



**Northeast  
Utilities System**

Millstone Offices • Rope Ferry Rd., Waterford, CT

P.O. Box 128  
Waterford, CT 06385-0128  
(203) 447-1791

May 23, 1996

Docket No. 50-423  
B15727

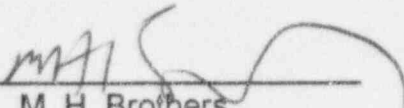
Re: 10CFR50.73(a)(2)(ii)(A)

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

This letter forwards Licensee Event Report 96-010-00, documenting an event that occurred at Millstone Unit No. 3 on April 25, 1996. This LER is submitted pursuant to 10CFR50.73 (a)(2)(ii)(A).

Very truly yours,

**NORTHEAST NUCLEAR ENERGY COMPANY**

  
\_\_\_\_\_  
M. H. Brothers  
Unit Director, Millstone Unit No. 3

Attachment: LER 96-010-00

cc: T. T. Martin, Region I Administrator  
A. C. Cerne, Senior Resident Inspector, Millstone Unit No. 3  
V. L. Rooney, NRC Project Manager, Millstone Unit No. 3

9605280270 960523  
PDR ADDCK 05000423  
S PDR

480011

IE22  
11

## 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-  
8 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 3

DOCKET NUMBER (2)

05000423

PAGE (3)

1 of 3

TITLE (4)

Potential Failure Mode of Rod Control System Acopian Power Supplies Could Create Unanalyzed Condition

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
04	25	96	96	010	00	05	23	96	FACILITY NAME	DOCKET NUMBER
OPERATING MODE (9)		5	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more) (11)							
POWER LEVEL (10)		000	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)(ii)		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

William J. Temple, Nuclear Licensing Supervisor

TELEPHONE NUMBER (Include Area Code)

(860)437-5904

## 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)

YES		NO		EXPECTED SUBMISSION	MONTH	DAY	YEAR
<input checked="" type="checkbox"/> (If yes, complete EXPECTED SUBMISSION DATE).		<input checked="" type="checkbox"/>					

## ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On April 25, 1996, with the plant in Mode 5 at 0-percent power, an Engineering review determined that the Acopian power supplies used in the rod control system, which have an automatic reset feature, may not reset within 200 milliseconds following a lightning strike. In this event, it is possible for the power supplies to reset after 200 milliseconds and recapture the rods in an intermediate, unanalyzed, asymmetrical position. While the sequence of events needed to create this condition has not occurred, the higher core peaking factors resulting from several rods fully inserting within one quadrant, may not be bounded by the analyses for a dropped rod or other Condition II event.

The Rod Control System has redundant 24-volt DC power supplies that provide voltage to control cards that regulate current to gripper and lift coils of the rod drive mechanisms. Based on the Rod Control System vendor recommendations, a new power supply installed in the summer-1995 refueling outage has an automatic reset feature designed to reset in 200 milliseconds once an overvoltage condition clears. This design is to preclude plant trips from lightning strikes, if the reset occurs before the rods begin to insert. However, if reset occurs after the rods are released, the potential result is an unanalyzed condition.

No immediate actions were required as the plant was in a shutdown condition. A subsequent engineering review conservatively determined on May 13, 1996, that the postulated condition may significantly compromise plant safety, and an immediate notification was made pursuant to 10CFR50.72(b)(1)(ii)(A). The reset feature will be deleted from the power supplies before Mode 4 operation, to prevent the possibility of it placing the plant in an unanalyzed condition from a lightning strike.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)				PAGE (3)
		YEAR	SEQUENTIAL NUMBER		REVISION NUMBER	
		96	--	010	-- 00	

Millstone Nuclear Power Station Unit 3

05000423

2 of 3

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

I. Description of Event

On April 25, 1996, with the plant in Mode 5 at 0-percent power, an Engineering review determined that the Acopian power supplies used in the rod control system, which have an automatic reset feature, may not reset within 200-milliseconds following a lightning strike, then reset and recapture rods in an intermediate, unanalyzed, asymmetrical position. Plant personnel became aware of this condition while reviewing a Westinghouse Electric Corporation, Nuclear Safety Advisory Letter, NSAL-96-002, Rod Ratchetting. Although the sequence of events needed to create this condition has not occurred, the higher core peaking factors resulting from several rods fully inserting within one quadrant, may not be bounded by the analyses for a dropped rod or other Condition II event.

