

# NORTHEAST UTILITIES



The Connecticut Light And Power Company  
Western Massachusetts Electric Company  
Holyoke Water Power Company  
Northeast Utilities Service Company  
Northeast Nuclear Energy Company

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P.O. BOX 270  
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(203) 665-5000  
April 28, 1993  
MP-93-345

Re: 10CFR50.73(a)(2)(i)

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

Reference: Facility Operating License No. NPF-49  
Docket No. 50-423  
Licensee Event Report 93-003-00

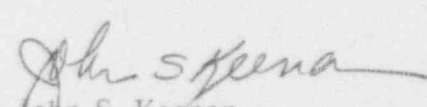
Gentlemen:

This letter forwards Licensee Event Report 93-003-00 required to be submitted within thirty (30) days pursuant to 10CFR50.73(a)(2)(i).

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

FOR: Stephen E. Scace  
Vice President - Millstone Station

BY:   
John S. Keenan  
Millstone Unit 2 Director

SES/BNF:ljs

Attachment: LER 93-003-00

cc: T. T. Martin, Region I Administrator  
P. D. Swetland, Senior Resident Inspector, Millstone Unit Nos. 1, 2 and 3  
V. L. Rooney, NRC Project Manager, Millstone Unit No. 3

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## LICENSEE EVENT REPORT (LER)

Estimated burden per response to comply with this information collection request: 50.0 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)

Millstone Nuclear Power Station Unit 3

DOCKET NUMBER (2)

0 5 0 0 0 4 2 3 1 OF 0 5

PAGE (3)

TITLE (4)

Inadequate Testing of Slave Relays

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
0	3	2	9	9	3	0	4	2	
0	3	2	9	9	3	0	4	2	

OPERATING MODE (9)

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

POWER LEVEL (10)	20.402(b)	20.402(c)	50.73(a)(2)(iv)	73.71(b)
1	20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
1	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)
1	20.405(a)(1)(iii)	X 50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
1	20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
1	20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME

Burtel N. Forrest, Engineer, Ext. 5442

TELEPHONE NUMBER

AREA CODE

2 0 3 4 4 7 - 1 7 9 1

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPPDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPPDS

SUPPLEMENTAL REPORT EXPECTED (14)

EXPECTED SUBMISSION DATE (15)

MONTH DAY YEAR

☐ YES (If yes, complete EXPECTED SUBMISSION DATE)☒ NO

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

On March 29, 1993, at 2000 hours with the plant in Mode 1 at 100% power, a deficiency in the surveillance procedures for testing slave relay actuations was discovered. The deficiency was related to inadequate slave relay testing of Air Operated Valves (AOVs) for Auxiliary Feedwater Pump alternate suction, Demineralized Water Storage Tank path to the Auxiliary Feedwater Pump Isolation Valves, and the Auxiliary Feedwater Pump Discharge Crossover valves. In addition, one of the contacts from this relay eliminates a time delay for an Emergency Diesel Generator start when an Emergency Bus Degraded Voltage Condition occurs. The discrepancy was discovered during a Unit 3 Operations Department drawing review. Operations Department personnel discovered that these AOVs are actuated during a Containment Isolation Phase-B (CIB). These AOVs are driven by a slave relay which had not been verified through the slave relay operability testing procedure. Testing of this relay is required by Plant Technical Specifications. A task force was assigned and additional testing deficiencies were identified.

The root cause of this event was determined to be a management deficiency during the procedure development. During test development neither an individual nor a group was assigned to ensure that department procedures were integrated to test all circuits and components receiving actuation signals.

Upon notification Unit 3 Operations entered the appropriate Limiting Condition for Operations (LCO). Actions were taken to ensure that proper testing was conducted. All components tested satisfactorily in their "as found" condition.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

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

I. Description of Event

On March 29, 1993, at 2000 hours with the plant in Mode 1 at 100% power, (586 degrees Fahrenheit, 2250 psia) a deficiency in the surveillance procedures for testing CIB slave relay K626 actuations was discovered. The deficiency related to inadequate slave relay testing of Air Operated Valves (AOVs) associated with the Auxiliary Feedwater System (FWA). The slave relay K626 associated with CIB actuations of several Auxiliary Feedwater Valves was not tested. The valves are the Auxiliary Feedwater Pump Alternate Suction Valves, Demineralized Water Storage Tank path to the Auxiliary Feedwater Pump Isolation Valves, and the Auxiliary Feedwater Pump Discharge Crossover Valves. The testing discrepancy was discovered during a Unit 3 Operations Department drawing review. Operations Department personnel discovered that these AOVs are actuated during a CIB. This relay also supplies a contact that eliminates a time delay for an Emergency Diesel Generator start during an Emergency Bus Degraded Voltage condition. Testing of this relay is required by Plant Technical Specifications (Tech Specs).

