

Part 21 (PAR)

Event # 49940

<b>Rep Org:</b> UNITED CONTROLS INTERNATIONAL	<b>Notification Date / Time:</b> 03/21/2014 08:46 (EDT)
<b>Supplier:</b> UNITED CONTROLS INTERNATIONAL	<b>Event Date / Time:</b> 03/21/2014 (EDT)
	<b>Last Modification:</b> 03/21/2014
<b>Region:</b> 1	<b>Docket #:</b>
<b>City:</b> NORCROSS	<b>Agreement State:</b> Yes
<b>County:</b>	<b>License #:</b>
<b>State:</b> GA	
<b>NRC Notified by:</b> KORINA LOOFT	<b>Notifications:</b> SCOTT SHAEFFER R2DO
<b>HQ Ops Officer:</b> CHARLES TEAL	PART 21 GROUP EMAIL
<b>Emergency Class:</b> NON EMERGENCY	
<b>10 CFR Section:</b>	
21.21(a)(2) INTERIM EVAL OF DEVIATION	

## PART 21 - SBM SELECTOR SWITCHES CONTACT ASSEMBLY UNPLANNED MANUFACTURING CHANGE

The following is an excerpt from a fax received from Unified Controls International (UCI):

"...there was a significant manufacturing process change to the General Electric SBM series switches in 2009. The high resistance across switch contacts in the GE SBM switches could lead to a failure of the switch to change state when required. Concerns have been raised regarding Tin Plated movable contacts used for make or break service and in use without protective lubrication. UCI is not capable to complete an evaluation of the affect that this change may have on in storage SBM switches or already installed SBM switches that were provided to the customers on the purchase orders listed in section [below]. UCI does not know the storage conditions, in service environmental conditions or in service cycling rates of the switches or how the each of these items may affect the change in contact resistance. Each affected customer needs to evaluate their in storage and in service switches and determine if the change in contact material could possibly create a safety hazard and effect the ability of the switches to perform in their safety related application."

The applicable purchase orders are:

Duke Energy, Purchase Orders: 131116, 133980, 147875, 129193, 130989 (Non-Safety Related), 133920, 148974 (Non-Safety Related), 152090 (Non Safety Related), 133972, 169525

Antung Trading Company, Purchase Order: PP120210

CFE, Purchase Order: 700327408

Fluor, Purchase Order: A3PB-6-0016-00Q1

IE19  
NRR

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United Controls International  
205 Scientific Drive  
Norcross, Georgia 30092  
(770) 496 1406 tel  
(770) 496 1422 fax

## ENGINEERING EVALUATION REPORT

EER-14-94013-02

Revision 0

SBM Selector Switches

Prepared By:   
Engineering

Date: 3/17/2014

Reviewed By:   
Engineering

Date: 3/20/14

Approved By:   
Quality Assurance

Date: 3/20/14

**EER-14-94013-02, Rev. 0****Revision History:**

Date	Revision	Description
03/17/14	0	Initial Issue

**1.0: Customers and Applicable Purchase Orders:**

Duke Energy, Purchase Orders: 131116, 133980, 147875, 129193, 130989 (Non-Safety Related), 133920, 148974 (Non-Safety Related), 152090 (Non-Safety Related), 133972, 169525

Antung Trading Company, Purchase Order: PP120210

CFE, Purchase Order: 700327408

Fluor, Purchase Order: A3PB-6-0016-00Q1

**2.0: Manufacturer:**

General Electric

**3.0: Part Numbers:**

16SBMA2A02S3A2K1, 16SBMA2A06S1A3K1, 16SBME4B34T1F1P1, 16SBMB3A19S1S2P1, 16SBMD2B77S3A2K1, 16SBMH2A73S3A2K1, 16SBMD3G41S1A2K1, 16SBMB3A30S1S2P1, 16SBMC3A01T1S2L1, 16SBMD2B82S1A3K1, 16SBMD3B27T1S2P1, 16SBMD3B31T1S2P1, 16SBME3A79S1S2P1, 16SBMH2A75S1A3K1

**4.0: References:**

1. General Electric Material Process E-Mail Dated 3/5/2014

**5.0: Description:**

This Engineering Evaluation is being written as a 10CFR 50, Part 21 Interim letter to document findings regarding switch failures and switch contact material of the GE SBM series of switches.

**6.0: Technical Evaluation / Analysis / Disposition:**

Duke energy returned three SBM switches, 004013-01-0002, 004013-01-0003 and 004013-01-0008 to UCI after they had failed on-site contact resistance testing. UCI performed as-found testing and determined that several contacts had resistance readings over the recommended tolerance of 0.1ohms. All three switches were loaded with their rated maximum continuous amperage for 15 minutes. After 15 minutes, the switch was actuated. This was repeated until the switches had been actuated while under load a total of 5 times. The contact resistance for all contacts was then measured and all

**EER-14-94013-02, Rev. 0****6.0: Technical Evaluation / Analysis / Disposition: (cont.)**

contacts were found to have contact resistances of less than 0.1ohms.

Further failure analysis was requested by Duke Energy to attempt to determine the cause of the high resistance failures. UCI performed material analysis of the contacts. The initial findings found oxidation and metallic tin present on the contact surface. Further testing was performed and it was determined that the contacts were tin plated silver. Duke Energy performed material testing on an older SBM switch and discovered that the contacts were silver only with no plating. It was determined on 3/3/2014 that the switch contact failures may have been due to a material issue or manufacturing process and not an isolated storage or in service condition.

