NORTHEAST UTILITIES

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

General Offices · Selden Street, Berlin Connecticut

P.O.BOX 270
HARTFORD, CONNECTICUT 06141-0270
(203)665-5000

Re: 10CFR50.73(a)(2)(vii)
April 20, 1992
MP-92-407

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 91-018-01

Gentlemen:

This letter forwards Licensee Event Report (LER) 91-018-01 which is being submitted as a revision to LER 91-018-00 to enhance the description of the event and include additional corrective action. LER 91-018-00 was submitted pursuant to 10CFR50.73(a)(2)(vii), any event or condition where a single cause or condition caused two or more independent trains to become inoperable in a single system designed to control the release of radioactive material.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

Stephen E. Scace
Director, Millstone Station

SES/JAL:ljs

Attachment: LER 91-018-01

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

Cert No P828873613

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NRC Form 366 (6-89) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104
EXPIRES: 4/30/92

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.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Millstone Nuclear Power Station Unit 3	0 5 0 0 0 4 2 3	1 OF 0 6

TITLE (4)

Both Supplemental Leak Collection and Release System Trains Inoperable Due to Design Deficiency

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 7	0 8	9 1	9 1	- 0 1 8	- 0 1	0 4	2 0	9 2		0 5 0 0 0
										0 5 0 0 0

OPERATING MODE (9)	1	THIS REPORT IS BEING SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	1 0 0	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
		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)	X 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
Jeffry A. Langan, Senior Engineer, x5544	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 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 July 8, 1991, at 0800 hours, at 100% power in Mode 1, 587 degrees Fahrenheit and 2250 psia, an investigation concluded that on June 9, 1991, as a result of a loss of non-vital power, a common mode failure had occurred which rendered both trains of the Supplemental Leak Collection and Release System (SLCRS) inoperable. The postulated cause is steam entering the common SLCRS discharge duct, melting the fusible links for the Train "A" and Train "B" fire dampers (3HVR*DMPF44 and 3HVR*DMPF29 respectively), and causing the fire dampers to close.

The root cause is design deficiency. The waste gas system and SLCRS were not properly designed to handle a loss of non-vital power.

As corrective action, the fusible links were replaced and the SLCRS returned to service. The design of the SLCRS and waste gas system were reviewed and procedural changes made to prevent a common mode failure of the SLCRS due to a loss of non-vital power.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Millstone Nuclear Power Station Unit 3	0 5 0 0 0 4 2 3	9 1	— 0 1 8	— 0 1	0 2 OF 0 6

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

1. Description of Event

On July 8, 1991, at approximately 0800 hours, at 100% power in Mode 1, 587 degrees Fahrenheit and 2250 psia, an investigation concluded that on June 9, 1991, a common mode failure had occurred which rendered both trains of the Supplemental Leak Collection and Release System (SLCRS) inoperable. The postulated cause is the continued operation of the Steam Jet Air Ejector (SJAE) at a time when the cooling medium to the SJAE inter and after-condensers was lost. Auxiliary steam from the main steam header provides the motive force in the SJAE to draw steam and non-condensible gases from the condenser. Condensate flow through the inter and after-condensers condenses the steam, which then drains back to the main condenser. Any non-condensible gases are drawn into the Gaseous Waste System (GWS), where they are cooled in the process vent cooler before being discharged into the SLCRS ductwork, and, ultimately, out the Millstone 1 discharge stack. The Reactor Plant Chilled Water System (CDS), which is powered from non-vital buses, provides the cooling to the process vent cooler. With no cooling to either the SJAE condensers or the process vent cooler, the auxiliary steam going to the SJAE, as well as the steam and non-condensibles being drawn from the condenser, passed unquenched into the GWS, and then into the SLCRS ductwork. In the event of a fire, the fusible links on the fire dampers are designed to melt at 165 degrees Fahrenheit to prevent the fire from spreading. In this incident, the temperature in the ductwork could have gone as high as 260 degrees Fahrenheit.