The Rod Control System has redundant 24-volt DC power supplies that provide voltage to control cards that regulate current to gripper and lift coils of the rod drive mechanisms. Based on the rod control system vendor recommendations, a new power supply was installed in the summer-1995 refueling outage. The new supply has an automatic reset feature that is designed to reset in 200 milliseconds once an overvoltage condition clears. This design is to preclude plant trips from lightning strikes if the power supply reset occurs within 200-milliseconds before the rods begin to insert. However, if reset occurs after the rods are released, the potential result is an unanalyzed condition.

No immediate actions were required as the plant was in a shutdown condition for other reasons. A subsequent engineering review conservatively determined on May 13, 1996, that the condition could be an unanalyzed condition that significantly compromises plant safety, and an immediate notification was made pursuant to 10CFR50.72(b)(1)(ii)(A). The vendor indicated that there is a low probability of a lightning strike shutting down both power supplies, coupled with a reset after 200 milliseconds. However, there is insufficient data available to support a conclusion that the probability is not credible. The reset feature will be deleted from the power supplies before Mode 4 operation, to prevent the possibility of it placing the plant in an unanalyzed condition from a lightning strike.

II. Cause of Event

The cause of the design concern is an inadequate design review by the vendor, Westinghouse Electric Corporation. The Acopian power supplies were installed in the summer-1995 refueling outage as a replacement for the obsolete Lambda power supplies. This change was made based on recommendations from the rod control system vendor. The new supplies have an automatic reset feature that is designed to preclude plant trips from lightning strikes if the reset occurs before the rods begin to insert. However, the loss of redundant power supplies in the rod control system power cabinets due to lightning strikes, followed by a reset after 200 milliseconds, was not considered by the vendor in the rod control system failure analysis, and therefore was not evaluated. The power supplies are non-safety related. Upon a failure of the power supplies, the rod control system is design to result in a rod insertion. Accordingly, plant personnel had no information to question the design until the vendor letter, NSAL-96-002 was reviewed.

III. Analysis of Event

An engineering review conservatively determined on May 13, 1996, that if the postulated condition were to occur, it may result in an unanalyzed condition that significantly compromises plant safety. An immediate notification was made pursuant to 10CFR50.72(b)(1)(ii)(A), although the sequence of events needed to create this has not occurred.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)				PAGE (3)
		YEAR	SEQUENTIAL NUMBER		REVISION NUMBER	
		96	--	010	-- 00	
Millstone Nuclear Power Station Unit 3	05000423					3 of 3

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

The Rod Control System has redundant 24-volt DC power supplies that provide voltage to control cards that regulate current to gripper and lift coils of the rod drive mechanisms. The previous Lambda power supplies became obsolete, and based on the rod control system vendor recommendations, an Acopian power supply was installed in the summer-1995 refueling outage. The new supply has an automatic reset feature that is designed to reset in 200 milliseconds once an overvoltage condition clears. This design is to preclude plant trips from lightning strikes if the reset occurs before the rods begin to insert. However, if reset occurs after the rods are released, the potential result is an unanalyzed condition.

Control rod motion begins approximately 100 milliseconds following a loss of power to the stationary gripper coils. If the power supply automatically resets within 200 milliseconds as designed, the rod will have dropped only a few inches if at all, and the gripper latches will recapture the rod with no ratchetting. If power is restored after 200 milliseconds, but before the rod reaches full insertion (approximately two seconds from fully withdrawn position), the rod will ratchet through the stationary gripper latches. The ratchetting will slow the rod insertion and depending on the initial elevation and time of reset, the rod may be recaptured at an intermediate position. In one condition, the core peaking factors resulting from several rods fully inserting within one quadrant, may not be bounded by the analyses for a single dropped rod or other Condition II event.

#### IV. Corrective Action

No immediate actions were required as the plant was in a shutdown condition for other reasons. As corrective action the reset feature will be deleted from the rod control system power supplies before Mode 4 operation. This will prevent the possibility of the reset feature causing an unanalyzed condition from a lightning strike. Regarding the vendor design review, NSAL-96-002 has been issued by the vendor.

#### V. Additional Information

##### Similar Events

No similar events on control rod power supplies have been reported.

##### Manufacturer Data

Vendor - Westinghouse Electric Corporation