

LICENSEE EVENT REPORT (LER)(See reverse for required number of
digits/characters for each block)ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY
INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS
LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED
BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN
ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-
6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC
20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104),
OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)

Millstone Nuclear Power Station Unit 1

DOCKET NUMBER (2)

05000245

PAGE (3)

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TITLE (4)

Redundant Train Wiring With Inadequate Physical Separation

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
06	23	95	95	033	00	02	19	97	FACILITY NAME	DOCKET NUMBER
OPERATING MODE (9)		N		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)						
POWER LEVEL (10)		100		20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(i)		50.73(a)(2)(viii)
				20.2203(a)(1)		20.2203(a)(3)(i)		<input checked="" type="checkbox"/> 50.73(a)(2)(iii)		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 or in NRC Form 366A
				20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	Robert W. Walpole, MP1 Nuclear Licensing Manager	TELEPHONE NUMBER (Include Area Code)	(860)440-2191
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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)

<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE).	<input checked="" type="checkbox"/> NO	EXPECTED SUBMISSION	MONTH	DAY	YEAR
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ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On January 20, 1997, at 1625 hours, with the plant in COLD SHUTDOWN, it was determined that two instances found where the physical separation of wiring, between redundant trains, was less than that required by the plant's design basis. These instances had been identified individually more than a year ago, but they were incorrectly dispositioned due to a lack of understanding of the plant's design basis. Both instances date back to initial plant construction. This event was reported on January 20, 1997, pursuant to 10CFR50.72(b)(1)(ii) as a condition that is outside the design basis of the plant.

The cause of these two conditions was a failure to verify that the criteria specified in submittals for Amendment 16 of the operating license were fully implemented in the As-built plant. The cause of the incorrect dispositioning was a failure to capture Amendment 16 submittal criteria in the Final Safety Analysis Report (FSAR), and to provide training of personnel on these criteria.

Physical separation was improved for one of the conditions as a result of plant modifications made during Refueling Outage 15. This modification will be reviewed to ensure that the appropriate criteria is met. The remaining corrective actions will be completed before Cycle 16 startup.

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Millstone Nuclear Power Station Unit 1

05000245

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

I. Description of Event

Both of the following conditions, where physical separation requirements were not met, date back to original plant construction.

On June 23, 1995, a condition was identified and documented that an S2 train safety-related control cable used for the automatic starting of diesel powered (S2) safety-related Service Water (SW) Pump D was routed through the S1 train switchgear Bus 14E, cubicle 10, which feeds the gas turbine powered (S1) safety-related SW Pump C. SW Pumps C and D are redundant loads, and constitute the only safety-related SW Pumps. The 4.16 kV switchgear is high energy equipment, and a postulated single failure in that cubicle could potentially impact both of the redundant safety-related SW Pumps.

On June 30, 1995, the above condition was dispositioned as not requiring any corrective action. The disposition failed to recognize physical separation requirements for wiring, established in the submittal in support of Amendment 16 to the operating license.

A second instance was identified and documented on November 25, 1995. A condition was found where the relays in Control Room Panel 906, which automatically start the redundant C (S1) and D (S2) SW Pumps and the redundant safety-related A (S1) and B (S2) Turbine Building Secondary Closed Cooling Water (TBSCCW) Pumps, were found to be in the same isolation box with inadequate separation between redundant components.

This second condition was found during implementation of loss-of-normal power (LNP) circuitry modifications performed during Refueling Outage 15. In the course of modifying the LNP circuitry, a Design Change Notice was issued to remove the S1 SW and TBSCCW relays from the isolation box. The As-Found condition, before the circuits were modified, did not meet the separation criteria specified in the submittal in support of the Amendment 16 to the operating license.

In NNECO's submittal to support Amendment 16 of the application for an operating license, it indicates that control room panels having equipment from both trains are separated physically by three feet or barriers provide separation. Although separation in panels outside of the control room was not explicitly addressed for the Amendment 16 submittal, Northeast Nuclear Energy Company (NNECO) is evaluating if this same criterion is applicable to panels or switchgear outside of the control room as well.

