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

SUBJECT:
Perry Nuclear Power Plant
Docket No. 50-440, License No. NPF-58
Response to Request for Additional Information Regarding Response to Bulletin 2012-01, "Design Vulnerability in Electric Power System" (TAC No. ME9369)

FirstEnergy Nuclear Operating Company responded to Nuclear Regulatory Commission (NRC) Bulletin 2012-01 "Design Vulnerability in Electric Power System" in a letter dated October 23, 2012 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12298A179). The NRC staff requested additional information in a letter dated December 20, 2013 (ADAMS Accession No. ML13351A314). The requested information is provided for the Perry Nuclear Power Plant in an attachment to this letter.

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.

I declare under penalty of perjury that the foregoing is true and correct. Executed on February 3, 2014.

Sincerely,

Ernest J. Harkness

Attachment: Response to Request for Additional Information on Bulletin 2012-01 for the Perry Nuclear Power Plant

cc: NRC Region III Administrator
NRC Resident Inspector
NRC Project Manager

For the Perry Nuclear Power Plant (PNPP), FirstEnergy Nuclear Operating Company (FENOC) responded to Nuclear Regulatory Commission (NRC) Bulletin 2012-01, "Design Vulnerability in Electric Power System," in a letter dated October 23, 2012 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12298A179). The NRC staff requested additional information in a letter dated December 20, 2013 (ADAMS Accession No. ML13351A314). The requested information is identified using bold text, followed by the FENOC response.

1. **Provide a summary of all interim corrective actions that have been taken since the January 30, 2012, event at Byron Station, Unit 2, to ensure that plant operators can promptly diagnose and respond to open phase conditions on the offsite power circuits for Class-1E vital buses until permanent corrective actions are completed.**

Response:

Lessons learned from the events at the Byron station were reviewed and various interim corrective actions evaluated for safety and efficiency at PNPP. Based on the plant's offsite power configuration, electrical design details, and on lessons learned, the following actions ensure plant operators can diagnose and respond to an open phase condition:

- Daily operator walkdowns are performed in the switchyard on offsite circuits.
- Surveillance instructions (seven day frequency) were revised to include steps to monitor all three phases of the offsite supply circuit to identify a potential open phase condition. As noted in the October 23, 2012 letter in response to question 2.d, since the checks are done at the engineered safety feature (ESF) bus level, it verifies availability of the entire offsite supply leading to the ESF bus. As also noted in response to question 2.e, the buses where this monitoring occurs are typically split between the two offsite sources, but this is not a requirement.

2. **Provide a status and schedule for completion of plant design changes and modifications to resolve issues with an open phase of electric power.**

Response:

Industry/PNPP Status:

- Holders of operating licenses and combined licenses for nuclear power reactors are investigating options to detect open phase conditions. There is currently no generic, off-the-shelf technology that has been proven to detect all the required open phase fault conditions for all plant and transformer designs.
- Holders of operating licenses and combined licenses for nuclear power reactors are engaged in development of the Nuclear Energy Institute (NEI) Open Phase Condition Industry Guidance Document, as well as development of

enhancements to software tools being used to analyze OPC faults. A December 2013 version of the Open Phase Condition Industry Guidance Document (NEI 13-12) was provided to the NRC in December.

- With the goal of ensuring accurate detection without compromising nuclear safety or increasing plant risk, this new open phase condition technology will be thoroughly evaluated, tested, and analyzed before installation.
- Vulnerability studies of the open phase fault conditions have started at PNPP.

Industry/PNPP Schedule:

- The industry developed an Open Phase Condition Initiative (October 2013; ADAMS Accession No. ML13333A147), which includes generic milestones for resolution of this issue. The following information is provided regarding the three remaining milestones in the Open Phase Condition Initiative:
  - PNPP personnel are working with industry experts to meet the December 31, 2014 milestone for either demonstrating compliance with the open phase condition criteria through analysis or identifying actions to demonstrate compliance. This analysis entails developing a detailed plant model. Assuming design changes will be needed to demonstrate compliance with the open phase condition criteria, this detailed plant model must be used to design an open phase detection scheme that can both reliably detect postulated open phase conditions and not inadvertently actuate in response to other expected transient events. This detailed analysis is scheduled to be completed by December 31, 2014.
  - PNPP Refueling Outage 15 is scheduled to begin in February 2015. The short timeframe between completion of the above analysis and Refueling Outage 15 does not support preparation and implementation of a design change modification that will effectively mitigate OPC vulnerabilities. Therefore, implementation of design changes at PNPP to meet the open phase condition criteria are planned for the spring of 2017, during Refueling Outage 16. The schedule for the last two milestones in the industry Open Phase Condition Initiative will therefore not be met at PNPP; specifically, the milestone date for implementation of design changes is revised from December 31, 2016 to June 30, 2017, and the milestone date for completing the monitoring period and the various document updates is revised from December 31, 2017 to June 30, 2018.
- FENOC intends to meet the above schedule at PNPP; however, deviations may be required to accommodate outage schedules, software and hardware availability, manufacturer's delivery capabilities, or other unexpected delays.
- Deviations at PNPP from the industry Open Phase Condition Initiative milestones will be documented through an appropriate deviation process. Revision 2 of the Open Phase Condition Industry Guidance Document, which is scheduled to be issued in June 2014, is expected to provide a deviation process for the industry.