



Northeast
Nuclear Energy

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The Northeast Utilities System

Donald B. Miller Jr.,
Senior Vice President -- Millstone

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

July 6, 1994
MP-94-445

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

Reference: Facility Operating License No. DPR-65
Docket No. 50-336
Licensee Event Report 91-009-01

This letter forwards Licensee Event Report 91-009-01 required to be submitted pursuant to paragraph 50.83(a)(2)(i), the completion of any nuclear plant shutdown required by the plant's Technical Specifications.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

Donald B. Miller, Jr.
Senior Vice President -- Millstone Station

DBM/RWB:dlr

Attachment: LER 91-009-01

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

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LICENSEE EVENT REPORT (LER)

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

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION
COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING
BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT
BRANCH (MNBB 7714), 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 2										DOCKET NUMBER (2) 05000336		PAGE (3) 1 OF 3		
TITLE (4) Both Emergency Diesel Generators Inoperable														
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		DOCKET NUMBER			
08	21	91	91	009	01	07	06	94	FACILITY NAME		DOCKET NUMBER			
											05000			
											05000			
OPERATING MODE (9)		THIS REPORT IS BEING SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more) (11)												
POWER LEVEL (10)		090												
		20.402(b)												
		20.405(a)(1)(i)												
		20.405(a)(1)(ii)												
		20.405(a)(1)(iii)												
		20.405(a)(1)(iv)												
		20.405(a)(1)(v)												
		20.405(a)(1)(vi)												
		20.405(a)(1)(vii)												
		20.405(a)(1)(viii)												
		20.405(a)(1)(ix)												
		20.405(a)(1)(x)												
LICENSEE CONTACT FOR THIS LER (12)														
NAME Philip J. Lutz, Site Licensing										TELEPHONE NUMBER (Include Area Code) (203) 447-1791 Ext. 6585				
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)														
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC				
X	EK	65	W290	Y										
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 16 single-spaced typewritten lines) (16)														
<p>On August 21, 1991, at 1804 hours, with the unit at 90% power, the 12U diesel generator exhibited erratic load control, while being operated in parallel with offsite circuits at 2100 KW load, at the end of its one hour surveillance run. The diesel generator was being run to verify its operability while its redundant diesel generator the 13U unit was out of service for maintenance. On noting the erratic load swings on the 12U Diesel Generator (D/G), the operator opened the output breaker to remove the load. The generator was then reparalleled to reload the 12U D/G, but erratic speed control caused load swings that prevented reloading at that time.</p> <p>With both emergency D/Gs out of service, the 13U D/G maintenance was completed, and the operability of the 13U D/G maintenance was completed, and the operability of the 13U D/G was demonstrated satisfactorily within 1 and 1/2 hours, and the unit remained in compliance with Technical Specification, Section 3.8.1.1, action (d).</p> <p>Troubleshooting continued to determine the cause of the 12U load swings by monitoring its governor control signals with additional instrumentation. The operability of the 13U D/G was periodically verified in accordance with Technical Specification requirements for one D/G being out of service. However, during the performance of an operability run on 8/23/91 at 0942 hours, the 13U D/G output breaker opened on a reverse power trip. The second D/G was declared inoperable as a result of the reverse power trip and a unit downpower to cold shutdown was commenced in accordance with Technical Specification Action Statement 3.8.1.1(d). The unit reached cold shutdown at 1410 hours on 8/24/91, and verified compliance with the action statements of Technical Specifications 3.8.1.2.b (no core alternations permitted), and 3.8.2.2 (containment integrity) with both D/Gs inoperable.</p>														

EXPIRES: 5/31/95

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNRB 7714), 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 2	DOCKET NUMBER (2) 05000336	LER NUMBER (6)			PAGE (3) 02 OF 03
		YEAR 91	SEQUENTIAL NUMBER 009	REVISION NUMBER 01	

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

I. Description of Event

On August 21, 1991, at 1804 hours, with the unit at 90% power, the 12U diesel generator exhibited erratic load control, while being operated in parallel with offsite circuits at 2100 KW load, at the end of its one hour surveillance run. The diesel generator was being run to verify its operability while its redundant diesel generator the 13U unit was out of service for maintenance. On noting the erratic load swings on the 12U Diesel Generator (D/G), the operator opened the output breaker to remove the load. The generator was then reparalleled to reload the 12U D/G, but erratic speed control caused load swings that prevented reloading at that time.

