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United States Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Perry Nuclear Power Plant
Docket No. 50-440

Ladies and Gentlemen:

Enclosed is Licensee Event Report (LER) 2006-005, Decreasing Instrument Air Pressure Results in Manual Reactor Protection System Actuation.

There are no regulatory commitments contained in this letter or its enclosure. Any actions discussed in this document that represent intended or planned actions are described for the NRC's information, and not regulatory commitments.

If there are any questions concerning this matter, please contact Mr. Jeffery J. Lausberg, Manager – Regulatory Compliance, at (440) 280-5940.

Very truly yours,

L.W. Pearce

Enclosure: LER 2006-005

cc: NRC Project Manager
NRC Resident Inspector
NRC Region III

JE22

LICENSEE EVENT REPORT (LER)

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

Estimated burden per response to comply with this mandatory collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by Internet e-mail to infocollects@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.

1. FACILITY NAME

Perry Nuclear Power Plant

2. DOCKET NUMBER

05000440

3. PAGE

1 OF 4

4. TITLE

Decreasing Instrument Air Pressure Results in Manual Reactor Protection System Actuation

5. EVENT DATE

MONTH	DAY	YEAR
12	13	2006

6. LER NUMBER

YEAR	SEQUENTIAL NUMBER	REV NO.
2006	- 005	- 000

7. REPORT DATE

MONTH	DAY	YEAR
02	09	2007

8. OTHER FACILITIES INVOLVED

FACILITY NAME	DOCKET NUMBER
FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE

1

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 |

10. POWER LEVEL

100

12. LICENSEE CONTACT FOR THIS LER

Tony Kledzik, Compliance Engineer, Regulatory Compliance

TELEPHONE NUMBER (Include Area Code)

(440) 280-5824

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

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES (If yes, complete EXPECTED SUBMISSION DATE).☒ NO15. EXPECTED
SUBMISSION
DATE

MONTH	DAY	YEAR

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

On December 13, 2006, at approximately 0435 hours, operators manually initiated a Reactor Protection System actuation in response to decreasing Reactor Pressure Vessel (RPV) coolant level. At the time of the event, the plant was in Mode 1 (i.e., Power Operation) with the reactor operating at 100 percent of rated thermal power. All control rods fully inserted into the core and RPV coolant level was maintained such that no emergency core cooling systems were needed to maintain level.

The cause of the event is attributed to decreasing Instrument Air System pressure caused by the separation of a header tubing elbow joint, which resulted in a transient in the Reactor Feedwater System. Less than adequate workmanship during plant construction, in the assembly of the air header joint, was determined to be the cause of the air header joint separation. The header tubing joint was replaced. Inspections of a sample of the accessible portions of the Instrument Air System were performed, prior to plant startup. Additional inspections of 2" and 3" soldered joints will be completed by the end of re-fuel outage 12 in 2009. The safety significance of this event is considered to be minimal.

This event is being reported in accordance with 10 CFR 50.73(a)(2)(iv)(A).

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

INTRODUCTION

On December 13, 2006, at approximately 0435 hours, a Reactor Protection System (RPS) [JC] actuation was manually initiated in response to decreasing Reactor Pressure Vessel (RPV) coolant level and no automatic Emergency Core Cooling Systems (ECCS) response occurred. At the time of the event, the plant was in Mode 1 (i.e., Power Operation) with the reactor operating at 100 percent of rated thermal power, and all ECCS's were operable. At 0549 hours, notification was made to the NRC operations Center (ENS Number 43049), in accordance with 10 CFR 50.72(b)(2)(iv)(B) as an event or condition that results in actuation of the RPS when the reactor is critical.

This event is being reported in accordance with 10 CFR 50.73(a)(iv)(A) as an event or condition that resulted in manual or automatic actuation of the RPS.

EVENT DESCRIPTION

On December 13, 2006, at approximately 0428 hours, control room operators entered an off normal instruction due to decreasing non-safety Instrument Air System [LD] pressure. The decreasing air pressure caused the Condensate System [SD] minimum flow recirculation valve to fail open as designed. This decreased the level in the hot surge tank causing a transient in the Reactor Feedwater System [SJ] which resulted in lowering RPV level. The operating crew, while responding to the feed water transient, investigated the source of the air pressure decrease and subsequently isolated the air leak at 0433 hours. However, instrument air pressure did not recover quickly enough to close the minimum flow recirculation valve and RPV level continued to decrease. Prior to the RPV level decreasing to its low alarm set point, the operating crew inserted a manual RPS Actuation at 0435 hours. The reactor was shut down and RPV coolant level was maintained such that no emergency core cooling systems were needed to maintain level. The plant entered Mode 3 (i.e., Hot Shutdown) at 0436 hours.

