General Information or Other (PAR) Event # 45651

Rep Org:	ABB INC. (MEDIUM VOLTAGE SERVICE)	**Notification Date / Time:**	01/23/2010 10:35 (EST)
Supplier:	ABB INC. (MEDIUM VOLTAGE SERVICE)	**Event Date / Time:**	01/23/2010 (EST)
		Last Modification:	02/05/2010
Region:	1	**Docket #:**	
City:	FLORENCE	**Agreement State:**	Yes
County:		**License #:**	
State:	SC		
NRC Notified by:	VICTOR ROMANO	**Notifications:**	MARVIN SYKES R2DO
HQ Ops Officer:	BILL HUFFMAN		GREG WERNER R4DO
Emergency Class:	NON EMERGENCY		S. PANNIER (E-MAIL) NRR
10 CFR Section:			J. THORP (E-MAIL) NRR
21.21	UNSPECIFIED PARAGRAPH		O.TABATABAI (E-MAIL) NRO

CIRCUIT BREAKER CHARGING MOTOR CRANK DOES NOT MEET HARDNESS SPECIFICATIONS

The following information was received via facsimile:

"This letter provides notification of a failure to comply with specifications associated with ABB P/N 716532C00 Motor Crank procured as a commercial grade item from Sims Machining, and dedicated by ABB from a production run of 105 pieces produced October 21, 2009. These motor cranks are used in K-Line electrically operated circuit breakers with Ryobi or Wuxi motors. The motor crank is attached to the end of an electric charging motor. When the motor rotates the crank moves the charging pawl assembly in a cyclical manner. The cyclical movement of the charging pawl assembly in turn works with the ratchet pawls and converts the rotational torque produced by the charging motor into linear spring displacement. The linear spring displacement is used to charge the closing springs in the breaker mechanism.

"Myers Control Power LLC notified ABB Florence on November 25, 2009 of a hardness test failure of motor cranks supplied by ABB for commercial applications. An evaluation was performed by ABB and noted that the required heat treatment process was not performed on a lot quantity of 105 motor cranks received October 24, 2009 from Sims Machining. Of the 105 non-heat treated motor cranks, 100 have been accounted for. Five K-Line circuit breakers procured from ABB between 10/24/2009 and 1/06/2010 may have non-heat treated motor cranks installed. Work process errors allowed non-heat treated motor cranks to be used in manufacture of K-Line circuit breakers. The motor crank is heat treated to prevent the premature wear of the crank as the roller on the crank turns around the output shaft during the charging cycle. The failure to heat treat the motor crank can cause the output shaft of the crank to wear. This will result in the misalignment of the spring charging components or ultimate failure of the spring charging system during the charging cycle, leading to the inability to close the breaker more than once.

IE19
NRR

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

a. Notification of the potential existence of this deviation to affected customers (to complete 1/31/2010).
b. Review historical procurement and inspection records associated with the subject part, vendor and similar machined parts requiring heat treatment. (Action complete - no previous heat treatment process errors identified for both commercial and safety-related applications.)
c. Follow-up with Sims Machining to determine how future incidents can be prevented and other actions warranted to prevent recurrence. (Action complete - Vendor requires certificate of heat treatment prior to sending to approved supplier for plating services.)
d. Remove all non-heat treated motor cranks from inventory and work in progress for rework. (Action complete - 99 of 105 affected motor cranks reworked and 1 motor crank maintained for life cycle testing resulting in 5 suspect motor cranks escaping facility.)
e. Revise inspection process instructions to ensure heat treatment is identified as a critical characteristic for verification (to complete by 1/25/2010).
f. A cycle test is being performed to determine level of premature wear due to non-heat treatment. Results expected to be complete by 1/31/2010.

"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 premature failure of the motor crank occurs. Licensees are requested to evaluate the history of circuit breaker operating cycles to determine if the circuit breaker motor crank should be replaced immediately, or to perform the replacement at the next convenient maintenance opportunity."

The HOO spoke to the point of contact for ABB on this issue and determined that the only two reactor licensees likely to have one of these discrepant breakers are Palo Verde and Surry.

