Docket File

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

August 15, 1995

Mr. J. W. Hampton
Vice President, Oconee Site
Duke Power Company
P. O. Box 1439
Seneca, SC 29679

SUBJECT: ISSUANCE OF AMENDMENTS - OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3 (TAC NOS. M88556, M88557, AND M88558)

Dear Mr. Hampton:

The Nuclear Regulatory Commission has issued the enclosed Amendment Nos. 210 , 210 , and 207 to Facility Operating Licenses DPR-38, DPR-47, and DPR-55, respectively, for the Oconee Nuclear Station, Units 1, 2, and 3. The amendments consist of changes to the Technical Specifications (TS) in response to your application dated February 24, 1994, as supplemented by letters dated April 19, May 25, August 25, 1994, January 4, January 27, February 22, March 15, April 19, and May 31, 1995. The amendments provide surveillance requirements for a planned modification to the Keowee emergency power generator's underground power path breaker closing logic.

As a result of the review of all issues needed to determine the acceptability of the proposed modification and surveillance requirements, the NRC identified other concerns related to overspeed and overfrequency vulnerabilities of the Keowee units. These concerns did not affect the specific amendment request, but the evaluation is included with the evaluation of the amendment for completeness. Part of the evaluation of the overspeed and overfrequency issues included an input from our review of the Probabilistic Risk Assessment (PRA) of the Keowee emergency power system. As a result of this review, the staff recommended the following:

- The reliability of key Keowee components should be monitored and appropriate preventative maintenance and testing should be performed (especially with regard to the modified portion of equipment) to ensure the conclusions of the reliability assessment remain valid.

- A mechanism, such as administrative controls, should be established to ensure that the time when both Keowee units are aligned to the offsite power system does not significantly decrease the reliability of the onsite power system and invalidate the preliminary conclusions of the reliability assessment. (An inherent assumption in that assessment was that dual unit commercial operation occurs approximately 3% of the year.)

The NRC staff discussed these recommendations with your staff during a May 25, 1995, conference call. In response, by letter dated May 31, 1995, you stated that:

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- The Keowee hydro units and related components are included in the Oconee Maintenance Rule Program. Performance will be monitored and trended against established performance criteria on availability, reliability, and maintenance preventable functional failures to assure that the assumptions of the PRA study remain valid and the Keowee reliability remains high.

- Based on a number of factors, future simultaneous commercial use of the Keowee units is not expected to deviate significantly from past historical data (approximately 3% annually). Also, sensitivity calculations which assumed simultaneous commercial operation of the Keowee hydro units of up to 30% of the time indicated that there is no measurable impact on Keowee reliability when compared to their commercial use for 3% of the time.

We have reviewed your May 31, 1995, response and find that it satisfies our recommendations. As a result, we conclude that the planned simultaneous use of the Keowee hydro units for commercial purposes is acceptable pending results of the staff's review of the final Keowee PRA expected to be completed by the end of 1995.

A copy of the related Safety Evaluation is also enclosed. A Notice of Issuance will be included in the Commission's biweekly Federal Register notice.

Sincerely,

ORIGINAL SIGNED BY:

Leonard A. Wiens, Senior Project Manager
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket Nos. 50-269/50-270/50-287

Enclosures:
1. Amendment No. 210 to DPR-38
2. Amendment No. 210 to DPR-47
3. Amendment No. 207 to DPR-55
4. Safety Evaluation

cc w/encl: See next page

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DATE	6/14/95	6/15/95	/95	/95	6/20/95	8/15/95

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- The Keowee hydro units and related components are included in the Oconee Maintenance Rule Program. Performance will be monitored and trended against established performance criteria on availability, reliability, and maintenance preventable functional failures to assure that the assumptions of the PRA study remain valid and the Keowee reliability remains high.

- Based on a number of factors, future simultaneous commercial use of the Keowee units is not expected to deviate significantly from past historical data (approximately 3% annually). Also, sensitivity calculations which assumed simultaneous commercial operation of the Keowee hydro units of up to 30% of the time indicated that there is no measurable impact on Keowee reliability when compared to their commercial use for 3% of the time.

