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March 23, 1999

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

Subject: Duke Energy Corporation  
Oconee Nuclear Station  
Docket Numbers 50-269, -270 and -287  
Emergency Operating Procedure Program History and  
Licensing Basis

The purpose of this letter is to provide the NRC with information regarding the Oconee Emergency Operating Procedure (EOP) program and licensing basis prior to the planned EOP inspection at Oconee in 1999. The attached overview of the Oconee EOP licensing basis and history is provided in an effort to facilitate the NRC's preparation for the inspection. As outlined in the attached paper, Oconee's EOP is based on plant specific emergency procedure guidelines as opposed to the B&WOG Technical Basis Document (TBD). Thus, a deviation document against Volume 1 of the B&WOG TBD does not exist. Duke requests NRC concurrence that the planned inspection will be based on the Oconee licensing basis as described in the attached paper.

Oconee's program for developing and maintaining EOPs has been previously communicated to the NRC through several licensing submittals, and documented in several inspection reports. The attachment to this letter consolidates some of this information and describes how the Oconee EOP program meets both the NRC's regulatory requirements and the technical requirements of supporting the engineering bases of the Oconee EOP.

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If there are any questions, please contact Lee A. Keller at  
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Very truly yours,



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Attachment

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## Attachment - Oconee EOP Licensing Basis and History

### **NRC Requirements for Emergency Operating Program Upgrades**

The initial NRC requirements related to EOP upgrades were detailed in NUREG-0737, "Post-TMI Requirements," Item 1.C.1, which was dated October 31, 1980. Item 1.C.1, "Guidance for the Evaluation and Development of Procedures For Transients and Accidents," required analyses of transients and accidents, development of emergency procedure guidelines, and upgrading of emergency procedures. These requirements superceded those of earlier post-TMI requirements. In response to Item 1.C.1, the industry initiated programs to respond to these requirements. In August 1982, NUREG-0899, "Guidelines for the Preparation of Emergency Operating Procedures," was published. NUREG-0899 described in detail acceptable approaches for the industry and licensees to respond to the requirements of Item 1.C.1, and to comply with 10 CFR 50.34(b)(6)(ii) for EOPs.

On December 17, 1982, Supplement 1 to NUREG-0737 (G. L. 82-33) was issued. Supplement 1 provided clarification of several parts of NUREG-0737, including upgrade of EOPs. The requirements of Chapter 7 of Supplement 1 replaced the corresponding requirements in NUREG-0737 as related to upgrading of EOPs. The submittal of a procedures generation package (PGP), which would describe the program for upgrading EOPs, was required of all licensees. The NRC would then review all PGPs, and upgraded EOPs would be audited on a selected basis.

### **B&WOG Anticipated Transient Operating Guidelines (ATOG) Program and NRC Review**

In response to the requirements of NUREG-0737, Item 1.C.1, the B&WOG developed the ATOG approach as the emergency procedure guidelines for the B&W-designed plants. The ATOGs were engineering-level guidance documents using the "symptom-based" approach, and included guidelines to serve as an outline for EOP development. Early interactions with the NRC on the ATOG concept began in August 1979. B&W developed a plant-specific ATOG for Oconee Unit 3, as well as the sister plants. The Oconee Unit 3 ATOG was submitted to the NRC for review on March 31, 1982. Minor revisions/updates to the Oconee Unit 3 ATOG were submitted

June 15, 1982, and July 2, 1983. Although plant specific, the Oconee Unit 3 ATOG was the only one actually reviewed by the NRC.

The NRC review of the Oconee 3 ATOG produced questions beginning in December 1982. The NRC SER (G. L. 83-31) was issued on September 19, 1983. The NRC identified 29 open items in the SER, which were characterized as "major areas that should be addressed further in a longer term ATOG program." The SER did conclude that the implementation of the ATOG guidance should proceed while the open items were being addressed in the longer term, provided that the ATWS and natural circulation issues raised in the SER were addressed with the current implementation. The SER also spoke to a "maintenance process" which will involve incorporation of new knowledge, corrections, and general improvement. The NRC issued a minor supplement to the ATOG SER on December 14, 1983. The B&WOG response to the SER dated December 9, 1983 committed to resolving the SER open items.

