



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

Pilgrim Nuclear Power Station

December 13, 2013

U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, D.C. 20555

SUBJECT: Entergy Nuclear Operations, Inc.  
Pilgrim Nuclear Power Station  
Docket No.: 50-293  
License No.: DPR-35

Licensee Event Report 2013-009-00, Loss of Offsite Power and Reactor Scram

LETTER NUMBER: 2.13.096

Dear Sir or Madam:

The enclosed Licensee Event Report (LER) 2013-009-00, Loss of Offsite Power and Reactor Scram, is submitted in accordance with 10 CFR 50.73.

This letter contains no commitments.

Please do not hesitate to contact Mr. Joseph R. Lynch, (508) 830-8403, if there are any questions regarding this submittal.

Sincerely,

A handwritten signature in cursive script that reads "D. Noyes".

David Noyes  
Director, Nuclear Safety Assurance

Attachment 1: Licensee Event Report 2013-009-00, Loss of Offsite Power and Reactor Scram (5 pages)

IE22  
NRR



cc: Mr. William M. Dean  
Regional Administrator, Region 1  
U.S. Nuclear Regulatory Commission  
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Ms. Nadiyah S. Morgan, Project Manager  
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USNRC Senior Resident Inspector  
Pilgrim Nuclear Power Station

**Attachment 1**

Letter Number 2.13.096

Licensee Event Report 2013-009-00

Loss of Offsite Power and Reactor Scram (5 Pages)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA/Privacy Service Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects.resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

# LICENSEE EVENT REPORT (LER)

**1. FACILITY NAME**

**Pilgrim Nuclear Power Station**

**2. DOCKET NUMBER**

**05000293**

**3. PAGE**

**1 OF 5**

**4. TITLE**

**Loss of Offsite Power and Reactor Scram**

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
10	14	2013	2013	009	00	12	13	2013	N/A	
									N/A	

**9. OPERATING MODE**  
N

**10. POWER LEVEL**  
100%

**11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)**

<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)
<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)
<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)
<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)
<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)
<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER
<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

**12. LICENSEE CONTACT FOR THIS LER**

NAME: Joseph R. Lynch, Licensing Manager  
TELEPHONE NUMBER (Include Area Code): (508)-830-8403

**13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT**

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

**14. SUPPLEMENTAL REPORT EXPECTED**

Yes (If yes, complete 15. EXPECTED SUBMISSION DATE)  NO

**15. EXPECTED SUBMISSION DATE**

MONTH	DAY	YEAR

**ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)**

On Monday October 14, 2013 at 2121 hours [EDT], with the reactor critical at 100% core thermal power, the mode switch in RUN, and offsite power 345KV Line 342 out of service for a scheduled upgrade, a loss of offsite power (LOOP) occurred due to the loss of the second 345KV Line 355. All control rods fully inserted, main steam isolation valves closed on the loss of power to the reactor protection system, and the emergency diesel generators automatically started supplying power to both 4160V safety buses. Following the scram, reactor water level lowered to +12 inches initiating the Primary Containment Isolation System (Group II, Reactor Building Isolation System (RBIS); and Group VI - Reactor Water Cleanup System) automatically per design. A plant cool down commenced with reactor water level being maintained in the normal post-scram band of +12 inches to +45 inches utilizing the High Pressure Coolant Injection (HPCI) and Reactor Core Isolation Cooling (RCIC) systems.

The cause of Line 355 loss was due to a failure of an offsite substation tower support. The offsite tower was repaired and Line 355 was energized at 2023 hours on October 15, 2013.

These events posed no threat to public health and safety.

**LICENSEE EVENT REPORT (LER)  
CONTINUATION SHEET**

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
Pilgrim Nuclear Power Station	05000293	YEAR	SEQUENTIAL NUMBER	REV NO.	2 OF 5
		2013	- 009	- 00	

**BACKGROUND:**

Pilgrim Station is connected to the transmission lines through a 345KV ring bus located within the station's 345KV switchyard. The 345KV ring bus connects the output of the main transformer, the startup transformer (SUT), Line 355, and Line 342. There are four gas circuit breakers which comprise Pilgrim's 345KV ring bus: ACB-102, ACB-103, ACB-104 and ACB-105.

