



Document Control Desk  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

15 January, 2001

Subject: Notification of Potential Defect per 10CFR Part 21  
Control Device for HK and K-Line Circuit Breakers

Notification by: ABB Power T&D Company, Inc.  
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In December 1998, Sequoyah Nuclear Plant (Chattanooga, TN) experienced a failure to close of a 7.5HK500/1200 Medium Voltage circuit breaker (Serial Number 48672-A101-1-3B) manufactured 3/30/1973. The cause of the breaker failure as determined by TVA was a failure of the Control Device (Part Number 191921T06). Specifically, a movable contact within the Control Device was found to have a broken spring retainer, which is a protuberance holding the return spring in place on the contact. This broken spring retainer allowed the spring to move out of its intended position, causing failure of the control contacts to make and break properly. This occurrence was documented and evaluated by the Tennessee Valley Authority Central Laboratories & Field Testing Service in their Technical Report #99-0550 on 11 February 1999.

On February 29, 2000, Catawba Nuclear Station (York, SC) experienced a failure to close of a 5HK250/1200 Medium Voltage circuit breaker (Serial Number 50465F-1-10186) manufactured 3/28/1979. The cause of the breaker failure as determined by Duke Power and ABB Florence was similar to the failure reported by TVA in 1998. Material analysis of the failed movable contact concluded that the material for the contact was correct to that specified. A dissected profile analysis of the failed contact revealed that the material at the base of the spring retainer on the movable contact was thin and failed due to fatigue. This failure was documented and evaluated by Duke Engineering Testing and Laboratory Services in their Metallurgical Analysis Report #2624 on 29 March 2000.

On October 30, 2000, during a routine inspection of a Control Device on a 7.5HK500/1200 Medium Voltage circuit breaker (Serial Number 50464L-2-07210)



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manufactured 2/29/1979, Catawba Nuclear Station found a movable contact that had failed in a similar manner as the other two previously reported. This failure was documented and evaluated by Duke Engineering Testing and Laboratory Services in their Metallurgical Analysis Report #2726 on 01 November 2000.

The cause of these three failures was fatigue of the metal at the base of the spring retainer on the movable contacts, due to insufficient metal mass at the base of the retainer. The spring retainer on the contact is formed with a die by punching the movable contact from the opposite side of the electrical contact mounting location during fabrication. The height of the spring retainer, therefore, determines the amount of material left at the base.

Corrective action for this incident has been taken. After further investigation, ABB Florence has determined that the height of the spring retainer was changed in September 1979 to a lower specification, leaving more material at the base of the spring retainer. The movable contact formed with the greater spring retainer height specification prior to 1979 has a small possibility of failure as discussed above. There have been no other reports of movable contact failures.

There have been only these three reports of this movable contact failure since the control device was introduced to the market in 1960. Since its introduction, more than 22,000 control devices have been produced for both HK and K-line type circuit breakers, each with 5 movable contacts. ABB therefore believes this problem is not significant enough to require immediate action from users. However, we recommend that control devices older than 1981 be replaced with new control devices on both HK and K-line breakers at the next scheduled maintenance of the breaker.

ABB will notify all customers who purchased this product.

Any questions concerning this notification should be directed to Darall Harris or Phillip Thompson at 843-665-4144.

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