

Maine Yankee

RELIABLE ELECTRICITY SINCE 1972

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

November 8, 1996

MN-96-163

JRH-96-242

UNITED STATES NUCLEAR REGULATORY COMMISSION

Attention: Document Control Desk

Washington, D. C. 20555

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

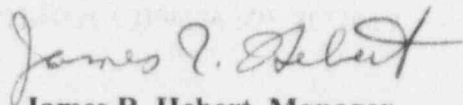
Subject: Maine Yankee Licensee Event Report 96-031, Plant Trip During Reactor Protection System Surveillance

Gentlemen:

Please find enclosed Maine Yankee Licensee Event Report 96-031 . This report is submitted in accordance with 10 CFR 50.73(a)(2)(iv).

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

Very truly yours,



James R. Hebert, Manager

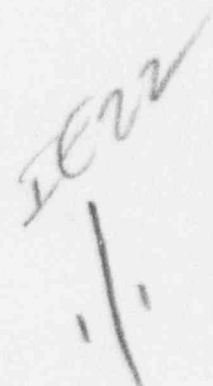
Licensing & Engineering Support Department

mwf

Enclosure

c: Mr. Hubert Miller
Mr. J. T. Yerokun
Mr. D. H. Dorman
Mr. Patrick J. Dostie
Mr. Uldis Vanags

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PDR ADDCK 05000309
S PDR



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-8 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)

PLANT TRIP DURING REACTOR PROTECTION SYSTEM SURVEILLANCE

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
10	09	96	96	031	00	11	08	96	FACILITY NAME	DOCKET NUMBER
OPERATING MODE (9)		7	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)							
POWER LEVEL (10)		90%	20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(i)		50.73(a)(2)(viii)	
			20.2203(a)(1)		20.2203(a)(3)(i)		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)		<input checked="" type="checkbox"/> 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	TELEPHONE NUMBER (Include Area Code)
Ethan Brand, NSEG Supervisor	(207) 882-5661

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE).	<input checked="" type="checkbox"/> NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR

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

On October 9, 1996, Maine Yankee was operating at 2440 Mwt (90.3% power) when the reactor scrammed. The reactor trip breakers opened without any initiating trip signals having been received. At the time of the trip, the logic trip relay surveillance was in progress and reactor trip breakers #3 and #7 were open as part of the surveillance. All safety related systems responded correctly upon the plant trip.

The exact cause of the trip has not been determined. The apparent cause of the trip was voltage transient in the logic circuitry being tested during the surveillance. Additional testing and analysis are being performed to attempt to determine the exact cause of the trip, including bench testing of the circuit to identify any potential design deficiencies which might have contributed to the event. Also being considered is additional monitoring of the circuit during the next surveillance.

The following logic matrix components which were undergoing testing at the time of the trip were replaced prior to plant restart: the test power supply and the Matrix Relay Hold push-button. Also, the circuitry was thoroughly tested (with no problems found) and the logic trip relay surveillance was completed before a plant restart.

LICENSEE EVENT REPORT (LER)

TEXT CONTINUATION

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Maine Yankee Atomic Power Company	50-309	96	- 031	- 00	2 OF 3

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

INITIAL PLANT CONDITIONS:

On October 9, 1996, Maine Yankee was in Mode 7, Power Operations, at 2440 Mwt steady state power, 90.3%.

EVENT DESCRIPTION:

On 10/9/1996 at 0950 the reactor scrammed when the reactor trip breakers opened without any initiating trip signals having been received. At the time of the trip the Reactor Protective System(RPS)(JC) Logic Trip Relays Test surveillance was in progress on the "AC" logic matrix and reactor trip breakers #3 and #7 were open as part of the surveillance.

SAFETY SIGNIFICANCE:

The safety significance was minimal. All safety related systems responded correctly upon the trip.

CAUSAL FACTORS:

Note: the RPS logic system was designed by Combustion Engineering as part of original plant design.

Refer to the attached diagram for the following discussion:

The RPS Logic Trip Relays Test surveillance tests each of four "K" relay (RLY) trip logic circuits. Each "K" relay opens two (of eight total) Reactor Trip Breakers (52). At least four Reactor Trip Breakers must open to cause a reactor trip. There are six logic matrixes (AB, AC, AD, BC, BD and CD), each with four logic matrix relays. Each matrix relay has an associated contact in its respective "K" relay circuit. To allow testing of each of the 24 (four in each of six logic matrixes) matrix relays without causing a reactor trip, only one "K" relay is allowed to de-energize at a time. This is accomplished by applying a hold current to a second coil in the three logic matrix relays not being tested in the specific logic matrix. The logic matrix being tested is then de-energized which in turn de-energizes the one logic relay not being supplied with hold current. This hold current is supplied by a single test power supply. Normally, the logic matrix relays are energized by auctioneered power supplies through the matrix trip circuit.

LICENSEE EVENT REPORT (LER)

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		96	- 031	- 00	

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

Conducting the surveillance involves manipulating two rotary contact switches (HS) and a push-button switch: the Channel Trip Select Switch (which selects one of the ten possible trips), the Matrix Relay Trip Select Switch (which selects one of the four Logic matrix relays), and the Matrix Relay Hold push-button switch (which applies a holding current to the non-tested matrix relays and inserts the trip selected by the Channel Trip Select Switch).

A fault tree was constructed to identify possible malfunctions that could cause a plant trip during the surveillance. This analysis identified that an interruption of the hold current for the matrix relays would result in a plant trip. This was verified by test before plant startup. Three components were identified which could result in interruption of the hold current: the power supply itself (or its supply), the Matrix Relay Hold push-button, and the Matrix Relay Trip Select Switch. While the plant was shutdown with the reactor trip breakers closed, each of these components (in the AC logic matrix) were manipulated as they would be in the test, with no problems noted. The power supply and the Matrix Relay Hold push-button switches were replaced before startup as a precautionary measure. The Matrix Relay Trip Select Switch was not replaced as no spare was available before startup.

Prior to plant startup, the RPS surveillance was completed with no other problems.

CORRECTIVE ACTIONS:

- The following AC logic matrix components that were undergoing testing at the time of the trip were replaced: the test power supply and the Matrix Relay Hold push-button. The circuitry was thoroughly tested and the RPS surveillance completed before plant restart.
- Additional testing and analysis are being performed to attempt to determine the exact cause of the trip, including bench testing of the circuit to identify any potential design deficiencies that might have contributed to the event.
- Additional monitoring of the circuit during the next surveillance is being considered.
- Combustion Engineering has been consulted on this problem and is providing additional assistance.

PREVIOUS SIMILAR EVENTS:

No previous similar reactor trips have been reported via LER. Maine Yankee has had two apparently similar reactor trips, in 1974 and in 1978; both of these previous trips occurred during RPS surveillance testing. The 1974 event appeared to be due to a faulty selector switch, and the 1978 event to faulty logic matrix relay.