Line 355 is a two terminal line which connects Pilgrim to National Grid's Carver Substation and is connected to ACB-102 and ACB-105. Line 342 is a three terminal line, which connects Pilgrim to the Canal Power Plant's Switchyard in Sandwich, MA and to Auburn Street Station Switchyard in Whitman, MA. The Canal Switchyard is owned and operated by NSTAR and Auburn Street Station Switchyard is owned and operated by National Grid. Pilgrim's ACB-103 and ACB-104 connect Line 342 to the plant's switchyard. The 345KV system is the Pilgrim Station output power connection and is the preferred off-site power source via the SUT.

The 345KV ring bus design locates the power transmission lines such that a failure of any one line will not result in the loss of the other line. Specifically, with both transmission lines in service, a failure of either 345KV line will not result in a main generator trip, a SUT trip, or a failure of the other 345KV line. Either of the two 345KV lines is capable of carrying full station output and supplying station loads via the SUT.

The 345KV protective relay system is designed and coordinated to isolate system disturbances and minimize the impact to the overall transmission system. The protective systems are comprised of a primary and secondary protection scheme and are divided into four zones of protection.

- The main transformer (bounded by ACB-104 and ACB-105)
- The SUT (bounded by ACB-102 and ACB-103)
- Line 355 (bounded by ACB-102 and ACB-105 and Carver Substation)
- Line 342 (bounded by ACB-103 and ACB-104 and Auburn Street Station Street and Canal Stations)

When ACB-104 and ACB-105 open, the main transformer is isolated from the 345KV transmission system thus no path to send power from Pilgrim Station, resulting in a generator full load reject event.

In addition to the preferred 345KV off-site power lines, Pilgrim has a secondary off-site power source, a 23KV line from NSTAR's Manomet Substation that provides power to a shutdown transformer (SDT).

Line 342 was scheduled to be out of service for approximately 6 weeks to allow for a major relay upgrade involving the 3 terminal configurations. The project included replacement of all of the protective relaying associated with the 3 terminals, Pilgrim Station and 2 remote terminals (at the Auburn Street Substation and at Canal Station).

On October 5, 2013, prior to removing the line from service, a field walk down was performed at the Carver Substation remote terminal for Line 355, to ensure that work being performed at the Carver Substation would not impact the integrity of the Line 355 during the time that the Line 342 was tagged out of service for maintenance.

On October 11, 2013, at approximately 0700 hours the Line 342 was removed from service and work commenced on the relay upgrades at all 3 terminals.

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**EVENT DESCRIPTION:**

On Monday October 14, 2013 at 2121 hours [EDT], with the reactor critical at 100% core thermal power, the mode switch in RUN, and offsite power 345KV Line 342 out of service for a scheduled upgrade, a loss of offsite power (LOOP) occurred due to the loss of the second 345KV Line 355. All control rods fully inserted, main steam isolation valves closed on the loss of power to the reactor protection system, emergency diesel generators automatically started supplying power to both 4160V safety buses. Following the scram, reactor water level lowered to +12 inches initiating the Primary Containment Isolation System (Group II, Reactor Building Isolation System (RBIS); and Group VI - Reactor Water Cleanup System) automatically per design. A plant cool down commenced with reactor water level being maintained in the normal post-scram band of +12 inches to +45 inches utilizing the High Pressure Coolant Injection (HPCI) and Reactor Core Isolation Cooling (RCIC) systems.

On October 15, 2013 at 1935 hours Line 355 repairs were completed, at 2023 hours Line 355 was energized from Carver to Pilgrim, and Breaker 102 was closed, energizing the Start-up Transformer, restoring offsite power to Pilgrim Station.

