UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET SW SUITE 23T85
ATLANTA, GEORGIA 30303-8931

June 28, 2000

SDP/EA-00-137

Duke Energy Corporation
ATTN: Mr. W. R. McCollum
Vice President
Oconee Nuclear Station
7800 Rochester Highway
Seneca, SC 29672

SUBJECT: NRC INSPECTION REPORT 50-269/00-11, 50-270/00-11 AND 50-287/00-11

Dear Mr. McCollum:

On June 8, 2000, the NRC completed a safety inspection at your Oconee facility. The enclosed report presents the results of this inspection.

The inspection was an in-office examination of Unresolved Item 50-269, 270, 287/00-04-01. The issue involved the lack of reasonable assurance that the spent fuel pool could be used as a source of water for high pressure injection in response to certain tornado events. As documented in Inspection Report 50-269, 270, 287/00-04, this issue was left unresolved pending NRC review of further information regarding the significance and underlying regulatory requirements associated with this item. Based on this review as described in the enclosed inspection report, this finding is now being characterized as an apparent violation of NRC requirements.

This issue was assessed using the applicable Significance Determination Process as an apparent significant finding that was preliminarily determined to be White. The enclosed report provides further amplification to support the NRC's preliminary significance determination. This is an issue of some increased importance to safety, which may require additional NRC inspection.

Although we believe that we have sufficient information to make our final significance determination for the issue, we are giving you the opportunity to send us your position on the finding's risk significance and the apparent violation. The bases for your position should be provided in writing. Also, please inform us if you would like to schedule a regulatory conference to discuss your evaluation and any differences with the NRC's evaluation. Accordingly, no enforcement is presently being issued for this inspection finding. Please contact Mr. C. Ogle at 404-562-4510 within 10 days of the date of this letter to inform the NRC of your intentions. If we have not heard from you in writing or regarding a conference within 14 days, we will continue with our significance determination and enforcement decision, and you will be advised by separate correspondence of the results of our deliberations on this matter.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be made publicly available.

Sincerely,

/RA/

Charles A. Casto, Director
Division of Reactor Safety

Docket Nos. 50-269, 50-270, 50-287, 72-04
License Nos. DPR-38, DPR-47, DPR-55, SNM-2503

Enclosure: Inspection Report Nos. 50-269/00-11,
50-270/00-11 and 50-287/00-11

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DEC

OFFICE	RII:DRS	RII:DRS											
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DATE	6/27/2000	6/27/2000											
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OFFICIAL RECORD COPY DOCUMENT NAME: C:\oconee11.wpd

U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos:	50-269, 50-270, 50-287, 72-04
License Nos:	DPR-38, DPR-47, DPR-55, SNM-2503
Report Nos:	50-269/00-11, 50-270/00-11, 50-287/00-11
Licensee:	Duke Energy Corporation
Facility:	Oconee Nuclear Station, Units 1, 2, and 3
Location:	7800 Rochester Highway Seneca, SC 29672
Dates:	June 8, 2000
Inspectors:	W. Rogers, Senior Reactor Analyst
Approved by:	C. Casto, Director Division of Reactor Safety

SUMMARY OF FINDINGS

Oconee Nuclear Station, Units 1, 2, and 3
NRC Inspection Report 50-269/00-11,
50-270/00-11, and 50-287/00-11

The report covered a one-day special, in-office, region-based follow up inspection of Unresolved Item 50-269, 270, 287/00-04-01: Lack of reasonable assurance that a High Pressure Injection pump could operate for the necessary time frame using the Spent Fuel Pool as the suction source following a tornado.

Cornerstone: Mitigating Systems

- White. The inspector identified an apparent violation of 10 CFR 50, Appendix B, Criterion III, Design Control, in that pressure, temperature or hydraulic requirements had not been adequately considered as design inputs for calculation OSC 3873, “Hydraulic Model of High Pressure Injection System with Suction from the Fuel Pool.” As a result, sufficient supply of primary side makeup water using the Spent Fuel Pool as the suction source to the High Pressure Injection pump was not assured following tornados of F3, F4, or F5 intensity.

Report Details

1. REACTOR SAFETY

1R21 Safety System Design and Performance Capability

(Closed) Unresolved Item 50-269,270,287/00-04-01: Lack of reasonable assurance that a High Pressure Injection pump could operate for the necessary time frame using the Spent Fuel Pool as the suction source following a tornado. Engineering analysis, including the lack of testing, did not support operation of a High Pressure Injection (HPI) pump taking suction from a Spent Fuel Pool (SFP) following tornados of F3, F4, or F5 intensity. This observation was unresolved pending a review of the significance and any underlying regulatory requirements associated with this mode of operation. The results of the inspector's review were as follows:

- Updated Final Safety Analysis Report, Section 3.1.2.2, stated in part that engineered safeguards systems, including emergency power sources were designed to performance standards that would enable the facility to withstand, without loss of capability to protect the public, the additional forces that might be imposed by natural phenomena which included tornado.

- Updated Final Safety Analysis Report, Section 3.2.2, stated that a sufficient supply of primary side makeup water is assured during a tornado initiated loss of offsite power by several backup systems. One of the backup systems was an HPI pump taking suction from the SFP. The HPI pump was to be powered from Keowee via the Auxiliary Service Water Pump Switchgear.