With both emergency D/Gs out of service, the 13U D/G maintenance was completed, and the operability of the 13U D/G was demonstrated satisfactorily within 1 and $\frac{1}{2}$ hours, and the unit remained in compliance with Technical Specification, Section 3.8.1.1, action (d).

Troubleshooting continued to determine the cause of the 12U load swings by monitoring its governor control signals with additional instrumentation. The operability of the 13U D/G was periodically verified in accordance with Technical Specification requirements for one D/G being out of service. However, during the performance of an operability run on 8/23/91 at 0942 hours, the 13U D/G output breaker opened on a reverse power trip. The second D/G was declared inoperable as a result of the reverse power trip and a unit downpower to cold shutdown was commenced in accordance with Technical Specification Action Statement 3.8.1.1(d). The unit reached cold shutdown at 1419 hours on 8/24/91, and verified compliance with the action statements of Technical Specifications 3.8.1.2.b (no core alterations permitted), and 3.8.2.2 (containment integrity) with both D/Gs inoperable.

II. Cause of Event

The root cause of the load swings was due to oxidation buildup on the relay contacts of the Unit Parallel Switch (UPS) or "Droop" Switch. This cause was confirmed in a troubleshooting run of the DG on 8/3/93.

The UPS relay contacts' rating makes them unsuitable for this application. The contacts are rated for 125 VDC-3 amp/12VDC-30 amps with a self-wiping feature. The UPS relay contacts control the load signal (small milli-amp signal) that is applied to the error summing junction in the electronic governor. This junction sums the load, speed, and speed setpoint (Motor Operated Potentiometer (MOP)) signals and the resulting output determines the Electronic Governor Actuator (EGA) actuator output signal. The varying load signals cause the EGA output signal to behave in an erratic manner, which causes the actuator to make step changes in the fuel rack position, with the result being erratic generator load.

At the time of the event, troubleshooting was performed on both diesel generator governor systems; this troubleshooting revealed the cause to be the governor control system. The 13U DG EGA unit input and output electrical signals were monitored during test runs in the loaded condition while paralleled to the grid. During observed load oscillations, the EGA output signal was recorded as making a change with no corresponding change in any input signals.

The "droop pot" is out of the circuit when operating in the non-parallel or "isochronous" mode, and thus its failure or erratic operation would not have affected emergency operation of the DG's.

The EGA and EGB-10C units from the 12U DG were sent for testing and analysis at the vendors' test facility. During testing of the EGA unit, unexplained EGA output voltage swings were observed. Unfortunately, the voltage swings could not be duplicated again at the test facility, and no valuable information was gained.

EXPIRES: 5/31/95

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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (8)		PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER
Millstone Nuclear Power Station Unit 2	05000336	91	— 009 —	01
				03 OF 03

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

During disassembly of the EGB-10C hydraulic actuator unit, a small amount of foreign material was noted. Initially, this contamination was considered as a possible cause of the erratic operation. In the final report, the vendor concluded the oil contamination was not the cause of the load swings seen at Millstone. This conclusion was based on the lack of any scoring of internal moving parts. This inconsistency between initial findings and final reports does not alter the facts of the abnormalities seen in the electronic controls performance and the contamination of the hydraulic oil that support the root cause conclusions at that time.

III. Analysis of Event

This report is being submitted pursuant to requirements of paragraph 50.73 (a) (2) (i), the completion of any nuclear plant shutdown required by the plants' Technical Specification.

There were no safety consequences as a result of this event since at all times the unit was in compliance with technical specifications.

The safety significance was minimal because the final reviews show the 13U DG would have been available to provide emergency power had there been a loss of normal power.

IV. Corrective Action

At the time of the event, the corrective action was to replace the governor units on both the 12U and 13U DG's. Following replacement, a full test program was conducted that subjected both DG's to a loss of normal power (LNP) start, with sequenced loading of the generator while running in isochronous mode, followed by partial and full load rejection tests, full rated loads at 2750 KW, and two hour runs at 2100KW.

Since the event, the governor control system on the 12U DG has been updated with a new EGA control and EGB-13C mechanical governor system. This system also replaces the relay contacts of the Droop Switch (UPS) with a unit more suitable for the application. This modification is scheduled for installation on the 13U DG during the 1994 refuel outage.

As an interim corrective action, a procedure change was generated to exercise the unit parallel switch (relay contacts) several times before the unit is paralleled to the grid. This will exercise and clean the contacts of the switch each month when the diesel surveillance run is performed.

V. Additional Information

Similar LERs: None

EHS	EK	— Emergency on-site power system
	65	— Governor (diesel generator)
	W290	— Woodward Governor
	RLY	— General Electric HFA