A subsequent investigation discovered that additional circuits were not completely tested from the Solid State Protection Cabinets (SSPS) to the actuated device. (Refer to Table 1 for a description.)

II. Cause of Event

The root cause of the event was a management deficiency during surveillance testing development. Neither an individual nor a group was assigned to review department test procedures to ensure that they were integrated to fully test actuation circuitry. Individual reviews were done within departments at the time of surveillance development. The complexity of the actuation circuits warranted an integrated approach during test development and reviews.

III. Analysis of Event

This event is reportable under 10CFR50.73(a)(2)(i) as a condition prohibited by Technical Specifications. The procedures failed to test and verify operability of a number of actuated circuits.

Plant Technical Specification 4.3.2.1 requires that each ESF instrumentation channel and interlock and the automatic actuation logic and relays shall be demonstrated OPERABLE by performance of the ESF Instrumentation Surveillance Requirements.

The safety significance of the untested circuits is minimal because all components operated properly when tested. Additionally, the design of components in the untested circuits are the same as those utilized extensively in similar plant circuits. The reliability of these components is extremely high as evidenced by no failures of slave relays since plant commercial operations. Specific mitigating factors for individual relay contacts not tested are listed in Table 1.

IV. Corrective Action

Unit 3 Operations entered the appropriate Limiting Condition for Operation (L.C.O.) upon notification of the testing deficiencies.

A task force to expedite the review of SSPS Slave Relays was formed. The group reviewed all available plant drawings and verified all slave relay contacts. Department procedures were also reviewed. A determination was made regarding the significance of each untested relay and the need to test its associated contacts. Testing deficiencies were identified and Operations was informed of the deficiencies. Testing was performed and the circuitry operated as designed.

Additional recommendations from the task force included: design changes, drawing changes, FSAR corrections and procedure enhancements. These are presently being addressed.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

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

A task force has been assigned to review related overlap testing issues associated with ESF Actuations. This will be completed by 31 December 1993.

V. Additional Information

LER 91-022, "Failure to Adequately Perform Overlap Testing of the Containment Depressurization Actuation Loops Due to Management Deficiency," this LER discussed inadequate testing procedures and the failure to verify the satisfactory overlap testing requirements exist.

LER 91-025, "Failure to Verify De-energization of Solid State Protection Input Relays For Cold Overpressure Protection Due to Procedural Deficiency," this LER discusses a non-standard circuit design as the contributing factor to a procedure deficiency.

LER 92-031, "Failure to Test High Pressure Output Relay for Power Operated Relief Valves Due to Procedural Deficiency," this LER discusses the lack of overlap testing verification.

LER 93-001, "Failure to Verify Testing of NIS Inputs into Westinghouse 7300 Process System Due to Procedural Deficiency," this LER discusses the improper testing of 7300 inputs due to a procedural deficiency.

Prior to this event the procedural deficiencies that were discovered were addressed as individual events. As a result of the event addressed in this LER an integrated approach for slave relay testing was adopted. The increased scope of the review yielded the discovery of numerous additional circuits which were found untested.

The review process currently being utilized will continue to investigate all related Engineered Safety Actuation circuits.

EIS CODESSystems

Solid State Protected System - JC

Components

Relay (RLY)

