

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

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September 28, 1989
MP-13552

Re: 10CFR50.73

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

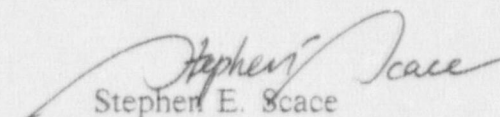
Reference: Facility Operating License No. DPR-65
Docket No. 50-336
Licensee Event Report 87-003-01

Gentlemen:

This letter forwards Licensee Event Report 87-003-01. This update report is submitted to reflect completion of corrective actions.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY


Stephen E. Scace
Station Superintendent
Millstone Nuclear Power Station

SES/RTB:mo

Attachment: LER 87-003-01

cc: W. T. Russell, Region I Administrator
W. J. Raymond, 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)

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 (2150-0104), 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 5																													
TITLE (4) Defective Steam Generator Tubes Not Repaired Prior To Startup																																																	
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																						
01			29			87			87			003			01			09			28			88			9			0500000																			
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)													
									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)									50.73(a)(2)(vi)									OTHER (Specify in Abstract below and in Text, NRC Form 366A)													
									20.405(a)(1)(iii)									X 50.73(e)(2)(i)									50.73(a)(2)(vii)(A)																						
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20.405(a)(1)(v)									50.73(a)(2)(iii)									50.73(a)(2)(ix)																															
LICENSEE CONTACT FOR THIS LER (12)																																																	
NAME R. Thomas Blanchard Jr., Ext. 5350															TELEPHONE NUMBER AREA CODE 203 447-1791																																		
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																						
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 January 29, 1987, at 1715, while operating at 100% power, a reanalysis of steam generator tube examination data, originally collected in October and November 1986, identified that one tube which had contained a repairable defect had not been repaired, as required by Technical Specification 4.4.5.1.4.b, prior to declaring the steam generator operable. In accordance with Technical Specification 3.03 a plant shutdown was initiated and the plant brought to cold shutdown approximately 25 hours later.

Continuing reanalysis of 1987 eddy current data identified 37 other tubes which also contained repairable defects which had not been repaired.

All tubes with repairable defects and others considered prudent to repair were plugged prior to increasing T_{avg} above 200 degrees Fahrenheit as required by Technical Specification 3.4.5.

No further corrective action is required.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
Millstone Nuclear Power Station Unit 2	0500033687	003	01	02	OF	05

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

I. Description of Event

At 1715 on January 29, 1987 while operating at 100% power a reanalysis of steam generator eddy current examination data collected in October and November of 1986 identified that the tube at Line 136, Row 42 in No. 1 Steam Generator contained a repairable defect 2.9 inches above the secondary face of the cold leg tubesheet. This defect had not been identified during the 1986 examination and thus had not been repaired. A plant shutdown was started as required by Technical Specification 3.03 and the plant brought to cold shutdown at 1824 on January 30, 1987.

On January 31, 1987 a second unrepaired defect was identified. This defect was located 0.2 inches above the secondary face of the hot leg tubesheet of No. 2 Steam Generator, at Line 48, Row 94.

II. Cause of Event

Investigation identified two separate and unrelated causes for this failure to accomplish all required repairs:

- The defect in No. 1 Steam Generator was not repaired because a Level III Eddy Current Data Analyst (Reviewer X) had improperly determined, on final review, that the eddy current signals were indicative of external tube deposits rather than a defect. Two independent Level II Data Analysts had previously indicated that the tube contained a 90% through-wall defect.
- The defect in No. 2 Steam Generator was not repaired because incorrect recording of the extent of the original test resulted in a portion of the tube not being analyzed during the examination. Specifically, the original analyst had improperly indicated that the tube had been examined and analyzed up to but not through the first egg crate support. In fact the area at the top of the tubesheet was not evaluated. In order to comply with contract requirements the tube was retested and analyzed in the area of the first egg crate support. Since the retest data in the area of the top of the tubesheet was believed to be redundant, the available data was not analyzed.

III. Analysis of Event

This event is reportable pursuant to 10CFR50.73(a)(2)(i)(B), operation in violation of a Technical Specification Limiting Condition for Operation. This report describes the circumstances surrounding a failure to comply with Technical specification requirements for examination and repair of steam generators. Specifically, existing defects in steam generator tubing, in excess of the plugging limit of Technical Specification 4.4.5.1.4.a.6 were not identified during the most recent eddy current examinations. This condition occurred because of (a) errors in judgement of a properly qualified and certified Level III Non-destructive Examiner and (b) failure of other Level II Non-destructive Examiners to follow the prescribed techniques for identifying the extent of eddy current examination.

The defects missed by these analysts are not considered to have significant safety consequences. Experience has shown that these defects are small volume pits. Testing has shown that this type defect does not result in tube break or tube burst conditions. Through wall penetration of these defects could result in small quantities of leakage into the secondary side of the steam generator. Technical Specification limits on leakage are adequate to assure significant leaks are properly handled.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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FACILITY NAME (1) Millstone Nuclear Power Station Unit 2	DOCKET NUMBER (2) 0 5 0 0 0 3 3 6 8 7 - 0 0 3 - 0 1 0 3 OF 0 5	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			

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

IV. Corrective Action

Reanalysis of eddy current data for all other instances where Reviewer X had reversed the evaluation of other analysts revealed that in 36 of 260 instances this reversal was inappropriate. To assure that other reviewers had not made similar errors, a sample (approximately 39% of other reviewers work was also reanalyzed. In every case the final reviewers decision was considered appropriate.

