

Entergy Nuclear Operations, Inc. Pilgrim Nuclear Power Station 600 Rocky Hill Road Plymouth, MA 02360

John A. Dent, Jr. Site Vice President

February 4, 2014

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

SUBJECT: Response to Request for Additional Information Regarding Response to Bulletin 2012-01, "Design Vulnerability in Electric Power System" Pilgrim Nuclear Power Station Docket No. 50-293 License No. DPR-35

REFERENCE: 1. NRC Letter to Entergy, "Bulletin 2012-01 Design Vulnerability in Electric Power System", dated July 27, 2012 (1.12.048)

- Entergy Letter to NRC, "90-Day Response to NRC Bulletin 2012-01, Design Vulnerability in Electric Power System" dated October 25, 2012 (2.12.071)
- 3. NRC Letter to Entergy, "Request for Additional Information Regarding Response to Bulletin 2012-01, *Design Vulnerability in Electric Power System*", dated December 20, 2013 (1.13.070)

LETTER NUMBER 2.14.013

Dear Sir or Madam:

On December 20, 2013, the NRC issued "Request for Additional Information Regarding Response to Bulletin 2012-01, "Design Vulnerability in Electric Power System" (Reference 3), requesting that each licensee submit a written response to verify completion of interim corrective actions and compensatory measures and to determine the status of each licensee's long term corrective actions.

The enclosed Attachment contains the Pilgrim Nuclear Power Station (PNPS) response to the request for additional information.

There are no new commitments contained in this submittal. Should you have any questions concerning the content of this letter, please contact Mr. Joseph R. Lynch, Manager, Regulatory Assurance at (508) 830-8403.

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I declare under penalty of perjury that the foregoing is true and correct; executed on February 4, 2014.

Sincerely,

John A. Dent, Jr.

Site Vice President

JAD/mew

- Attachment: Pilgrim Nuclear Power Station Response to Request for Additional Information Regarding NRC Bulletin 2012-01
- cc: Mr. William M. Dean Regional Administrator, Region 1 U. S. Nuclear Regulatory Commission 2100 Renaissance Boulevard, Suite 100 King of Prussia, PA 19406-1415
 - Ms. Nadiyah Morgan, Project Manager Office of Nuclear Reactor Regulation U. S. Nuclear Regulatory Commission MS O-8C2A Washington, DC 20555

NRC Senior Resident Inspector Pilgrim Nuclear Power Station

Attachment to

PNPS Letter 2.14.013

Pilgrim Nuclear Power Station Response to Request for Additional Information Regarding NRC Bulletin 2012-01

(3 Pages)

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NRC letter (ADAMS ML13351A314) dated December 20, 2013, (Reference 3) requests the following:

"In order for the NRC staff to complete its review of responses to the bulletin, the following additional information is requested:

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.

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 1 - Summary of All Interim Corrective Actions

Lessons learned from the events at Byron station were reviewed and various interim corrective actions evaluated for safety and efficiency at the Pilgrim Nuclear Power Station (PNPS). Based on the plant's offsite power configuration, electrical design details, and lessons learned, the following actions were taken to ensure plant operators can promptly diagnose and respond to open phase conditions (OPC):

Interim Corrective Actions

- The PNPS eSOMS tour procedure revision 73 requires two daily tours (once per shift) to walk down the 345 KV switchyard to determine if an open phase has occurred on the bus work, phase leads and insulators for the primary power source to the class 1E buses A5 and A6 via the Startup Transformer (SUT).
- The PNPS eSOMS daily tour procedure was revised to include visual inspection of the 23KV yard to detect an open phase on the secondary offsite power source to the class 1E buses A5 and A6 via the Shutdown Transformer (SDT).
- PNPS Procedure 8.C.22, "Startup Transformer and 345kV Switchyard Surveillance" performs a weekly surveillance to verify that all three phase potentials to the SUT are available.
- PNPS Procedure 8.C.18, "4.16kV/480V Switchgear Surveillance" is a weekly surveillance to check the voltages on all three phases of class 1E safety buses A5 and A6.
- Alarm Response Procedure ARP- C3R-A7 "LINE 342 UNDER VOLTAGE" added an open phase event as a possible cause for the under voltage condition on this line feed to the primary side of the SUT.
- ARP- C3R-A8 "LINE 355 UNDER VOLTAGE" added an open phase event as a
 possible cause for the under voltage condition on this line feed to the primary side of
 the SUT.