- Updated Final Safety Analysis Report, Section 3.2.2, further stated that protection against a tornado is an Oconee design criterion with the capability to safely shutdown all three units in that normal shutdown systems will remain available or alternate systems will be available to allow shutdown of the plant.

- 10 CFR 50, Appendix B, Criterion III, Design Control, stated in part that "Measures shall be established to assure that applicable regulatory requirements and design basis ... are correctly translated into specifications, drawings, procedures, and instructions ....Design control measures shall be applied to items such as... stress, thermal, hydraulic and accident analysis ..."

- Duke Topical Report 1-A stated that the Duke quality assurance program met the requirements of ANSI 45.2.11 - 1974, "Quality Assurance Requirements for the Design of Nuclear Power Plants."

- ANSI 45.2.11, Section 3.2.4, stated in part that design inputs included design conditions such as pressure and temperature and Section 3.2.11 stated that hydraulic requirements such as pump net positive suction head, allowable pressure drops, and allowable fluid velocities were design inputs.

- Problem Investigation Report O-98-00148 identified that calculation OSC3873, "Hydraulic Model of High Pressure Injection System with Suction from the Fuel

Pool," had not considered the effects of SFP depletion while using this operational mode, and did not include the Reactor Coolant System effects while placing the HPI pump into service, the atmospheric pressure of the Oconee site elevation or instrument error. All of these factors affect the hydraulic requirements when operating the HPI pump while taking suction from the SFP.

As discussed in the current draft version of calculation OSC-3873, "Flashing is the limiting condition on taking suction from the Spent Fuel Pool. The combination of Spent Fuel Pool temperatures and levels creates a limiting condition for the vapor pressure almost exceeding the minimum line pressure. This limiting condition was reached at seven hours in the Units 1/2 Spent Fuel Pool and six hours in the Unit 3 pool. Further draindown could lead to flashing, loss of suction, and vapor binding in the pump." Therefore, a sufficient supply of primary side makeup water could not be assured during a tornado initiated loss of offsite power event.

This situation existed after April 1, 2000. This Unresolved Item is considered an Apparent Violation (EEI) of 10 CFR 50, Appendix B, Criterion III (EEI 50-279,280,287/00-11-01).

Risk Determination

This issue was assessed in accordance with the NRC Reactor Oversight Process's Significance Determination Process (SDP). The assessment included an SDP Phase 1 Screening and a Phase 3 Risk Analysis.

The licensee's procedure for responding to a tornado that disables the primary suction water source for HPI (the Borated Water Storage Tank) requires operators to manipulate manual valves to align the HPI pump to the SFP. Step 5.4 of licensee procedure AP/1/A/1700/006, Natural Disaster, also directs operators to provide power to the HPI pump from a special electrical switchgear, which is enclosed in a tornado hardened structure. The probabilistic risk analysis (PRA) credits the SFP suction source following tornados of F2, F3, F4, and F5 intensity. However, the F2 tornado does not cause a failure of the Borated Water Storage Tank. In this case, the licensee's alarm response procedure directs operators to use the Borated Water Storage Tank re-fill procedure, OP/1,2,3/A/1104. This procedure contains eight possible flow paths for re-filling the tank. Therefore, the HPI/SFP function was only used as a modeling convenience for the F2 tornado and was not considered in this risk consideration.

The risk analysis for the tornado was performed by generating the baseline core damage frequency (CDF) and dominant cut sets from a full scope PRA model that included internal events and some external events. The baseline CDF was 6.77E-5/year, at an E-9 truncation. The dominant cut sets included F3 tornados and the HPI/SFP function, F4 tornados and the HPI/SFP function, and F5 tornados and the HPI/SFP function. The resulting CDFs were:

F3 tornado	7.95E-7/year
F4 tornado	1.67E-7/year
F5 tornado	9.50E-9/year

Total	9.53E-7/year

The basic event for this risk evaluation was event BHPOSFDHE, in which the crew fails to recover HPI suction with SFP as a suction source. The BHPOSFDHE failure probability of 6.3E-2 was modified to always being failed, and the CDF was recalculated. After extracting the F3, F4 and F5 initiating events from the solution, the associated CDFs were:

F3 tornado	3.47E-6/year
F4 tornado	2.65E-6/year
F5 tornado	1.12E-7/year

Total	6.23E-6/year

Therefore, the delta CDF is 6.23E-6/year - 9.5E-7/year = 5.28E-6/year

Based on this information, the inspector concluded that this issue was within the increased regulatory response band (white).

4. OTHER ACTIVITIES

4OA5 Management Meetings

.1 Exit Meeting Summary

The inspection results were presented to Mr. L. Nicholson and other members of licensee management at the conclusion of the inspection on June 28, 2000. The licensee acknowledged the findings presented.

The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

L. Nicholson, Regulatory Compliance Manager

ITEMS OPENED, CLOSED OR DISCUSSED

Opened

50-269,270,287/00-11-01	EEI	Hydraulic requirements had not been adequately considered as design inputs for calculation OSC 3873, Hydraulic Model of High Pressure Injection System with Suction from the Fuel Pool (1R21).

Previous Items Closed

50-269,270,287/00-04-01	URI	Lack of reasonable assurance that a High Pressure Injection pump could operate for the necessary time frame using the Spent Fuel Pool as the suction source following a tornado (1R21).