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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
Response to Request for Additional Information Regarding License Amendment Request to Adopt National Fire Protection Association Standard 805
(CAC Nos. MF3301 and MF3302)

By letter dated December 23, 2013 (Accession No. ML14002A086), as supplemented by letters dated February 14, 2014; April 27, 2015; May 27, 2015; June 26, 2015; November 6, 2015; December 21, 2015; February 24, 2016; and May 12, 2016 (Accession Nos. ML14051A499, ML15118A484, ML15147A372, ML15177A110, ML15313A306, ML15356A136, ML16055A160, and ML16133A340 respectively), FirstEnergy Nuclear Operating Company (FENOC) submitted a license amendment request to change the Beaver Valley Power Station, Unit Nos. 1 and 2, fire protection program to one based on the National Fire Protection Association (NFPA) Standard 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants," 2001 Edition.

By letter dated December 2, 2016 (Accession No. ML16333A016), the Nuclear Regulatory Commission (NRC) requested additional information to complete its review. The FENOC response to the request for information is attached.

Remaining information that the NRC needs to complete its review is planned to be submitted by June 28, 2017. This includes the responses to probabilistic risk assessment requests 3 and 19 in the NRC letter dated March 4, 2015 (Accession No. ML15049A507), as well as updates to the license amendment request attachments K, M, and S.

There are no regulatory commitments included 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.

I declare under penalty of perjury that the foregoing is true and correct. Executed on January 30, 2017.

Sincerely,

Marty L. Richey

Attachment:
Response to December 2, 2016 Request for Additional Information

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

The NRC staff's request for additional information (RAI) is provided in bold text followed by the FENOC response.

Probabilistic Risk Assessment (PRA) Request for Additional Information 27, "Very Early Warning Fire Detection System (VEWFDS) Credit"

Section 2.4.3.3 of NFPA 805 states that the probabilistic safety analysis (also referred to as PRA) approach, methods, and data shall be acceptable to the authority having jurisdiction, which is the NRC. Section 2.4.4.1 of NFPA 805 further states that the change in public health risk arising from transition from the current fire protection program to an NFPA 805-based program, and all future plant changes to the program, shall be acceptable to the NRC.

Regulatory Guide (RG) 1.174, Revision 2, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis" (ADAMS Accession No. ML100910006), provides quantitative guidelines on core damage frequency (CDF), large early release frequency (LERF), and identifies acceptable changes to these frequencies that result from proposed changes to the plant's licensing basis and describes a general framework to determine the acceptability of risk-informed changes. The NRC staff's review of the information in the license amendment request identified additional information that is needed to fully characterize the risk estimates.

New guidance on the credit taken for VEWFDS is available in NUREG-2180, "Determining the Effectiveness, Limitations, and Operator Response for Very Early Warning Fire Detection Systems in Nuclear Facilities, (DELORES-VEWFIRE)," of which the final (pre-publication) version is available at ADAMS Accession Nos. ML16286A000 and ML16286A002. The methodology in NUREG-2180 is acceptable to the NRC because it is currently the best available guidance. By letter dated July 1, 2016 (ADAMS Accession No. ML16167A444), the guidance provided in Frequently Asked Question 08-0046, "Closure of National Fire Protection Association 805 Frequently Asked Question 08-0046, 'Incipient Fire Detection Systems'," dated November 23, 2009 (ADAMS Accession No. ML093220426), has been retired, and alternative approaches for staff evaluation are necessary.

Explain how credit (e.g., approach, methods, data, and assumptions) taken in the fire PRA (FPRA) for the proposed VEWFDS is consistent with the guidance in NUREG-2180 or bounds the risk results (i.e., CDF, LERF, change in CDF, and change in LERF) that would be obtained, had the guidance in NUREG-2180 been applied. If

credit taken for VEWFDS in the FPRA is not consistent with or bounded by NUREG-2180, provide:

a. **The risk results (i.e., CDF, LERF, change in CDF, and change in LERF): (1) without credit for VEWFDS that would be obtained had the guidance in NUREG-2180 been applied or (2) that would be obtained had an alternative method been used, along with a description and justification for the alternative method. Development and use of an alternative proposal may extend the time required to complete the review. The new risk results can be generated from a sensitivity study type evaluation insofar as formal incorporation of the new method into the PRA model of record is not required.**

b. **Explain how the total risk and increase in risk are consistent with the guidelines in RG 1.174.**

Response:

Credit in the fire PRA for the VEWFDS at Beaver Valley Power Station Unit No. 1 (BVPS-1) and Beaver Valley Power Station Unit No. 2 (BVPS-2) has been re-evaluated and is consistent with the new guidance in NUREG-2180. The fire event trees have been updated in accordance with Section 6.4 of NUREG-2180 with the appropriate parameter inputs used from Appendix F.

The VEWFDS was fully operational as of February 2016 for BVPS-1 and August 2016 for BVPS-2. The VEWFDS design requirements, system installation, acceptance testing, inspection and maintenance, training, and alarm response procedure were presented in the response to fire protection engineering (FPE) RAI 15 (Accession Nos. ML15118A484 and ML15147A372). Fire PRA credit taken for the VEWFDS in accordance with the previously-approved frequently asked question 08-0046 was explained in the response to PRA RAI 12 (Accession No. ML15177A110). The VEWFDS is credited for reducing the probability of fires that may propagate from cabinets in which the systems are installed, and not for reducing damage within the source cabinets, or for area-wide detection.

Particularly, the VEWFDS high-sensitivity cloud chamber detection system is currently installed in select low-voltage cabinets (cabinets containing equipment with an operating voltage less than 250 volts) in the process rack rooms in BVPS-1 and BVPS-2 (fire compartments 1-CR-4 and 2-CB-1, respectively), as well as the west communications room in BVPS-2 (fire compartment 2-CB-6). As part of the change in VEWFDS fire PRA credit from FAQ 08-0046 to NUREG-2180, only one item in the license amendment request Attachment S, Table S-2 will be changed. Item BV1-2854 will not relocate the computer inverter to fire compartment 1-MG-1. The existing inverter in 1-CR-4 will be replaced with a new inverter, and the VEWFDS will be connected to it in the future. The inverter will contain nominal 480 volt components. Therefore, it is designated a power cabinet, and fire PRA credit will be taken in accordance with NUREG-2180. An updated description for item BV1-2854 in Table S-2 will be provided in a future submittal.

VEWFDS alarms are displayed in the main control rooms on the annunciator systems, and the first instruction step of the response procedures requires an operator with fire watch qualifications to respond to the affected fire compartment. A continuous fire watch remains until the alarm is cleared.

The calculated probability of non-suppression for damage outside of cabinets the VEWFDS monitors in the fire PRA has been re-evaluated and is consistent with the methods, data, and assumptions in NUREG-2180. The updated results will be included with the response to PRA RAI 03 and 19.