Maine Yankee
RELIABLE ELECTRICITY FOR MAINE SINCE 1972

EDISON DRIVE • AUGUSTA, MAINE 04336 • (207) 622-4868

December 28, 1990
MN-90-130 ETB-90-109

UNITED STATES NUCLEAR REGULATORY COMMISSION
Attention: Dr. Thomas E. Murley, Director
Office of Nuclear Reactor Regulation
Washington, DC 20555

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

Subject: 10 CFR Part 21 Report - GE Type AK-2A-25-1 Low Voltage Switchgear Breakers

Gentlemen:

This report is submitted in accordance with 10 CFR Part 21 due to a condition associated with GE Type AK-2A-25-1 Low Voltage Switchgear Breakers identified at Maine Yankee that could represent a generic safety concern. This determination was made on December 27, 1990.

Maine Yankee's reactor trip breakers (RTBs) are type AK-2A-25-1 Low Voltage Switchgear Breakers manufactured by General Electric (GE). There are eight breakers currently used in the Reactor Protective System and one breaker installed as a cross connect (TCB-9). Maine Yankee also has two spare breakers on site. The RTBs use two springs in a spring actuated over-center toggle type mechanism. As the closing force is applied by the closing solenoid armature, energy is stored in the operating springs. After the springs have gone over center, movement of the output crank of the mechanism is blocked for a time by a cam arrangement. As the springs are further extended, the blocking cam moves away from the output crank, and the springs are allowed to discharge part of their stored energy, closing the breaker contacts. This assures a fast-snapping type of closing action. The breaker mechanism is tripped by displacement of the trip latch. When the latch moves off the trip latch roller, the remaining force in the operating springs causes the mechanism's toggle to collapse, resulting in the opening of the breaker contacts. Consequently, the operating springs are required for both the closing and tripping functions.

The safety function of the RTBs is to trip in response to a Reactor Protective System signal. This interrupts power to the Control Element Drive Mechanism (CEDM) coils, which allows the CEAs to fall into the core and shut down the reactor.

During a RTB monthly surveillance conducted on November 27, a RTB would not reclose following trip testing. Investigation found the closing coil failed as a result of the loss of both actuating springs. Based on the information obtained in response to the failed RTB surveillance test, a RTB could close with one spring while the other spring could disengage and jam the operating mechanism thus preventing the breaker from tripping. The probability of this occurring is low because it depends on a single spring becoming disengaged and then jamming the operating mechanism to the extent that it would not trip the breaker. In the event that one spring becomes disengaged we believe it likely that the second spring would also become disengaged because there is uneven spring tension on the operating mechanism. However, to the best of our knowledge, there have been no instances in which a disengaged operating spring has prevented a RTB from performing its safety function.

IE19
1/0

Maine Yankee has discussed this matter with the breaker manufacturer. The manufacturer provided the following information upon completion of their inspection:

1. A breaker that has successfully closed and still has both springs in place will trip, regardless of the orientation of the springs. (The RTBs at Maine Yankee were inspected and both operating springs were engaged.)

2. If the breaker looses one spring during an operation, the breaker could fail if the lost spring were to jam the mechanism.

3. If the breaker looses both springs, the breaker will not close and the closing coil will burn up if an attempt is made to close the breaker while the springs are off. This happens when the closing coil cut-off switch can not operate because it depends on proper mechanism operation to function.

The manufacturer further stated that they do not know at this time when the springs become disengaged. They have tried unsuccessfully to duplicate the spring disengagement. One factor which has been identified as having an influence on the failures is the orientation of the operating springs. There are two correct orientations for installation of operating springs. When facing the front of the RTB with the end of the springs hooked from under the carrier pin, the left hand spring must have a counterclockwise spiral and the right hand spring must have a clockwise spiral. If the springs are hooked over the top of the carrier pin, the left hand spring must then have a clockwise spiral and the right hand spring must have a counterclockwise spiral.

At Maine Yankee, to ensure that actuation springs remain properly installed, the actuation springs are visually checked intact following RTB closure. An informational tag indicating such has been placed on the main control board panel adjacent to the RTB controls.

We trust this information is satisfactory. Please contact us should you have any questions regarding this matter.

Very truly yours,

E Thomas Boulette

E. Thomas Boulette
Vice President, Operations

ETB/sjj

c: Mr. Thomas T. Martin
Document Control Desk
Mr. E. H. Trottier
Mr. Charles S. Marschall