

General Information or Other (PAR)

Event # 44896

Rep Org: ABB INC.	Notification Date / Time: 03/11/2009 15:52 (EDT)
Supplier: ABB INC.	Event Date / Time: 03/11/2009 (EDT)
	Last Modification: 03/11/2009
Region: 1	Docket #:
City: Florence	Agreement State: Yes
County:	License #:
State: SC	
NRC Notified by: TERRY MALLOY	Notifications: ANTHONY DIMITRIADIS R1
HQ Ops Officer: DAN LIVERMORE	REBECCA NEASE R2
Emergency Class: NON EMERGENCY	JULIO LARA R3
10 CFR Section:	THOMAS FARNHOLTZ R4
21.21 UNSPECIFIED PARAGRAPH	

PART 21 NOTIFICATION - DEFECTIVE HK AND K-LINE CIRCUIT BREAKER TENSION SPRINGS

The identification of the subject component is as follows: ABB P/N 716359A00 Tension Spring. These springs are used in both HK (Medium Voltage) and K-Line (Low voltage) circuit breakers. In the HK breaker, the spring is used on the racking mechanism to position the racking mechanism interlocking latch. In the K-Line circuit breaker, the spring resets the prop latch mechanism following a circuit breaker trip. Circuit breakers and spare parts procured from ABB between 04/23/2008 and 02/27/2009 may have suspect springs installed.

Nature of the deviation: Micro-cracks in the base of the hooked end of the springs may result in failure of the springs after repetitive cycles. A broken spring could potentially affect the ability of a K-Line or HK breaker to reset and close after an opening operation. Initial report of the nonconformance was generated on 02/11/2009 (NCR #68999JL), reporting that springs failed during mechanical life testing being performed on a K-Line breaker. These springs failed after approximately 2,800 cycles each.

Given the large number of applications 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 a similar failure of the tension spring occurs. Licensees are requested to evaluate the history of inspections, maintenance practices, and circuit breaker operating cycles for K-Line breakers, and racking cycles for HK breakers to determine if the circuit breaker spring should be replaced immediately or at the next convenient maintenance opportunity. ABB recommends that any suspect spring with greater than 1,400 operating cycles be replaced as soon as possible.

Currently ABB is determining the affected licensees and will notify them on or about March 30, 2009.

JE20
IE19



March 11, 2009

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

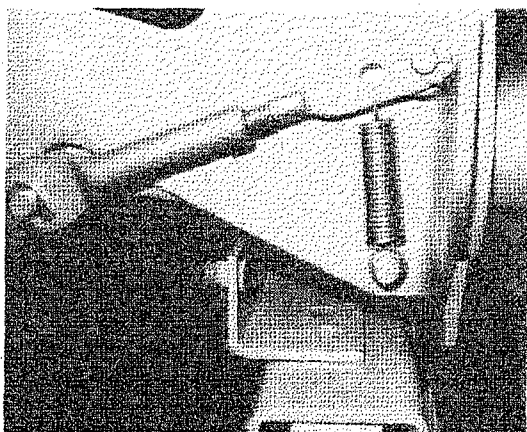
Subject: 10 C.F.R. Part 21 Notification of Deviation re. P/N 716359A00 Tension Springs

Dear Sir or Madam:

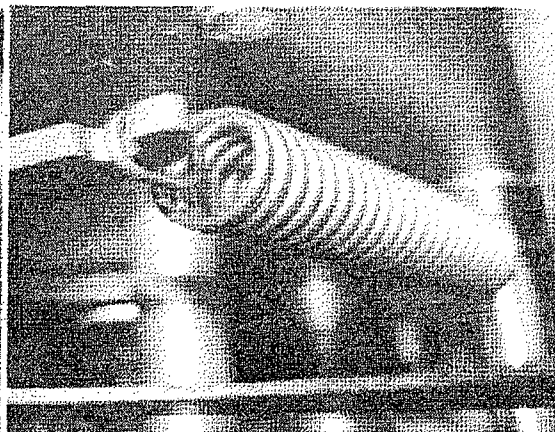
This letter is submitted in accordance with 10 C.F.R. § 21.21(d)(3)(ii) with respect to a failure to comply with specifications associated with P/N 716359A00 Tension Springs procured as a commercial grade item from Ace Wire Spring and Form, Inc., and dedicated by ABB from a Production run of 1215 pieces produced April 18, 2008. The information below is provided in order to meet the specific reporting requirements set forth in 10 C.F.R. § 21.21(d)(4).

The notifying individual is Mr. Kelly Welborn, Plant Manager, ABB Inc., 2300 Mechanicsville Road, Florence, SC 29501.

