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10 CFR 50.73

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

Pilgrim Nuclear Power Station
Docket No. 50-293
License No. DPR-35

The enclosed supplemental Licensee Event Report (LER) 99-004-01, "*Setpoint of Target Rock Relief Valves Found out of Tolerance Due to Stellite Oxidation and Setpoint Drift*," is submitted in accordance with 10 CFR 50.73.

This letter contains no commitments.

Please contact Bryan Ford at (508) 830-8403 if there are any questions regarding this report.

Mike Bellamy

PMK/jb

Enclosure: LER 99-004-01

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INPO Records

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LICENSEE EVENT REPORT (LER)

(See reverse for number of digits/characters for each block)

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FACILITY NAME (1) <p style="text-align:center;">PILGRIM NUCLEAR POWER STATION</p>	DOCKET NUMBER (2) <p style="text-align:center;">05000-293</p>	PAGE(3) <p style="text-align:center;">1 of 5</p>
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TITLE (4)
Setpoint of Target Rock Relief Valves Found Out of Tolerance Due to Stellite Oxidation and Setpoint Drift

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
05	29	99	1999	004	01				N/A	05000
									N/A	05000

OPERATING MODE (9) N 000	POWER LEVEL (10) 000	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR: (Check one or more) (11)							
		20.2201 (b)	20.2203(a)(2)(v)	X	50.73(a)(2)(i)	50.73(a)(2)(viii)			
		22.2203(a)(1)	20.2203(a)(3)(i)		50.73(a)(2)(ii)	50.73(a)(2)(x)			
		20.2203(a)(2)(i)	20.2203(a)(3)(ii)		50.73(a)(2)(iii)	73.71			
		20.2203(a)(2)(ii)	20.2203(a)(4)		50.73(a)(2)(iv)	OTHER			
		20.2203(a)(2)(iii)	50.36(c)(1)		50.73(a)(2)(v)	Specify in Abstract below			
		20.2203(a)(2)(iv)	50.36(c)(2)	X	50.73(a)(2)(vii)	or in NRC Form 366A			

LICENSEE CONTACT FOR THIS LER (12)

NAME Bryan Ford	TELEPHONE NUMBER (Include Area Code) (508) 830-8403
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
X	SB	RV	T020	Y					

SUPPLEMENTAL REPORT EXPECTED (14)				EXPECTED SUBMISSION DATE(15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	X	NO					

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On May 29, 1999, it was identified that the initial as-found popping pressure of the pilot assemblies that were previously installed in three of the four Target Rock two-stage main steam relief valves exceeded Technical Specification 3.6.D.1. The pressures occurred during routine testing at a test facility.

The cause of the out of tolerance popping pressure of one of the pilot assemblies was attributed to setpoint drift. The cause of the out of tolerance popping pressures of the other two pilot assemblies was not identified when LER 99-004-00 was prepared, but is now believed to be Stellite oxidation. This supplement to LER 99-004-00 reflects findings made after the pilot assemblies had been disassembled for inspection, reworked, and reassembled. Following the rework, the assemblies were tested for certification by test facility personnel. The pilot assemblies removed for testing were replaced with certified spare pilot assemblies during the refueling outage.

The as-found popping pressures occurred during testing of the pilot assemblies while shut down for the 1999 refueling outage. The as-found popping pressures posed no threat to public health and safety.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
PILGRIM NUCLEAR POWER STATION	05000-293	1999	004	01	2 OF 5

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

BACKGROUND

The Pilgrim Station pressure relief system (PRS) is designed to prevent over-pressurization of the nuclear system. The PRS consists of two safety valves and four two-stage relief valves. The valves, installed in the main steam system piping upstream of the main steam isolation valves, are all located within the drywell. The safety valves are self-actuating, provide over-pressure protection, and discharge directly into the drywell atmosphere, if actuated. The relief valves augment the safety valves and are sized to prevent unnecessary actuation of the safety valves. The relief valves are self-actuating and discharge into the suppression pool through discharge piping connected to the valves. The two-stage relief valves consist of a pilot assembly and main stage. The pilot assembly provides the pressure sensing function and the main stage provides the pressure relieving function. The relief valves were manufactured by the Target Rock Corporation, model number 7567F.

