Boston Edison

Pilgrim Nuclear Power Station
Rocky Hill Road
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10 CFR 50.73

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BECo Ltr. #96-051

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

Docket No. 50-293
License No. DPR-35

The enclosed Licensee Event Report (LER) 96-002-00, "Loss of Position Indication of Reactor Core Isolation Cooling Motor Operated Valve During Surveillance Test," is submitted voluntarily.

In this report, the following commitments are made:

- Evaluate the practice and process of removing fuses as part of surveillance tests and take appropriate corrective action.
- Personnel who remove and replace fuses will receive training in checking for fuse tightness.

Please do not hesitate to contact me if there are any questions regarding this report.

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JPC/dmc/9600200

cc: Mr. Thomas T. Martin
Regional Administrator, Region I
U.S. Nuclear Regulatory Commission
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Sr. NRC Resident Inspector - Pilgrim Station

Standard BECo LER Distribution

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NRC Form 366 (5-92)

U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

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

APPROVED BY OMB NO.3150-0104
EXPIRES 5/31/95

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE(3)
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TITLE (4)
Loss of Position Indication of Reactor Core Isolation Cooling Motor Operated Valve During Surveillance Test

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 N/A	DOCKET NUMBER 05000
02	05	96	96	002	00	05	17	96	FACILITY NAME N/A	DOCKET NUMBER 05000

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR: (Check one or more) (11)							
			20.402(b)		20.45(c)		50.73(a)(2)(iv)		73.71(b)
POWER LEVEL (10)	100		20.405(a)(1)(i)		50.36(c)(1)		50.73(a)(2)(v))(D)		73.71(c)
			20.405(a)(1)(ii)		50.36(c)(2)		50.73(a)(2)(vii)	X	OTHER
			20.405(a)(1)(iii)		50.73(a)(2)(i)(B)		50.73(a)(2)(viii)(A)		(specify in Abstract below and in Text, NRC Form 366A)
			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 (Include Area Code)
Jeffrey P. Calfa - Senior Regulatory Affairs Engineer	508-830-8108

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
X	BN	FUB	B130	N						

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 February 5, 1996, at 1637 hours, the position indication for the reactor core isolation cooling (RCIC) system inboard steam isolation valve was lost as plant operators slowly jogged open the valve. The system was previously removed from service on February 5, 1996, at 1152 hours for a RCIC logic system functional test. The problem was experienced during the final steps of the logic system functional test.

The most probable cause was a loss of control power to the valve motor operator due to a loose control power fuse. The fuse lost electrical contact due to vibration from the breaker contactors while operators jogged the valve open. The surveillance procedure included steps that required fuse removal and re-installation, but accountability to check for tightness between the fuse and the fuse holder was unclear. The fuse was removed and cleaned, the fuse holder clips tightened, and the fuse was re-installed. The RCIC system was returned to service at 2152 hours on February 5, 1996. A contributing cause was a lack of training on checking for fuse tightness. Corrective action includes evaluating the practice and process of removing fuses as part of surveillance testing and addressing recommendations based upon the evaluation. Additional action includes training on checking for fuse tightness.

The event occurred with the plant operating at 100 percent power with the reactor mode selector switch in the RUN position. The reactor vessel pressure was 1027 psig with the reactor water temperature at saturation temperature for the reactor pressure. This event posed no threat to public health and safety.

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

BACKGROUND

The reactor core isolation cooling (RCIC) system provides makeup water to the reactor vessel following reactor vessel isolation in order to prevent the release of radioactive materials to the environment as a result of inadequate core cooling. RCIC consists of a steam driven turbine-pump and associated valves and piping capable of delivering makeup water to the reactor vessel. The steam supply to the RCIC turbine comes from the reactor vessel. The steam first passes through the motor operated inboard steam isolation valve, MO-1301-16, and then through the motor operated outboard steam isolation valve, MO-1301-17. The steam then passes through the RCIC turbine steam supply valve, MO-1301-61, then through the RCIC trip and throttle valve, SV-1301-1, to the turbine. Electrical logic causes the RCIC isolation valves to close and isolate the RCIC system. This same logic also causes the closing of the trip and throttle valve, SV-1301-1. Instrument and control (I&C) technicians use procedure 8.M.2-2.10-7, "RCIC Auto Isolation System Logic Test," to test the automatic isolation function.

For the performance of 8.M.2-2.10.7, operations personnel close valves MO-1301-61 and MO-1301-16 and open breakers D751 and B1864 for the valve motor operators. The control power fuse for the motor operator for MO-1301-16 at breaker B1864 is also removed per the procedure. Technicians then perform the portion of the procedure that initiates a series of RCIC isolation signals to verify the appropriate relays change state.

