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January 16, 2009

U.S. Nuclear Regulatory Commission  
ATTENTION: Document Control Desk  
Washington, D.C. 20555

Subject: McGuire Nuclear Station, Units 1 and 2  
Docket No. 50-369, 50-370  
Catawba Nuclear Station, Units 1 and 2  
Docket Numbers 50-413 and 50-414  
Problem Investigation Process No. M-08-06877

Pursuant to 10 CFR 21.21(d)(3)(ii), Duke Energy Carolinas LLC is providing written notification regarding the identification of a defect found in a basic component. This information was initially reported to the NRC Operations Center on December 18, 2008 (reference Event Number 44732). A revision to this initial report was reported to the NRC Operations Center on December 22, 2008.

The attachment to this letter provides the information requested by 10CFR21.21(d)(4). There are no commitments contained in this letter or its attachment.

This issue is considered to be of no significance with respect to the health and safety of the public.

Should you have any questions or require additional information, please contact Julius W. Bryant at (704) 875-4162.

Very truly yours,

Bruce H. Hamilton

Attachment

JE19  
NRC

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cc: L. A. Reyes, Regional Administrator  
U.S. Nuclear Regulatory Commission, Region II  
Sam Nunn Atlanta Federal Center  
61 Forsyth Street, SW, Suite 23T85  
Atlanta, GA 30303

J. F. Stang, Jr. (Addressee Only)  
Senior Project Manager (McGuire)  
U.S. Nuclear Regulatory Commission  
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J. B. Brady  
Senior Resident Inspector  
U.S. Nuclear Regulatory Commission  
McGuire Nuclear Station

B. O. Hall, Section Chief  
Radiation Protection Section  
1645 Mail Service Center  
Raleigh, NC 27699

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.

Bruce Hamilton  
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12700 Hagers Ferry Road  
Huntersville, NC 28078-9340

(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.

Facility:

Duke Energy Carolinas, LLC (Duke)  
McGuire Nuclear Station  
12700 Hagers Ferry Road  
Huntersville, NC 28078

Duke Energy Carolinas, LLC (Duke)  
Catawba Nuclear Station  
4800 Concord Road  
York, SC 29745

Basic component which fails to comply or contains a defect:

E-max Instruments Digital Optical Isolator (DOI)  
Model 175C180  
Duke Purchase Order 82097

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

The DOIs were commercial grade items dedicated by Duke. They were manufactured by: E-max Instruments.

- (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.

Nature of the defect:

The defective DOIs are Model 175C180, manufactured by E-max Instruments (also known as Electro-max) 13 Inverness Way, South Englewood, CO 80112. Duke is the only NRC licensee known to have been supplied Model 175C180 DOIs.

Twenty-five (25) Model 175C180 DOIs (Serial Numbers 11304 to 11328) were manufactured on November 16, 2006 and supplied to Duke under Purchase Order 82097. These DOIs are commercial grade items dedicated by Duke for its own use. Following dedication, a pre-installation bench test revealed that three (3) of these DOIs exhibited low voltage readings at their output terminals. These three DOIs were not installed. Instead, they were returned to E-Max Instruments for failure analysis. Five (5) other DOIs from the same purchase order were tested, found to be acceptable, and installed in McGuire's Standby Shutdown facility (SSF). Post-installation testing indicated that the DOI's installed on the SSF performed satisfactorily and the vendor has indicated they should continue to perform satisfactorily. Of the remaining seventeen (17) DOIs supplied to Duke under PO 82097, none of them were ever installed in the plant. One (1) was transferred to Westinghouse as part of the compatibility testing program and, if returned, will not be installed due to a loss of traceability, one (1) was presumed to have been scrapped, and fifteen (15) were returned to the vendor as part of a recall. Duke now has none of the subject DOIs remaining in stock.

Failure analysis of the three (3) DOIs which exhibited low output voltage readings was conducted by E-max Instruments. One (1) failure was determined to be attributable to a random internal failure and the other two (2) failures were attributable to a manufacturing defect with a capacitor internal to the DOIs. This defect will cause the output voltage to drop when the DOI is not energized with a very light load on the output. Duke's bench test observed this same phenomenon. E-max Instruments has revised their internal processes to prevent recurrence. At this time, Duke is the only known nuclear utility purchasing E-max Instruments Model 175C180 DOIs. The defective capacitors were only used by E-max in the Model 175C180 DOIs.

Safety hazard which could be created by such defect:

No defective E-max Instruments DOIs were ever installed at Duke. Five (5) of the twenty five (25) DOIs received by Duke via PO 82097 were tested, found to be acceptable, and installed in McGuire's SSF. Post-installation testing indicated that the DOI's installed on the SSF performed satisfactorily and the vendor has indicated they should continue to perform satisfactorily. The three (3) DOIs that

exhibited low voltage output during pre-installation bench testing were returned to the vendor for failure analysis. Of the remaining seventeen (17) DOIs supplied to Duke under PO 82097, none of them were ever installed in the plant. One (1) was transferred to Westinghouse as part of the compatibility testing program and, if returned, will not be installed due to a loss of traceability, one (1) was presumed to have been scrapped, and fifteen (15) were returned to the vendor as part of a recall. Duke now has none of the subject DOIs remaining in stock.