#### **Procedures Generation Package Submittal**

In response to Supplement 1 to NUREG-0737 (GL 82-33), Duke prepared and submitted the Oconee PGP on April 14, 1983 to respond to the requirements for an EOP upgrade program. The PGP identified that the Oconee Unit 3 ATOG would be used for the initial development of the Oconee EOP, and that later revisions will be incorporated in accordance with the EOP development process. The resulting plant-specific technical guidelines were identified as the Emergency Procedure Guidelines (EPG). A key element of the EOP development process described was the EOP verification program. The EOP engineering bases associated with the accident mitigation and recovery strategies were verified by the workplace procedure RS-003, "Technical Verification of Nuclear Station Emergency Procedures and Guidelines." A copy of RS-003 was included with the PGP submittal. RS-003 described the review of vendor guidelines (ATOG), plant-specific EPG, and the station EOP. RS-003 also described the long-term maintenance and engineering verification of the EOP-related documentation.

**Implementation of ATOG Based EOPs / Development of  
Emergency Procedure Guidelines**

In parallel with the NRC review of the Oconee Unit 3 ATOG, the internal Duke engineering review of the planned implementation of the ATOG-based EOPs started. Both of these review processes identified many areas in which the ATOG guidance required refinement (note the eventual number of NRC ATOG SER open items discussed above). At this time Duke recognized that a need was developing for a living document originating from the ATOG to support the required enhancements and the long-term maintenance of the engineering guidance for accident mitigation. To meet this objective, Duke decided to develop and maintain the Emergency Procedure Guidelines (EPG) internally. The EPGs, originating from the Unit 3 ATOG, were to incorporate new knowledge, corrections, and general improvements, as required by the NRC ATOG SER. Later, the B&WOG decided to discontinue future updates to the plant-specific ATOGs. Therefore, the Oconee EPG served to bridge the gap between the discontinued plant-specific ATOG, and the future generic B&WOG Technical Basis Document (TBD). In addition, the TBD did not initially include any template for EOP development, similar to the ATOG template. For these reasons the Oconee EPG serves as a living engineering-level basis document for the Oconee EOP.

The first release of the Oconee EPG was dated December 5, 1983. The EPG included the following enhancements, many of which addressed the ATOG SER open items:

- Broader entry conditions to include events from less than power operation
- Broader identification of abnormal conditions
- Pressurized thermal shock
- Reactor vessel and hot leg voids
- Improved SGTR guidance
- Multiple event transients
- Improved ICC guidance
- High point vents operation
- Reactor vessel and hot leg level instruments utilization
- Improved natural circulation cooldown guidance
- Improved water-solid guidance

- Better coverage of component and system operating limits
- Additional details based on plant-specific design

Results of Duke thermal-hydraulic analyses were also used to improve the accident mitigation guidance. Knowledge gained from the Westinghouse Owner's Group ERGs being used for EOP development for Duke's McGuire and Catawba Nuclear Stations was considered for applicability to Oconee. Industry events and analysis results were considered for applicability to Oconee. Also, as the B&WOG issued any new accident mitigation and recovery guidance it was reviewed and, if applicable, included in the Oconee EPG and EOP.

### **EPG Setpoints**

The Oconee EPG include numerous setpoints on process parameters and other considerations that are key elements in the accident mitigation strategy. These setpoints are documented in an engineering calculation file that meets Duke's QA requirements for safety-related documents. The basis for each setpoint and its derivation are described in detail. As setpoints are revised or new ones added, the engineering calculation file is revised, reviewed, and approved.

### **Initial Implementation of Upgraded EOP / Long-Term Maintenance Program**

The upgraded EOP based on the EPG was implemented on September 13, 1985. The long-term EPG/EOP maintenance program was then initiated and has been in effect to the present. Several of the more significant EPG/EOP revisions involved NRC submittals. On December 12, 1984, Duke submitted a natural circulation cooldown approach in response to NRC G. L. 81-21. The submittal received an SER dated June 5, 1985. On June 27, 1986 a submittal was made in regard to the use of the inadequate core cooling instrumentation (i.e. subcooled margin monitor, hot leg and vessel head level instrumentation, reactor coolant pump

current indication). A NRC SER in response to this submittal was dated September 29, 1987. The majority of the EPG/EOP revisions that have occurred were initiated by the station based on operator exercises on the control room simulator.

