

January 10, 2003

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-0001

Subject: Oconee Nuclear Station - Units 1, 2 and 3  
Docket Nos. 50-269, 50-270, 50-2887  
Response to NRC Preliminary White Finding

Duke Energy Corporation (Duke) is in receipt of the referenced NRC preliminary white finding letter<sup>1</sup> and SDP Phase III Summary attachment, dated November 21, 2002. The subject letter describes one apparent violation of Technical Specification 5.4.1 concerning a failure to properly implement vendor's written instructions. The purpose of this letter is to provide information regarding Duke's investigation of this event, discuss corrective actions and provide additional clarification.

Duke acknowledges that the "black" phase electrical connector, associated with the Unit 3 HPI pump motor, was discovered to be inadequately attached to the power cable conductor. Duke has completed its root cause investigation for this event. The conclusion reached by the root cause investigation was that an inappropriate action occurred which inadvertently loosened the connector after the last performance test of this cable in April 2000. This inappropriate action made the connector susceptible to complete disconnection during repair efforts in May 2002. The root cause investigation was not able to identify any specific performance deficiency associated with the inappropriate action. Vendor instructions for the

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<sup>1</sup> NRC letter to Duke Energy Corporation, (Attn: R. A. Jones), "Oconee Nuclear Station - NRC Inspection Report 50-269/02-15, 50-270/02-15, 50-269/02-15; Preliminary White Finding" dated November 21, 2002.

installation of this type of connector specifically state that once installed, the connector may be partially unscrewed to allow for alignment during connection. This configuration could allow for connector loosening over time.

Following discovery of the problem with the "black" phase electrical connector, Duke inspected all the HPI pump emergency power cable connectors. The Unit 3 "red" phase connector was found to be loosened approximately 4-5 turns (approximately 8-9 turns are required to fully tighten the connector). No other connector problems were found. Duke has replaced all three unit's HPI pump emergency power cable electrical connectors with connectors of a different design such that they are not susceptible to the same failure mode. Additionally, Duke is planning to inspect the normal cable connectors on all three units HPI pump motors for tightness and apply tape to cables and elbows to prevent loosening.

In the Report Details, the NRC states that when disassembled, the "black" connector showed signs of heating. As part of Duke's root cause investigation, a metallurgical failure analysis was performed, including electron microscopy, spectrographic analysis and micro-structure examination of the "black" connector. The discoloration was attributed to sulfur-rich deposits formed by a chemical reaction with the surrounding rubber boot, rather than heat induced oxidation.

Also in the Report Details, the NRC stated that had it been necessary to operate the Unit 3 HPI pump, the two connectors would have overheated and failed. Duke differs with this conclusion in regard to both connectors. The connectors are rated at 200 amps and the HPI motor is rated at 74 amps. Assuming successful reassembly of the "black" connector and a partially tightened connector, the excess connector ampacity, combined with the robustness of the rubber boot would have most likely allowed normal operation of the HPI pump. Therefore it is reasonable to assume that the "red" phase connector would not have failed.

Finally, in the Report Details, the NRC has stated that the associated HPI pump motor could have been damaged due to

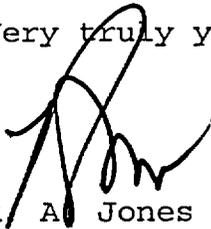
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overheating caused by an imbalance between the three electrical phases. It is Duke's position that this event would have been unlikely as the HPI pump motor ground detection relays would have actuated, protecting the HPI pump. Additionally, the other HPI pump would have been to provide flow to the Reactor Coolant System in the unlikely event that the protective relaying failed and allowed motor damage.

In conclusion, Duke has not been able to identify a specific performance deficiency which led to this event. Corrective actions have been completed to ensure this condition is not present on other HPI emergency power cables. Also, as outlined above, the Inspection Report provides information which differs with the conclusions reached by Duke's own root cause investigation.

If you have any questions or require additional information, please contact Noel Clarkson, Oconee Regulatory Compliance Group at 864-885-3077.

Very truly yours,



R. A. Jones  
Site Vice President  
Oconee Nuclear Site

Cc: L. A. Reyes, Regional Administrator  
Region II

M. C. Shannon, Senior Resident Inspector  
Oconee Nuclear Site

L. N. Olshan, Senior Project Manager  
NRR

F. J. Congel, Director, Office of Enforcement