Upon completion of the logic portion of the test, operations personnel install the control power fuse at B1864 for MO-1301-16 and close the breakers that were previously opened. The valves are then opened in a particular sequence to return the system to its normal standby lineup. Valves MO-1301-16 & 17 are opened in a specific sequence to gradually pressurize and warm the pipe. Valve MO-1301-17 has a seal-in circuit and is first opened fully. Valve MO-1301-16 is a jog valve and is jogged into the open position slowly while monitoring the increase in steam supply piping pressure.

The RCIC system was removed from service on February 5, 1996, at 1152 hours to perform procedure 8.M.2.-2.10.7.

EVENT DESCRIPTION

On February 5, 1996, at 1637 hours, operations personnel were restoring RCIC to service in accordance with procedure 8.M.2.-2.10.7. Operations personnel noted a loss of valve position indication for MO-1301-16 as the valve was being jogged open in accordance with Attachment 1 step 62(a) of the procedure. The operator had jogged MO-1301-16 three times in the open direction and observed valve movement as indicated by dual light indication and steam supply line pressure increase. On the fourth jog of the valve, valve position indication was lost to MO-1301-16 at panel C904. Operations personnel closed and tagged the in-series isolation valve MO-1301-17. Investigation after the loss of position indication found that the breaker had not tripped open and the control power fuse was slightly oxidized.

Operations notified the NRC Operations Center in accordance with 10 CFR 50.72 at 2152 hours on February 5, 1996, based on the information available to the operators at the time of the notification. Problem Report (PR) 96.9043 was written to document the problem and maintenance request (MR) 19600284 was written for troubleshooting and repair.

The event occurred while the plant was operating at 100 percent reactor power with the reactor mode selector switch in the RUN position. The reactor vessel pressure was approximately 1027 psig with the reactor vessel water temperature at saturation temperature for the reactor pressure.

CAUSE

The cause of the lost position indication of MO-1301-16 was a loose control power fuse in breaker B1864. The fuse was most likely loose because the fuse clip tightness was not checked sufficiently upon re-installation of the fuse as required by procedure 8.M.2-2.10.7.

Prior to the performance of procedure 8.M.2-2.10.7, valve MO-1301-16 operated normally and its position indications were normal. The valve was closed as part of procedure 8.M.2-2.10.7. The breaker for MO-1301-16, B1864, was opened and the control power fuse for the breaker was removed also as part of the procedure. The procedure requires that fuses removed be inspected and cleaned, if necessary, and fuse clip tightness be checked after fuse installation. After the logic system test portion of the procedure was performed, the control power fuse was re-installed in B1864, and the breaker was closed. Operations personnel noted a loss of valve position indication as the valve was subsequently being jogged open in step 62(a) of the procedure. Maintenance request (MR) 19600284 was issued to investigate the problem. A troubleshooting procedure was initiated to inspect the cubicle for loose connections and fuse condition. The investigation found that the breaker had not tripped open. Operations personnel closed and tagged isolation valve MO-1301-17. Wiring connections within breaker B1864 were inspected and no loose wires were found. When the control power fuse was inspected, it was observed that the control room position indication flickered. The fuse was removed, some minor fuse oxidation was observed and cleaned, and the fuse holder connections were tightened. When the fuse was installed, the valve was cycled several times with satisfactory results. Procedure 8.M.2-2.10.7 was completed and the RCIC system was returned to normal standby service.

Procedure 8.M.2-2.10.7 was not clear with respect to the procedure steps to check for fuse tightness in the fuse holder. The control power fuse is located within motor control center B18 in the reactor building. The technicians performing this test do not enter the reactor building for the test. A plant operator opens the breaker, removes the fuse, and hangs the appropriate tags. Procedure 8.M.2-2.10.7 Attachment 1 steps 10 (d) (1) and 60 (e) (1) are the steps where the fuse is removed and replaced. The steps have statements to inspect the fuse and holder for cleanliness and looseness but do not require a signoff.

These steps are followed by a check mark or "N/P" if not performed. Step 60(e) of Attachment 1 of 8.M.2-2.10.7 requires an inspection of the fuse and fuse holder for proper fit. The procedure step requires the performer to check a block that either "..free play [of the fuse in the fuse holder is] evident.." or "..No free play [is] evident..". The "..No free play [of the fuse in the fuse holder is] evident.." block was checked. In the sequence of events of the procedure, these steps are the point at which the action within the procedure to perform various tasks is transferred from one group to another. The lack of a procedural signoff, combined with the transfer of ownership at this time, makes it unclear as to which group was accountable for the fuse and holder inspection steps. However, it is clear the fuse was not tightly installed within the fuse holder since the fuse lost electrical contact merely from operators jogging the valve in the open direction four times. Regardless of who was responsible for this particular fuse tightness check, "skill of the craft" training is appropriate for maintenance and operations personnel who remove and replace fuses.

