November 25, 2013

Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001
FAX 301-816-5151

Subject: 10CFR Part 21 Notification of Deviation re. K-Line Circuit Breaker Primary Close Latch

1. This letter provides notification of a failure to comply with specifications associated with a primary close latch, part number 716611K02, used in K-Line 225 to 2000 amp continuous current low voltage electrically operated Model 7 circuit breakers. It does not affect previous models of these same breakers that have not been upgraded to include the interlocking primary and secondary close latches (see Figure 2). It also does not affect manually operated K-Line breakers or K3000/4000 circuit breakers. Information is provided as specified in 10CFR21 paragraph 21.21(d) (4).

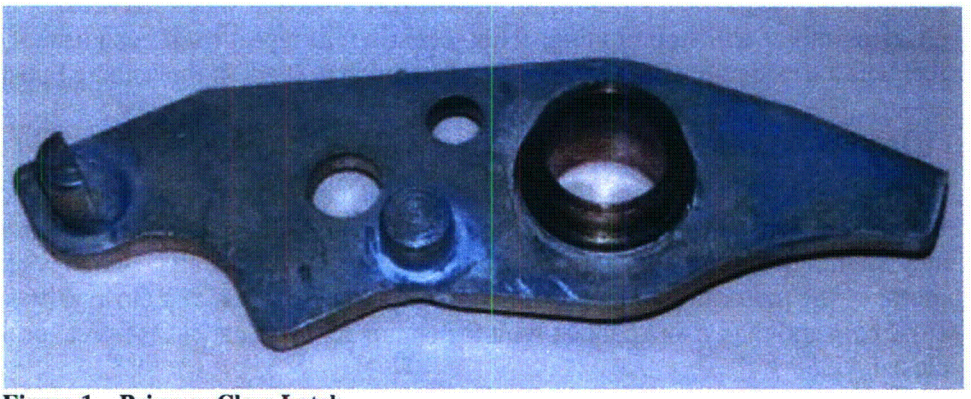

**Figure 1 – Primary Close Latch**

2. Notifying individual: Jay Lavrinc, Vice President & General Manager, ABB (Medium Voltage Service), 2300 Mechanicsville Road, Florence, SC 29501

3. Identification of the Subject component: ABB part number 716611K02 primary close latch. This primary close latch is used on new legacy K-Line Model 7 electrically operated circuit breakers. It is also used during breaker refurbishments when a primary close latch is required to be replaced because of damage or wear. The primary close latch is available as a component part and is also used in K-Line Model 7 up-grade kits.

4. If a breaker is sent in for refurbishment, the primary and secondary latches are replaced unless it is required in the customers PO that they not be replaced unless they are damaged or worn.

5. Nature of the deviation: Some Primary Close latches were manufactured out of dimensional tolerance between July 2011 and March 2013. They were ground out of specification during fabrication which can cause improper mating between the primary and secondary close latches. There is a potential that the primary close latch could stick in the actuated position and prevent a circuit breaker from closing or opening and staying open, on the next electrical command.

IE19
NRR

**ABB Inc.**

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MEDIUM VOLTAGE SERVICE

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6. Corrective actions include:
    a. Remove all part number 716611K02 primary close latches from inventory. (Action complete)
    b. Outsource primary close latch fabrication to approved vendor. (Action complete)
    c. Complete First Article Inspection of primary close latches fabricated at newly approved vendor. (Action complete)
    d. Notification of the potential existence of this deviation to affected customers (Action to be completed by 5 December 2013)

7. It is recommended that the affected Licensees replace K-Line primary close latches for Model 7 electrically operated circuit breakers at the next convenient maintenance cycle. If a Licensee is concerned about a critical circuit prior to the next maintenance opportunity, the condition of the breaker can be determined by visual inspection of the circuit breaker stored energy indicator (flag).

    If a breaker is closed it will remain closed until it receives a trip command. If the circuit breaker is open and the stored energy indicator shows "springs charged" through the window of the escutcheon plate, the circuit breaker is in a condition to close when called upon at next electrical or mechanical close command.

Very truly yours,

Jay Lavrinc
VP & GM ABB MVS

**ABB Inc.**

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**Scenario of Potential Failure:**

**With an EO breaker set up to charge on open (standard K-Line wiring)**

The standard set up for an electrically operated (EO) K-Line circuit breaker is to charge the closing springs when the breaker is opened. There is the potential after a close operation for the primary close latch to stick in the actuated position. When the breaker is closed, even with the close latch out of position (as described above), the breaker will remain closed by design until a trip signal or manual trip operation is provided.

