Entergy

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

David E. Noyes, Director
Regulatory & Performance Improvement

October 20, 2015

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

SUBJECT: Licensee Event Report 2015-007-00, Single Main Steam Isolation Valve Closure Resulting in Automatic Reactor Scram

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

LETTER NUMBER: 2.15.070

Dear Sir or Madam:

The enclosed Licensee Event Report (LER) 2015-007-00, Single Main Steam Isolation Valve Closure Resulting in Automatic Reactor Scram, is submitted in accordance with 10 CFR 50.73.

This letter contains no commitments.

Please do not hesitate to contact Mr. Everett P. Perkins, Jr. (508) 830-8323, if there are any questions regarding this submittal.

Sincerely,

DE Noyes

David E. Noyes
Director, Regulatory and Performance Improvement

Attachment 1: Licensee Event Report 2015-007-00, Single Main Steam Isolation Valve Closure Resulting in Automatic Reactor Scram (4 pages)

IE22
NRR

cc: Mr. Daniel H. Dorman
Regional Administrator, Region 1
U.S. Nuclear Regulatory Commission
2100 Renaissance Blvd., Suite 100
King of Prussia, PA 19406-2713

USNRC Senior Resident Inspector
Pilgrim Nuclear Power Station

Ms. Booma Venkataraman
Project Manager
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Mail Stop O-8C2A
Washington, DC 20555

Attachment 1

Letter Number 2.15.070

Licensee Event Report 2015-007-00

Single Main Steam Isolation Valve Closure Resulting in Automatic Reactor Scram

(4 Pages)

NRC FORM 366 (01-2014) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 01/31/2017

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Pilgrim Nuclear Power Station	05000293	1 OF 4

4. TITLE

Single Main Steam Isolation Valve Closure Resulting in Automatic Reactor Scram

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
									N/A	N/A
08	22	2015	2015	007	00	10	20	2015	FACILITY NAME N/A	DOCKET NUMBER N/A

9. OPERATING MODE	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: *(Check all that apply)*			
N	☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)
	☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
	☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
	☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
10. POWER LEVEL	☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☑ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
	☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
100	☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
	☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ OTHER
	☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

LICENSEE CONTACT	TELEPHONE NUMBER *(Include Area Code)*
Mr. Everett P. Perkins, Jr. - Regulatory Assurance Manager	508-830-8323

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

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
A	LD	PSF		Y					

14. SUPPLEMENTAL REPORT EXPECTED	15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☑ NO				

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

On Saturday, August 22, 2015, at 1628 [EDT], with the reactor at 100% core thermal power the Pilgrim Nuclear Power Station experienced an automatic reactor scram due to Average Power Range Monitor High Flux signal from the rapid closure of one main steam isolation valve (MSIV). All plant systems responded as designed.

The Root Cause of this event is inadequate worker practices resulting in an excessive load being applied to the unistrut enclosed pneumatic line (during or prior to 2001) causing it to lay on a Main Steam Line subject to vibration. The excessive load caused an initiating crack in the nipple threads that over time resulted in a shear of the line.

The pneumatic supply line nipple was replaced and the line was re-supported.

This event posed no threat to public health and safety.

BACKGROUND

There are four Main Steam lines and each line contains two Main Steam Isolation Valves (MSIVs), one inboard valve located in the Drywell and one outboard valve located in the Steam Tunnel. The MSIVs are normally open during normal plant operation. Each MSIV is a 20" diameter Y-body globe valve with a pneumatic actuator to open and pneumatic & spring to close. The valve is a fail-safe closed design. A hydraulic cylinder sharing a common piston rod is used to control the closure speed via a needle valve. The safety function of these valves is to automatically close on a Primary Containment Isolation System Group 1 isolation signal.

EVENT DESCRIPTION:

On Saturday, August 22, 2015, at 1628 [EDT], with the reactor at 100% core thermal power the Pilgrim Nuclear Power Station (PNPS) experienced an automatic reactor scram signal due to the rapid closure of one MSIV. Inboard MSIV AO-203-1C had closed.

Primary Containment Isolation System Group II - Sampling Systems, Group VI - Reactor Water Cleanup System and Reactor Building Isolation System isolations occurred as expected due to the reactor scram at 100 percent power.

