



Albert F. Kaiser  
President

May 6, 1988

Mr. Carl Berlinger, Branch Chief  
Office of Generic Communications  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Subject: Part 21 Report  
ASEA BROWN BOVERI  
Power Distribution Inc.  
K-Line Low Voltage Circuit Breakers  
With High Instantaneous Trip SS-5G and SS-5

Gentlemen:

There is a potential deficiency in the high instantaneous circuitry of the solid state trip device of the ASEA BROWN BOVERI, Power Distribution, Inc. low voltage K-Line circuit breakers. This condition exists only in circuit breakers equipped with an extended instantaneous pickup trip setting of 24 multiples of per unit current.

These units are installed in some K-Line circuit breakers at CEI Perry Unit 1 in Cleveland, Ohio and, P.S.E.&G. Salem Units 1 and 2 in Hancocks Bridge, New Jersey.

Some of the circuit breakers that were supplied by ABB to these stations were ordered with the extended instantaneous pickup setting, sometimes referred to as Hi-Inst. During field testing of these units at C.E.I., using single pole low voltage primary test currents, the measured operating time delay intervals were noted to have exceeded the specified limits when higher than standard multiples of test current were applied. A summary of the testing revealed that single phase current levels in the range of 10 KA and above, when applied to a 225 ampere rating, resulted in excessive time intervals. Follow-up factory testing by ABB demonstrated similar results. Three phase response is not affected and will have correct timing.

The 'standard testing method' requires that the test values of input current be a prescribed multiple of 1.5 times the instantaneous tap setting. Factory testing performed in accordance with the standard procedures results in satisfactory operation. However when higher multiples of current are used the misoperation as noted above was observed.

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These higher levels of current may occur on systems with a capability of producing them. It has been determined that the Perry system has the capacity of the higher levels. When the higher levels are reached, a condition can occur in which the instantaneous trip function of the circuit breaker will not respond in accordance with the published curves. As such, the fault current can persist for an increased interval before the circuit breaker backup function will clear the fault.

In the worst case this condition will cause a temperature rise of the circuit breaker current conductors such that the main contacts may weld. This could prevent the circuit breaker from opening. This is not likely to result in fire or mechanical damage to the equipment.

All of the circuit breakers are equipped with backup trip functions that will actuate a trip operation independently of the instantaneous feature. These backup functions are capable of sensing overload and fault currents, but by design requirements will operate at longer time intervals. These backup functions also have an adjustable feature to increase or decrease the operating time intervals. The response time of the backup function can be decreased by setting the adjustable feature to a minimum time band.

At the present time, it appears that the values of some of the components in the instantaneous trip circuit will need replacement. Efforts are being made to further define the quantity and type of components parts that may need to be replaced.

There are approximately 30 circuit breakers at Perry Unit 1 and 56 at Salem Units 1 & Unit 2. This includes the non safety related breakers as well as the safety related 1E breakers.

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