

Part 21 (PAR)

Event # 50013

<b>Rep Org:</b> UNITED CONTROLS INTERNATIONAL		<b>Notification Date / Time:</b> 04/09/2014 13:37 (EDT)	
<b>Supplier:</b> UNITED CONTROLS INTERNATIONAL		<b>Event Date / Time:</b> 03/25/2014 (EDT)	
<b>Last Modification:</b> 04/09/2014			
<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>	RAY POWELL	R1DO
<b>HQ Ops Officer:</b> STEVE SANDIN		MALCOLM WIDMANN	R2DO
<b>Emergency Class:</b> NON EMERGENCY		JAMES DRAKE	R4DO
<b>10 CFR Section:</b>		NRR PART 21 GROUP	EMAIL
21.21(a)(2)	INTERIM EVAL OF DEVIATION		

PART 21 - POTENTIAL DEFECT IN GENERAL ELECTRIC SB1 SWITCHES AND HEA RELAYS

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

"The purpose of this letter is to provide the NRC with a report in general conformity of the requirements of 10CFR Part 21.21. On March 19, 2013, United Controls Issued an Interim letter regarding a discovered manufacturing change in the contact assembly of General Electric SBM series switches. Since 2009, the manufacturing process of the contact assembly of the SBM switch contacts has changed to have the whole assembly (contact holder and contact tip) tin plated. This was discovered while investigating an SBM switch that failed at a customer site due to high contact resistance across closed contacts. The finding that there was a manufacturing process change in the SBM switches lead to further discussions and evaluations regarding equipment of similar design. General Electric SB1 series switches and HEA series relays use the same contact arrangement design as the SBM series switches. The contact assemblies of the SB1 switches and HEA relays are subject to the same tin plating process of the contact assembly as previously reported on the 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 SB1 switches and GE HEA relays to perform in their intended safety related application.

"UCI will notify the affected Utilities to our findings."

The affected Part Number, Utility, Order Number and Quantity is listed below:

- Part Number 12HEA61B23SX2; Utility CFE; Order 700372018; Quantity 3
- Part Number 12HEA61C236X2; Utility FPL Turkey Point; Order 02260642-34; Quantity 2
- Part Number 12HEA61C237; Utility OPPD; Order 180520; Quantity 4

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NRR

- Part Number 12HEA61C238X2; Utility OPPD; Order 180520; Quantity 3
- Part Number 12HEA61C237; Utility OPPD; Order 185929; Quantity 2
- Part Number 12HEA61C237X2; Utility OPPD; Order 188314; Quantity 2
- Part Number 12HEA63C239X2; Utility FPL St. Lucie; Order 02260642-41; Quantity 8
- Part Number HEA61C234X2; Utility Antung; Order PP100204; Quantity 2
- Part Number HEA61C244X2; Utility OPPD; Order 179664; Quantity 5
- Part Number HEA61C241X2; Utility OPPD; Order 179664; Quantity 2
- Part Number HEA63C239X2; Utility FPL St. Lucie; Order 02260642-103; Quantity 3
- Part Number 12HEA61C238X2; Utility OPPD; Order 194686; Quantity 4
- Part Number 16SB1BB339STS2P; Utility Duke Oconee; Order 156606; Quantity 11
- Part Number 165BIFB2C85SWM2Y; Utility Nextera Seabrook; Order 2259825-3; Quantity 1
- Part Number 16SB1LB2C01LSM2P; Utility CFE; Order 700327408; Quantity 3

Utility CFE is the Comisión Federal de Electricidad (Mexico) and Utility Antung is located in Taiwan.

"If you have any questions or wish to discuss this matter or this report, please contact:

Jim Garrison  
Engineering Manager, Seismic and Equipment Qualification  
JGarrison@unitedcontrols.com  
770-496-1406 X 103"

The 10CFR Part 21.21 received on March 19, 2014 is EN #49940.,

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**UCI  
FAX TRANSMITTAL**

<b>DATE:</b>	April 9, 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>	Interim letter	<b>PAGES:</b>	11 pages 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**

April 8, 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 SB1 Switches and HEA Relays

The purpose of this letter is to provide the NRC with a report in general conformity of the requirements of 10CFR Part 21.21. On March 19, 2013, United Controls Issued an Interim letter regarding a discovered manufacturing change in the contact assembly of General Electric SBM series switches. Since 2009, the manufacturing process of the contact assembly of the SBM switch contacts has changed to have the whole assembly (contact holder and contact tip) tin plated. This was discovered while investigating an SBM switch that failed at a customer site due to high contact resistance across closed contacts. The finding that there was a manufacturing process change in the SBM switches lead to further discussions and evaluations regarding equipment of similar design. General Electric SB1 series switches and HEA series relays use the same contact arrangement design as the SBM series switches. The contact assemblies of the SB1 switches and HEA relays are subject to the same tin plating process of the contact assembly as previously reported on the 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 SB1 switches and GE HEA relays to perform in their intended safety related application.

