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April 18, 2011

10 CFR 21.21

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

Subject: McGuire Nuclear Station  
Docket Nos. 50-369 and 50-370  
10 CFR 21 Notification - Identification of Defect  
Problem Investigation Process No.: M-11-01725

Pursuant to 10 CFR 21.21(d)(3)(ii), Duke Energy Carolinas, LLC (Duke Energy) is providing the required written notification of the identification of a defect. An initial report was made to the NRC Operations Center on March 18, 2011. The NRC assigned event number 46681 to this notification.

The attachment to this letter provides the information requested by 10 CFR 21.21(d)(4). In addition, the attachment discusses the relevance of this issue to Duke Energy's McGuire Nuclear Station (MNS). 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 P.T. Vu, MNS Regulatory Compliance, at (980) 875-4302.

Sincerely,

Regis T. Repko

Attachment

IE19  
MNR

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

Jon Thompson  
Project Manager  
U.S. Nuclear Regulatory Commission  
Office of Nuclear Reactor Regulation  
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Joe Brady  
NRC Senior Resident Inspector  
McGuire Nuclear Station

Tom Horner  
Quality Assurance Manager  
Engine Systems, Inc.  
175 Freight Road  
Rocky Mount, NC 27804

Attachment

Notification per 10 CFR 21.21 (d)(3)(ii)

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.

Regis T Repko  
Vice President  
McGuire Nuclear Station  
12700 Hagers Ferry Road  
Huntersville, NC 28078

(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 Energy)  
McGuire Nuclear Station (MNS)  
12700 Hagers Ferry Road  
Huntersville, NC 28078

Basic components which fail to comply or contain a defect:

Woodward Governors  
Supplied by Engine Systems, Inc. (ESI)

Model PG-PL, P/N 9903-569, S/N 16173399 and S/N 1788546; Duke Energy  
CID 860747, PO 106046 (ordered June 4, 2008), and Contract 125329 (executed  
October 27, 2009).

Model EGB-35P, P/N 9903-438-ESI, S/N 17213011, S/N 17218509 and S/N  
17218510; Duke Energy CID 573331, PO 133530 (ordered June 1, 2010).

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

Manufacturer:

Woodward Governor Company  
Loveland, CO 80538

Vendor/Supplier/Distributor:

Engine Systems, Inc.  
175 Freight Road  
Rocky Mount, NC 27804

(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:

When Foreign Material Exclusion (FME) plugs were removed from a new Diesel Generator governor actuator (CID 573331), to install new tube fittings and pipe nipples, paint chips were discovered in the threads and around the FME plugs. This actuator was one of three purchased, all three are new not refurbished actuators. The paint chips were located on the FME plugs or in the threads of the remote oil cooler adapter plate. The other two actuators in storage under CID 573331 were inspected and paint chips were found in the same holes, in the threads and on the FME plugs.

Two governors (CID 860747) used for the auxiliary feedwater pump Terry turbines are currently stored in the warehouse. Both components were inspected visually through the sealed bag for loose paint and/or foreign material. The oil fill cap on the top of the governor was examined, and the paint readily flaked off the cap when rubbed through the plastic bag, suggesting that this problem is a generic problem that also applies to these governors. When these paint chips flake off, as would be expected from applying pressure to remove the cap, there is a risk of introduction into the governor housing as the cap is removed, where these paint chips could then challenge the ability of the governor to adequately control the turbine speed.

Foreign material in the form of paint chips inside the hydraulic actuator does constitute a deviation from the technical requirements of the purchase document. Procurement documents gave the basic understanding that the component was being purchased for use on the emergency diesel engines. These actuators containing paint chips do not meet the cleanliness requirements for successful, trouble free operation, or use, and therefore represent a deviation from the technical requirements of the purchase order.

