appendix H, Section IV.A states:

Each capsule withdrawal and the test results must be the subject of a summary technical report to be submitted, as specified in 10 CFR 50.4, within one year of the date of capsule withdrawal, unless an extension is granted by the Director, Office of Nuclear Reactor Regulation.

The recent BVPS-2 maintenance and refueling outage 2R20 commenced on October 21, 2018. In accordance with Updated Final Safety Analysis Report, Table 5.3-6, "Reactor Vessel Material Irradiation Surveillance Schedule," capsule Y was removed from the reactor vessel on October 29, 2018.

As identified in a FENOC letter dated April 25, 2018 (Reference 1), BVPS-2 will permanently cease power operation by October 31, 2021. The original 40-year license for BVPS-2 was to expire on May 27, 2027, which is more than five years after the planned cessation of power operation. This original 40-year license period for BVPS-2 is hereafter referred to as the 40-year life.

3.0 PROPOSED EXEMPTION

FENOC proposes a permanent exemption to the 10 CFR 50, Appendix H, Section IV.A, requirement to submit a summary technical report (regarding capsule withdrawal and capsule test results) to the Nuclear Regulatory Commission (NRC) within one year of withdrawal for capsule Y.

Capsule Y will be disassembled and the neutron dosimeters will be tested within one year after the capsule withdrawal to ensure that valid dosimetry measurements can be obtained prior to excessive radioactive decay of the dosimeters. The capsule contents will be inventoried and placed in storage so that they are retrievable for future testing if it becomes necessary. Mechanical testing of capsule Y will not be performed.

If the decision is made to operate BVPS-2 beyond October 31, 2021, a revised capsule testing schedule would be submitted for NRC approval prior to October 31, 2021.

4.0 JUSTIFICATION OF EXEMPTION

Technical discussion:

Compliance with the requirements of 10 CFR 50, Appendix H; 10 CFR 50, Appendix G; and 10 CFR 50.61 for the BVPS-2 40-year life were evaluated as described below to determine if the proposed exemption request is acceptable.

10 CFR 50, Appendix H, requires licensees to use ASTM E185-82, "Standard Practice for Conducting Surveillance Tests for Light-Water Cooled Nuclear Power Reactor Vessels," to determine the required number and timing of capsule withdrawals. For BVPS-2, Westinghouse Report WCAP-16527-NP, Supplement 1 (Reference 2), identifies that the change in the reference temperature of the material (ΔRT_{NDT}) at 54 effective full power years (EFPY) (60-year end-of-life) is less than 100 degrees Fahrenheit. For reactor vessels that are in this category, ASTM E185-82 recommends that three capsules are to be withdrawn, with the final capsule having a fluence of between 1 and 2 times the projected end-of-life fluence of the reactor vessel. Four BVPS-2 capsules have been withdrawn and tested. Capsule X fluence corresponds to the projected peak vessel fluence at 58.6 EFPY, which is significantly greater than the expected peak fluence value for the BVPS-2 reactor vessel through the end of its 40-year life. Therefore, it is concluded that the requirements of ASTM E185-82 have been met for BVPS-2 through the end of its 40-year life, without the testing of capsule Y.

The current analysis of record for BVPS-2 reactor vessel integrity, WCAP-16527, Supplement 1 (Reference 2), utilizes the capsule X data that bounds the projected peak fluence value for the BVPS-2 reactor vessel through the end of its 40-year life. Per WCAP-16527, Supplement 1, all beltline and extended beltline materials are projected to maintain an upper-shelf energy (USE) greater than the 10 CFR 50, Appendix G, minimum value of 50 foot-pounds (ft-lbs) through 54 EFPY. Additionally, all beltline and extended beltline materials maintain pressurized thermal shock reference temperature (RT_{PTS}) values below the 10 CFR 50.61 screening criteria of 270 degrees Fahrenheit for plates, forgings, and axial welds and 300 degrees Fahrenheit for circumferential welds at 54 EFPY.

The proposed exemption request is acceptable because BVPS-2 will remain compliant with ASTM E185-82, and meets the applicable requirements of 10 CFR 50, Appendix G, and 10 CFR 50.61 for its 40-year life. Current USE and PTS limits remain applicable and appropriate for use at BVPS-2 through the end of its 40-year life.

The required number of capsules have already been withdrawn and tested to justify 40 years of operation for BVPS-2. Capsule Y was required to justify operation to the end of a 60-year life. Since BVPS-2 will cease operation prior to reaching the end of the 40-year life, it is no longer necessary to test capsule Y.