#### **B&WOG EOP Technical Basis Document Program**

The ATOG SER list of open items and the NRC requirement for an EOP maintenance program prompted a decision by the B&WOG to develop the generic EOP Technical Basis Document (TBD). The main objective of the TBD was initially to respond to the ATOG open items. It was recognized that continuing with the plant-specific ATOG documents would be inefficient as well as uneconomical and so updating of the ATOG documents was discontinued. There was also a benefit with a generic TBD in that greater similarity in the accident mitigation guidance at the sister plants would develop. The initial release of the TBD was dated July 23, 1985. A submittal for NRC review occurred in September 1985. During the development of the TBD chapters Duke was actively involved in providing technical comments for consideration by the B&WOG. However, it must be recognized that the TBD was a generic high-level vendor guidance document that was never endorsed by Duke. The Oconee EPG continued as the engineering basis document for the Oconee EOP. In addition, the TBD did not initially include example guidelines for EOP development.

Revisions to the TBD were periodically released, with some introducing minor changes and some constituting major changes. In response to NRC requests, Revision 4 of the TBD dated December 14, 1990, included a new volume which was basically an example of how to implement the TBD guidance into an EOP format. This document entitled "TBD Volume 1 - Generic Emergency Operating Guidelines (GEOG)" is the vendor-preferred approach to implementation. In Revision 6 of the TBD dated January 9, 1992, another new volume entitled "TBD Volume 2 - GEOG Bases" was released. This volume serves as a step-by-step basis document for the GEOG. With the addition of these two new volumes, the original TBD was now designated Volume 3.

TBD Volume 3 states the following:

- The vendor guidance and bases are contained in Volume 3
- The generic nature may not optimally suit a given plant
- Volume 1 provides a functional example of how the TBD guidance can be covered in a procedure
- Volume 1 should not be used as a direct EOP model
- Volume 1 does not cover all of the options supported by Volume 3
- Volume 1 uses the vendor-preferred option
- Volume 1 does not lessen the viability of the remaining options
- Volume 1 using only one option was done solely to simplify the guideline

These statements are referred to below when the issue of deviations is discussed.

#### **NRC SER and Audit of PGP**

By letter dated June 7, 1985, the NRC issued a SER for the Oconee PGP. This SER favorably closed out NUREG-0737, Item 1.C.1. In order to assess compliance with PGP commitments, the NRC conducted an audit at Oconee in December 1986. The Oconee EPG were provided to the NRC by letter dated October 31, 1986, for audit preparation purposes as the plant-specific EOP guidelines. The NRC audit report is dated June 2, 1987. Although the audit determined that human factors and control room deficiencies existed, the audit report stated that "The technical content of the EOP was found to be consistent with the site-specific Emergency Procedure Guidelines with minor exceptions," and "the technical aspects of the Oconee EOP were exemplary." The audit report does not identify any areas other than the above two as being deficient relative to the regulatory requirements. Consequently, it is concluded that the Oconee EOP upgrade program met the NRC's expectations relative to the requirements of Supplement 1 to NUREG-0737 (GL-82-33).

#### **NRC EOP Inspection**

A NRC inspection of the EOP at Oconee was conducted between April 25 and May 5, 1988. The purpose of the inspection was

stated as being to verify the adequacy of the EOP for continued safe operation of the facility. The results of the inspection are documented in Inspection Report 88-11 dated June 28, 1988. In order to facilitate NRC preparation for the inspection, a copy of the EPG and the EPG Reference Document was provided to NRC Region II. The EPG Reference Document (EPGRD) is a reference book detailing the EPG bases. The NRC inspection report did not identify any violations or deviations. A number of findings were identified, and a response was requested. The Duke response was submitted on September 9, 1988. A follow up to this inspection was subsequently documented as Inspection Report 89-24 dated August 29, 1989.

#### **B&W Review of Oconee EOP**

A review of the Oconee EPG/EOP by B&W was performed in 1989 to provide vendor feedback on the technical guidance relative to the TBD. Duke reviewed the B&W comments and incorporated those that improved the guidance in the Oconee EPGs/EOP.

