

Maine Yankee

RELIABLE ELECTRICITY SINCE 1972

329 BATH ROAD • BRUNSWICK, MAINE 04011 • (207) 798-4100

June 9, 1997

MN-97-074

JRH-97-153

UNITED STATE NUCLEAR REGULATORY COMMISSION

Attention: Document Control Desk

Washington, D.C. 20555

Reference: (a) License No. DPR-36 (Docket No. 50-309)

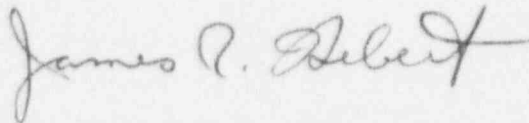
Subject: Licensee Event Report 97-010, Steam Generator Tube Deficiencies Issues

Gentlemen:

Please find enclosed Maine Yankee Licensee Event Report 97-010. This report is submitted in accordance with 10 CFR 50.73(a)(2)(i) and 10 CFR 50.73(a)(2)(ii).

Please contact us should you have any questions regarding this matter.

Very truly yours,



James R. Hebert, Manager

Licensing & Engineering Support Department

slc

enclosure

c: Mr. Hubert Miler
Mr. J. T. Yerokun
Mr. D. H. Dorman
Mr. Patrick J. Dostie
Mr. Uldis Vanages

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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 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-6 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)

Maine Yankee Atomic Power Company

DOCKET NUMBER (2)

50-309

PAGE (3)

1 OF 3

TITLE (4)

Steam Generator Tube Deficiencies Issues

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
05	09	97	97	-- 010	-- 00	06	09	97	FACILITY NAME	DOCKET NUMBER
OPERATING MODE (9)		1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)							
POWER LEVEL (10)		0	20.2201(b)		20.2203(a)(2)(v)		x		50.73(a)(2)(i)	50.73(a)(2)(viii)
			20.2203(a)(1)		20.2203(a)(3)(i)		x		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

Thomas D. Williams, Senior Operations Engineer
Ethan Brand, Plant Licensing Section Head

TELEPHONE NUMBER (Include Area Code)

(207) - 882-5661

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)

☒ YES
(If yes, complete EXPECTED SUBMISSION DATE).

NO

EXPECTED
SUBMISSION
DATE (15)

MONTH	DAY	YEAR
12	09	97

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

On May 9, 1997, Maine Yankee was in the Refueling Shutdown Condition.

Maine Yankee was performing examinations of its Steam Generators (SG) during the refueling outage, including a 100% examination of all the tubes in all three Steam Generators. At 1740 on May 9, 1997, Engineering reported that greater than 1% of the total tube population were determined to be defective. In accordance with requirements of Maine Yankee Technical Specifications, a four hour report was made to the NRC.

Tubes representative of those containing the largest detected defects were selected to undergo in-situ hydro testing. On May 21, 1997, one tube in #3 Steam Generator leaked at a pressure lower than that required by Reg. Guide 1.121 criteria.

All of the other initially tested tubes satisfied the Reg. Guide 1.121 leak criteria. The sample size for testing was expanded to include tubes whose Eddy Current Test characteristics were close to that of the failed tube. All of the additional tubes tested met the Reg. Guide 1.121 leak criteria.

Causal factors of the events include: Primary and Secondary Water Stress Corrosion Cracking, pitting, intergranular Attack, and that bobbin flaw signals are difficult to detect at dented egg crates.

Corrective actions include: plus point exams of all dented intersections in egg crate supports 1 through 6, plug all detected cracks and plug volumetric indications equal to or greater than 40% through-wall and those which have grown.

LICENSEE EVENT REPORT (LER)
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		YEAR	SEQUENTIAL	REVISION	
Maine Yankee Atomic Power Company	50-309	97	-- 010	-- 00	2 OF 3

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

INITIAL PLANT CONDITIONS:

On May 9, 1997, Maine Yankee was in the Refueling Shutdown Condition.