Regulatory discussion:

10 CFR 50.12, "Specific exemptions," states that the Commission may grant exemptions from the requirements of the regulations of this part provided that the exemption is authorized by law, will not present undue risk to the public health and safety, and is consistent with the common defense and security. The regulation also states that the commission will not consider granting an exemption unless special circumstances are present.

Required criteria:

The requested exemption satisfies the required criteria as described below.

1. This exemption is authorized by law.

The Commission has the authority under 10 CFR 50.12 to grant an exemption from the requirements of Part 50 upon proper justification. Therefore, granting an exemption is explicitly authorized by law.

2. This exemption will not present undue risk to the public health and safety.

Section IV.A of 10 CFR 50 Appendix H indicates that capsule withdrawal and associated test results need to be the subject of a summary technical report that is to be submitted to the NRC within one year of capsule withdrawal. Although capsule Y was removed from the BVPS-2 reactor vessel on October 29, 2018, exemption is requested from the associated testing and report submittal activities. The exemption is requested based on previous capsule withdrawal and test results that have already justified a 40-year life for BVPS-2 and the fact that operation of BVPS-2 will permanently cease prior to reaching the end of its 40-year life. The intent of the regulation has already been met for the expected remaining period of unit operation, and therefore, this exemption will not present undue risk to the public health and safety.

3. This exemption is consistent with the common defense and security.

Previous capsule test results have justified a 40-year life for BVPS-2 and operation of BVPS-2 will permanently cease prior to reaching the end of its 40-year life. Utilizing previously withdrawn capsule test results as a basis for BVPS-2 reactor vessel integrity through the end of its 40-year life maintains consistency with the common defense and security.

Special circumstances:

Appendix H of 10 CFR 50, section I, identifies that the data to be obtained through the Appendix H surveillance program "will be used as described in Section IV of Appendix G to part 50." The introduction to Appendix G states that "This appendix specifies fracture toughness requirements for ferritic materials...to provide adequate margins of safety

during any condition of normal operation ... "

The underlying purpose of 10 CFR 50, Appendix H (and Appendix G), is to provide adequate margins of safety to protect the reactor vessel from brittle fracture. Appendix H assists in protecting the reactor vessel from brittle fracture by requiring a surveillance program that monitors changes in the fracture toughness properties of the ferritic materials that make up the reactor vessel. The results of the surveillance program required by Appendix H are evaluated against the fracture toughness limits established in accordance with 10 CFR 50, Appendix G, Section IV.

In accordance with 10 CFR 50.12(a)(2)(ii), a special circumstance would involve the application of a regulation when it is not necessary to achieve the underlying purpose of the rule. This would apply to section IV.A of 10 CFR 50, Appendix H, that requires the submittal of a technical report that provides withdrawn capsule test results within one year of the date of the capsule withdrawal. The capsule testing requirements necessary to provide adequate margins of safety and protect the BVPS-2 reactor vessel from brittle fracture have already been met for its 40-year life. These requirements include the testing of at least three capsules and the testing of at least one capsule that is between 1 and 2 times the projected peak end-of-life fluence of the vessel. The BVPS-2 USE and RTPTS values meet or exceed the requirements of 10 CFR 50.61 and 10 CFR 50, Appendix G through the end of the 40-year life. Also, the current pressure-temperature (P-T) limit curves are conservative with respect to the most recent fluence analysis. Because BVPS-2 will cease operation prior to the end of its 40-year life, the testing of capsule Y is not required to achieve the underlying purpose of 10 CFR 50, Appendix H, because the capsule testing requirements necessary to protect the BVPS-2 reactor vessel against brittle fracture have already been met for its 40-year life.

5.0 ENVIRONMENTAL ASSESSMENT

FENOC has determined the proposed exemption does not require an environmental review since it meets the eligibility criteria for categorical exclusion in 10 CFR 51.22(c)(25), as: (i) there is no significant hazards consideration; (ii) there is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite; (iii) there is no significant increase in individual or cumulative public or occupational radiation exposure; (iv) there is no significant construction impact; (v) there is no significant increase in the potential for or consequences from radiological accidents; and (vi) the requirements from which the exemption is sought involves inspection or surveillance requirements. The information provided below supports the basis for determination.

(i) No significant hazards consideration.

Section IV.A of 10 CFR 50, Appendix H, indicates that capsule withdrawal and associated test results need to be the subject of a summary technical report that is to be submitted to the NRC within one year of capsule withdrawal. Although capsule Y was removed from the Beaver Valley Power Station, Unit No. 2 (BVPS-2) reactor

vessel on October 29, 2018, exemption is requested from the associated testing and report submittal activities. The exemption is requested based on previous capsule withdrawal and test results that have already justified a 40-year life for BVPS-2 and the fact that BVPS-2 will permanently cease operation prior reaching the end of its 40-year life.