10CFR21 does not allow credit for pre-installation bench testing or post-maintenance testing. Therefore, this evaluation must assume that defective E-max Instruments DOIs could have been installed and placed in service. At the McGuire Nuclear Station, the Model 175C180 DOIs are only used in the SSF, where they provide isolation between safety and non-safety circuits. If installed, defective DOIs would have remained capable of performing this isolation function. However, a low output voltage resulting from defective DOIs could have affected the ability of the SSF to perform its function. The McGuire SSF provides an alternate and independent means of achieving and maintaining a hot standby condition for one or both Units following a postulated fire, sabotage or a Station Black Out event. This function is non-safety related, not required to be functional during design basis events, and is not required by McGuire Technical Specifications. Therefore, any installation of defective DOIs on the McGuire SSF would not have represented a substantial safety hazard reportable under 10 CFR 21.

As stated earlier, no defective E-max Instruments DOIs were installed at any Duke facility. However, it is possible that a defective DOI could have been transferred from McGuire to the Catawba Nuclear Station. Assuming it was installed, a defective DOI could have been utilized in a variety of nuclear safety related applications at Catawba. Although the safety hazard created by installation of a defective DOI at Catawba depends upon the application, it is possible that a train of a safety related system could have been rendered incapable of performing its design basis function. Consequentially, the postulated use of a defective DOI in one train of a Catawba safety related system concurrent with a single failure on the other train could have created a substantial safety hazard. This condition is being reported as required by 10 CFR 21.

There are no known applications for the E-max Instruments Model 175C180 DOIs at the Oconee Nuclear Station.

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

The initial station problem report (PIP M-08-06877) stated that the low voltage output problem with three (3) E-max Instruments DOIs was discovered on October 24, 2008. An evaluation was completed on December 18, 2008 which determined that these DOIs had a defect which represented a substantial safety

hazard reportable under 10 CFR 21. This information was initially reported to the NRC Operations Center on December 18, 2008 (reference Event Number 44732). A revision to this initial report was reported to the NRC Operations Center on December 22, 2008.

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

The defective DOIs are Model 175C180, manufactured by E-max Instruments (also known as Electro-max) 13 Inverness Way, South Englewood, CO 80112. The vendor has indicated that the defect is isolated to the Model 175C180 DOIs. Duke is the only NRC licensee known to have been supplied Model 175C180 DOIs.

Twenty-five (25) Model 175C180 DOIs were manufactured on November 16, 2006 and supplied to Duke under Purchase Order 82097. All twenty five (25) of these DOIs were shipped to the McGuire Nuclear Station. These DOIs are commercial grade items dedicated by Duke for its own use. Following dedication, a pre-installation bench test revealed that three (3) of these DOIs exhibited low voltage readings at their output terminals. These three (3) DOIs were not installed. Instead, they were returned to E-Max Instruments for failure analysis. Five (5) other DOIs from the same purchase order were tested, found to be acceptable, and installed in McGuire's SSF. Post-installation testing indicated that the DOI's installed on the SSF performed satisfactorily and the vendor has indicated they should continue to perform satisfactorily. Of the remaining seventeen (17) DOIs supplied to Duke under PO 82097, none of them were ever installed in the plant. One (1) was transferred to Westinghouse as part of the compatibility testing program and, if returned, will not be installed due to a loss of traceability, one (1) was presumed to have been scrapped, and fifteen (15) were returned to the vendor as part of a recall. Duke now has none of the subject DOIs remaining in stock.

- (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.

1. No defective E-max Instruments DOIs were ever installed at Duke. Five (5) of the twenty five (25) DOIs received by Duke via PO 82097 were tested, found to be acceptable, and installed in McGuire's SSF. Post-installation testing indicated that the DOI's installed on the SSF performed satisfactorily and the vendor has indicated they should continue to perform satisfactorily. The three (3) DOIs that exhibited low voltage output during pre-installation bench testing were returned to the vendor for failure analysis. Of the remaining seventeen (17) DOIs supplied to Duke under PO 82097, none of them were ever

installed in the plant. One (1) was transferred to Westinghouse as part of the compatibility testing program and, if returned, will not be installed due to a loss of traceability, one (1) was presumed to have been scrapped, and fifteen (15) were returned to the vendor as part of a recall. Duke now has none of the subject DOIs remaining in stock.

2. E-max Instruments performed a failure analysis of the three (3) DOIs which exhibited low output voltage readings. One (1) failure was determined to be attributable to a random internal failure and the other two (2) failures were attributable to a manufacturing defect with a capacitor internal to the DOIs. This defect will cause the output voltage to drop when the DOI is not energized with a very light load on the output. E-max Instruments has revised their internal processes to prevent recurrence. At this time, Duke is the only known nuclear utility purchasing E-max Instruments Model 175C180 digital optical isolators. The defective capacitors were only used by E-max in the Model 175C180 digital optical isolators.

All corrective actions are currently complete. This report contains no actions which are intended to be commitments to the NRC.

- (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.

None