To assure that all tubes were analyzed over their full required length, every tube that was not fully analyzed during the original test because of tube restriction to the passage of the eddy current probe was reviewed to assure that all areas of the tube were analyzed. Four additional tubes were identified that had not been completely analyzed. None of these contained defects.

All tubes which contained defects were repaired by plugging in accordance with Technical Specification 4.4.5.1.4.b. Other tubes were also plugged to reduce steam generator primary-to-secondary leakage and to minimize the probability of future leakage. A total of 81 tubes were plugged. They were:

Steam Generator No. 1

<u>Line</u>	<u>Row</u>	<u>Line</u>	<u>Row</u>	<u>Line</u>	<u>Row</u>
25	19	31	43	31	45
32	42	32	46	33	45
47	91	47	93	48	90
48	94	49	91	49	93
83	93	84	94	85	93
102	46	103	43	119	91
119	93	120	90	121	91
135	45	136	46	137	43
136	42	137	45	31	15
33	21	91	65	107	67
68	46	69	85	78	82
78	86	78	88	80	84
83	83	87	87	108	34
109	49	109	85	110	80
113	63	114	12	114	62
116	14	116	18	116	38
116	60	118	18	122	18
123	19	128	16	128	52
130	14	25	17	24	18
24	20	25	21	26	18
26	20				

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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FACILITY NAME (1) Millstone Nuclear Power Station Unit 2	DOCKET NUMBER (2) 0 5 0 0 0 3 3 6 8 7 - 0 0 3 - 0 1 0 4 OF 0 5	LER NUMBER (6)			PAGE (3)		
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TEXT (If more space is required, use additional NRC Form 366A's) (17)

IV. Corrective Action (Continued)

Steam Generator No. 2

Line	Row	Line	Row	Line	Row
31	45	33	43	47	91
47	93	49	91	119	91
119	93	120	90	121	93
136	42	135	45	136	46
105	83	120	62	120	64
124	56	126	48	142	14
68	72	48	94		

Upon completion of these repair actions, the steam generators were declared operable in accordance with Technical Specification 4.4.5.1.4.b.

The procedures and specifications for conduct of the Steam Generator Eddy Current Examinations were reviewed to determine what additional controls were needed to prevent recurrence of these errors. The following actions were taken:

- (a) Detailed formal, written guidelines for analysis of Millstone Unit 2 Eddy Current data were developed and implemented. These guidelines provide specific guidance to the data analyst for interpretation of Millstone Unit 2 Eddy current data. The guidelines include discussion of testing equipment, calibration and data analysis. The method of analysis for both typical and nontypical signals was addressed using previous field data, data from tubes which had been removed and destructively examined, and data from laboratory produced flawed tube standards. Analysis criteria for various inspection methods and test variables was also included in the guidelines.

These guidelines were implemented for the 1988 examination. They were updated to reflect new information obtained in 1988 and used for the 1989 examination. Use of these guidelines has significantly improved the analysis of Millstone Unit 2 Eddy Current Data.

- (b) A plant specific data analyst training and performance demonstration program was developed and implemented. Detailed lesson plans, written examinations, as well as training aids were developed and used. Eddy current data taken from actual Millstone Unit 2 examinations was used for training. Different eddy current data from Millstone Unit 2 examinations was used for testing each analyst. Analysts must pass both a written and a practical examination prior to analyzing Millstone 2 eddy current data.
- (c) Detailed plant specific guidelines for eddy current data reporting were developed to assure all data reports would be compatible with Millstone Unit 2's eddy current data management system.
- (d) Specific, detailed criteria for discrepancies which the eddy current data management system must be able to identify were developed. Eddy current data management personnel were trained and tested on the proper use of the data management system. The eddy current data management systems were tested using actual eddy current data containing known errors. All data management systems satisfactorily identified all errors.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

Estimated burden per response to complete this information collection request: 50.0 hrs. Forward comments regarding burden estimate to the Records and Reports Management Branch (p-53P), U. S. Nuclear Regulatory Commission, Washington, DC 20555, and to the Paperwork Reduction Project (2-80-0104), Office of Management and Budget, Washington, DC 20503.

FACILITY NAME (1) Millstone Nuclear Power Station Unit 2	DOCKET NUMBER (2) 0 5 0 0 0 3 3 6 8 7 -	LER NUMBER (6)			PAGE (3)		
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TEXT (If more space is required, use additional NRC Form 366A's) (17)

IV. Corrective Action (Continued)

- (e) Computer aided data analysis was developed and refined for application at Millstone Unit 2. A sample of tubes was subjected to computer analysis in 1988. This test confirmed that computer aided analysis could significantly decrease the probability of missing repairable defects. In 1989 all secondary data analysis of bobbin coil eddy current data was performed using computer aided analysis.
- (f) During the 1988 and 1989 examinations additional Northeast Utilities personnel were assigned to monitor the vendor compliance with the guidelines and specifications for the examinations. This monitoring was effective in assuring the vendor met all requirements.

These actions have proven effective in eliminating errors in data analysis, data review, and data management.

V. Additional Information

The affected steam generators were manufactured by Combustion Engineering and are identified as Series 67.

ELIS Codes : AB-SG-C490
AE-TBG-C490

There are no similar events.