Technical Specification 3.6.D.1 specifies the nominal setpoint of the relief valves be selected between 1095 psig to 1115 psig with a tolerance of +/- one percent. The relief valves' nameplate setpoint is 1115 psig and therefore, with a tolerance of + one percent, the maximum pressure allowed by Technical Specification 3.6.D.1 is 1126 psig.

The relief valves are also part of the automatic depressurization system (ADS). As part of the ADS, the valves are designed to automatically actuate as a result of a depressurization permissive signal, and can be manually actuated from the control room for depressurization.

On May 8, 1999, Pilgrim Station was shut down for the 1999 refueling outage. During the outage, one main steam safety valve (RV-203-4B) and the pilot assemblies of main steam relief valves RV-203-3A, RV-203-3B, RV-203-3C and RV-203-3D were removed for testing. The testing is specified in Technical Specifications 4.6.D (safety and relief valves) and 4.13 (inservice code testing). The testing was performed at the Wyle Laboratories test facility.

EVENT DESCRIPTION

On May 29, 1999, it was identified that the initial as-found popping pressure of the pilot assemblies that were previously installed in three of the four main steam relief valves exceeded Technical Specification 3.6.D.1 (1126 psig including tolerance). Specifically, pilot assembly serial number 1208, previously installed in RV-203-3A, was 1140 psig; pilot assembly serial number 1048, previously installed in RV-203-3B, was 1180 psig; pilot assembly serial number 1025, previously installed in RV-203-3C, was 1217 psig and pilot assembly serial number 1207, previously installed in RV-203-3D, was within tolerance.

The as-found popping pressures that were not within Technical Specification 3.6.D.1, were documented in problem reports that are part of the Pilgrim Station corrective action program. PR 99.9294 documented the as-found popping pressure of pilot assembly serial number 1048 (1180 psig). PR 99.9295 documented the as-found popping pressure of pilot assembly serial number 1208 (1140 psig). PR 99.9296 documented the as-found popping pressure of pilot assembly serial number 1025 (1217 psig).

The as-found popping pressures occurred during testing of the pilot assemblies while shut down for the 1999 refueling outage (RFO-12).

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
PILGRIM NUCLEAR POWER STATION	05000-293	1999	004	01	3 OF 5

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

CAUSE

The root cause of the as-found popping pressure of pilot assembly serial number 1208 (1140 psig) was attributed to setpoint drift. The factors known to contribute to setpoint drift have been described in NRC Information Notice 88-30, "Target Rock Two-Stage SRV Setpoint Drift Update." Moreover, it has been recognized that the pilot assemblies can exhibit setpoint drift greater than +/- one percent with no associated mechanical problems.

The root cause of higher than anticipated lift pressures for pilot assemblies S/N 1048 and 1025 is attributed to stellite oxidation. Such oxidation results in sticking between the pilot disc and seat. SRV leakage/in-service time and removal of the SRV pilot valves following flood up were evaluated as potential contributing causes.

CORRECTIVE ACTION

On June 10, 1999, the pilot assembly previously installed in the fourth Target Rock relief valve, RV-203-3D, was tested at the test facility. The initial as-found popping pressure of pilot assembly serial number 1207, previously installed in RV-203-3D, was 1117 psig.

When LER 99-004-00 was prepared, the pilot assemblies (#1025, #1048, #1207, #1208) were being disassembled for inspection and rework. Following the rework, the assemblies were tested for certification by test facility personnel. Following satisfactory certification testing, assemblies #1025, #1207, and #1208, were returned to Pilgrim Station. Assembly #1048 is awaiting rework and certifications.

The pilot assemblies removed for testing during the 1999 refueling outage were replaced with certified pilot assemblies.

ACTION TO PREVENT RECURRENCE

Wyle Labs has been requested to perform disc tests for all valves tested in the future (leaking or leak tight). This testing will identify potential sticking discs and allow additional seat and disc examinations. Such examinations will aid in determining the source of corrosion bonding when such bonding is found.

The Pilgrim Station Inservice Testing Program continues to monitor and identify improvements to reduce the impact of operational steam leakage and corrosion bonding on setpoint drift. One action taken in RFO-13 was to remove leaking pilots prior to vessel flood up. This action is believed to reduce corrosion bonding and setpoint drift.