#### **Documentation of Safety-Significant Deviations and Additions**

Reviews of the B&WOG ATOG, TBD, and related documentation were performed from the inception of the EPG development program. The intent of these reviews was to identify differences between the vendor recommendations and the EPG/EOP for possible inclusion in the EPG/EOP. NRC comments and SERs were also reviewed. NRC inspections of utility EOP programs to confirm the implementation of the commitments contained in the PGPs, Information Notice 86-64 and Supplement 1 to NUREG-0737 identified industry shortcomings in the area of documenting deviations from NRC-approved generic technical guidelines.

Since the NRC approved ATOG technical guidelines for Oconee were plant-specific (not generic), no such deviation document was developed. Since the plant-specific EPG is the engineering basis for the EOP, there should be no deviations.

Prior to the NRC EOP inspection in 1988, it became apparent that the NRC expected B&W utilities to have developed a deviation document in which the differences between the TBD and the EOP were identified and justified. At this time the definition of what constituted a deviation was unclear within Duke. Duke defined a deviation as "a departure in concept between transient mitigation strategies presented in the TBD and the EPG." Using

this definition a deviation document consisting of 27 deviations was completed, relative to Revision 1 of the TBD, dated December 31, 1987. The "EPG-TBD Deviations Document" was provided to the NRC for the purposes of the 1988 EOP inspection. One additional deviation was added later on June 16, 1988. The NRC inspection report described the review that was conducted of this first version of a deviation document.

Further interactions between the NRC and the B&WOG have placed additional emphasis on the deviation document. The NRC has stated they prefer that the deviations should be relative to Volume 1 of the TBD, which is the GEOG. As stated previously (refer to the above topic B&WOG EOP Technical Basis Document Program) Volume 1 is an example of an implementation of the Volume 3 guidance in a procedure-like format, and is commonly referred to as the vendor-preferred mitigation approach. It is noted that Volume 3 includes other mitigation options, a greater level of detail, and broader guidance than Volume 1. Consequently, Duke has elected to document deviations relative to TBD Volume 3. This approach encompasses all mitigation options in the TBD. Furthermore, it must be noted that the plant-specific EPG, not the generic TBD, is the engineering basis for the Oconee EOP.

Standard Review Plan Section 13.5.2 provides information on what constitutes a deviation. On page 13.5.2-A5, deviations are identified as being "safety-significant," and either modifications, differences or additions to the approved guidelines. Specific examples included:

- Modification to the mitigation strategy
- Differences in the equipment operating criteria
- Differences in equipment operating characteristics
- Plant-specific methods, equipment, setpoints, or action levels
- Additional actions that affect the mitigation strategy
- Items not covered in the NRC-approved guidelines

Using the above guidance as to what constitutes a deviation, a revised deviations document, "Safety-Significant Deviations and Additions to the B&WOG Technical Basis Document" has been developed relative to TBD Volume 3. This document will be revised periodically as required due to changes in either the

EPG/EOP or the TBD Volume 3. Deviations are classified into one of four categories. The first category, "NRC-Approved," represents guidance which has been approved by the NRC as part of the Oconee ATOG SER or other formal licensing action, even though the guidance differs from the TBD. The second category, "NRC-Recommended," includes guidance which the NRC has recommended either formally or informally and which differs from the TBD. The third category, "Plant-Specific," includes guidance that originates based on Oconee design features that are not generic and are not discussed in the TBD. The fourth category, "Duke Power Initiative," includes mitigation and recovery approaches that differ from the TBD and were determined by Duke Power engineering staff to be enhancements to the TBD guidance.

#### Summary

The Duke Power program for the engineering basis for the Oconee EOP was developed to meet the regulatory requirements of Supplement 1 to NUREG-0737. The relevant commitments of the PGP submittal have been documented in an NRC report dated June 2, 1987. Duke has an EOP maintenance program that incorporates enhancements to the EOP as improvements are identified by the utility and within the industry. Duke participates in EOP-related activities undertaken by the B&WOG, in particular in the review and improvement of the TBD. However, the Oconee plant-specific EPG is the engineering basis for the Oconee EOP. Deviations between the EPG and the EOP should not exist. Deviations between the EPG and the TBD have been identified for the purpose of characterizing the scope of safety-significant differences between the Oconee EPG and B&WOG TBD.