* * * UPDATE FROM VICTOR RAMOMO TO JOHN KNOKE AT 1344 EST ON 2/5/10 * * *

"ABB has taken the following corrective actions:

"a. Notification of the potential existence of this deviation to affected customers. (Action complete - notification letters sent 2-1-20 I0)

b. Review historical procurement and inspection records associated with the subject part, vendor and similar machined parts requiring heat treatment. (Action complete - no previous heat treatment process errors identified for both commercial and safety-related applications)

c. Follow-up with Sims Machining to determine how future incidents can be prevented and other actions warranted to prevent recurrence. (Action complete - Vendor requires certificate of heat treatment prior to sending to approved supplier for plating services)

d. Remove all non-heat treated motor cranks from inventory and work in progress for rework. (Action complete - 99 of 105 affected motor cranks reworked and I motor crank maintained for life cycle testing resulting in 5 suspect motor cranks escaping facility)

e. Revise inspection process instructions to ensure heat treatment is identified as a critical characteristic for verification. (Action complete)

f. A cycle test is being performed to determine level of premature wear due to non-heat treatment. (Action complete)

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"Mechanical life testing of two non-heat treated motor cranks for premature wear was completed. The first crank was measured prior to being installed on the breaker. The output shaft of the crank was measured and found to be 0.370/0.371 before the test began. The breaker was stopped and the crank was removed after 2500, 7500, 10,000 and 12,500 operations. The output shaft was measured and the threaded end of the crank that screws onto the output shaft of the motor was inspected. There was no measurable/noticeable wear in either location.

"The second crank was measured and installed on the breaker. The output shaft on the crank was measured and found to be 0.370/0.371 before the test began. The breaker was stopped and the crank was removed and measured after 2500,7500, 10,000, 12,500 and at 14,500 operations. No wear was measured during or after the test as a result of thee accumulated operations. The output shaft was measured and the threaded end of the crank that screws onto the output shaft of the motor was inspected. There was no measurable/noticeable wear in either location. After 10,000 operations it was noted in both cases that the body of the crank showed signs of wear where it comes into contact with the charging assembly. This wear was present as a result of the lack of heat treatment.

"The wear that was documented during the testing of the motor cranks should not be detrimental to the operation of the breakers. Both of the motor cranks completed the number of mechanical life operations required for certification to the ANSI standard, 12,500. It is recommended that the cranks in question be replaced during the next scheduled availability for the customers affected by this issue."

Notified R4 DO (Vincent Gaddy), R2DO (David Ayers), Part 21 Group (email)

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ABB

February 5, 2010

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

Subject: Amended Report 10CFR Part 21 Notification of Deviation re. P/N 716532C00 Motor Crank

Dear Sir or Madam:

This amended report is submitted to provide the list of affected utilities who may have received a suspect component, to report results of life cycle testing of non-heat treated motor cranks, and to update status of corrective actions detailed in the original notification.

The notifying individual is Mr. William Conlon, General Manager, ABB Inc. (Medium Voltage Service), 2300 Mechanicsville Road, Florence, SC 29501.

Identification of the subject component is as follows: This letter provides notification of a failure to comply with specifications associated with ABB P/N 716532C00 Motor Crank procured as a commercial grade item from Sims Machining, and dedicated by ABB from a production run of 105 pieces produced October 21, 2009. These motor cranks are used in K-Line electrically operated circuit breakers with Ryobi or Wuxi motors. The motor crank is attached to the end of an electric charging motor. When the motor rotates the crank moves the charging pawl assembly in a cyclical manner. The cyclical movement of the charging pawl assembly in turn works with the ratchet pawls and converts the rotational torque produced by the charging motor into linear spring displacement. The linear spring displacement is used to charge the closing springs in the breaker mechanism.

Myers Control Power LLC notified ABB Florence on November 25, 2009 of a hardness test failure of motor cranks supplied by ABB for commercial applications. An evaluation was performed by ABB and noted that the required heat treatment process was not performed on a lot quantity of 105 motor cranks received October 24, 2009 from Sims Machining. Of the 105 non-heat treated motor cranks, 100 have been accounted for. Five K-Line circuit breakers procured from ABB between 10/24/2009 and 1/06/2010 may have non-heat treated motor cranks installed. Work process errors allowed non-heat treated motor cranks to be used in manufacture of K-Line circuit breakers. The motor crank is heat treated to prevent the premature wear of the crank as the roller on the crank turns around the output shaft during the charging cycle. The failure to heat treat the motor crank can cause the output shaft of the crank to wear. This will result in the misalignment of the spring charging components or ultimate failure of the spring charging system during the charging cycle, leading to the inability to close the breaker more than once.

ABB Inc.

2300 MECHANICSVILLE ROAD
FLORENCE, SC 29501 USA

MEDIUM VOLTAGE SERVICE

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

ABB

ABB has taken, the following corrective actions:

a. Notification of the potential existence of this deviation to affected customers. (Action complete – notification letters sent 2-1-2010)
b. Review historical procurement and inspection records associated with the subject part, vendor and similar machined parts requiring heat treatment. (Action complete – no previous heat treatment process errors identified for both commercial and safety-related applications)
c. Follow-up with Sims Machining to determine how future incidents can be prevented and other actions warranted to prevent recurrence. (Action complete – Vendor requires certificate of heat treatment prior to sending to approved supplier for plating services)
d. Remove all non-heat treated motor cranks from inventory and work in progress for rework. (Action complete – 99 of 105 affected motor cranks reworked and 1 motor crank maintained for life cycle testing resulting in 5 suspect motor cranks escaping facility)
e. Revise inspection process instructions to ensure heat treatment is identified as a critical characteristic for verification. (Action complete)
f. A cycle test is being performed to determine level of premature wear due to non-heat treatment. (Action complete)

