October 3, 2006

MEMORANDUM TO: Evangelos Marinos, Chief
Plant Licensing Branch II-1
Division of Licensing
Office of Nuclear Reactor Regulation

FROM: George A. Wilson, Chief **/RA/**
Electrical Engineering Branch A
Division of Engineering
Office of Nuclear Reactor Regulation

SUBJECT: OCONEE NUCLEAR STATION UNITS 1, 2, AND 3 - EXIGENT TECHNICAL SPECIFICATION ONE-TIME CHANGE REQUEST TO EXTEND THE ALLOWED OUTAGE TIME FOR KEOWEE HYDRO UNIT 2 (TAC NO. MD3070, MD3071, and MD3072)

On September 27, 2006, Duke Energy Corporation (the licensee) submitted an amendment request to change the Oconee Nuclear Station Units 1, 2, and 3 Operating License. The requested changes would extend by 30 days the remaining 11 days from the 2005 outage of Keowee hydro unit (KHU2) (from 45 days to 75 days) the completion time (CT) when one KHU is not operable. The licensee requested the changes to accommodate significant repair work on the KHU2 generator rotor. The proposed changes to the Technical Specifications (TS) would revise TS 3.8.1, "AC Sources - Operating," Required Action C.2.2.5 to allow for a one time additional CT of 30 days. The licensee proposed this change as a one-time change that will expire at 1029 hours on November 03, 2006. The licensee responded to the staff's questions in a submittal dated October 2, 2006.

The proposed license amendment is needed to avoid a potential shutdown in accordance with TS 3.8.1 at the expiration of the allowed outage time (AOT), which would require all three Oconee Units to be in MODE 3 within the next 12 hours and in MODE 5 within 84 hours.

The Electrical Engineering Branch A has reviewed the proposed change related to the one-time extension of the AOT and finds it acceptable. This memorandum and the attached safety evaluation complete our review under TAC Nos. MD3070, MD3071, and MD3072.

Enclosure: As stated

CONTACT: G. Morris, NRR/EEEA
(301) 415-4074

October 3, 2006

MEMORANDUM TO: Evangelos Marinos, Chief
Plant Licensing Branch II-1
Division of Licensing
Office of Nuclear Reactor Regulation

FROM: George A. Wilson, Chief **/RA/**
Electrical Engineering Branch A
Division of Engineering
Office of Nuclear Reactor Regulation

SUBJECT: OCONEE NUCLEAR STATION UNITS 1, 2, AND 3 - EXIGENT TECHNICAL SPECIFICATION ONE-TIME CHANGE REQUEST TO EXTEND THE ALLOWED OUTAGE TIME FOR KEOWEE HYDRO UNIT 2 (TAC NO. MD3070, MD3071, and MD3072)

On September 27, 2006, Duke Energy Corporation (the licensee) submitted an amendment request to change the Oconee Nuclear Station Units 1, 2, and 3 Operating License. The requested changes would extend by 30 days the remaining 11 days from the 2005 outage of Keowee hydro unit (KHU2) (from 45 days to 75 days) the completion time (CT) when one KHU is not operable. The licensee requested the changes to accommodate significant repair work on the KHU2 generator rotor. The proposed changes to the Technical Specifications (TS) would revise TS 3.8.1, "AC Sources - Operating," Required Action C.2.2.5 to allow for a one time additional CT of 30 days. The licensee proposed this change as a one-time change that will expire at 1029 hours on November 03, 2006. The licensee responded to the staff's questions in a submittal dated October 2, 2006.

The proposed license amendment is needed to avoid a potential shutdown in accordance with TS 3.8.1 at the expiration of the allowed outage time (AOT), which would require all three Oconee Units to be in MODE 3 within the next 12 hours and in MODE 5 within 84 hours.

The Electrical Engineering Branch A has reviewed the proposed change related to the one-time extension of the AOT and finds it acceptable. This memorandum and the attached safety evaluation complete our review under TAC Nos. MD3070, MD3071, and MD3072.