One control rod, 42-55, [AA] did not initially display a full in position indication on the initial SCRAM. At 0436 hours, operators initiated Alternate Rod Insertion (ARI) [AA] as required by plant procedures and confirmed all rods had full in indication. The Shift Manager subsequently made an Event Notification to the NRC for manual RPS actuation and stated that control rod 42-55 did not insert fully on the initial SCRAM. Further review by the plant staff determined that the control rod had fully inserted and only a position indication malfunction had occurred. All control rods inserted within their required scram times. The NRC operations center was updated with this information at 0814 hours.

Other Plant Response

On December 13, 2006, at approximately 0617 hours, the Condensate Minimum Recirculation Flow Valve failed closed due to a broken spring in the valve's positioner, resulting in a loss of minimum flow to the Condensate System. This caused elevated temperatures in the Off Gas System [WF]. Elevated temperatures in the off gas charcoal absorbers were identified when temperatures in the two inlets to the charcoal beds were at approximately 650 Degree's Fahrenheit and increasing. The charcoal beds were subsequently purged with nitrogen to reduce the amount of oxygen and decrease charcoal bed temperatures to acceptable levels.

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On December 17, 2006, at 0027 hours the plant entered Mode 4 (i.e., Cold Shutdown). On December 18, 2006, at 1036 hours, the plant entered Mode 2 (i.e., Startup). On December 19, 2006, at 1715 hours, the plant entered Mode 1 and the generator was subsequently synchronized to the grid at 2131 hours.

CAUSE OF EVENT

The cause of the event is attributed to decreasing Instrument Air System pressure from a 45 degree elbow joint separation on a 2 inch copper tubing instrument air header. This resulted in a feedwater system transient and manual actuation of the RPS due to the decreasing RPV coolant level.

The cause of the air header joint separation was determined to be less than adequate workmanship during plant construction in the assembly of the joint. Analysis of the joint determined that the tube was inadequately inserted into the socket (i.e., the tubing was not inserted far enough into the socket when the joint was soldered). The maintenance history of this section of piping was reviewed to determine if any modifications or reworks had been made to this portion of the system. There had been no work orders on the subject joint. This improperly made-up joint had been in place since plant construction.

Ineffective review and implementation of relevant industry operating experience (OE) was also identified as a root cause. Also, the lack of a program, in the past, to ensure that Modifications and Preventative Maintenance Tasks (PMTs) are implemented as intended was a contributing cause.

EVENT ANALYSIS

The safety significance of this event is considered to be minimal. The operators took conservative action to manually actuate the RPS when it was determined that RPV coolant level control was challenged. The plant safety systems responded as designed. Operator response was appropriate and consistent with operator training. Other plant systems, structures, and components responded as described in the EVENT DESCRIPTION section of this report.

The risk associated with a General Transient has been evaluated and documented in the Probabalistic Risk Assessment (PRA) model and the Updated Safety Analysis Report (USAR). A General Transient is an incident of moderate frequency and does not represent an increase in the core damage frequency. Based on the results documented in USAR Chapter 15 (event 7, i.e., manual SCRAM) the risks associated with a manual SCRAM are acceptable. Since the December 13, 2006 SCRAM is bounded by a manual SCRAM, evaluated in the USAR and mitigating functions performed as expected, the event was not risk significant.

CORRECTIVE ACTIONS

The damaged joint was replaced. Ultrasonic Testing (UT) was performed on 8% (approximately 345 joints) of the 2" and 3" soldered copper tubing in the instrument air system throughout the plant to determine the extent of joints assembled with inadequate insertion. The instrument air system's 2" and 3" copper tubes having soldered joints were targeted because the capacity of the air compressors can adequately make-up the air volume from a leak less than 2" and greater than 3" copper tubing is not used in the plant. This testing resulted in 5 joints being identified that did not meet established insertion criteria. Clamps were placed on these 5 joints to prevent separation. A plan will be developed in order to conduct additional UT inspections of 2" and 3" soldered joints. These inspections will be completed by the end of re-fuel outage 12 in 2009.

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Programs and processes are currently in place at Perry which would have effectively reviewed the relevant industry OE. The programs and processes will be verified to ensure that they are being implemented correctly and are effectively reviewing industry OE. Also, the Equipment Reliability process will be strengthened to ensure that issues are implemented as intended and in a timely manner.

The failed Condensate Minimum Recirculation Flow Valve positioner was repaired.

PREVIOUS SIMILAR EVENTS

A historical review of the instrument air system revealed that there was a history of leaking joints in the 2" and 3" tube joints during the early days of plant startup and operations. Portions of the Instrument Air System were modified to prevent joint separation and a repetitive task was initiated to regularly inspect the joints. The task was later canceled. Review of LER's for the past 5 years did not identify any similar previous events.

COMMITMENTS

No regulatory commitments are contained in this report.

Energy Industry Identification System Codes are identified in the text as [XX]