Mechanical life testing of two non-heat treated motor cranks for premature wear was completed. The first crank was measured prior to being installed on the breaker. The output shaft of the crank was measured and found to be 0.370/0.371 before the test began. The breaker was stopped and the crank was removed after 2500, 7500, 10,000 and 12,500 operations. The output shaft was measured and the threaded end of the crank that screws onto the output shaft of the motor was inspected. There was no measurable/noticeable wear in either location.

The second crank was measured and installed on the breaker. The output shaft on the crank was measured and found to be 0.370/0.371 before the test began. The breaker was stopped and the crank was removed and measured after 2500, 7500, 10,000, 12,500 and at 14,500 operations. No wear was measured during or after the test as a result of the accumulated operations. The output shaft was measured and the threaded end of the crank that screws onto the output shaft of the motor was inspected. There was no measurable/noticeable wear in either location. After 10,000 operations it was noted in both cases that the body of the crank showed signs of wear where it comes into contact with the charging assembly. This wear was present as a result of the lack of heat treatment. See photo of wear pattern of motor crank in photo below.

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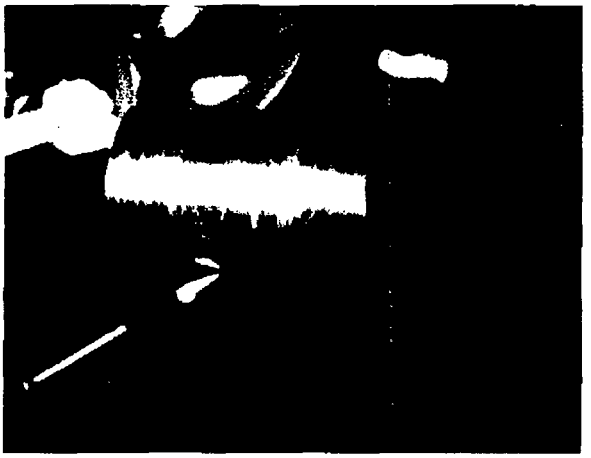
ABB



The wear that was documented during the testing of the motor cranks should not be detrimental to the operation of the breakers. Both of the motor cranks completed the number of mechanical life operations required for certification to the ANSI standard, 12,500. It is recommended that the cranks in question be replaced during the next scheduled availability for the customers affected by this issue.

If you have any questions regarding this notice, please be so kind as to contact the quality manager, Mr. Victor Romano, directly at 843-472-0511.

Very truly yours,

W T Conlon

William Conlon
General Manager

ABB Inc.

2300 MECHANICSVILLE ROAD
FLORENCE, SC 29501 USA

MEDIUM VOLTAGE SERVICE

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

Customer	Order	Qty	Material Number	Date Shipped	1E Safety Related	Serial Number
Dominion Surry	RN25494	2	KL06E10160	11/20/2009	Yes	1VAFKRN25494001J09 1VAFKRN25494002J09
Dominion Surry	RN25494	2	KL06E10165	11/20/2009	Yes	1VAFKRN25494003J09 1VAFKRN25494004J09
Dominion Surry	RN25494	2	KL06E10166	11/20/2009	Yes	1VAFKRN25494005J09 1VAFKRN25494006J09
TVA	TVA5156	1	KLS5M99004	11/19/2009	No	1VAFKTVA5156001I09
APS	PH28529	2	KLS6E90171	12/9/2009	Yes	1VAFKPH28529001J09 1VAFKPH28529002J09
APS	PH28528	2	KLS6E90176	12/28/2009	Yes	1VAFKPH28528001J09 1VAFKPH28528002J09
APS	PH28616	2	KLS6E90177	12/31/2009	Yes	1VAFKPH28616001K09 1VAFKPH28616002K09
APS	PH28616	2	KLS6E90177	1/6/2010	Yes	1VAFKPH28616003K09 1VAFKPH28616004K09
Dominion Surry	RN25494	2	KLS6E90178	11/20/2009	Yes	1VAFKRN25494007J09 1VAFKRN25494008J09
APS	PH28614	2	KLS6E90179	12/29/2009	Yes	1VAFKPH28614001K09 1VAFKPH28614002K09
APS	PH28624	4	KLS6E90181	12/28/2009	Yes	1VAFKPH28624001L09 1VAFKPH28624008L09 1VAFKPH28624012L09 1VAFKPH28624015L09
APS	PH28624	1	KLS6E90181	12/16/2009	Yes	1VAFKPH28624016L09