

Part 21 (PAR)

Event # 47818

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County:	License #:		
State: SC			
NRC Notified by: DAVID BROWN	Notifications:	BLAKE WELLING	R1DO
HQ Ops Officer: CHARLES TEAL		GERALD MCCOY	R2DO
Emergency Class: NON EMERGENCY		DAVID HILLS	R3DO
10 CFR Section:		VINCENT GADDY	R4DO
21.21(d)(3)(i) DEFECTS AND NONCOMPLIANCE		PART 21 GROUP	EMAIL

PART 21 REPORT - HK CIRCUIT BREAKER STUDS FAILED TO MEET SPECIFICATION

"This letter is submitted in accordance with 10 C.F.R. 21.21(d)(3)(ii) with respect to a failure to comply with the specifications associated with two studs P/N 163392A00 and 192247A00 used in medium voltage HK circuit breakers that may be subject to failure due to hydrogen embrittlement due to incorrect processing during plating. These studs were manufactured at the ABB Medium Voltage Service facility in Florence, SC from steel rod, heat treated in-house, and then sent to Surtronics for zinc plating with chromate treatment, including hydrogen embrittlement relief baking immediately following plating. A total of 51 pieces of P/N 163392A00 and 104 pieces of P/N 192247A00 were plated by Surtronics."

JEI9
NRR



April 9, 2012

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

Subject: 10CFR Part 21 Notification of Deviation re. HK Circuit Breaker Studs

This letter is submitted in accordance with 10 C.F.R. § 21.21(d)(3)(ii) with respect to a failure to comply with the specifications associated with two studs P/N 163392A00 and 192247A00 used in medium voltage HK circuit breakers that may be subject to failure due to hydrogen embrittlement due to incorrect processing during plating. These studs were manufactured at the ABB Medium Voltage Service facility in Florence, SC from steel rod, heat treated in-house, and then sent to Surtronics for zinc plating with chromate treatment, including hydrogen embrittlement relief baking immediately following plating. A total of 51 pieces of P/N 163392A00 and 104 pieces of P/N 192247A00 were plated by Surtronics.

1. Notifying individual: Jay Lavrinc, Vice President & General Manager, ABB (Medium Voltage Service), 2300 Mechanicsville Road, Florence, SC 29501
2. The identification of the subject component is as follows: ABB P/N 163392A00 stud and 192247A00 stud. These studs are used in truck assemblies for large frame (7.5 and 15) HK circuit breakers and in TVA refurbishment kits. The 163392A00 and 192247A00 studs are used to hold the puffer piston pivot bracket in place.
3. Nature of the deviation: Two of five refurbished HK circuit breakers provided to TVA incurred damage to the 163392A00 studs during the receiving inspection. TVA provided notice of this damage to ABB on March 22, 2012. The damaged studs were provided to a material analysis lab (Element Material Technology) for failure analysis on April 2, 2012. On April 4, 2012, Element Material Technology provided a report of failure to ABB and ABB reviewed the same on April 4, 2012. The failure of the breaker studs appears to have been caused by hydrogen embrittlement, and therefore it is believed that there was a failure to comply with the baking portion of the specification which sets forth certain baking parameters in order to protect the studs against hydrogen embrittlement. Extent of condition testing performed internally by ABB indicated that P/N 192247A00 may also be subject to hydrogen embrittlement due to being finished in conjunction with the same production run.
4. The function of these studs is to hold the puffer piston pivot bracket in place and allow proper air flow direction. The safety related function of the puffer assembly is the creation of an airflow through the puffer nozzle when the circuit breaker is opened. The air flow is directed between the arcing contact and the stationary contact so as to propel the arc up into the arc chute assembly. Failure to provide proper air flow could cause damage to the arcing contact

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assembly. The failure of a proper airflow could cause damage to the contacts due to prolonged arcing and subsequent high resistance in the contact assembly, however the breaker will still operate. ABB's recommendation is to review the suspected parts during the next planned service interval.

5. Corrective actions include:

- a. Notification of the potential existence of this deviation to affected customers (Action to be complete May 3, 2012).
- b. Review historical procurement and inspection records associated with the subject parts. Objective evidence from ABB inspections indicates all characteristics confirmed including hardness and dimensions, including verification of vendor finishing times. (Action complete)
- c. Removed all P/N163392A00 studs (quantity of 7) from inventory. Four of 7 were provided to Element Materials Technology for material analysis and destructive testing. Their report indicated satisfactory material, hardness, tensile strength and grain structure. (Action complete)
- d. Confirmed that no inventory of P/N 192247A00 was available for testing. (Action complete)
- e. Notified Surtronics of the above failure to comply issues and established that ABB will perform a process audit during the next finishing production run for replacement parts 163392A00 and 192247A00. (Action to be completed by April 20, 2012)

Because of the large potential variety of usages for the affected circuit breakers, ABB (Medium Voltage Service) cannot determine if the potential for a substantial safety hazard exists at any licensee's facility if premature failure of these studs occurs. Licensees are requested to evaluate the history of circuit breaker operating cycles to determine if the circuit breaker studs should be replaced immediately, or to perform the replacement at the next convenient maintenance opportunity.

Very truly yours,

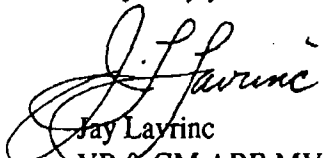

Jay Layrinc
VP & GM ABB MVS

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