**When the breaker receives a trip signal and it is not held constant:**

When the breaker receives a trip signal and then the signal is released, the breaker will open and the spring charging motor of the EO breaker will charge the closing springs. During the charging of the closing springs, the roller on the closing cam passes the primary close latch, which is stuck in the actuated position, and the breaker will close without receiving an electrical or mechanical stimulus for the breaker to close. When the breaker closes, the spring charging motor will stop running. This scenario will repeat itself each time the breaker receives a trip signal while the primary close latch is stuck in the actuated position.

**When the breaker receives an electrical trip signal and the signal is held constant:**

When the breaker closes and the primary close latch is stuck in the actuated position, the breaker will close and reopen. The charging motor will continue to run, rotating the close cams and "pumping" the closing springs and the primary contacts until voltage is removed from the motor or the motor fails. The movable primary contacts open and close at every rotation of the close cam and they make contact with the stationary contacts but the breaker never fully latches closed.

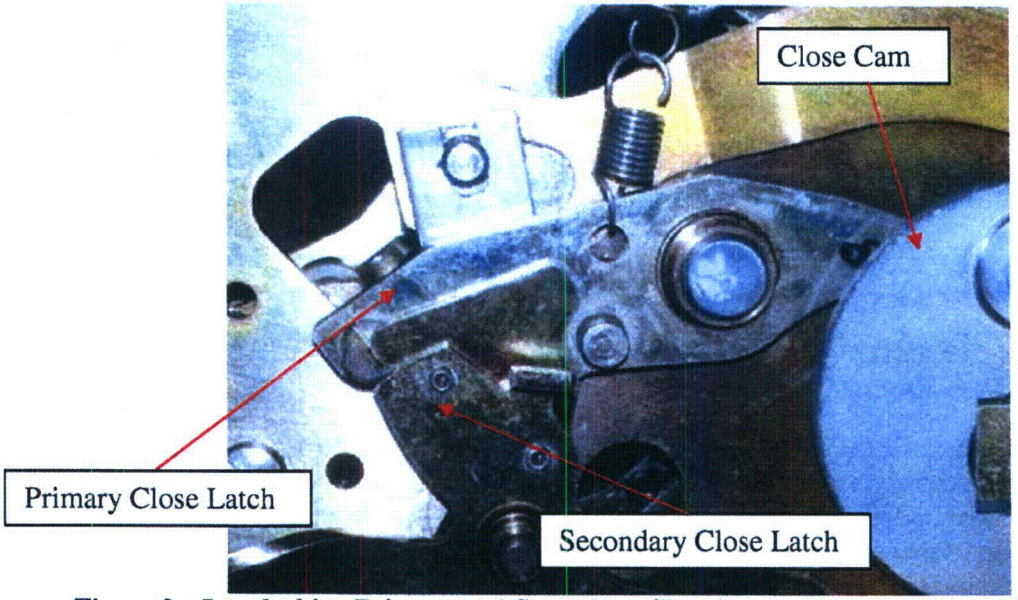


**Figure 2 – Interlocking Primary and Secondary Close Latches in operating mechanism**

Part 21 (PAR) Event # 49579

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|---|---|---|---|
| **Rep Org:** ABB INC | | **Notification Date / Time:** 11/25/2013 14:52 | (EST) |
| **Supplier:** ABB INC | | **Event Date / Time:** 11/25/2013 | (EST) |
| | | **Last Modification:** 11/25/2013 | |
| **Region:** 1 | **Docket #:** | | |
| **City:** FLORENCE | **Agreement State:** | Yes | |
| **County:** | **License #:** | | |
| **State:** SC | | | |
| **NRC Notified by:** JAY LAVRINC | **Notifications:** | DAN SCHROEDER | R1DO |
| **HQ Ops Officer:** CHARLES TEAL | | FRANK EHRHARDT | R2DO |
| **Emergency Class:** NON EMERGENCY | | HIRONORI PETERSON | R3DO |
| **10 CFR Section:** | | GREG PICK | R4DO |
| 21.21(d)(3)(i) DEFECTS AND NONCOMPLIANCE | | PART 21 GROUP | EMAIL |

PART 21 REPORT - PRIMARY CLOSE LATCH FAILED TO MEET SPECIFICATION IN K-LINE CIRCUIT BREAKERS

The following is a summary of a fax received from ABB Inc.:

"[ABB Inc. is reporting a] failure to comply with specifications associated with primary close latch, part number 716611K02, used in K-Line 225 to 2000 amp continuous current low voltage electrically operated Model 7 circuit breakers. It does not affect previous models of these same breakers that have not been upgraded to include the interlocking primary and secondary close latches. It does not affect manually operated K-Line breakers or K3000/4000 circuit breakers."

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