UCI will notify the affected Utilities to our findings.

Required information as per 10CFR Part 21.21(d)(4) follows:

- (i) ***Name and Address of the individual or individuals informing the Commission  
Robert Hale (or Designee)***  
President and Chief Executive Officer  
United Controls International  
205 Scientific Drive  
Norcross, GA 30092



- (ii) ***Identification of the facility, the activity, or the basic component supplied for such facility or such activity within the United States which fails to comply or contains a defect.***

General Electric SB1 series switches and HEA series relays, manufactured during 2009 and later. Note: UCI is unable to determine if the manufacturing change in 2009 is a potential defect and whether it could pose a substantial safety hazard at any U.S. licensee using such relays and switches.

- (iii) ***Identification of the firm constructing the facility or supplying the basic component which fails to comply or contains a defect.***

United Controls International  
205 Scientific Drive  
Norcross, GA 30092

- (iv) ***Nature of the defect or failure to comply and the safety hazard which is created or could be created by such defect or failure to comply.***

The manufacturing process of the contact assemblies on General Electric SB1 series switches and HEA series relays was changed in 2009. As part of the new process, the entire contact assembly (contact holder and contact tip) is tin plated. UCI is unable to evaluate if this manufacturing change could create a substantial safety hazard. UCI does not know the storage conditions, in service environmental conditions or in service cycling rates of the switches and relays or how 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 relays and determine if the change in contact material could possibly create a safety hazard and effect the ability of the switches and relays to perform in their safety related application.

- (v) ***The date on which the information of such defect or failure to comply was obtained.***

March 25, 2014



- (vi) *In the case of a basic component which contains a defect or fails to comply, the number and location of these components in use at, supplied for, being supplied for, or may be supplied for, manufactured or being manufactured for one or more facilities or activities subject to the regulations in this Part.*

Part Number	Utility	Purchase Order	Quantity
12HEA61B235X2	CFE	700372018	3
12HEA61C236X2	FPL Turkey Point	02260642-34	2
12HEA61C237	OPPD	180520	4
12HEA61C238X2	OPPD	180520	3
12HEA61C237	OPPD	185929	2
12HEA61C237X2	OPPD	188314	2
12HEA63C239X2	FPL St. Lucie	02260642-41	8
HEA61C234X2	Antung	PP100204	2
HEA61C244X2	OPPD	179664	5
HEA61C241X2	OPPD	179664	2
HEA63C239X2	FPL St. Lucie	02260642-103	3
12HEA61C238X2	OPPD	194686	4
16SB1BB339ST52P	Duke Oconee	156606	11
16SB1FB2C85SWM2Y	Nextera Seabrook	2259825-3	1
16SB1LB2C01LSM2P	CFE	700327408	3

- (vii) *The corrective action which has been, is being, or will be taken; the name of the individual or organization responsible for the action; and the length of time that has been or will be taken to complete the action.*

At this time UCI is notifying all Utilities to which it has supplied safety related HEA relays and SB1 switches to since the manufacturing process change in 2009.

- (viii) *Any Advice related to the defect or failure to comply about the facility, activity, or basic component that has been, is being, or will be given to purchasers or licensees.*

U.S. Licensees with installed or in storage SB1 switches and HEA relays should evaluate if tin plated contacts are acceptable for use in their specific installed system and location.



UNITED CONTROLS INTERNATIONAL

(ix) *In the case of an early site permit, the entities to whom an early site permit was transferred.*

Not Applicable.

If you have any questions or wish to discuss this matter or this report, please contact:

Jim Garrison  
Engineering Manager, Seismic and Equipment Qualification  
[jgarrison@untiedcontrols.com](mailto:jgarrison@untiedcontrols.com)  
770-496-1406 x 103

Sincerely,

A handwritten signature in black ink that reads "Robert B. Hale".