We have reviewed your May 31, 1995, response and find that it satisfies our recommendations. As a result, we conclude that the planned simultaneous use of the Keowee hydro units for commercial purposes is acceptable pending results of the staff's review of the final Keowee PRA expected to be completed by the end of 1995.

A copy of the related Safety Evaluation is also enclosed. A Notice of Issuance will be included in the Commission's biweekly Federal Register notice.

Sincerely,

Leonard A. Wiens, Senior Project Manager
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket Nos. 50-269/50-270/50-287

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1. Amendment No. 210 to DPR-38
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3. Amendment No. 207 to DPR-55
4. Safety Evaluation

cc w/encl: See next page

Mr. J. W. Hampton
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Oconee Nuclear Station

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

DUKE POWER COMPANY

DOCKET NO. 50-269

OCONEE NUCLEAR STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 210
License No. DPR-38

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment to the Oconee Nuclear Station, Unit 1 (the facility) Facility Operating License No. DPR-38 filed by the Duke Power Company (the licensee) dated February 24, 1994, as supplemented by letters dated April 19, May 25, August 25, 1994, January 4, January 27, February 22, March 15, April 19, and May 31, 1995, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations as set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations set forth in 10 CFR Chapter I;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is hereby amended by page changes to the Technical Specifications as indicated in the attachment to this license amendment, and Paragraph 3.B of Facility Operating License No. DPR-38 is hereby amended to read as follows:

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Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 210, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 30 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Herbert N. Berkow

Herbert N. Berkow, Director
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Technical Specification
Changes

Date of Issuance: August 15, 1995

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

DUKE POWER COMPANY

DOCKET NO. 50-270

OCONEE NUCLEAR STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 210
License No. DPR-47

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment to the Oconee Nuclear Station, Unit 2 (the facility) Facility Operating License No. DPR-47 filed by the Duke Power Company (the licensee) dated February 24, 1994, as supplemented by letters dated April 19, May 25, August 25, 1994, January 4, January 27, February 22, March 15, April 19, and May 31, 1995, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations as set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations set forth in 10 CFR Chapter I;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is hereby amended by page changes to the Technical Specifications as indicated in the attachment to this license amendment, and Paragraph 3.B of Facility Operating License No. DPR-47 is hereby amended to read as follows:

Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 210, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 30 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Herbert N. Berkow, Director
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Technical Specification
Changes

Date of Issuance: August 15, 1995

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

DUKE POWER COMPANY

DOCKET NO. 50-287

OCONEE NUCLEAR STATION, UNIT 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 207
License No. DPR-55

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment to the Oconee Nuclear Station, Unit 3 (the facility) Facility Operating License No. DPR-55 filed by the Duke Power Company (the licensee) dated February 24, 1994, as supplemented by letters dated April 19, May 25, August 25, 1994, January 4, January 27, February 22, March 15, April 19, and May 31, 1995, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations as set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations set forth in 10 CFR Chapter I;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is hereby amended by page changes to the Technical Specifications as indicated in the attachment to this license amendment, and Paragraph 3.B of Facility Operating License No. DPR-55 is hereby amended to read as follows:

Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 207, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 30 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Herbert N. Berkow, Director
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Technical Specification
Changes

Date of Issuance: August 15, 1995

ATTACHMENT TO LICENSE AMENDMENT NO. 210

FACILITY OPERATING LICENSE NO. DPR-38

DOCKET NO. 50-269

AND

TO LICENSE AMENDMENT NO. 210

FACILITY OPERATING LICENSE NO. DPR-47

DOCKET NO. 50-270

AND

TO LICENSE AMENDMENT NO. 207

FACILITY OPERATING LICENSE NO. DPR-55

DOCKET NO. 50-287

Replace the following pages of the Appendix "A" Technical Specifications with the enclosed pages. The revised pages are identified by Amendment number and contain vertical lines indicating the areas of change.