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- ARP- C3L-E7 "STARTUP TRANSFORMER UNDER VOLTAGE" added an open phase event as a possible cause for the under voltage condition.
- ARP C3L-C5 "SHUTDOWN XFMR TROUBLE" provides operator action in response to an under voltage alarm on the 23KV secondary offsite power source.
- PNPS Procedure 2.4.144, "Degraded Voltage" provides necessary guidance to the control room operator to take corrective actions under this situation. The 4.16kV Class 1E buses A5 and A6 are constantly monitored for degraded voltage conditions. The degraded voltage relays are connected between phases A-B and B-C. These relays are set approximately at 95% of the 4.16kV and provide an alarm-only function only when any of the phases is degraded below 95% of nominal voltage. When the Class 1E buses are aligned to the SUT or to the SDT, if an open phase condition at the high side of the SUT or the SDT were to occur, the degraded voltage relays are designed to pick-up to alarm in the control room; although without formalized engineering evaluations, it cannot be guaranteed that the alarm will occur on an open phase event.
- The existing Preventive Maintenance (PM) activities are adequate to identify missing, broken, or other insulator problems in all applications. The four year PMs are performed in accordance with PNPS Procedure 3.M.3-71, "Inspection and Maintenance of 345kV Disconnects, Insulators and Miscellaneous Switchyard Components".
- Per Preventive Maintenance Basis Document (PMBD) #284, infrared (IR) thermography survey of the switchyard insulators is performed annually. With the addition of twice-daily tours to verify no loss of phase has occurred, annual IR surveys offer adequate protection. Additionally, corona surveys are performed every 6 months.
- Operators were trained during the 2012-2014 Cycle 2 Plant Status Update Operator Requalification Training (Course O-RQ-04-01-159) to help detect and respond to an open phase event. The training reviewed the procedural and operator tour changes made in response to this event.

Response 2 - Status and Schedule for Completion of Plant Design Changes

Status

• All holders of operating licenses and combined licenses for nuclear power reactors are investigating options being researched by several vendors (PCS2000, EPRI, Schweitzer, etc.) to detect OPC faults. 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.

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- All holders of operating licenses and combined licenses for nuclear power reactors are fully engaged in the development of the NEI OPC Guidance Document, as well as development of enhancements to software tools being used to analyze OPC faults.
- With the goal of ensuring accurate detection without compromising nuclear safety or increasing plant risk, this new OPC technology is being thoroughly evaluated, will be tested, and will provide reasonable assurance of precluding false operation of automatic features.
- Vulnerability studies of the OPC faults have been completed for some of the plants in Entergy Nuclear Fleet. It was decided that additional vulnerabilities studies for the remaining plant transformers (including PNPS) with Y-Y transformer configurations such as the PNPS Startup Transformer (SUT) (preferred offsite power source) would not be pursued. Rather, design modifications to detect the open phase condition would be pursued. PNPS is pursuing the PCS2000 design for open phase detection and automatic actions.
- For the Delta Y SDT (secondary offsite power source), an analysis will be pursued to confirm that no additional actions are required since negative sequence relays currently exist which would alarm/trip this source on an OPC.

Schedule

- PNPS has committed to the generic schedule provided in the Industry OPC Initiative.
- It is our intention to meet the milestones of this schedule; however, deviations may be required to accommodate outage schedules, software and hardware availability, manufacturer's delivery capabilities, licensing delays, etc.
- Any deviation from the Industry OPC Initiative schedule will be documented through the forthcoming deviation/exemption process addressed in the NEI OPC Guidance Document.