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Subject: Oconee Nuclear Station, Units 1, 2, and 3
Docket Nos. 50-269, -270, -287
Comments on Preliminary Accident Sequence Precursor Analysis of April 2000 Operational Condition

Reference 1: NRC Report, "Oconee Nuclear Station, Units 1, 2, and 3 RE: REVIEW OF PRELIMINARY ACCIDENT PRECURSOR ANALYSIS OF APRIL 2000 OPERATIONAL CONDITION," May 9, 2002.

Reference 2: Oconee Nuclear Station, Units 1, 2, and 3, Docket Numbers 50-269, 50-270, and 50-287, "Proposed License Amendment Request to Fully Credit the Standby Shutdown Facility and to Eliminate Crediting the Spent Fuel Pool to High Pressure Injection System Flow Path for Tornado Mitigation," June 7, 2002.

The subject report [Reference 1] was provided to Duke Energy Corporation (Duke) in a letter from the staff dated May 9, 2002. Duke appreciates the opportunity to review and comment on the staff's assessment of the specific deficiencies cited against the Oconee Nuclear Station (ONS) tornado mitigation systems. However as described below, Duke believes that the upcoming update to the ONS tornado licensing basis will result in risk values that are below the staff's precursor threshold.

Recently, Duke initiated an effort to modify its tornado design basis through a risk-informed license amendment request (LAR) [Reference 2] in order to establish a licensing basis that is both clear and defendable. To support this risk-informed LAR submittal, Duke undertook a significant effort to update and improve its tornado probabilistic risk assessment model to gain a better understanding of the potential effects on plant structures, systems, and components and their associated risks. This effort included a review of all major assumptions, improved human reliability analysis, improved treatment of spatial and functional dependencies, incorporation of inter-unit dependencies, additional engineering analysis of borated water storage tank (BWST) and upper surge tank

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(UST) wind capacities and many other changes. This model update also incorporates several important plant modifications and procedure changes that were implemented. Additional discussion of these changes is provided in Attachment 3 of Reference 2.

The estimated tornado core damage frequency (CDF) contribution and risk insights have changed significantly since the last major update to the tornado model in 1995 for the ONS individual plant examination of external events (IPEEE) submittal. The knowledge and insights gained through this update process clearly show that the ONS IPEEE tornado model is not adequate to conduct an accurate assessment of risk impact of the tornado mitigation issues that were present at Oconee. Because the subject ASP analysis relies heavily on the assumptions and analysis developed for the IPEEE, it is subject to most of the same shortcomings and is not considered to provide an accurate assessment of the incremental core damage probability.

Based on the results of this effort, Duke considers the actual core damage impact to be essentially zero for both Units 1 & 2 due to AC power dependencies and other system limitations that had not previously been recognized in the tornado risk analysis. Specifically, a loss of power on Unit 1 Essential Switchgear 1TC would have resulted in a loss of Keowee Auxiliary Power. Keowee emergency power back to the ASW Switchgear would then be expected to fail after approximately one hour. Additionally, a significant dependency exists between the potential failure of the AC Power System and failure of the BWST and West Penetration Room (WPR) wall. A tornado of sufficient intensity to damage the BWST is expected to have a very high conditional probability for failure of the Main Feeder Buses in the Turbine Building. Consequently, the same tornado event that would require the use of the Station Auxiliary Service Water (ASW) or High Pressure Injection (HPI) systems, could also cause a failure of emergency power to the ASW and HPI system pumps.

For a tornado strike on Unit 3, there is a higher conditional probability of survival of the Unit 1 power systems which can provide support to Keowee and to Unit 3, e.g., backup Vital Instrumentation and Control power and High Pressure Service Water systems. However, even with Unit 1 support systems available, there are significant limitations on the use of Station ASW and HPI from the spent fuel pool [Reference 2]. With consideration of these limitations and the BWST/WPR dependencies, the impact on Unit 3 incremental core damage probability is expected to be less than 1E-06.

Another issue that Duke encountered during its tornado analysis update was a problem with cut set solution error. Initially, it was observed that the total cut set frequency was not consistent with the overall tornado strike frequency and the overall failure probability of the Standby Shutdown Facility. It was further found

that employing a "Boolean solution" of the tornado fault tree model produced a CDF that is approximately 1/3 less than the cut set solution. This difference is due to limitations of the "min cut upper bound" methodology associated with the combination of basic events with high probabilities and a high level of dependency between cut sets. This issue should be investigated for the accident sequence precursor model to determine whether any error was introduced by the cut set solution technique and whether it had any significant impact on the incremental conditional core damage probability results.

Again, thank you for the opportunity to comment on the report. Inquiries on this submittal should be directed to Stephen C. Newman of the Oconee Regulatory Compliance Group at (864) 885-4388

Very truly yours,

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