NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/85

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
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TITLE (4)

Personnel Errors During Design Change Installation Cause RWCU and RHR Isolations

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 6	2 6	8 6	8 6	0 2 7	0 0	0 7	2 5	8 6		0 5 0 0 0
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OPERATING MODE (9)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
4	20.402(b)	20.405(c)	X 50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10) 0 0 0	20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
	20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
	20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
	20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
	20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
Paul Russ, Compliance Engineer, ext.6472	AREA CODE 2 1 6 — 2 5 9 - 3 7 3 7

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	

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 fifteen single-space typewritten lines) (16)

On June 26, 1986 at 0423, 2315, and June 27 at 1507, personnel errors caused Engineered Safety Feature System (ESF) actuations during installation of a Reactor Water Cleanup (RWCU) design change. The first actuation occurred while performing a surveillance test on the RWCU containment isolation logic. Because of a failure to follow the design change implementation procedure, the logic test bypass switch was defeated resulting in an unexpected containment isolation of the RWCU system during performance of the test. The second actuation occurred when a connector was separated and de-energized the Residual Heat Removal (RHR) logic circuits, causing a containment isolation of the RHR system. The cause of this event was the design change implementation instruction which did not sufficiently detail the required wiring change. The third actuation occurred when an Instrumentation and Control technician removed a jumper to complete the RWCU design change. The technician inadvertently grounded the jumper causing an RWCU logic fuse to blow resulting in another isolation of the RWCU system.

Corrective actions which will be taken to prevent recurrence include a review of the program interfaces between the design control and work control process and training personnel regarding their responsibility to properly follow procedures.

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

On June 26, 1986 at 0423, 2315, and on June 27 at 1507, personnel errors caused Reactor Water Cleanup (RWCU)[CE] and Residual Heat Removal (RHR)[BO] System containment isolations. At the time of the events, the plant was in Operational Condition 4 (Cold Shutdown), the reactor vessel [RPV] pressure was atmospheric and reactor coolant temperature was approximately 145 degrees. RWCU was in normal operation, rejecting water to the condenser [SG]. RHR train A was in shutdown cooling mode and train B was in standby.

Prior to the first isolation, electrical maintenance workers were installing test switches in the RWCU containment isolation logic circuitry as part of a design change. On June 25 at 1915, a maintenance worker commenced work on Division 2 RWCU logic in a sequence that was not in accordance with the work package that implemented the design change. This resulted in defeating a logic test bypass switch [HS] without the installation of the required temporary jumper. On the following shift at 0353, an Instrumentation and Control (I&C) technician obtained permission from Control Room operators to perform a Division 2 RWCU Surveillance Instruction (SVI). At 0423 in accordance with the SVI, the technician lifted leads in the isolation logic circuitry. Because the logic test bypass switch had earlier been defeated without installation of the required temporary jumper, the logic circuitry de-energized and caused the RWCU containment isolation. Control Room operators responded to the RWCU pump suction low flow alarms [FA] and upon investigation, discovered that the logic test bypass switch had been defeated as a result of the design change work. The I&C technician immediately re-connected the lifted lead. At 0425, the Control Room operators re-opened the RWCU containment isolation valves, started both RWCU pumps and re-established blowdown to the main condenser [COND].

The cause of this ESF actuation was personnel error. The maintenance worker failed to follow the work order step sequence implementing the design change. In addition, the Control Room operators failed to ensure SVI prerequisites were met which would have required a verification that no other maintenance was being performed on the RWCU channels.

Events which led to the second ESF actuation occurred on June 26. While implementing the design change described above, an electrical maintenance worker elected to separate a connector (P105) [CON] in order to make wiring connections in accordance with the design change. This was necessary because the design change installation instruction did not clearly define the required wiring disconnection necessary to complete the wiring changes. At 2315, after discussions with the Control Room operators, the maintenance technician disconnected P105 resulting in an unexpected RHR containment isolation. Control Room operators responded to the isolation and discovered that disconnecting P105 not only affected the RWCU as expected, but also de-energized the RHR containment isolation valve logic. The maintenance worker re-connected P105, then at 2342, the Control Room operators reset the isolation logic and returned RHR to the shutdown cooling mode.

The cause of this event was an unclear installation instruction accompanying

the design change which did not sufficiently detail the required wiring changes.

The third ESF actuation occurred on June 27 at 1507 during completion of the RWCU design change. While an I&C technician was removing a temporary jumper, installed as part of the design change, he inadvertently grounded the jumper. This caused the RWCU isolation logic fuse to blow. A RWCU containment isolation valve closure and RWCU pump trip resulted. The Control Room operators responded, the fuse was immediately replaced and at 1542, the RWCU containment isolation valves were re-opened and both RWCU pumps were started.

This ESF actuation was caused by personnel error. The I&C technician inadvertantly grounded the jumper.

RWCU and RHR containment valve closures are designed to actuate when a breach in the reactor coolant pressure boundary occurs in one of these systems. A loss of power to the isolation logic for RWCU or RHR will initiate closure of the respective systems' containment isolation valves. If an RWCU containment isolation were to occur at high reactor power, the momentary loss of the RWCU system may cause reactor coolant conductivity to slowly increase until the system is returned to service. In addition, during shutdown with no or low internal recirculation flow, reactor vessel thermal stratification may also occur. However, the time out of service for RWCU would be short and these effects minimal. In the plants present operational condition, these effects were negligible.

During this event, decay heat was not present, and the reactor coolant temperature did not rise. If a similar RHR system isolation had occurred when decay heat was present, Control Room operators would have responded as required to return the system to service thereby minimizing reactor coolant temperature increase. There were also alternate systems available which could be used for decay heat removal which would have been placed in operation as required. Consequently, this event had no safety significance. No previous similar events were identified.

The RWCU design change was implemented in response to the events described in LERs 86003 and 86009. During these previous events, cramped work locations caused two RWCU isolations during the performance of an SVI. This design change installed test switches to eliminate the need for lifting certain leads. This design change has been completed.

Corrective Actions which have been or will be taken to prevent recurrence include:

1. The maintenance technician involved in the first event was counseled regarding his responsibility to correctly follow procedures. He has also received training on Plant Administrative Procedure (PAP) 0905, "Work Order Process". In addition, the maintenance technician group will also receive training emphasising this responsibility.

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

2. Control Room operators will be retrained on the requirements described in the Surveillance Control Procedure.

3. Review the program and organization interfaces between the design control and work control pre-planning and review processes. Specific emphasis will be directed towards ensuring installation instructions better prescribe:

   a) precautionary measures to minimize unplanned actuations or disabling systems.

   b) special attention to detail including required sequence of work.

4. The I&C technician who removed the temporary jumper causing the third ESF actuation received disciplinary time off and was counseled regarding his responsibilities to use proper techniques when working on energized equipment. The I&C technicians group will receive training emphasising the need for attention to detail especially during work involving lifted leads.

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

THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

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MURRAY R. EDELMAN
SR. VICE PRESIDENT
NUCLEAR

July 25, 1986
PY-CEI/NRR-0509 L

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

Perry Nuclear Power Plant
Docket No. 50-440
LER 86-027-0

Dear Sir:

Enclosed is Licensee Event Report 86-027-0 for the Perry Nuclear Power Plant.

Very truly yours,

Murray R. Edelman
Senior Vice President
Nuclear Group

MRE:njc

Enclosure: LER 86-027-0

cc: Jay Silberg, Esq.
John Stefano (2)
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