On January 20, 1997, with the plant in the COLD SHUTDOWN condition, it was determined that the above two instances, involving physical separation of wiring between redundant trains, was less than that required by the plant's design basis. These conditions previously identified were incorrectly dispositioned due to a lack of understanding of the plant's design basis.

II. Cause of Event

The cause of these two conditions was a failure to verify that the separation criteria specified in submittals for the Amendment 16 of the operating license were fully implemented in the As-built plant. The cause of the incorrect dispositioning was a failure to capture the separation criteria as outlined in Amendment 16 in the FSAR, and to provide training of the personnel on these criteria.

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III. Analysis of Event

This event is reportable pursuant to 10CFR50.73(a)(2)(ii)(B) as a condition that was outside of the design basis of the plant. The safety-related SW System, the TBSCCW System, and the Onsite Emergency Power System are required to withstand a credible postulated single-failure without the loss of the safety functional requirements. Physical separation is a means to ensure that redundant equipment or systems are independent of each other and that a single-failure will not cause the complete loss of a safety-related function. If physical separation requirements are not met, or alternative barrier mechanisms are not in place, between redundant equipment and systems, the safety-related functional requirements can be compromised by a single-failure. No actual event occurred whereby the functional capability of either redundant division was affected. Therefore, there were no safety consequences.

The most immediate consequence of losing Service Water during a Design Basis Event would be the loss of the cooling function for the Diesel Generator, and thereafter, the Diesel Generator itself. The loss of the TBSCCW System would result in the loss of the room coolers for the diesel generator room and the Feedwater Coolant Injection (FWCI) area coolers.

These two conditions are traceable to the redesign of the emergency power systems. As originally designed the diesel generator was intended to be connected to both buses 14E and 14F, which are now the two redundant 4.16 kV safety-related buses, for divisions S1 and S2 respectively. Also originally, the gas turbine generator would only connect to buses 14E and 14F if the diesel generator failed to start. During the licensing process this design was found to be unacceptable, and the design was modified so that the gas turbine generator would connect automatically to bus 14E (and other buses for FWCI), and the diesel generator would automatically connect to bus 14F. Amendments 17 and 18 document the splitting of buses 14E and 14F. Review of pre-startup Control Wiring Diagrams have determined that the diesel generator sequencer sent an auto start signal to both of the redundant SW and TBSCCW loads, with logic that provided for start of the alternate pump if the primary one failed. After the diesel generator was isolated from Bus 14E, during the licensing process, the relays and cables associated with the above conditions should have been separated, but were not.

IV. Corrective Action

During Refueling Outage 15, the S1 TBSCCW and SW relays were removed from within the S2 train isolation box in Control Room Panel 906. The change documentation did not specify that the S1 and S2 wiring must be separated by three feet or a barrier be provided. Therefore, the S1 and S2 wiring will be checked to ensure that it meets the requisite separation requirement prior to startup for operating Cycle 16.

The S2 train diesel powered SW Pump control cable entering S1 Bus 14E Cubicle 10 will be removed or a suitable barrier provided prior to startup for operating Cycle 16.

The UFSAR will be updated to include applicable physical wiring separation criteria applicable to Millstone Unit No. 1. This will be completed prior to startup for operating Cycle 16.

Under the Configuration Management Program/50.54(f) effort, NNECO will perform a review of the physical separation of wiring at Millstone Unit No. 1 prior to startup for operating Cycle 16.

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As committed to in LER 96-030 (Commitment No. B15701-1), a specific engineering guidance document delineating the requirements for separation of redundant safety-related circuits at Millstone Unit No. 1 is being developed prior to startup for operating Cycle 16. This document will now be an electrical specification.

As committed to in LER 96-030 (Commitment No. B15701-2), training will be provided for Millstone Unit No. 1 maintenance and engineering personnel on redundant safety circuit separation issues prior to startup for operating Cycle 16.

V. Additional InformationSimilar Events

LER 95-025, Reactor Protection System Power Supplies do not Meet Physical Separation Criteria
LER 96-030, Radiation Monitoring System Detector Cables Did Not Meet Physical Separation Criterion of Design Bases

Manufacturer Data

Not Applicable