



**Kelvin Henderson**  
Vice President  
Catawba Nuclear Station  
803-701-4251

**Duke Energy**  
CNO1VP | 4800 Concord Rd.  
York, SC 29745

CNS-13-006

November 8, 2013

10 CFR 21.21

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

Subject: Duke Energy Carolinas, LLC (Duke Energy)  
Catawba Nuclear Station, Units 1 and 2  
Docket Nos. 50-413 and 50-414  
10 CFR 21 Notification - Identification of Defect

Pursuant to 10 CFR 21.21(d)(3)(ii), Duke Energy is providing the required written notification of the identification of a defect. This information was initially reported to the NRC Operations Center on October 10, 2013.

The attachment to this letter provides the information required by 10 CFR 21.21. In addition, the attachment discusses the relevance of this issue to Duke Energy's Catawba Nuclear Station. There are no commitments contained in this letter or its attachment.

Should you have any questions or require additional information, please contact L.J. Rudy at (803) 701-3084.

Very truly yours,

Kelvin Henderson

LJR/s

Attachment

IE19  
LJR

Document Control Desk  
Page 2  
November 8, 2013

xc (with attachment):

V.M. McCree  
Regional Administrator  
U.S. Nuclear Regulatory Commission - Region II  
Marquis One Tower  
245 Peachtree Center Ave., NE Suite 1200  
Atlanta, GA 30303-1257

J.C. Paige (addressee only)  
NRC Project Manager  
U.S. Nuclear Regulatory Commission  
Mail Stop 8 G9A  
11555 Rockville Pike  
Rockville, MD 20852-2738

G.A. Hutto, III  
NRC Senior Resident Inspector  
Catawba Nuclear Station

ATTACHMENT

10 CFR 21.21 NOTIFICATION

EATON CUTLER-HAMMER MODEL 9575H3A000 RELAYS

This notification follows the format of and addresses the considerations contained in 10 CFR 21.21(d)(4)(i)-(viii).

(i) Name and address of the individual or individuals informing the Commission:

**Kelvin Henderson, Vice President  
Duke Energy Corporation  
Catawba Nuclear Station  
4800 Concord Road  
York, SC 29745**

(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:

**The basic component which is the subject of this notification is an Eaton Cutler-Hammer Model 9575H3A000 relay, purchased commercial grade and dedicated by Duke Energy for use in nuclear safety related applications.**

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

**The affected relays were supplied as commercial grade items by Eaton Cutler-Hammer and were manufactured by an overseas manufacturer (China).**

(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 Model 9575H3A000 relay is a vendor-recommended replacement for the obsolete Model 9575H2612A relay utilized in certain safety related motor starter circuits. The replacement relay was purchased by Duke Energy as a commercial grade item and was dedicated by Duke Energy for use in safety related applications. The affected relay batch number is 1111AF (old stock). In addition, it was discovered that there is also a potentially affected batch of similar relays from 2005 (batch number 0421AF).**

**On August 5, 2013, annunciators were received for diesel generator (DG) 2B low lube oil inlet and outlet temperature. Investigation revealed that the control relay in motor control center cubicle 2EMXF F02D was not operating as expected. A work order was generated to replace the failed relay. While working the work order, a relay contact pad was found resting next to the relay. An inspection of the relay revealed that the contact pad came from the backside of the left movable contact. With the relay coil in the energized state and the contact pad missing, the relay contact would not engage. This prevented the lube oil heaters from energizing.**

**The failed relay was sent to the Duke Energy Metallurgical Laboratory. It was observed that the gold brazing material was miniscule where the pad should have been attached. The laboratory observed the same brazing issue with the adjacent relay contact/pads that were still attached on the failed relay. The material could barely be seen under the pads, whereas it should have protruded out the edges for good brazing. It was determined that the overseas manufacturer of the relays had insufficiently bonded the**

relay contact pads to the movable contact arms for at least this one known batch of relays.

