

# Maine Yankee

RELIABLE ELECTRICITY FOR MAINE SINCE 1972

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May 29, 1991  
MN-91-85

SEN-91-156

UNITED STATES NUCLEAR REGULATORY COMMISSION  
Attention: Document Control Desk  
Washington, DC 20555

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

Subject: Maine Yankee Licensee Event Report 91-005-00 - Plant Trip on Main  
Transformer Failure

Gentlemen:

Please find enclosed Maine Yankee Licensee Event Report 91-005-00. This report is submitted in accordance with the requirements of 10 CFR 50.73(a)(2)(iv).

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

Very truly yours,

*SENichols*

S. E. Nichols, Manager  
Nuclear Engineering & Licensing

SEN/sjj

c: Mr. Thomas T. Martin  
Mr. Charles S. Marschall  
Mr. E. H. Trottier  
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LICENSEE EVENT REPORT (LER)

Facility Name(1) Maine Yankee Atomic Power Company	Docket Number(2) 0 15 10 10 10 13 10 19 1 1 of 12	Page(3) 1 of 12
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Title(4) Plant Trip on Main Transformer Failure

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 4	2 1	9 9	1 9	1 - 0 1 0 1 5 -	0 1 0	0 1 5	2 1	9 9	1

This Report is Submitted Pursuant to the Requirements of 10 CFR § (Check one or more the following) (11)

Operating Mode (9)	7	20.402(b)	20.405(c)	50.73(a)(2)(v)	73.71(b)
Power Level (10)	1 0 0	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)(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)(v)	50.73(a)(2)(iii)	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 Ethan B. Brand, Nuclear Safety Engineer	Telephone Number Area Code 2 0 7 8 8 12 16 13 12 11
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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
x	1	L	XIFMIR	GLOBID	Y				

Supplemental Report Expected (14)

(If yes, complete Expected Submission Date) not known	No	Expected Month	Day	Year

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

On April 29, 1991, Maine Yankee tripped from 100% power when one of the two main output transformers developed an internal fault. The electrical fault in the main transformer X-1A resulted in a generator primary relay trip of the main turbine. The Reactor Protective System tripped the reactor on Loss of Load. Protective relaying and the automatic transfer to reserve power performed as designed.

The transformer fault caused arcing at the neutral bus beneath the main generator. The arcing damaged hydrogen lines and the neutral leads bushings and resulted in a hydrogen fire beneath the main generator. The plant declared an Unusual Event due to the fire, which was allowed to burn itself out over a 3 hour period.

The damaged transformer has been replaced with an on-site spare (X-15). The main generator repairs are expected to be completed by the end of May, 1991, at which time the plant expects to resume operation.

Two transformer failures (without fires) occurred previously at Maine Yankee on August 13, 1988 (X-1A) (LER-88-006), and on August 31, 1978 (X-1B).

The root cause of the transformer fault is indeterminate pending further inspection. The transformer (X-1A) had been rebuilt following the fault in 1988 and had been in service for approximately 9 months.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

Facility Name(1)	Docket Number(2)	LER Number (6)			Page(3)
		Year	Sequential Number	Revision Number	
Maine Yankee Atomic Power Company	0151010101019	911	005	002	of 012

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

On April 29 1991, Maine Yankee tripped from 100% power when one of the two main output transformers developed an internal fault. The electrical fault in the main transformer X-1A resulted in a generator primary relay (GGP) trip of the main turbine (TRB). The Reactor Protective System (JCS) tripped the reactor on loss of load. Protective relaying and the automatic transfer to reserve power performed as designed.

The transformer fault current caused the main generator neutral bus potential to rise high enough to cause arcing between the neutral bus and neutral bus enclosure. The arcing damaged adjacent hydrogen lines, neutral bushings and the neutral enclosure. Hydrogen leakage from damaged lines and neutral bushings ignited, resulting in a fire below the main generator. The plant fire brigade responded and the generator was purged with carbon dioxide to remove the source of hydrogen and to allow the fire to self-extinguish over a 3 hour period.

The transformer fault caused an overpressure and rupture of the transformer casing. The explosion of hot oil initiated the transformer fire protection deluge system. Approximately 150 gallons of mineral based (non-PCB) transformer oil leaked into a storm drain and reached the Back River near the plant. Cleanup of the oil spill is complete.

The fire beneath the main generator damaged the neutral bus and bushings, requiring replacement of these components. Collateral damage was restricted to the immediate area of the neutral bus and bushings, and involved some generator instrumentation and hydrogen lines. Small fires in the immediate area caused by the fire debris resulted in minimal damage to other surrounding equipment.

The plant declared an Unusual Event due to the fire, which burned for approximately 3 hours.

The ruptured transformer has been replaced with an on-site spare (X-15). The parallel main transformer X-1B, and the two station service transformers have been examined and tested, with no faults or inconsistencies discovered. The main generator inspection and repairs are expected to be completed by the end of May 1991, at which time the plant is expected to resume operation.

Two transformer failures (without fires) occurred previously at Maine Yankee on August 13, 1988, (X-1A) (LER 88-006), and on August 31, 1978 (X-1B).

The transformer (X-1A) is a General Electric 3 phase, 345KV/22KV, 430/600 MVA, forced oil, air cooled unit. The root cause of the transformer fault is indeterminate pending further inspection. The transformer (X-1A) had been rebuilt following the fault in 1988 and has been in service for approximately 9 months.

An evaluation of the root cause of the incident has been completed and is undergoing internal review. An evaluation to determine the cause of the transformer failure is ongoing. An updated LER will be submitted when this effort has been completed.