Reactor water level was restored to normal and maintained by the feedwater system. Reactor pressure control was maintained using the main turbine bypass valves. The plant was brought to a cold shutdown condition using the normal systems. All plant systems responded as designed to perform the safety functions.

The primary containment was de-inerted. A drywell entry was made to investigate the cause of the inboard MSIV AO-203-1C closure. The pneumatic supply to the inboard MSIV AO-203-1C valve control manifold was found sheared.

During the post trip review of the event, an anomaly was identified in the reactor protection system (RPS) channel A2. Reactor pressure exceeded the value for generating a reactor pressure trip signal. However, the channel A2 reactor high pressure trip was not recorded in the plant process computer log of the event. Due to the de-energize-to-actuate circuit design, once a scram trip signal is generated within the channel (in this case a reactor high flux signal), actuation of another signal has to be determined by other means, usually by review of the plant process computer log. Investigation of the circuit did not determine a definitive cause. The instrumentation loop was calibrated and a relay replaced prior to return to service. The most probable cause was oxidation on the relay contacts that provide the signal to the plant process computer. The relay contacts were burnished.

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CAUSE OF THE EVENT

Direct Cause: The cause of the event is that the pneumatic supply to the inboard MSIV AO-203-1C valve control manifold was found sheared at a threaded nipple location.

Root Cause: The Root Cause of this event is inadequate worker practices resulting in an excessive load being applied to the unistrut enclosed pneumatic line (during or prior to 2001) causing it to lay on a Main Steam Line subjecting the line to vibration. The excessive load caused an initiating crack in the nipple threads that over time resulted in a shear of the line.

Contributing Cause: Inadequate identification and repair of adverse conditions. When the support failure was identified in 2001, an inadequate repair was performed.

CORRECTIVE ACTIONS

Completed:
1. The pneumatic supply nipple was replaced and the piping was re-supported.
2. A leak check of all fittings to the inboard MSIVs was performed.

Planned:
Additional corrective actions are captured in the corrective action program by Condition Report CR-PNP-2015-07285.

SAFETY CONSEQUENCES

UFSAR Appendix R.2.1.3.2 provides a summary of the initial core analysis for "Closure of One Main Steam Isolation Valve." A single MSIV closure with initial power is expected to cause a high neutron flux scram, increased reactor pressure, and increased fuel temperature. UFSAR Figure R.2-5 illustrates the predicted transient response including flux above the high neutron flux scram setpoint which causes the reactor scram. No fuel damage or challenge to safety limits occurs.

Abnormal Operational Transients (AOT) are evaluated in the Updated Final Safety Analysis Report (UFSAR) to ensure that fuel cladding Minimum Critical Power Ratio (MCPR) Safety Limits are satisfied given transients caused by a single operator error or equipment malfunction. The spectrum of postulated initiating transient event categories is identified in UFSAR Section 14.3.2. The transient analysis contained in UFSAR Section 14 is supplemented by the original transient analysis contained in UFSAR Appendix R.

Closure of a single MSIV is an evaluated transient that is not required to be evaluated for each core reload because the transient is non-limiting. Only the most limiting AOT events affecting MCPR are addressed for each core reload to validate safety system settings and establish reactor fuel thermal limits.

This event is bounded by the analysis.

REPORTABILITY

This report is submitted in accordance with 10 Code of Federal Regulations (CFR) 50.73(a)(2)(iv)(A) – System Actuation, Any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph (a)(2)(iv)(B). The Reactor Protection System and Containment Isolation Signals are included in 10CFR50.73(a)(2)(iv)(B). The Reactor Protection System and Containment Isolation Signals were automatically actuated.

PREVIOUS EVENTS

No recent single MSIV closure events have occurred at PNPS.

ENERGY INDUSTRY IDENTIFICATION SYSTEM (EIIS) CODES

COMPONENTS	CODES
Pipe Fitting	PSF

SYSTEMS	CODES
Instrument Air System	LD
Main Steam System	SB

REFERENCES

Condition Report CR-PNP-2015-07285, Single Main Steam Isolation Valve Closure Resulting in Automatic Reactor Scram

Condition Report CR-PNP-2015-07295, Reactor Protection System Reactor High Pressure Channel A2 Trip Was Not Captured As Tripped by the Plant Process Computer