**CAUSE:**

The direct cause of the loss of offsite power Line 355 is a defective tower support (wood pole) at Carver Substation. The wood pole experienced a buckling type failure causing a fault on the "B" phase of the Line 355 resulting in a loss of the line. The pole supported the "B" phase of the Line 355 345KV transmission line between Carver and Pilgrim Stations. The design of the pole met and/or exceeded all of the strength requirements as specified by the National Electrical Safety Code C2-2012 (NESC) and the Commonwealth of Massachusetts 220 CMR 125.00 "Installation & Maintenance of Electric Transmission Lines". The defects were determined to be de-laminations in the outer two inches of the pole, which at the critical sections, reduced the pole's capacity to below 25 percent of its original strength.

The root cause of the loss of offsite power from Line 355 is that Pilgrim plant procedures contain inadequate pre-defined risk based criteria for planned offsite maintenance that places the station in a single point vulnerability. Pilgrim procedures, PNPS 1.5.22 "Risk Assessment Process" or EN-WM-104 "On Line Risk Assessment" do not specifically address risk mitigation for having one 345KV line out of service for maintenance. Equipment Out of Service (EOOS) risk color is unchanged and integrated risk per EN-WM-104 screens out as low integrated risk and is subjective.

**CORRECTIVE ACTIONS:**

The following corrective actions were completed:

NSTAR replaced the defective wooden pole and inspected remaining wooden poles on A and C phases.

NSTAR also conducted aerial inspection on Line 355.

Entergy requested NSTAR to delay the December 2013 Line 355 outage to allow for additional run time on Line 342 modifications and to mitigate risk associated with susceptibility to winter storms.

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Additional corrective actions included are as follows:

- Revise Pilgrim Procedure 1.5.22 to provide guidance to recognize and assess single line vulnerability and to consider regulatory margin for risk mitigation, while offsite line outages are planned.
- Formalize mitigating actions required to be implemented prior to removing either 345 KV line from service.
- Develop additional requirements to control work during single line configuration.

These actions are addressed in the Corrective Action Program under Pilgrim Condition Report, CR-PNP- 2013-6944.

**ASSESSMENT OF SAFETY CONSEQUENCES:**

All Pilgrim Station safety-related components operated as designed.

A Loss Of Offsite Power (LOOP) is an analyzed transient for Pilgrim Station and it was verified that the plant responded as designed.

During the loss of power to the SUT, Operations maintained safe shutdown conditions (reactivity control, reactor water inventory, decay heat removal, etc.) following previously established plant procedures. The EDGs started and loaded as expected, supplying power to emergency buses A5/A6 for approximately 23 hours until Line 355 was reenergized on October 15, 2013, at 2023 hours. The SDT and Station Blackout Diesel Generator (SBO DG) were in normal stand-by status and available during the duration of the transient. Station Risk was elevated to Yellow. Conditional Core Damage Frequency (CCDF) of the event was estimated to be 1.9E-5.

Throughout this event there was no adverse impact on the public health and safety.

**REPORTABILITY:**

This event was previously reported via EN#49411 was reported in accordance with 10 CFR 50.72(b)(2)(iv)(B), as an event or condition that results in a valid actuation of the reactor protection system (RPS) when the reactor is critical. Accordingly, this LER is submitted under 10 CFR 50.73(a)(2)(iv)(A).

**PREVIOUS EVENTS:**

The most recent LOOP events at Pilgrim Station reported as LER are as follows:

LER 2013-003-00, Loss of Off-Site Power Events Due to Winter Storm Nemo, dated April 8, 2013.

LER 2008-006-00, Automatic Scram Resulting from Switchyard Breaker Fault During Winter Storm, dated February 12, 2009.

LER 2008-007-00, Momentary Loss of all 345KV Off-Site Power to the Startup Transformer from Switchyard Breaker Fault, dated February 12, 2009.

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**ENERGY INDUSTRY IDENTIFICATION SYSTEM (EIIS) CODES:**

None

**REFERENCES:**

Condition Report CR-PNP-2013-6944, Loss of Offsite Power and Subsequent Reactor Scram