Remove Pages	Insert Pages
4.6-1	4.6-1
4.6-3	4.6-3

4.6 EMERGENCY POWER PERIODIC TESTING

Applicability

Applies to the periodic testing surveillance of the emergency power sources.

Objective

To verify that the emergency power sources and equipment will respond promptly and properly when required.

Specification

4.6.1 Monthly, a test of the Keowee Hydro units shall be performed to verify proper operation of these emergency power sources and associated equipment. This test shall assure that:

a. Each hydro unit can be automatically started from the Unit 1 and 2 control room.

b. Each hydro unit can be synchronized through the 230 Kv overhead circuit to the startup transformers.

c. Each hydro unit can energize the 13.8 Kv underground feeder.

d. The 4160 volt startup transformer main feeder bus breakers and standby bus breaker shall be exercised.

4.6.2 a. Annually, the Keowee Hydro units will be started using the emergency start circuits in each control room to verify that each hydro unit and associated equipment is available to carry load within 25 seconds of a simulated requirement for engineered safety features.

b. Promptly following the above annual test, each hydro unit will be loaded to at least the combined load of the auxiliaries actuated by ESG signal in one unit and the auxiliaries of the other two units in hot shutdown by synchronizing the hydro unit to the offsite power system and assuming the load at the maximum practical rate.

c. Also, the ability of the Keowee Unit ACBs to close automatically to the underground path will be tested on an annual frequency.

4.6.3 Monthly, the Keowee Underground Feeder Breaker Interlock shall be verified to be operable.

4.6.4 During each refueling outage, a simulated emergency transfer of the 4160 volt main feeder buses to the startup

≥2.12 VDC.

(3) The electrolyte level of each connected cell is between the minimum and maximum level indication marks.

c. Annually verify that:

(1) The cells, end-cell plates and battery racks show no visual indication of structural damage or degradation.

(2) The cell to cell and terminal connections are clean, tight and coated with anti-corrosion grease.

4.6.10 Annually, a one hour discharge service test at the required maximum load shall be made on the instrument and control batteries, the Keowee batteries, and the switching station batteries.

4.6.11 Monthly, the operability of the individual diode monitors in the Instrument and Control Power System shall be verified by imposing a simulated diode failure signal on the monitor.

4.6.12 Semiannually, the peak inverse voltage capability of each auctioneering diode in the 125 VDC Instrument and Control Power System shall be measured and recorded.

Bases

The Keowee Hydro units, in addition to serving as the emergency power sources for the Oconee Nuclear Station, are power generating sources for the Duke system requirements. As power generating units, they are operated frequently, normally on a daily basis at loads equal to or greater than required by Table 8.1-1 of the FSAR for ESF bus loads. Normal as well as emergency startup and operation of these units will be from the Oconee Unit 1 and 2 Control Room. The frequent starting and loading of these units to meet Duke system power requirements assures the continuous availability for emergency power for the Oconee auxiliaries and engineered safety features equipment. It will be verified that these units will carry the equipment of the maximum safeguards load within 25 seconds, including instrumentation lag, after a simulated requirement for engineered safety features. To further assure the reliability of these units as emergency power sources, they will be, as specified, tested for automatic start on a monthly basis from the Oconee control room. These tests will include verification that each unit can be synchronized to the 230 kV bus and that each unit can energize the 13.8 kV underground feeder. Also, the verification of the ability of the Keowee Unit ACBs to automatically close to the underground power path will be performed by the annual tests.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 210 TO FACILITY OPERATING LICENSE DPR-38

AMENDMENT NO. 210 TO FACILITY OPERATING LICENSE DPR-47

AND AMENDMENT NO. 207 TO FACILITY OPERATING LICENSE DPR-55

DUKE POWER COMPANY

OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3

DOCKET NOS. 50-269, 50-270, AND 50-287

1.0 INTRODUCTION

By letter dated February 24, 1994, as supplemented by letters dated April 19, May 25, August 25, 1994, January 4, January 27, February 22, March 15, April 19, and May 31, 1995, Duke Power Company (the licensee) proposed several changes to the Oconee Nuclear Station, Units 1, 2, and 3 Technical Specifications to encompass surveillance requirements for a modification added to the control circuitry of the Keowee hydro station's output breakers for the underground emergency power path. In response to the staff's request of March 30, 1994, the licensee submitted additional information in letters dated April 19, May 25, August 25, 1994, January 4, January 27, February 22, March 15, April 19, and May 31, 1995, that did not change the scope of the February 24, 1994, application and the initial proposed no significant hazards consideration determination.