Robert B. Hale  
President  
United Controls International




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

## ENGINEERING EVALUATION REPORT

EER-14-94013-03

Revision 0

SB1 Selector Switches and HEA Relays

Prepared By:   
 Engineering

Date: 4/8/2014

Reviewed By:   
 Engineering

Date: 4/8/14

Approved By:   
 Quality Assurance

Date: 4/9/14



**EER-14-94013-03, Rev. 0****Revision History:**

Date	Revision	Description
04/08/14	0	Initial Issue

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

Omaha Public Power, Purchase Orders: 180520, 185929, 188314, 179664, 194686

Florida Power and Light, Purchase Orders: 02260642-34, 02260642-41, 02260642-103

Nextera, Purchase Order: 2259825-3

CFE Purchase Orders: 700372018, 700327408

Antung Purchase Order: PP100204

Duke Energy Purchase Order: 156606

**2.0: Manufacturer:**

General Electric

**3.0: Part Numbers:**

12HEA61B235X2, 12HEA61C236X2, 12HEA61C237, 12HEA61C238X2,  
12HEA61C237X2, 12HEA63C239X2, HEA61C234X2, HEA61C244X2, HEA61C241X2,  
HEA63C239X2, 16SB1BB339STS2P, 16SB1FB2C85SWM2Y, 16SB1LS2C01LSM2P

**4.0: References:**

1. General Electric Material Process E-Mail Dated 3/25/2014

**5.0: Description:**

This Engineering Evaluation is being written as a 10CFR 50, Part 21 Interim letter to document findings regarding the change of a manufacturing process of the contact assemblies of GE SB1 switches and HEA relays.

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

A prior issue was discovered due to the failure of several GE SBM switches during on-site contact resistance testing. The SBM switches failed at a customer site due to high contact resistance across closed contacts. It was determined during that investigation that the manufacturing process of the contact assemblies of the GE SBM switches had changed in 2009 to include the tin plating of the entire contact assembly (contact holder and contact tip). Further investigation determined that the same contact assembly is used on GE SB1 switches and HEA relays. Both of the items are affected by the same manufacturing process change as the GE SBM switches.

**EER-14-94013-03, Rev. 0****7.0 Conclusions:**

Based on the above findings, there was a significant manufacturing process change to the General Electric SB1 series switches and HEA series relays in 2009. The high resistance across switch contacts in the GE SB1 switches and HEA relays could lead to a failure of the switch and relay 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 SB1 switches and HEA relays or already installed SB1 switches and HEA relays 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 and relays 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 3/25/2014**

**EER-14-94013-03, Rev. 0**

**Attachment 1  
General Electric Material Process Email Dated 3/25/2014**

**EER-14-94013-03, Rev. 0****Jim Garrison**

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**From:** Statton, Jim (GE Energy Management) <James.Statton@ge.com>  
**Sent:** Tuesday, March 25, 2014 3:40 PM  
**To:** Jim Garrison; Colson, Karlos  
**Cc:** Korina Looft  
**Subject:** RE: SBM Switch Question.

Hello Jim,

The coined contact process applies to all; SBM, SB1 and HEA products.

Regards,  
Jim

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**From:** Jim Garrison [mailto:JGarrison@unitedcontrols.com]  
**Sent:** Tuesday, March 25, 2014 2:15 PM  
**To:** Statton, Jim (GE Energy Management); Colson, Karlos  
**Cc:** Korina Looft  
**Subject:** RE: SBM Switch Question

Jim,

Thank you for the answer.

Did this new manufacturing process also extend to the SB1 switches and HEA relays?

**Jim Garrison**  
Engineering Manager  
United Controls International  
(770)-498-1406 ext. 103

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**From:** Statton, Jim (GE Energy Management) [mailto: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

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**EER-14-94013-03, Rev. 0**

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

Hello Karlos,

Please see comments from our designer:

As far as I know, we have never experienced corrosion on the SBM contacts. This condition has not been reported by our customers.

The SBM contacts are not welded, instead they are coined to the base. It is what we call coining process where the silver tip contact is placed in a confined die and subjected to sufficiently high pressure to induce plastic flow on the surface of the material.

The moving contact base is made of cartridge brass (70-30) and the stationary contact base is made of tinned Cu-Zn-Sn alloy. In both cases the contact tip are made of silver .109 DIA.

Can we get a picture of these contacts?

Regards,  
Jim

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**From:** Colson, Karlos [<mailto:Karlos.Colson@Gexom.com>]  
**Sent:** Monday, January 13, 2014 3:12 PM  
**To:** Statton, Jim (GE Energy Management)  
**Cc:** Jim Garrison [[JGarrison@unitedcontrols.com](mailto:JGarrison@unitedcontrols.com)]  
**Subject:** FW: SBM Switch Question  
**Importance:** High