United Controls International contacted General Electric to determine if the switches supplied to Duke Energy on PO 133972 were manufactured incorrectly and why the material of the contacts had changed. General Electric confirmed that the findings by UCI that the contacts are tin plated is correct. The manufacturing process of the SBM switch contact assemblies was changed in 2009 to have the entire assembly tin plated.

**7.0 Conclusions:**

Based on the above findings, there was a significant manufacturing process change to the General Electric SBM series switches in 2009. The high resistance across switch contacts in the GE SBM switches could lead to a failure of the switch to change state when required. Concerns have been raised regarding Tin Plated movable contacts used for make or break service and in use without protective lubrication. UCI is not capable to complete an evaluation of the affect that this change may have on in storage SBM switches or already installed SBM switches that were provided to the customers on the purchase orders listed in section 1.0. UCI does not know the storage conditions, in service environmental conditions or in service cycling rates of the switches or how the each of these items may affect the change in contact resistance. Each affected customer needs to evaluate their in storage and in service switches and determine if the change in contact material could possibly create a safety hazard and effect the ability of the switches to perform in their safety related application.

**8.0 Attachments:**

- 1. General Electric Material Process E-Mail, Dated 3/5/2014**

**EER-14-94013-02, Rev. 0**

**Attachment 1  
General Electric Material Process Email Dated 3/5/2014**

**EER-14-94013-02, Rev. 0****Jim Garrison**

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**From:** Statton, Jim (GE Energy Management) <James.Statton@ge.com>  
**Sent:** Wednesday, March 05, 2014 11:31 AM  
**To:** Jim Garrison; Colson, Karlos  
**Cc:** Jeannette Martin  
**Subject:** RE: SBM Switch Question

Hello Jim,

Please see comments from our designer

The SBM contacts are pure silver tips coined to a brass contact holder. Since the beginning of 2009, the process changed to have the whole assembly (contact holder and contact tip) tin plated.

However, this process does not affect the resistivity and reliability of the contacts. Both the old process and the new process are deemed equivalent.

There is no particular contact resistance value and/or tolerance that can be used for a pass/fail criteria found on the product's department published data. None of the switches product publications indicate any numerical value or tolerance for contact resistance.

Using a resistance meter to ascertain contact resistance for SB type switches is not recommended or advisable as a method to ascertain contact continuity. Any attempt to use such a meter will produce variable readings. Should resistance verification be desired the method that is recommended is to use a test circuit that includes a DC source connected to a known resistance load through the switch's closed contacts and to measure the voltage drop across the closed contacts. There is no definite value or prediction of how much this voltage drop will be but it is expected it will be a negligible value.

Regards,  
Jim

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**From:** Jim Garrison [mailto:JGarrison@unitedcontrols.com]  
**Sent:** Monday, March 03, 2014 12:10 PM  
**To:** Statton, Jim (GE Energy Management); Colson, Karlos  
**Cc:** Jeannette Martin  
**Subject:** RE: SBM Switch Question

Jim,

From talking with our customer, they believe that contacts in the SBM were of a different design. The stationary contacts being pure silver with a steel back coined to a nickel plated brass base and the moving contact being pure silver with a steel back coined to a brass base. They confirmed this through testing an old switch that they had in storage. Do you know when the material specification and process for the contacts may have changed? Please let me know, thanks.

**Jim Garrison**  
Engineering Manager  
United Controls International  
(770)-496-1406 ext. 103

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**From:** Statton, Jim (GE Energy Management) [mailto:James.Statton@ge.com]  
**Sent:** Wednesday, January 15, 2014 8:04 AM  
**To:** Colson, Karlos  
**Cc:** Jim Garrison  
**Subject:** RE: SBM Switch Question

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**United Controls International** □ 205 Scientific Dr. Norcross, GA 30092

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**UCI  
FAX TRANSMITTAL**

<b>DATE:</b>	March 21, 2014		
<b>TO:</b>	NRC OPERATIONS CENTER	<b>FROM:</b>	Korina Looff/UCI
<b>FAX:</b>	301-816-5151	<b>FAX:</b>	770-496-1422
<b>TEL:</b>	301-816-5100	<b>TEL:</b>	770-496-1406
<b>CC:</b>	Part 21 Initial Notification Report	<b>PAGES:</b>	7 with cover page

**COMMENTS:**

**I WILL FOLLOW UP AS DIRECTED TO MAKE SURE THE FAX  
TRANSMITTAL WAS RECEIVED.**

**THANK YOU,**

**KORINA LOOFT**





**10CFR21 INTERIM LETTER**

March 19, 2014

U.S. Nuclear Regulatory Commission  
Document Control Desk  
Washington D.C. 20555-0001

Subject: 10CFR21 Interim Letter, UCI Not Capable to Determine if Defect Exists  
General Electric SBM Switches

This report documents the discovery of a manufacturing change in the contact assembly of General Electric SBM series switches. At this time, UCI is unable to evaluate if this manufacturing change may have an adverse effect on the capability of the General Electric SBM switches to perform in their intended safety related application.

UCI reviewed all orders on which General Electric SBM switches have been supplied since the manufacturing change occurred in 2009. The attached report, EER-14-94013-02, Revision 0, documents the Utilities, part numbers and purchase orders that may have been affected. UCI will notify the affected Utilities to our findings.

Sincerely,

A handwritten signature in black ink that reads 'Robert B. Hale'. The signature is written in a cursive style with a large, stylized 'R'.

Robert B. Hale  
President