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

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

Table 1

Relay (Contact)	Function	Mitigating Factors
K610 (15,16) Both Trains	On SIS, this bypasses a 270 sec delay for 4KV bus power supply transfer if bus voltage drops to approximately 70-90% of normal	1
K610 (1,2) Both Trains	On SIS, trips Main Steam Valve Building Exhaust Fan 3HVV*FN1C(D)	1
K626 (7,8) Both Trains	On CDA, this bypasses a 270 sec delay for 4KV bus power supply transfer if bus voltage drops to approximately 70-90% of normal	1
K626 (15,16) Both Trains	On CDA, Opens Aux Feed Pump Suction Valve to DWST 3FWA*AOV61A(B)	1,3,5
K626 (17,18) Both Trains	On CDA, Closes Aux Feed Pump Discharge Cross-Connect Valve 3FWA*AOV62A(B)	1,3,5
K626 (13,14) Both Trains	On CDA, Closes Aux Feed Pump Suction Valve to CST 3FWA*AOV23A(B)	1,3,5
SISK1 (1L,1K) Both Trains	On SIS, Stops ESF Bldg Normal Supply Fan 3HVQ-FN1	1
SISK1 (2L,2K) Train A Only	On SIS, Stops ESF Bldg Normal Supply Fan 3HVQ-FN1	1
SISK1 (2H,2G) B Train Only	On SIS, Stops Aux Bldg Heating and Ventilation Air Supply Unit 3HVR-HVU2A	1
SISK2 (2A,2B) Train A Only	On SIS, Stops Aux Bldg Heating and Ventilation Air Supply Unit 3HVR-HVU2B	1
SISK2 (1H,1G) Train B Only	On SIS, Stops Aux Bldg Heating and Ventilation Air Supply Unit 3HVR-HVU2B	1
K629 (7,8) A Train Only	On CIA, Closes Post Accident Sampling Containment Isolation Valve 3SSP*CTV7	3,5
K629 (9,10) Both Trains	On CIA, Closes Post Accident Sampling Containment Isolation Valve 3SSP*CTV8	3,5
K627 (15,16) Both Trains	On SLI, Close Main Steam Pressure Relieving Valves 3MSS*PV20A(B)	7
K627 (17,18) Both Trains	On SLI, Close Main Steam Pressure Relieving Valves 3MSS*PV20C(D)	7
K620X (1A,1B) Both Trains	On SIS or P-14, Initiates Mechanical Turbine Trip	1,2
K620X (1D,1E) Both Trains	On SIS or P-14, Initiates Electrical Turbine Trip	1,2
K620X (1H,1G) Both Trains	On SIS or P-14, Trip 'A' Turbine Driven Feed Pump 3FWS-P2A	1,6
K620X (1L,1K) Both Trains	On SIS or P-14, Trip 'B' Turbine Driven Feed Pump 3FWS-P2B	1,6
K620X (2A,2B) Both Trains	On SIS or P-14, Trip Motor Driven Feed Pump 3FWS-P1	1,6
K638 (1,2) Both Trains	On P-12, Block Condenser Steam Dump Operation (K638 (1,2) actuates slaves K726 & K727 to perform this function)	1

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		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		9   3	0   0   3	0   0	0   5	OF	0   5

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

Table 1 (continued)

Relay (Contact)	Function	Mitigating Factors
CBIK1 (1H,1J) Both Trains	On CBI, Closes Control Room Ventilation Outlet Air Isolation Valves 3HVC*SOV22(23)	5
CBIK1 (2H,2G) Both Trains	On CBI, Aligns Technical Support Center Ventilation To Filtered Recirculation Mode	1
K740 (1,2) Both Trains	On SIS and Low RWST Level (520K Gal), Trip Low Pressure Safety Injection Pumps 3RHR*P1A(B)	4

Mitigating Factors

1. Within each train these circuit's redundant signals actuate the specified components. Therefore, if one of the "untested" contacts failed during an accident, the redundant signal would actuate the component.
2. On every Safety Injection Signal/Reactor trip, a signal is generated from the reactor trip breakers which directly trips the turbine independently of the slave relay circuit. Additionally, Emergency Operating Procedures require *immediate* verification of turbine trip for every reactor trip. Therefore, if the turbine trip were to fail, the operator would know immediately and manually trip the turbine.
3. The listed components are normally in their accident position while the plant is at power. Therefore, if an untested contact were to fail, there would most likely be no consequence.
4. If the RHR pumps did not trip on Low-Low Refueling Water Storage Tank (RWST) level as designed, the operator would detect this. The Emergency Operating Procedures require frequent checking of RWST level. The Low-Low RWST level signal is received at approximately 43% full, or 520,000 gallons, which will allow ample time for the operator to notice and take appropriate actions.
5. If the listed components were to remain out of position during an accident, an alarm would be provided to the operator on the ESF STATUS PANEL. The Emergency Operating Procedures require checking of this panel shortly after accident initiation. Therefore, if an untested contact failed and the component were not in it's safe position, the operator would notice this condition early in the event and manually realign the component at that time.
6. Tripping of the main Feedwater Pumps is mentioned in the analysis as an additional measure taken to ensure Normal Feed to the Steam Generators is terminated on a Steam Generator High Level Condition. The Feed Pump Trip function is actually redundant to the closure of the Feedwater Isolation Valves, Feedwater Regulating Valves, and the Feedwater Regulating Bypass valves, which isolate normal feedwater on a Feedwater Isolation Signal (FWI).
7. The Main Steam Pressure Relief Valves are positioned by a controller which would close the valves as pressure decreases. The Steam Line Isolation (SLI) signal overrides all signals to force the valves to the closed position. The SLI signal has closed these valves during previous pressure transients while the Unit was off line. Additionally, the Emergency Operating Procedures direct the Operators to check to ensure closure of these valves in response to a SLI signal.