

LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1): Perry Nuclear Power Plant, Unit 1

DOCKET NUMBER (2): 0 5 0 0 0 4 4 0 1 OF 0 4

PAGE (3): 1 OF 0 4

TITLE (4): RWCU Isolation on High Delta Flow While Attempting to Warm-up the System

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 NAMES		DOCKET NUMBER(S)										
0	2	2	9	2	9	2	0	3	2	7	9	2	0	5	0	0	0	0	0	0	0

OPERATING MODE (9): 1

POWER LEVEL (10): 1 0 0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 50. (Check one or more of the following) (11):

20.402(b)	30.405(c)	50.731a(2)(iv)	73.71(b)
20.405(a)(1)(ii)	50.381a(1)	50.731a(2)(ix)	73.71(c)
20.405(a)(1)(iii)	50.381a(2)	50.731a(2)(xii)	OTHER (Specify in Abstract below and in Text (NRC Form 386A))
20.405(a)(1)(iv)	50.731a(2)(ii)	50.731a(2)(xiii)(A)	
20.405(a)(1)(v)	50.731a(2)(iii)	50.731a(2)(xiii)(B)	
20.405(a)(1)(vi)	50.731a(2)(iv)	50.731a(2)(x)	

LICENSEE CONTACT FOR THIS LER (12):

NAME: Henry L. Hegrat, Compliance Engineer, Extension 5185

TELEPHONE NUMBER: 2 1 6 2 5 9 1 - 3 7 3 7

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13):

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRCDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRCDS

SUPPLEMENTAL REPORT EXPECTED (14):

YES (If yes, complete EXPECTED SUBMISSION DATE): NO:

EXPECTED SUBMISSION DATE (15):

MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16):

On February 28, 1992 at 2135, while attempting to startup the Reactor Water Cleanup (RWCU) System, an RWCU isolation occurred as a result of high differential flow. Immediate corrective action was taken to verify that no actual system leakage had occurred. The RWCU system was secured and subsequently returned to service.

The cause of this event is considered to be a design deficiency associated with system voiding phenomenon which occurred during cooldown of the RWCU system. Upon subsequent system startup attempts by the operators, flow past the inlet valve resulted in filling of these voids, which caused initiation of the 45 second differential flow isolation timer. When this flow timer timed out prior to stabilization of system flow, an isolation on high differential flow occurred.

Pursuant to the corrective actions for previous similar events, a Technical Specification change to increase the differential flow timer setpoint was submitted to the NRC on October 30, 1991. This change would avoid unnecessary isolation valve closure and shutdown of the system. All licensed operators will be trained on the lessons learned with regard to this event.

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TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20545, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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TEXT (if more space is required, use additional NRC Form 366A (5-89))

I. Introduction

On February 28, 1992 at 2135, while attempting to startup the Reactor Water Cleanup (RWCU) [CE] System, an RWCU isolation occurred as a result of high differential flow. At the time of the event, the plant was in Operational Condition 1 (Power Operation) at 100 percent power with the Reactor Pressure Vessel [RPV] at 1026 psi and saturated conditions. The NRC Operations Center was informed of the event via the Emergency Notification System at 2330 hours in accordance with notification requirements identified in 10CFR50.72(b)(2)(ii). This event is being reported under the requirements of 10CFR50.73(a)(2)(iv).

II. Event Description

On February 28, 1992, Surveillance Instruction (SVI-E31-T0083-A) "RWCU Differential Flow High And Timer Channel A Functional For 1E31-K602A, 1E31-K603A and 1E31-K605A" was being performed. An alarm unit trip value was found to be outside of its Leave-As-Is Zone (LAI2). A three input summer was required to be removed and recalibrated. In accordance with Technical Specification Table 3.3.2-1 Action 27, operations personnel closed the affected system isolation valves within one hour and shutdown the RWCU system at 1338 hours.