Enclosure: As stated

DISTRIBUTION:

M. Mayfield L. Olshan

**ADAMS/ACCESSION NO.:**

| **OFFICE** | EEEA:NRR | BC:EEEA:NRR |
|---|---|---|
| **NAME** | GMorris | GWilson |
| **DATE** | 10/03/ 06 | 10/03/ 06 |

**OFFICIAL RECORD COPY**

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

EXIGENT TECHNICAL SPECIFICATION ONE-TIME CHANGE REQUEST TO EXTEND THE

ALLOWED OUTAGE TIME FOR KEOWEE HYDRO UNIT 2

OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3

TAC NOs. MD3070, MD3071, and MD3072

## 1.0 INTRODUCTION

On September 27, 2006, Duke Energy Corporation (the licensee) submitted an amendment request to change the Oconee Nuclear Station (ONS) Units 1, 2, and 3 Operating License. The requested changes would extend by 30 days the remaining 11 days from the 2005 outage of KHU2 (from 45 days to 75 days) the completion time (CT) when one Keowee hydro unit (KHU) is not operable. The licensee requested the changes to accommodate significant repair work on the KHU2 generator rotor. The proposed changes to the Technical Specifications (TS) would revise TS 3.8.1, "AC Sources - Operating," Required Action C.2.2.5 to allow for a one time additional CT of 30 days. The licensee proposed this change as a one-time change that will expire at 1029 hours on November 03, 2006. The licensee responded to the staff's questions in a submittal dated October 2, 2006

The proposed license amendment is needed to avoid a potential shutdown in accordance with TS 3.8.1 at the expiration of the allowed outage time (AOT), which would require all three Oconee Units to be in MODE 3 within the next 12 hours and in MODE 5 within 84 hours.

## 2.0 BACKGROUND

On September 23, 2006, at 1050 hours all three ONS Units entered TS Limiting Conditions for Operation (LCO) 3.8.1, Condition C.2.1. The condition was initially entered for Keowee Hydro Unit 2 (KHU2) routine surveillance testing. Shortly thereafter, KHU2 experienced an emergency lockout condition. While logged into LCO 3.8.1, required action (RA) C.1 commenced that verified, within the required completion time (CT), the operability of the remaining KHU1 and underground power path.

Pursuant to LCO 3.8.1, RA C.2.1, if the inoperable KHU is not restored by 1050 hours on Tuesday, September 26, 2006, Condition M applies and all three ONS Units must be in MODE 3 within 12 hours and MODE 5 within 84 hours. The alternate second completion time (45 days) of required action 2.2.5 may be used provided required actions C.2.2.1 - C.2.2.4 are performed prior to exceeding 72 hours. These required actions require both standby buses be energized from a Lee combustion turbine, KHU generation to the grid be suspended, verification that the remaining KHU and its underground path and both required offsite power sources are operable, verification that several electrical power system related LCOs are met, and verification of alternate power source capability.

This proposed change seeks additional time to extend the CT for RA C.2.1 in order to continue troubleshooting efforts, perform repairs, and to return the unit to service. Initial trouble shooting discovered a failed rotor coil jumper. The root cause of the condition has not been determined yet; however, an investigating team has been formed and is working around the clock to determine the cause and subsequent repairs to prevent recurrence.

Differential relay protection schemes are normally placed around major electrical equipment such as generators and transformers to detect developing internal failures before they become major faults. Other events occurred to KHU2 on August 10, 2005 and August 20, 2005. During both events an emergency lockout signal was received. Both events were attributed to failures in the generator bus differential relay circuit as the most probable cause. The licensee has confirmed that the KHU2 unit was outside the reach of those differential relays. In addition, the licensee has confirmed the generator differential relay scheme for DHU1 has been tested in the last year.

The Oconee safety-related buses normally receive power from the unit's auxiliary transformer while the unit is operating and from the startup transformer when the unit is shutdown. All six transformers are sized to power the accident load on one unit and the shutdown loads on the remaining units. Besides the remaining KHU1, the Oconee site also can receive emergency power from the Lee Combustion Turbines (LCT) (three units located approximately 30 miles from the Oconee site) through a dedicated 100 kV line. The LCT source is presently feeding the standby buses for all three Oconee units. The remaining KHU1 has been lined up to the underground feeder and can also feed the standby bus , or the overhead 230 KV bus to the startup transformers if required.