Procedure 1.3.4-1.8, "Surveillance Procedures Formatting Guide," provides details that are applied to procedural steps of a surveillance procedure whenever fuses are removed as part of the procedure. Step 8.0 (1) of Attachment 1 states that when fuses are removed during performance of the procedure, steps shall be provided to verify proper fuse size and that the fuse/fuse holder was inspected for signs of arcing, oxidation, and damage. The steps are also accompanied with a signoff block as well as a verifier's signature space. Procedure 8.M.2-2.10.7 did not contain signoff requirements or verifying signatures for the control power fuse removal that resulted in the loose fuse. The procedure was not sufficient with regard to accountability of the check for fuse tightness in the fuse holder.

Review of the alarm chart recorder in the control room revealed that the "RCIC VALVES OVERLOAD" alarm (C904L-D5) did not actuate. The absence of the alarm and the condition of the breaker not having tripped confirmed that the motor overload did not occur. In addition, a review of Emergency Plant Indicating Computer data indicated both valve MO-1301-16 position indicating lights were energized in the mid position and a corresponding steam supply pressure increase. This information indicates the valve was responding to the jog signals to open and ruled out the possibility of pressure locking or thermal binding.

There is no indication that the fuse caused any problems with MO-1301-16 position indication or operability prior to commencement of 8.M.2-2.10.7. The most likely cause of the problem was that the fuse became loose in the fuse clip (holder) due to the removal and re-installation within the procedure. The procedure requires the valve be opened slowly which means jogging the valve. The fuse apparently lost sufficient electrical connection due to the vibration from the motor contactors in the breaker as the valve was being jogged. Since jogging is performed to control steam supply piping pressurization, the discovery of the loose fuse was not a chance occurrence. The loose fuse was discovered by the jogging induced vibration from the motor contactor. The RCIC trip and throttle valve, SV-1301-1, was closed during the test and was still closed per procedure when MO-1301-16 was being jogged open. The subsequent procedure step 64 would have reset the trip and throttle valve.

CORRECTIVE ACTION

An investigation and troubleshooting plan was implemented. The fuse was removed, the fuse clip tightened, the fuse cleaned, and the fuse re-installed in accordance with MR 19600284. The RCIC system was declared operable and returned to standby service on February 5, 1996, at 2152 hours.

Engineering personnel will evaluate the practice and process of removing of fuses as part of surveillance testing. Based on the results of the evaluation, engineering will provide the necessary recommendations.

Operations and maintenance personnel who remove and replace fuses will receive "skill of the craft" type training in checking for fuse tightness.

Applicable procedures will be revised if necessary including the specific procedure discussed within this report.

SAFETY CONSEQUENCES

This event posed no threat to public health and safety.

During the time the RCIC system was removed from service for testing, including the fuse problem experienced during the test, the high pressure coolant injection (HPCI) system was operable in accordance with Technical Specification 3.5.D.2.

This report is submitted voluntarily. The fuse problem occurred as a result of removing and re-installing the fuse during the surveillance while RCIC was removed from service for the test. The system was operable before the test. The pre-planned process of jogging open MO-1301-16 as part of the surveillance test identified the loose fuse prior to returning the system to service.

SIMILARITY TO PREVIOUS EVENTS

A review was conducted of Pilgrim Station licensee events reports (LERs) submitted since 1984. The review focused on LERs involving loose fuses or fuse oxidation. The review identified LER 95-001-00. LER 95-001-00 reported the reactor building to torus train 'B' vacuum relief valve opened due to a loose fuse in control room panel C-7. The slightly oxidized fuse had been removed and re-installed via a temporary procedure. The temporary procedure did not provide instructions to check and tighten fuse clip tension if necessary. The fuse clip was tightened and the fuse was replaced. A procedure revision was made to require inspection of fuses and fuse holders whenever fuses are removed during performance of temporary procedures.

ENERGY INDUSTRY IDENTIFICATION (EIIS) CODES

COMPONENTS	CODES
breaker	BKR
fuse	FU
fuse block (fuse clip)	FUB
valve, isolation (MO-1301-16)	ISV

SYSTEMS

reactor core isolation cooling (RCIC) system	BN
high pressure coolant injection (HPCI) system	BJ