The failure was identified through surveillance testing of SLCRS. On June 17, 1991, surveillance procedure SP 3614L.1, Supplementary Leak Collection And Release System Operability Test, was performed per Technical Specification (T.S.) 4.6.6.1 on the "B" SLCRS Train. The test failed due to low air flow in the system. Further investigation revealed a mechanically damaged fusible link in fire damper 3HVR*DMPF29. The fusible link was replaced, the damper re-opened, and the surveillance passed. LER 91-015-00 provides further details concerning the replacement of 3HVR*DMPF29. At the time the A SLCRS Train was within all required surveillance intervals, and the damage to the B Train fusible link did not indicate a problem with the A train.

On July 2, 1991, the "A" SLCRS Train was tested per surveillance procedure SP 3614L.1 as required by T.S. 4.6.6.1. The "A" Train failed due to low flow. Further investigation revealed a melted fusible link in fire damper 3HVR*DMPF44. The fusible link was replaced, the damper re-opened, and the surveillance satisfactorily completed. LER 91-017 provides further details concerning the replacement of the fusible link for 3HVR*DMPF44.

On July 8, 1991, further investigation into the cause of the failures of the fusible links determined that the fusible link for 3HVR*DMPF29 had not mechanically failed, but had melted. The action of the fire damper closing had then resulted in mechanical damage to one of the two pieces of link. When the common mode failure was identified, both trains of SLCRS were operable. Therefore, no immediate report per 10CFR50.72(b)(1)(i) was required.

The Gaseous Waste System is designed to transfer gasses or vapors from several systems throughout the plant, including the Steam Jet Air Ejector (SJAE), to the Unit 1 gaseous effluent discharge stack. Any hot gasses are cooled by the process vent cooler, located in a common suction line for the process vent fans. The process vent fans discharge through two dampers, which close on a safety injection signal, to the SLCRS discharge header (reference attached figure). The reactor and turbine trip on June 9, 1991, resulted in a loss of non-vital electrical power for 29 minutes. Among the equipment out of service during this event were the circulating water pumps and the reactor plant chill water pumps. The circulating water pumps provide cooling water to the condenser. The chill water pumps provide cooling to the process vent cooler. The resultant high condenser pressure, loss of condensate cooling to the air ejectors, and continued auxiliary steam flow to the air ejector system is postulated to have increased pressure in the piping that connects to the waste gas system to as high as 10-12 psig. With no cooling to quench the steam being sent to the process vent cooler, it is postulated that steam flowed from the condenser through the waste gas system and into the common SLCRS/ waste gas discharge duct. The temperature of the steam was potentially as high as 260 degrees Fahrenheit. The steam is postulated to have melted the links for 3HVR*DMPF44 and 3HVR*DMPF29, which resulted in the closure of the fire dampers.

II. Cause of Event

The root cause for closure of both 3HVR*DMPF44 and 3HVR*DMPF29 is design deficiency. The SLCRS system was not properly designed to operate following a loss of non-vital power.

III. Analysis of Event

This event is being reported pursuant to 10CFR50.73(a)(2)(vii), as an event where a single cause or condition caused two independent trains to become inoperable in a single system designed to control the release of radioactive material.

During this event, both SLCRS trains were inoperable for a period of eight days. Following restoration of the SLCRS "B" Train on June 17, 1991, the "A" Train remained inoperable for an additional fifteen days.

During a Design Basis Accident (DBA) the SLCRS collects small amounts of leakage from the Containment Building, and systems in the Auxiliary Building, Emergency Safeguards Features Building, Main Steam Valve Building, and Containment Enclosure Building and the Containment Boundary. The SLCRS maintains the buildings at a slight negative pressure of 0.25 WG and provides a filtered release path through the Unit 1 gaseous effluent discharge stack. The filters are assumed to remove 95% of all radioactive iodines. Although the SLCRS was inoperable, other systems remained available to mitigate the consequences of an accident. The safety related Auxiliary Building Ventilation system remained available during this time to provide filtered exhaust of air being released from the auxiliary building. Through common duct work and building inter connections the Auxiliary Building ventilation could have provided a filtered discharge path for buildings in the SLCRS boundary, although the 0.25" WG design assumption and 1 minute draw-down time requirements would not have been met. The Containment Building, which provides the primary barrier against fission product release in an accident, remained intact during this time. In addition, all post Design Basis Accident radiological release calculations assume a ground release, which is conservative, rather than a discharge through the Millstone Unit 1 Stack. Finally, to exceed 10CFR100 limits, a significant number of fuel failures are required. Current Reactor Coolant System activity indicates zero leaking fuel pins. As such it is highly unlikely that any 10CFR100 limits would have been exceeded had the SLCRS system been required to operate during the time both trains were out of service.