EVENT DESCRIPTION:

Maine Yankee was performing examinations of its Steam Generators (SG) during the refueling outage. The initial examination program included:

- ▶ A 100% examination of the tubes in all three Steam Generators using a bobbin probe.
- ▶ A 20% examination of 12 inch and 20 inch sleeves in all three Steam Generators using a plus point probe.
- ▶ A 100% examination of all 30 inch sleeves in all three Steam Generators using a plus point probe.
- ▶ An examination of a 300 tube sample in the hot leg ARC region of all three SG's using a plus point probe.
- ▶ An examination of 20% of the hot leg drilled support plate intersections with dents showing greater than five volts in all three Steam Generators using a plus point probe.
- ▶ An examination of 20% of cold leg top of tube sheet expansions in all three SGs using a plus point probe.
- ▶ An examination of all bobbin probe indications including Non-Quantified Indications (NQI) and Distorted Support Indications (DSI) with a plus point probe.
- ▶ A 20% sample of H1 and H2 intersections above the sludge pile in Steam Generators 1 & 3 and a 20% sample of H1 intersections in Steam Generator #2 using a plus point probe.

At 1740 on May 9, 1997, Engineering reported that greater than 1% of the total tube population was determined to be defective. A defective tube is a tube with at least one of the following: volumetric imperfections equal to or greater than 40% through-wall, volumetric imperfections having shown evidence of growth since detected, even if less than 40% through-wall, and any cracks. In accordance with requirements of Maine Yankee Technical Specifications, a four hour report was made to the NRC at 2030 on May 9, 1997.

Tubes representative of those with the largest defects were selected to undergo in-situ hydro testing. The selection was based on the plus point and bobbin indicated voltages, defect length, and defect depth. The testing was to demonstrate compliance with Reg. Guide 1.121 structural criteria.

At 1710 on May 21, 1997, a video inspection of tube R14L43 in Steam Generator #3 revealed that it had leaked at a pressure lower than that designated by Reg. Guide 1.121 requirements. A Four Hour Report was made to the NRC at 2011 on May 21, 1997.

The initial hydro sample size was expanded by nine tubes. These additional tubes contained defects with characteristics, identified by Eddy Current testing, approaching those of the tube that failed to meet the Reg. Guide 1.121 criteria. All of the additional tubes were tested and satisfied the Reg. Guide 1.121 leak criteria.

Tube R14L43 in Steam Generator #3 was the only tube in the in-situ hydro test program that leaked at less than the highest Reg. Guide 1.121 target test pressure.

A review of the data collected in 1995 at the site of the tube rupture showed that there was a distorted signal at the site using the bobbin probe. This signal was missed during the 1995 evaluation. A dent signal was present in 1995, which may have masked the indication.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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

SAFETY SIGNIFICANCE:

The safety significance of this event is considered low. The single tube which failed to meet Reg. Guide 1.121 criteria leaked at 3,100 psig. This is greater than the Main Steam Line Break (MSLB) pressure of 2,898 psig, which is the highest pressure expected during normal or accident conditions.

CAUSAL FACTORS:

The causes of the degradation of the Steam Generator tubes are considered to be Primary Water Stress Corrosion Cracking, Secondary Side Stress Corrosion Cracking, pitting, and Intergranular Attack.

Bobbin signals from imperfections and defects are difficult to discern when coincident with egg crate dent signals.

Upon examining the 1995 bobbin signals, the Steam Generator tube that leaked during testing was shown to be flawed during the 1995 inspection but was not evaluated as having an imperfection. A dent signal was present in 1995, which may have masked the indication.

CORRECTIVE ACTIONS:

Perform plus point exams of all dented intersections in egg crate supports one through six.

Plug all detected cracks.

Plug volumetric imperfections equal to or greater than 40% through-wall.

Plug volumetric imperfections having shown evidence of growth since detected, even if less than 40% through-wall

PREVIOUS SIMILAR EVENTS:

LER 95-004 Circumferential Cracking of Steam Generator Tubes

LER 94-012 Steam Generator Tube Degradation

LER 93-018 Number of Defective Tubes in #3 Steam Generator Greater Than Technical Specification 4.10 Limit

LER 92-013 Failure of Steam Generator J-Tubes and Moisture Separator Cans

LER 90-012 Plant Shutdown due to Steam Generator #1 Tube Leak

LER 82-029 Steam Generator Eddy Current Tube Failures