FirstEnergy Nuclear Operating Company (FENOC) has evaluated the proposed exemption to determine whether or not a significant hazards consideration is involved by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

1. Does the proposed exemption involve a significant increase in the probability or consequence of an accident previously evaluated?

Response: No

The proposed exemption has no effect on facility structures, systems, and components (SSCs), the capability of any facility SSC to perform its design function, or plant operations, and, therefore, would not increase the likelihood of a malfunction of any facility SSC or increase the consequences of previously evaluated accidents. The proposed exemption does not alter any assumptions or methodology associated with the previously evaluated accidents in the BVPS Updated Final Safety Analysis Report. The proposed exemption will not affect the probability of occurrence of any previously analyzed accident.

Therefore, there is no increase in the probability or consequence of any previously evaluated accident.

2. Does the proposed exemption create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No

The proposed exemption does not involve a physical alteration of the facility. No new or different type of equipment will be installed, and there are no physical modifications to existing equipment associated with the proposed exemption.

Similarly, the proposed exemption would not physically alter any SSCs involved in the mitigation of any accidents. Thus, no new initiators or precursors of a new or different kind of accident are created. Furthermore, the proposed exemption does not create the possibility of a new accident as a result of new failure modes associated with any equipment or personnel failures. No changes are being made to the facilities' normal parameters or in protective or mitigative action setpoints, and no new failure modes are being introduced.

Therefore, the proposed exemption does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed exemption involve a significant reduction in a margin of safety?

Response: No

The proposed exemption does not alter the design basis or any safety limits for BVPS-2, nor does it impact station operation or any facility SSC that is relied upon for accident mitigation.

Therefore, the proposed exemption does not involve a significant reduction in a margin of safety.

Based on the above, FENOC concludes that the proposed exemption does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

(ii) There is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite.

The proposed exemption from the testing of reactor vessel capsule Y and associated report submittal activities will not result in any changes to systems, structures, or components that function to limit or monitor the release of plant effluents. The proposed exemption does not involve a physical alteration of the facility, and it will not impact operation of any plant system. Therefore, there is no significant change in the type or significant increase in the amount of effluents that may be released offsite with the proposed exemption.

(iii) There is no significant increase in individual or cumulative public or occupational radiation exposure.

The proposed exemption does not involve a physical alteration of the facility, and it will not impact operation of any plant system. Therefore, there will be no significant increase in individual or cumulative public or occupational radiation exposure associated with this exemption.

(iv) There is no significant construction impact.

No construction activities are associated with the proposed exemption.

(v) There is no significant increase in the potential for or consequences from radiological accidents.

The proposed exemption does not involve a physical alteration of the facility and it will not impact operation of any plant system.

The proposed exemption will not affect the ability to respond to or mitigate any previously evaluated accidents, or affect the radiological assumptions used in the evaluations. The exemption will not affect the consequences of any accidents previously evaluated. Therefore, the proposed exemption does not result in a significant increase in the potential for, or consequences of, a radiological accident.

(vi) The requirements from which an exemption is sought involve inspection or surveillance requirements.

The purpose of the exemption is to allow alternative action to the stated requirement in Section IV, Item A, in Appendix H of 10 CFR 50. The proposed exemption involves reactor vessel capsule testing and associated report submittal requirements. Performance of the scheduled capsule testing is a surveillance requirement.

6.0 CONCLUSION

Pursuant to 10 CFR 50.12, the requested exemption is authorized by law, will not present an undue risk to public health and safety, and is consistent with the common defense and security. Approval of this exemption request does not violate the underlying purpose of 10 CFR 50, Appendix H.

7.0. REFERENCES

- Letter from FENOC to NRC, "Certification of Permanent Cessation of Power Operations for Beaver Valley Power Station, Unit Nos. 1 and 2, Davis-Besse Nuclear Power Station, Unit No. 1, and Perry Nuclear Power Plant, Unit No. 1," dated April 25, 2018. [ADAMS Accession Number ML18115A007]
- Westinghouse Report WCAP-16527-NP, Supplement 1, Revision 1, "Analysis of Capsule X from FirstEnergy Nuclear Operating Company Beaver Valley Unit 2 Reactor Vessel Radiation Surveillance Program," September 2011. [ADAMS Accession Number ML13151A060]