Later that day, following calibration of the input summer, SVI-E31-T0083-A was successfully re-performed. Operations personnel then attempted to perform a startup of the RWCU system per System Operating Instruction (SOI-G33) "Reactor Water Cleanup System (Unit 1)". While performing the RWCU system re-pressurization/warm-up section of the SOI, operations personnel cracked open the pump inlet valve to allow flow to warm-up the system. A high differential flow signal was generated from the Leak Detection System [IJ] which initiated a 45 second differential flow timer. Operators attempted to prevent the imminent isolation by throttling back and finally closing the pump inlet valve at approximately 35 seconds into the 45 second differential flow timer. However, at 2135, the RWCU system received a containment isolation signal from the Leak Detection System and the Nuclear Steam Supply Shutoff System [JM] on high differential flow, and the RWCU system successfully isolated in accordance with its intended design. After the isolation was reviewed by the oncoming shift, the RWCU system was successfully unisolated at 0055 and subsequently returned to service at approximately 0905 on February 29, 1992.

III. Cause Analysis

The cause of this event is considered to be a design deficiency which results in system voiding during cooldown of the RWCU system.

It is believed that during shutdown of the RWCU system on February 28, 1992, stagnant water, close to saturated conditions, was trapped on the shell side of the regenerative heat exchanger. As the system cooldown progressed, pressure reduction, aided by minor heat exchanger drain valve leakage, caused this water to flash to steam. Licensed Operators had no indication that the RWCU system had

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AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR
REGULATORY COMMISSION, WASHINGTON, DC 20555 AND TO
THE PAPERWORK REDUCTION PROJECT (3150-0104) OFFICE
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TEXT IF MORE SPACE IS REQUIRED, USE ADDITIONAL NRC Form 366A (1/77)

partially voided until the void began to fill as they performed system re-pressurization/warm-up evolutions by cracking open the pump inlet valve. At this point, flow was detected entering but not leaving the system, resulting in a large sustained differential flow signal and initiation of the 45 second differential flow isolation timer. When this flow timer timed out prior to stabilization of system flow, an isolation on high differential flow occurred.

IV. Safety Analysis

The Leak Detection System compares RWCU inlet flow to return flows (return flow to the reactor vessel through the feedwater line and blowdown flows to the main condenser and radwaste). All three flows are summed to generate a total flow value. A RWCU high differential flow signal is generated from the Leak Detection System when RWCU inlet flow exceeds return flow by 68 gpm. If this differential flow signal continues for 45 seconds, a RWCU system containment isolation will occur. This could occur as the result of a line break in the RWCU system. The 45 second time delay is intended to allow for system flow transients when operational configurations change. During this event, although no actual leak existed, it is believed that a RWCU high differential flow did exist due to the apparent formation of a void in the system. The Leak Detection system responded as designed to indicate high differential flow and initiated a containment isolation. All other plant systems responded as designed. Therefore, this event is not considered to be safety significant.

Following a RWCU containment isolation, the loss of the RWCU system may cause reactor coolant conductivity to slowly increase until the system is returned to service. In this event, the system was returned to service prior to a significant increase in conductivity.

Other RWCU containment isolations have been reported in LERs 88-039, 89-025, 90-008, 90-022, 91-006, and 91-011. Corrective actions previously completed as a result of these events are described in their respective LERs. The void formation was previously identified as a result of corrective actions associated with LER 90-022, and reported to the NRC in the supplement to LER 91-011 on December 6, 1991. Past corrective actions taken specific to this phenomena included: evaluation of alternate means to re-pressurize/warm-up the system; implementation of procedural changes to reduce the probability that this event could reoccur; initiation of an EDCR to eliminate minor heat exchanger drain valve leakage; and submittal of a Technical Specification change to increase the RWCU delta-flow timer setpoint. Implementation of this Technical Specification change should preclude occurrence of a similar isolation in the future.

Additionally, as previously reported in LER 91-011, Supplement 1, a vendor analysis determined that no long-term deleterious effects had resulted or would result from occasional RWCU system transients involving flashing or voiding.

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TEXT OF THIS PAGE IS REPRODUCED. USE ADDITIONAL NRC FORM 3864 (1-87)

V. Corrective Action

On October 30, 1991, a Technical Specification Change Request (PY-CEI/NRR-1390L) which included a change to increase the delta-flow timer setpoint was submitted to the NRC. This change would avoid unnecessary isolation valve closure and shutdown of the system. All licensed operators will be trained on the lessons learned with regard to this event. No additional actions have been identified pending approval of the aforementioned request.

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