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Oconee Nuclear Station

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July 13, 2011

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

Subject: Oconee Nuclear Station
Docket Nos. 50-269, 50-270, 50-287
NRC Event Number 46955
10 CFR 21 Notification - Identification of Defect
Kalsi Engineering Valve and Actuator Program Software Error Report
No. 2011-02

Gentlemen:

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 in the Kalsi Engineering Valve and Actuator Program software. This information was initially reported to the NRC Operations Center at 1604 EST on June 13, 2011. The NRC assigned event number 46955 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 Oconee Nuclear Station. There are no commitments contained in this letter or its attachment.

Should you have any questions or require additional information, please contact Sandra N. Severance, Oconee Regulatory Compliance, at (864) 873-3466.

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

Sincerely,


T. Preston Gillespie, Jr.
Vice President
Oconee Nuclear Site

Attachment

JEI9
NRR

Document Control Desk
July 13, 2011
Page 2

xc (w/attachment/enclosure):

Mr. Victor McCree
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U.S. Nuclear Regulatory Compliance
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Mr. Andrew Sabisch
NRC Senior Resident Inspector
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Ms. Susan Jenkins,
Director, Division of Radioactive Waste Management
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2600 Bull Street
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Mr. P. Daniel Alvarez
Quality Assurance Manager
Kalsi Engineering, Inc.
745 Park Two Drive
Sugar Land, TX 77478-2885

Attachment
Oconee Nuclear Station
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.

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Vice President
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7800 Rochester Highway
Seneca, SC 29672

(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)
Oconee Nuclear Station
7800 Rochester Highway
Seneca, SC 29672

Basic component which fails to comply or contains a defect:

KVAP (Kalsi Engineering Valve and Actuator Program) software

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

Kalsi Engineering, Inc.
745 Park Two Drive
Sugar Land, TX 77478-2885

(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 Kalsi Engineering KVAP software is used at the Oconee Nuclear Station (ONS) to determine and verify acceptable valve performance based on valve configuration. On June 7, 2011, Kalsi Engineering provided the following as a description of the error in the software for predicting valve performance:

1. KVAP provides default flow and torque coefficients for ball and plug valves using the valve inlet diameter. For some valves, the port diameter (ball ID) can be significantly smaller than the valve inlet diameter. As a result, the default flow coefficients used in the KVAP are higher than the actual flow coefficients. These result in under-prediction of the valve pressure drop and the friction torque components (bearings and dynamic seat torques). Even though the required seating and unseating torque values at the fully closed position are calculated correctly, the dynamic torque values may be under-predicted away from the seat. The hydrodynamic torque component (which begins with flow initiation) should be set to zero within the no-flow zone.
2. In some valve designs, the flow does not initiate until the obturator (disc, ball or plug) travels a noticeable distance or angle (as high as 25 degrees) from the closed position (0 degree position). In KVAP, the no-flow zone is limited to less than 5 degrees and may be unconservative for some valves. The no-flow zone can be calculated using the ball ID and the seat ID. The valve pressure drop and required torque through the no-flow zone remain nearly constant. Margin results may be affected if the minimum margin occurs at or near the no-flow zone.
3. This error can potentially affect margin predictions.

KVAP analyses with any of the following attributes are possibly affected by this error:

- Ball and plug valves with port or seat diameters smaller than the inlet diameter
- Valves with extended no-flow zones.

Safety hazard which could be created by such defect:

As a result of the Kalsi software error, the non-conservatively calculated torque values resulted in negative actuator margins for a containment isolation valve on each ONS unit, calling into question the capability of the actuators to close the valves under all design conditions.

Entry into Required Actions for Technical Specification 3.6.3, Containment Isolation Valves, for ONS Units 2 and 3, was required. The ONS Unit 1 affected valve was previously modified based on a reconciled KVAP program during the refueling outage completed on June 9, 2011.

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

On June 7, 2011, ONS received Kalsi Engineering, Inc KVAP Error Report No. 2011-2 documenting the potential defect. Combined with existing ONS evaluation, the error was determined to be a defect.

(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 affected valves are located in the respective ONS Auxiliary Buildings and are outside containment isolation valves for the Reactor Coolant System Letdown flow path. These valves were originally installed by a modification performed in 1995 and 1996 for each of the ONS units, with subsequent valve seat material changes made in 2003 and 2004.

The ONS Unit 1 valve was modified during the refueling outage completed on June 9, 2011. The other two valves for ONS Units 2 and 3 that were declared inoperable on June 2, 2011 were modified and declared operable on June 11 and 10, 2011, respectively.

(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.

Duke Energy has performed modifications to each of the affected ONS Units 2 and 3 valves. These valves were restored to operable status on June 11 and 10, 2011, respectively.

Corrective actions taken or planned:

There are no further corrective actions required.

Length of time to complete the action:

There are no further corrective actions required.

(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.

No additional actions have been identified at this time.