In the event of a safety injection with a loss of offsite power during normal isolation, the waste gas line to the SLCRS header will isolate. Therefore, SLCRS will remain operable and available for use. However, should a loss of offsite power occur followed by a safety injection signal, there is a possibility that the SLCRS could become inoperable due to a common mode failure.

IV. Corrective Action

The immediate corrective action was to replace the fusible links on the SLCRS fire dampers after the dampers were discovered closed on June 17, 1991 (for 3HVR*DMPF29), and July 2, 1991 (for 3HVR*DMPF44).

As a long term corrective action, the design of the SLCRS system and connections to the waste gas system has been reviewed. The fusible links in dampers 3HVR*DMPF29 and 44 have been changed to ones with setpoints of 285 degrees Fahrenheit to prevent the SLCRS from becoming inoperable on a loss of non-vital power. These modifications were made prior to plant startup on February 4, 1992.

Several additional corrective actions have been taken as described in LER 91-014-01. The instrument tubing from the condenser to the pressure switches used to derive the C-9 interlock has been changed from ½" OD to ¾" OD, and has been sloped to eliminate any potential loop seals. This will increase the reliability of the interlock and ensure steam dumps are isolated on a low vacuum condition in the condenser. In addition, plant operating procedures have been revised to direct the control room operators to close the Main Steam Isolation Valves (MSIVs) in the event of a loss of non-vital power. Taking this action will not only limit the energy input to the condenser, but will also isolate the auxiliary steam supply to the SJAE. Finally, a new stationwide post-trip review procedure has been implemented, and the Unit 3 specific procedure on post-trip reviews has been upgraded. These procedures significantly expand the scope of the review process, including looking for collateral damage and potential common mode failures, and provides for sufficient personnel to ensure the review is completed in a timely manner.

V. Additional Information

As stated in LER 91-014, a design review will address the problems associated with the loss of circulating pumps and the attendant high temperatures experienced in the secondary system due to a loss of non-vital power. The corrective action taken for this event resolves the immediate concern for maintaining the operability of SLCRS following a loss of non-vital power.

There have been no other events where a loss of offsite power has resulted in a common mode failure in redundant safety systems. Other common mode failures which have occurred at Millstone 3 were covered in LERs 87-004, 87-005, 88-008, 88-010 and 89-028.

LER 87-004, Motor Driven Auxiliary Feedwater Pump Trips Due to Low Suction Pressure Trips, concerned the setting of the low suction pressure trip of the Auxiliary feed pumps.

LER 87-005, Control Room Pressurization Surveillance Failure Caused by Mispositioned Throttle Valve Due to personnel Error, covered the improper positioning of the Control Room Pressurization System throttle valves.

LER 88-005, Cold Overpressure Protection System Fails to Operate During Pressure Transient, covered the failure of the Cold Overpressure Protection to operate due to lack of procedure on how to place the system in service.

LER 88-008, Fire Detection Zones Improperly Wired During Construction, covered the improper wiring of fire detectors during initial construction.

LER 88-010, Improper Nuclear Instrument Calibration Due to Low Leakage Core, covered the improper calibration of the nuclear instrumentation system due to a low leakage core.

LER 89-028, Fuel Building Integrity Lost During Fuel Movement Due to Open Door Caused by Personnel Error, covered the loss of fuel building integrity due to a personnel error.

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

The corrective action for the above LERs all involved actions specific to the affected system and would not have prevented this event.

EIIS CODES

System: Supplementary Leak Collection and Release System - BD

Components: (Fire) Damper - DMP

SLCRS – WASTE GAS CROSS TIE