

# Maine Yankee

RELIABLE ELECTRICITY SINCE 1972

EDISON DRIVE • AUGUSTA, MAINE 04330 • (207) 622-4868

December 20, 1993

MN-93-119

JRH-93-262

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 93-016-01, Multiple 480 Volt Breaker Trips Caused by RMS-9 Trip Devices

Gentlemen:

Please find enclosed Maine Yankee Licensee Event Report 93-016-01. This report is submitted in accordance with 10CFR50.73(a)(2)(v) and 10 CFR 21.

Please contact us should you have questions regarding this matter.

Very truly yours,

James R. Hebert, Manager  
Licensing & Engineering Support Department

SJB/mwf

Enclosure

c: Mr. Thomas T. Martin  
Mr. J. Yerokun  
Mr. E. H. Trottier  
Mr. Patrick J. Dostie

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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  
(MNB 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)  
Maine Yankee Atomic Power CompanyDOCKET NUMBER (2)  
50-309PAGE (3)  
1 OF 2TITLE (4)  
Multiple 480 Volt Breaker Trips Caused by RMS-9 Trip Devices

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	04	93	93	--016--	01	09	06	93	FACILITY NAME	DOCKET NUMBER
										50-309
										50-309

OPERATING MODE (9)	3	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 50.73 (Check one or more) (11)			
POWER LEVEL (10)	0	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(i)	50.36(c)(1)	X 50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	X OTHER
		20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	(Specify in
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	Abstract below
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	and in Text, NRC Form 366A)

LICENSEE CONTACT FOR THIS LER (12)  
NAME  
Danny P. McDougald, Nuclear Safety EngineerTELEPHONE NUMBER (Include Area Code)  
(207) 882-6321

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)				
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDs
B	ED	BKR	GE	Y

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
X YES (If yes, complete EXPECTED SUBMISSION DATE).	NO		10	22	93

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

This report is being submitted in accordance with two other reporting requirements:

1. Written report for 10 CFR Part 21
2. Special report to the commission as required by Technical Specification 3.23 remedial action for P-4, Electric-driven fire pump, being inoperable for greater than 7 days.

On July 30, 1993, Maine Yankee (MY) was cooling down in preparation for refueling. At 1022 hrs. while in the transthermal condition, a 480 volt ground alarm was received and P-29D service water [SW] pump [P] tripped. The pump's air circuit breaker [ACB] had opened, causing a SW low pressure alarm, and an operator immediately started a standby pump.

Normally a single ground fault will not actuate the RMS-9 device, which serves as an overcurrent protection on the breakers in the ungrounded 480 volt buses. This device was designed with long-time/short-time trip functions for motor control circuit (MCC) loads and instantaneous trip functions for motor loads, chosen to coordinate with the upstream and downstream protective devices. This coordination ensures that an overcurrent condition on a load would not result in de-energizing the entire bus or any upstream load. The RMS-9 trip device was certified by GE as a suitable replacement for the EC trip units that were originally installed in GE AK circuit breakers. The RMS-9 trip devices were installed in all AK-25 breakers at MY for both safeguards and non-safeguards 480 volt buses. There are eight AK-25 circuit breakers which control loads required to mitigate an accident. These include 4 (2 on each of two trains) service water pumps (which provide the ultimate heat sink for engineered safeguards), and 4 (2 on each of two trains) which feed various instrumentation, valves and other equipment necessary for engineered safeguards. In addition one breaker feeds an electric driven fire pump and one is the output breaker of an auxiliary diesel generator which is used to meet 10 CFR Part 50 Appendix R requirements.

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 (MNB 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)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Maine Yankee Atomic Power Company	50-309	93	--016--	01	2 OF 2

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

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Normally a single ground fault will not actuate the RMS-9 device, which serves as an overcurrent protection on the breakers in the ungrounded 480 volt circuits. This device was designed with long-time/short-time trip functions for motor control circuit (MCC) loads and instantaneous trip functions for motor loads, chosen to coordinate with the upstream and downstream protective devices. This coordination ensures that an overcurrent condition on a load would not result in de-energizing the entire bus or any upstream load. The RMS-9 trip device was certified by GE as a suitable replacement for the EC trip units that were originally installed in GE AK circuit breakers. The RMS-9 trip devices were installed in all AK-25 breakers at MY for both safeguards and non-safeguards 480 volt buses. There are eight AK-25 circuit breakers which control loads required to mitigate an accident. These include 4 (2 on each of two trains) service water pumps (which provide the ultimate heat sink for engineered safeguards), and 4 (2 on each of two trains) which feed various instrumentation, valves and other equipment necessary for engineered safeguards. In addition one breaker feeds an electric driven fire pump and one is the output breaker of an auxiliary diesel generator which is used to meet 10 CFR Part 50 Appendix R requirements.

On July 30, 1993, electricians did not identify any RMS-9 trip flags present on the P-29D breaker. A 74 device flag on the 480 volt bus 8 was present; this flag indicates a system ground and sends a signal to the panalarm. P-29D motor and breaker were meggered with satisfactory results.

At 1200 hrs., P-29D was restarted and experienced no initial problems. At 1345 hrs., the P-29D breaker again tripped open. This time, MCC-8B feeder breaker also tripped open. P-29D is powered from Bus 8, which also feeds MCC-8B. MCC-8B subsequently feeds MCC-8B1. The MCC-8B feeder breaker trip therefore resulted in loss of both MCC-8B and MCC-8B1. The de-energized buses made several motor operated valves inoperable including containment integrity valves which required entry into a 4 hour remedial action of Technical Specifications. Only one ECCS train was required at the time and the "A" train remained operable.

Investigation of the ground continued until 0130 hrs. on July 31, 1993. The ground was located in the Boric Acid Mix Tank (BAMT) startup heaters.

The ACB spurious trip problem is believed to be attributed to the RMS-9 trip devices initiating breaker trips when short duration current transients were induced by a ground fault spike. This spike can result in "sympathetic" trips occurring on other 480 volt breakers powered from parallel circuits of a 480 volt ground. There is no operational experience of a ground fault affecting other buses unless cross-tied. MY believes the delta-delta transformer connection isolates the fault to the affected bus.

On August 4, 1993, MY determined that during a Loss of Coolant Accident (LOCA) non-environmentally qualified (EQ) components or cable could degrade and cause grounds. The resulting current spikes could result in spurious tripping and de-energizing of equipment needed to mitigate the consequences of an accident.

The safety significance of this postulated event is that some systems required to mitigate an accident could be spuriously de-energized. Operational experience has shown that the ACBs can be reclosed within a few minutes even with the ground fault present, if the RMS-9 trip device has no flags (indicating no true overcurrent condition).

While shutdown, the engineered safeguards equipment that were affected by the RMS-9 devices, were either not necessary or did not need automatic action. The Residual Heat Removal (RHR) system, cooled by SW, could be stopped momentarily, without consequence, until the breakers were reclosed.

All ten 480 volt GE RMS-9 trip devices were replaced by the more reliable mechanical GE EC trip devices, prior to plant startup. The P-4, electric-driven fire pump, had its trip device changeout completed on Sept. 11, 1993, and Technical Specification 3.23 remedial action was exited accordingly.