## 3.0 REGULATORY REQUIREMENTS

The regulatory requirements which the staff applied in its review of the application includes:

General Design Criterion (GDC) 17, "Electric power systems," of Appendix A, "General Design Criteria for Nuclear Power Plants," to Title10, Part 50, of the Code of Federal Regulations (CFR) requires, in part, that nuclear power plants have onsite and offsite electric power systems to permit the functioning of structures, systems, and components that are important to safety. The onsite system is required to have sufficient independence, redundancy, and testability to perform its safety function, assuming a single failure. The offsite power system is required to be supplied by two physically independent circuits that are designed and located so as to minimize, to the extent practical, the likelihood of their simultaneous failure under operating and postulated accident and environmental conditions. In addition, this criterion requires provisions to minimize the probability of losing electric power from the remaining electric power supplies as a result of loss of power from the unit, the offsite transmission network, or the onsite power supplies.

GDC-18, "Inspection and testing of electric power systems," requires that electric power systems that are important to safety must be designed to permit appropriate periodic inspection and testing.

10 CFR 50.36, "Technical Specifications," requires a licensee's TS to establish LCOs and surveillance requirement (SR) for equipment that is required for safe operation of the facility. Specifically, Section 50.36(c)(1) stipulates the items to be included in the TS and Section 50.36(c)(3) stipulates the surveillance requirements.

## 4.0 TECHNICAL EVALUATION

ONS OPERABILITY requirements for the onsite and offsite AC sources during plant operation (MODES 1, 2, 3, and 4) are specified in TS 3.8.1, “AC sources - Operating.” TS 3.8.1 includes AOT that permit the ONS to continue to operate for 3 days with one Keowee Hydro Unit inoperable. KHUs provide onsite ac power system for all three ONS Units.

The proposed change only applies to the one time inoperability of the KHU2 due to failure of the rotor field coil jumper in order to continue troubleshooting efforts, perform repairs, and to return the unit to service.

The licensee believes that a common cause issue does not exist with KHU1. The licensee stated in the LAR this conclusion is based upon the following facts:

- Visual inspection of KHU2 indicates no other coil jumpers have similar indications of failure. KHU2 has experienced two emergency lockouts within the last year. KHU1 has not experienced any emergency lockouts during it’s recent operating history.

- Initial testing has not identified any deficiencies that are common to KHU1.

A component of the root cause evaluation will be to address the extent of condition. The licensee indicated that they will maintain contact with the staff as the root cause develops. If at any time during the investigation a common cause is identified affecting HKU1 operability the appropriate TS condition will be entered.

Since KHU2 and the overhead power path are already out of service, these steps have been taken as a preliminary conservative measure:

1 No discretionary T1 work will be undertaken.

2 A LCT will be energizing the standby bus via an isolated power path. A second LCT will be operating in standby.

3 No discretionary work on KHU1.

4 No discretionary work on the Standby Shutdown Facility or the Emergency Feedwater.

5 Appropriate actions will be taken to limit physical access to the backup emergency power transformer CT-5

6 On going testing and troubleshooting efforts have not identified any potential cause that is common to KHU1.

7 No adverse weather is expected in October from hurricanes or tornadoes.

The following additional compensatory measures for the period KHU2 and associated overhead power path are out of service will be taken:

The third remaining LCT is also available and can be started and used to supply both standby buses should the running LCT fail.

KHU1 will not be allowed to generate power to the grid (commercial generation prohibited).

Four independent offsite power sources will be available to the Oconee 230 kV switchyard.

On the basis of its review, the staff finds that the licensee has adequately addressed the staff's concerns and that the amendment request is acceptable based on the deterministic evaluation.

## 5.0 CONCLUSION

The staff has reviewed the licensee's submittal and finds that the proposed changes related to TS LCO 3.8.1, "AC Sources - Operating," required action C.2.2.5 to extend 30 days to provide additional time to effect repairs on KHU2 is acceptable. The staff's conclusion is based on the following:

1 No discretionary T1 work will be undertaken.

2 During the 30 day extension period, a LCT will be energizing the standby bus via an isolated power path. A second LCT will be operating in standby.

3 No discretionary work on KHU1.

4 No discretionary work on the Standby Shutdown Facility or the Emergency Feedwater.

5 Appropriate actions will be taken to limit physical access to the backup emergency power transformer CT-5

6 On going testing and troubleshooting efforts have not identified any potential cause that is common to KHU1.

7 No adverse weather is expected in October from hurricanes or tornados.

8 The third remaining LCT is also available and can be started and used to supply both standby buses should the running LCT fail.

9 KHU1 will not be allowed to generate power to the grid (commercial generation prohibited).

10 Four independent offsite power sources will be available to the Oconee 230 kV switchyard.