From:	Venkataraman, Booma
To:	Lashley, Phil H.
Cc:	Danna, James
Subject:	RE: Beaver Valley Power Station Units 1&2: Request for Additional Information for NFPA 805 License Amendment Request, CAC Nos. MF3301 and MF3302
Date:	Tuesday, August 08, 2017 2:29:00 PM
Attachments:	Beaver Valley_ Subsequent PRA RAIs_final.docx

Phil,
Please discard the attachment in the e-mail below. Attached is the correct file with the editorial corrected.
Sorry for the inconvenience.
Thanks, Booma

From: Venkataraman, Booma
Sent: Tuesday, August 08, 2017 2:02 PM
To: 'Lashley, Phil H.' <phlashley@firstenergycorp.com>
Cc: Danna, James <James.Danna@nrc.gov>
Subject: Beaver Valley Power Station Units 1&2: Request for Additional Information for NFPA 805 License Amendment Request, CAC Nos. MF3301 and MF3302

Phil,
By letter dated December 23, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML 14002A086), 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; May 12, 2016; January 30, 2017; April 21, 2017; and June 23, 2017 (ADAMS Accession Nos. ML14051A499, ML15118A484, ML15147A372, ML15177A110, ML15313A306, ML15356A136, ML16055A160, ML16133A340, ML17030A312, ML17111A882, ML17177A097, respectively), FirstEnergy Nuclear Operating Company (FENOC, the licensee) submitted a license amendment request to change the Beaver Valley Power Station, Units 1 and 2, fire protection program to one based on the National Fire Protection Association Standard 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants," 2001 Edition, as incorporated into Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.48(c).

A draft request for information (RAI) was sent to you on July 31, 2017. A clarification call was held on August 8, 2017. The final RAI version after the clarification is attached to this e-mail. It was agreed that FENOC will respond to the attached RAI with a supplement by September 7, 2017.

Please treat this e-mail as transmittal of formal RAIs. If circumstances result in the need to revise the requested response date, please contact me at (301) 415-2934 or via email at Booma.Venkataraman@nrc.gov.

Sincerely, Booma

Booma Venkataraman, P.E.
Project Manager, NRR/DORL/LPL1
Office of Nuclear Reactor Regulation
Booma.Venkataraman@nrc.gov
301.415.2934

REQUEST FOR ADDITIONAL INFORMATION

LICENSE AMENDMENT REQUEST TO ADOPT

NATIONAL FIRE PROTECTION ASSOCIATION STANDARD 805

PERFORMANCE BASED STANDARD FOR FIRE PROTECTION

FOR LIGHT WATER REACTOR GENERATING PLANTS

FIRSTENERGY NUCLEAR OPERATING COMPANY

BEAVER VALLEY POWER STATION, UNITS 1 AND 2

DOCKET NOS. 50-334 AND 50-412

By letter dated December 23, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML 14002A086), 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; May 12, 2016; January 30, 2017; April 21, 2017; and June 23, 2017 (ADAMS Accession Nos. ML14051A499, ML15118A484, ML15147A372, ML15177A110, ML15313A306, ML15356A136, ML16055A160, ML16133A340, ML17030A312, ML17111A882, ML17177A097, respectively), FirstEnergy Nuclear Operating Company submitted a license amendment request to change the Beaver Valley Power Station, Units 1 and 2, fire protection program to one based on the National Fire Protection Association Standard 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants," 2001 Edition, as incorporated into Title 10 of the Code of Federal Regulations (10 CFR), Section 50.48(c). To complete its review, the U.S. Nuclear Regulatory Commission (NRC) staff requests a response to the questions below.