The Metallurgical Laboratory analyzed relays from two newer batches and observed that the overseas manufacturer has since improved the process for attaching the contact pads, in batch numbers 1142AF and 1150AF (new stock). The process change involved using silver instead of gold to make the brazing connection of the pad to the brass contact arm. The use of gold was specific to batch number 1111AF. The use of silver is specific to batch numbers 1142AF and 1150AF. It was noted that the contact pads (both old stock and new stock) are designed to be pressed into the brass contact arm and brazed into place. Regarding the failed relay, there was an extremely small amount of gold brazing present on the loose contact pad. Additionally, the old stock pad's steel boss was thinner than the new stock pad's steel boss. The thicker steel boss of the new stock pad allows for a better press fit.

Duke Energy receipt testing on batch number 1111AF resulted in six out of ten relays failing the contact resistance measurement of less than 50 mOhms. Four of six relays failed resistance testing in 2012. The four failed relays were returned to Eaton Cutler-Hammer, who provided four new relays; two of these four new relays failed resistance testing as well. All of these relays were from batch number 1111AF. A corrective action program report was generated for each instance where relays from this batch number failed inspection, one in 2012 and one in 2013. However, at the time, these reports were not recognized as potentially reportable per 10 CFR 21 due to insufficient information being contained in them. Because the second set of relays also experienced a high failure rate, action should have been taken to evaluate this issue before releasing the remaining "passed" items into inventory for use in the plant.

Relays of this type had been installed in the DG lube oil sump tank heater and the DG jacket water heater applications for DGs 2A and 2B. Duke Energy concluded that for these two installed applications, no substantial safety hazard existed, as DGs 2A and 2B were determined to be operable. (The heaters operate while the DGs are in standby to maintain required lube oil and jacket water temperature. Failure of these heaters to automatically start would be detected by alarms and action would be taken to mitigate the condition. The heaters are not required for DG operability when the engines are running.) However, because similar relays were in inventory, they theoretically could have been utilized in other safety related applications (even though they were not actually utilized in any other safety related applications). The most significant safety related applications where the relays could have been utilized were in circuitry associated with safety related ventilation system fans. Had they been utilized in these systems, a failure could have prevented the affected ventilation system fan from starting on an actuation signal.

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

Following internal technical evaluation, Duke Energy performed the evaluations required by 10 CFR 21 and Duke Energy procedures and determined that this issue is 10 CFR 21 reportable on October 7, 2013. The responsible company officer was formally notified on October 9, 2013.

- (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:

**Catawba is the only Duke Energy facility that had any of the affected relays. Duke Energy did not sell or transfer any of the affected relays to any other utility. There were four of the potentially affected relays previously installed in safety related applications at Catawba, two from affected batch number 1111AF and two from 2005 potentially affected batch number 0421AF. All four relays have since been replaced as shown below.**

**2EMXF F02A (DG 2B Jacket Water Heater Relay (batch number 1111AF)) --**

**Replaced August 28, 2013**

**2EMXF F02D (DG 2B Lube Oil Heater Relay (batch number 1111AF)) --**

**Replaced August 27, 2013**

**2EMXE F02A (DG 2A Jacket Water Heater Relay (batch number 0421AF)) --**

**Replaced September 30, 2013**

**2EMXE F02D (DG 2A Lube Oil Heater Relay (batch number 0421AF)) --**

**Replaced September 30, 2013**

**The affected and potentially affected relays have been removed from inventory.**

- (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:

**The remaining affected and potentially affected relays were removed from use in safety related applications during the Unit 2 Fall 2013 refueling outage. None of the affected or potentially affected relays are contained in inventory. The procedure governing quality assurance receipt inspection was revised in June 2013 to require that disposition information is included in corrective action program reports if any items fail receipt inspection. This will ensure that corrective action is taken to evaluate and address the issue prior to releasing the remaining "passed" items into inventory for use in the plant. Organizations participating in the above corrective actions included Engineering, Maintenance, and Nuclear Supply Chain.**

- (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:

**Institute for Nuclear Power Operations Consolidated Event System (ICES) report number 307897 was generated concerning this issue. Following the determination that this issue is 10 CFR 21 reportable, Duke Energy made an initial notification concerning this subject to the NRC Operations Center on October 10, 2013 (Event Number 49426).**