The identification of the Subject component is as follows: ABB P/N 716359A00 Tension Spring. These springs are used in both HK (Medium Voltage) and K-Line (Low Voltage) circuit breakers. In the HK breaker, the spring is used on the racking mechanism to position the racking mechanism interlock latch. In the K-Line circuit breaker, the spring resets the prop latch mechanism following a circuit breaker trip. See photos below:



HK Racking Mechanism Latch



K-Line Prop Latch Reset Arm

ABB Inc.

2300 MECHANICSVILLE ROAD
FLORENCE, SC 29501 USA

MEDIUM VOLTAGE SERVICE

PHONE (843) 413-4700
FACSIMILE (843) 413-4850



Circuit breakers and spare parts procured from ABB between 4/23/2008 and 2/27/2009 may have suspect springs installed.

Nature of the deviation: Micro-cracks in the base of the hooked end of the springs may result in failure of the springs after repetitive cycles. A broken spring could potentially affect the ability of a K-Line or HK breaker to reset and close after an opening operation. Initial report of the nonconformance was generated 2/11/2009 (NCR #68999II), reporting springs failed during mechanical life testing being performed on a K-Line Breaker. Three springs failed after approximately 2800 cycles each.

Metallurgical analysis of a failed spring concluded that the failure originated in pre-existing cracks in the bend area at the base of the fully formed round hook. Subsequent investigation at the vendor site determined that a production run in April 2008 was manufactured using a different method than prior production runs, in that the fully formed round end of the spring was made using a manual press instead of an automatic hydraulic/pneumatic press. The manual press forming cycle was significantly faster, in that the loop was formed in approximately one second, versus six seconds for the automatic press. Additionally, the manual forming operation was done after tempering and stress-relieving the spring, while the automatic forming occurred prior to tempering and stress relief.

An additional issue was identified during the investigation in that the opposite end rectangular hook had tool marks from the forming operation that could result in premature spring failure. One spring failed after 6000 cycles in the concave bend area at this end. See photo below:

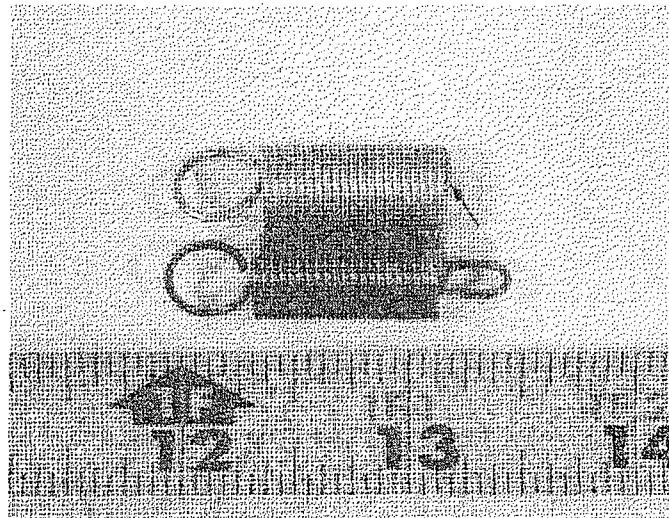


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ABB is taking, or has taken, the following corrective actions:

- a. Promptly notify affected customers of the possibility of a failure of the springs as outlined. This action is expected to be completed on or about March 30, 2009.
- b. Reviewed historical procurement and inspection records associated with the subject part and vendor and determined that no previous defects were identified in the last five years, out of nearly nine thousand units received for both commercial and safety-related applications.
- c. Worked with our vendor, Ace Wire, to determine how future incidents can be prevented and developed quality assurance means to minimize the possibility of a recurrence. As of March 9, 2009, tooling has been polished to minimize tooling marks, and the fully formed hook will be made using the automatic forming machine on future orders.
- d. A cycle test is being performed to compare springs produced before and after Ace Wire polished the hook forming tools to validate that the corrective actions are sufficient. Microscopic inspection is also being done to attempt to quantify whether the tooling marks have been reduced. The inspection is expected to be completed on or about March 30, 2009.

Given the large number of applications 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 a similar failure of the tension spring occurs. Licensees are requested to evaluate the history of inspections, maintenance practices, and circuit breaker operating cycles for K-Line breakers, and racking cycles for HK breakers to determine if the circuit breaker spring should be replaced immediately or at the next convenient maintenance opportunity. ABB recommends that any suspect spring with greater than 1400 operating cycles be replaced as soon as possible.

If you have any questions regarding this notice, please be so kind as to contact Mr. Kelly Welborn directly at 843-413-4777.

Sincerely Yours,

A handwritten signature in cursive script, appearing to read 'Kelly Welborn', is written over a horizontal line.

Kelly Welborn
Plant Manager

ABB Inc.

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FLORENCE, SC 29501 USA

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