Probabilistic Risk Assessment (PRA) RAI 03.b.01

In its letter dated April 27, 2015 (ADAMS Accession No. ML15118A484) in response to PRA RAI 14, the licensee stated that the uncertainty analysis for fire-induced core damage frequency (CDF) and (large early release frequency (LERF) would be re-evaluated taking into account state of knowledge correlation (SOKC). In its letter dated June 23, 2017 (ADAMS Accession No. ML17177A097) the licensee responded to PRA RAI 03 and explained that though such an analysis was performed, the results were not incorporated into its integrated analysis risk results because the impact was determined to be “very small.” Provide the following:

a. The results of the analysis showing the increase in the risk estimates (i.e., core damage frequency (CDF), large early release frequency (LERF), delta (Δ) CDF and ΔLERF) from including the contribution of SOKC. Compare this increase to the Regulatory Guide (RG) 1.205, Revision 1, “Risk-Informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants (ADAMS Accession No. ML092730314) risk acceptance guidelines for self-approved changes to determine the magnitude of the impact.

b. If the impact of including the contribution from SOKC is not small compared to the RG 1.205 risk acceptance guidelines for self-approved changes, then add an implementation item to LAR Attachment S that provides for the incorporation of the contribution from SOKC into fire risk estimates used to support future self-approved changes.

PRA RAI 19.01

In its letter dated June 23, 2017 (ADAMS Accession No. ML17177A097) in its response to PRA RAI 19, the licensee identified seven conservative modeling assumptions and stated that though these conservatisms increase the total risk, they are "*present in both the transitioning plant model and the compliant model and so they have no effect on the reported change in risk*." The NRC staff does not agree with this statement since conservative assumptions in the transition plant model can impact the risk of a variance from a deterministic requirement (VFDR). The NRC staff found that there appears to be a number of VFDRs that cannot be fully modelled because of conservative modeling assumptions that were made in the Fire PRA. For example, the modeling assumption to fail instrument air for all fires impacts calculation of the risk of VFDRs associated with loss of instrumentation air to atmospheric steam dump valves (ASDVs). If both the compliant and transition plant models assume that instrument air is failed then the change in risk calculated for fire scenarios in which the ASDVs are required to be opened using instrument air will be underestimated. Provide the following:

a. Identification of the VFDRs for the plant whose risk contribution could be impacted by conservative modeling.

b. If conservative modeling is identified that can impact the calculation of risk associated with a VFDR and lead to underestimation of the total change-in risk, then demonstrate that the total risk increase associated with unresolved VFDRs is offset by the total risk decrease associated with risk reduction modifications even when the conservative modeling is removed. If the total risk increase associated with unresolved VFDRs is not offset by the total risk decrease associated with risk reduction modifications when the conservative modeling is removed, then provide updated total CDF, LERF, ΔCDF and ΔLERF risk estimates and demonstrate that the risk acceptance guidelines in RG 1.205 are still met.

c. As an alternative to the request in part (b), provide an updated integrated analysis that replaces the conservative modeling with realistic modeling that does not underestimate the total change-in-risk.

PRA RAI 22.01

In its letter dated April 21, 2017 (ADAMS Accession No. ML17111A882), the licensee submitted a revised LAR Attachment S "Plant Modifications and Items to Be Completed."

a. The descriptions of Implementation Items BV1-3108/BV2-1622 in LAR Attachment S, Table S-3, do not reflect the full set of actions provided in the licensee's letters dated April 27, 2015 (ADAMS Accession No. ML15118A484) and April 21, 2017 (ADAMS Accession No. ML17030A312). The NRC staff requests that the licensee revise Implementation Items BV1-3108/BV2-1622 to

reflect the wording proposed in the letters dated April 27, 2015 and April 21, 2017:

> Update FPRA Model, Risk Metrics, and Change-in-Risk Values following completion of risk-relevant modifications and implementation items; Update quantitative screening of fire scenarios in this model accounting for CDF and LERF in accordance with the criteria endorsed in RG 1.200, Rev. 2; and Implement new plant modifications or PRA refinements as necessary if the risk from the updated FPRA Model with the updated quantitative screening of fire scenarios exceeds the acceptance guidelines of RG 1.174.

b. The "LAR Section/Source" column in LAR Attachment S, Table S-3 has not been updated to reflect accurate sources including RAI responses for some of the implementation items. This was identified for Implementation Items BV1-3108, BV1-3109, BV2-1622, and BV2-1623. The staff found that these implementation items reference Attachments S and V when the sources of these implementation items is actually in licensee letters dated April 27, 2015 and April 21, 2017 in response to PRA RAIs 22 and 24. The NRC staff requests that the licensee update the "LAR Section/Source" column for all implementation items in LAR Attachment S, Table S-3 to reflect all applicable sources.