During RFO #13, 2 SRV pilot assemblies tested beyond specified limits, but showed improved performance from RFO #12 testing. However, the sample population (2 valve pilot assemblies) is insufficient to conclude that the improved performance was attributable to removing the pilots prior to vessel flood up. (Refer to Pilgrim LER 2001-004-00, dated June 28, 2001, for further information on the RFO #13 pilot assembly event.)

SAFETY CONSEQUENCES

The as-found setpoints of the pilot assemblies for the relief valves posed no threat to public health and safety.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
PILGRIM NUCLEAR POWER STATION	05000-293	1999	004	01	4 OF 5

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

For the pressure relief (PRS) function, the ASME Boiler and Pressure Vessel Code Section III allows an overpressure of 110 percent of the reactor vessel design pressure. The Pilgrim Station reactor vessel design pressure is 1250 psig. Therefore, the maximum code allowable reactor vessel pressure is 1375 psig. Analysis was conducted of the as-found popping pressures relative to the supplemental reload licensing report for Pilgrim Station for the past fuel cycle (cycle 12, when the pilot assemblies were installed).

- For a postulated transient (closure of the main steam isolation valves and subsequent scram resulting from high neutron flux), the reactor vessel pressure would not have exceeded the code allowable pressure of 1375 psig. Therefore, the as-found popping pressures of the pilot assemblies formerly installed in the RV-203-3A/B/C would not have resulted in reactor vessel pressures having an impact on the integrity of the reactor vessel and the related pressure boundary. The as-found popping pressures of the relief valves for the transient, however, could have resulted in the actuation of a safety valve(s).
- For a more frequently anticipated transient, the margin between the reactor vessel pressure and the setpoint of the main steam safety valves could have been reduced. In the limiting case of such an event (load rejection without steam bypass to the main condenser), the margin could have been sufficiently small to result in the partial opening (simmering) of a safety valve(s).

For the automatic depressurization (ADS) function, the relief valves function to automatically open to depressurize the reactor vessel for low pressure core cooling provided by the Residual Heat Removal System (LPCI mode) and Core Spray Systems. The opening function is provided by circuitry and stored pneumatic energy that, independent of main steam pressure, actuates the pilot assembly and, consequently, opens the relief valve for the ADS function. The problem involved the (main steam) pressure sensing function provided by the pilot assemblies of the respective relief valves, not the circuitry or pneumatic energy that functions to automatically (or manually) open the relief valves for the ADS function.

For Pilgrim Station, pressure relief capacity has an insignificant impact on the minimum critical power ratio (MCPR). Therefore, the as-found popping pressure of the relief valves does not decrease the margin to the safety limit MCPR.

REPORTABILITY

This report is submitted in accordance with 10 CFR 50.73(a)(2)(i)(B) because it is assumed the as-found pressures at the test facility would have been the pressure at which the relief valves would have automatically opened for pressure relief if a high reactor pressure condition had occurred while the pilot assembly, was installed in the respective relief valve. The condition is assumed to have existed for a period longer than the 24 hour limiting condition for operation specified in Technical Specification 3.6.D.2 for the relief valves.

This report is submitted in accordance with 10 CFR 50.73(a)(2)(vii)(D) because three of the four Pressure Relief System relief valves were inoperable. The relief valves are credited in the Pilgrim Station updated Final Safety Analysis Report Accident Analysis for mitigating a steam pipe break outside containment after the closure of the main steam isolation valves.

SIMILARITY TO PREVIOUS EVENTS

A review was conducted of Pilgrim Station LERs. The review focused on relief valve test related LERs that were submitted since 1984. The review identified LER 91-014-01 and LER 93-011-00. LER 91-014-01 reported the initial popping pressure of pilot assembly serial number 1025 was 1128 psig and the popping pressure of pilot assembly serial number 1048 was 1128 psig. LER 93-011-00 reported the initial popping pressure of pilot assembly serial number 1025 was 1144 psig.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
PILGRIM NUCLEAR POWER STATION	05000-293	1999	004	01	5 of 5

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ENERGY INDUSTRY IDENTIFICATION SYSTEM (EIIS) CODES

The EIIS codes for this report are as follows:

COMPONENTS **CODES**

Valve, relief RV

SYSTEMS

Main steam system SB