The authorized parts supplier for nuclear applications of Woodward governor actuators is ESI. Based on the observations of the three actuators and discussion with ESI, the apparent cause of introduction of the paint chips was the insertion of the FME plugs to cover the hydraulic connection ports, at ESI. The actuators are manufactured at Woodward, and painted before leaving the manufacturing facility. When they are painted, FME plugs are inserted in the three oil ports of the adapter plate. The actuator and plugs are all painted. When the FME plugs are removed (presumably at ESI for bench calibration) the paint is disturbed and cracks at the FME plug interface to the base metal. It was found that the paint could be easily removed with minimal effort, making it likely

that paint would become loose particles when disturbed. Bench calibration is performed at ESI during which time actual hydraulic hoses are connected to the ports. Oil is circulated within the actuator during bench calibration. When calibration is complete, the hydraulic lines are removed, red FME plugs are threaded into the ports, the entire actuator is placed in a plastic bag with desiccant for storage, and the bag is heat sealed. The component is received at MNS in a sealed bag, and maintained that way; it is not opened until needed for use. For the two actuators (CID 573331) inspected in the warehouse, the heat sealed bag was intact and had not been opened by Duke Energy. Therefore, the paint chips found within the threads of the ports were not introduced by Duke Energy; they were there when the bag was sealed at ESI.

All three of the new actuators (CID 573331) contained paint chips in the same area which indicates the same practices of FME control at the supplier led to the same results. For extent of condition, it appears any actuator painted at the Woodward facility is painted with the same paint, which is loosely adhered to the base metal. The actuators for the auxiliary feedwater pump Terry turbines stored under CID 860747 are manufactured at the Woodward facility, tested at ESI and supplied to Duke Energy.

Safety hazard which could be created by such defect:

The actuator uses hydraulic force, internally generated through pumps, to position the output shaft of the actuator. This output shaft is connected to the engine fuel racks and adjusts fuel delivery based on the actuator output. The internal workings of the actuator include extremely tight clearances and tolerances; cleanliness is critical to proper operation of the actuator. The paint chips found inside the actuator were large enough to interfere with proper operation of the actuator, and therefore proper operation of the emergency diesel generator. The actuators were not installed with the foreign material left inside; however delivery from the supplier to the customer in this condition represents a defect and it could create a substantial safety hazard were it to remain uncorrected.

ESI issued Report # 8001498-FA, Revision 0 dated February 22, 2010. This report documented an inspection of an identical Woodward governor actuator in which foreign material caused erratic operation of the actuator, and constituted a failure of the actuator to function. In this report, the erratic operation of the actuator and resulting load fluctuations of the diesel engine were a result of the foreign material entering the critical clearances and causing components to stick temporarily. The report assessed the clearances between critical components and reported the average critical clearance between components to be 0.0005 inch. There were a few orifices as well with the smallest being found at 0.028 inch.

The paint chips identified in the new actuators as supplied by the same supplier were larger than the clearances identified in their report. As dried paint chips are friable, had these pieces been left in the threaded ports, operation of the actuator could easily break the dried paint chips into many small particles, transport them

through the internals of the actuator, thereby increasing the likelihood that foreign material would enter a critical clearance and disrupt the operation of the actuator.

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

March 5, 2011 - Paint chips were discovered in the threads and around the FME plugs of the diesel engine governor actuators at MNS.

(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.

Two (2) auxiliary feedwater pump Terry turbine governors are in stock, Model PG-PL, P/N 9903-569, S/N 16173399 and S/N 1788546; Duke Energy CID 860747, PO 106046 (ordered June 4, 2008), and Contract 125329 (executed October 27, 2009).

Three (3) diesel generator governor actuators are in stock, Model EGB-35P, P/N 9903-438-ESI, S/N 17213011, S/N 17218509 and S/N 17218510; Duke Energy CID 573331, PO 133530 (ordered June 1, 2010). S/N 17213011 has been cleaned and installed in 2B diesel generator.

Duke Energy has no direct knowledge of any other governors from this vendor with potential for the same problem.

(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.

Corrective actions taken or planned:

1. March 5, 2011 - ESI was contacted regarding this problem.
2. March 6, 2011 - The governor actuator (CID 543331, S/N 17213011) was thoroughly cleaned before being installed in the 2B diesel engine.
3. March 11, 2011 - MNS Engineering determined this defect would present a significant safety hazard if uncorrected and installed.
4. March 18, 2011 - MNS Site Vice President was notified of this defect.
5. March 18, 2011 - The NRC was notified by Fax/ENS, assigned NRC Event Number 46681.
6. March 18, 2011 - ESI was notified by letter of this defect.
7. March 31, 2011 - The affected CID 543331 components were shipped back to ESI.

Attachment: Notification per 10 CFR 21.21(d)(3)(ii)

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8. April 8, 2011 - Return Good Authorization # 8001799 and # 8001800 were issued by ESI for Duke Energy to return the affected CID 860747 components to ESI.

(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.

A Nuclear Network message will be sent by Duke Energy to alert the industry of this defect.