During the course of the review of this proposed TS change, the staff identified concerns related to potential overspeed and overfrequency transients of the Keowee hydro units. Although these issues do not affect the acceptability of the proposed TS surveillance, the evaluation is included in this report for completeness.

By Licensee Event Report (LER) 269/93-01 dated February 2, 1993, the licensee for Oconee Nuclear Station informed the staff about the potential inoperability of a Keowee hydro unit (source of emergency onsite electrical power) which could occur during parallel operation with the offsite electrical power system. Under certain conditions the unit would separate from the offsite system, overspeed, and trip.

By LER 269/93-01, Revision 1, dated August 1, 1994, the licensee reported an additional scenario involving parallel operation in which the safety-related systems supported by the onsite emergency power system could be rendered inoperable or be delayed in startup because of the overfrequency of the Keowee output following a load rejection so that time requirements for the plant's accident analyses might not be met.

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As short-term corrective action, the licensee implemented administrative controls (output power level, net lake head, and number of hydro units operating) on the use of the two Keowee hydro units for parallel operation with the offsite power system. In a letter of August 25, 1994, the licensee discussed a permanent hardware modification that, coupled with the administrative limits, is intended to prevent the two scenarios from occurring.

In letters dated December 19, 1994, and January 13, 1995, the NRC requested additional information about the licensee's analyses and evaluations related to the administrative controls and modifications. The licensee responded to these requests in a letter dated January 4, 1995; in a formal discussion on January 19, 1995; and during informal discussions at the site on January 26-27, 1995. As a result, in a letter of January 27, 1995, the licensee stated that it needed to revise supporting calculations to incorporate the effects of additional instrument uncertainties and that these revised calculations would result in a lower Keowee output power limit during commercial operation.

During a conference call with the licensee on February 2, 1995, the staff discussed future testing, surveillance, and administrative control of the Keowee hydro units needed to ensure their availability to perform their safety functions following commercial operation. The licensee addressed these topics in an action plan attached to a March 15, 1995, letter and revised in an April 19, 1995, letter after an additional conference call with the staff on March 29, 1995.

The NRC has completed the review of the licensee's corrective actions (administrative controls and hardware modification) for the overspeed and overfrequency problem and finds them acceptable subject to the conditions discussed in the following sections.

2.0 DISCUSSION

The emergency electrical power sources for the Oconee Nuclear Station are two Keowee hydro units each rated at 87.5 MVA. These hydro units independently supply power via one overhead path or one underground path. Each unit can be aligned to either path with interlocks, which allow only one unit at a time to be aligned to the underground path and the other unit then aligned to the overhead path. The design basis for the plants allows the Keowee units to be periodically used individually or simultaneously as sources of commercial power to the offsite electrical system (the grid). On a loss-of-coolant accident (LOCA), a loss-of-offsite power (LOOP), or a grid disturbance, both hydro units receive an emergency start signal. If they are operating in parallel to the grid, the automatic start signal causes them to separate from the grid and either operate in standby (if offsite power is available) or supply the emergency and/or shutdown loads (if offsite power is not available) in time to meet the accident analysis requirements.

2.1 LER 269/9216

On October 12, 1992, the licensee determined that a single electrical fault could cause the loss of both emergency power paths because of the isolating action of the Keowee output transformer and unit emergency lockout relays (see Licensee Event Report 269/92-16). Immediate corrective action involved aligning one Keowee hydro unit to the overhead path and dedicating the other hydro unit to the underground path by opening the disconnect switches of its overhead breaker.

As a long-term corrective action, the licensee will modify (according to NSM #ON-52966) the control circuitry for each hydro unit's underground path breaker by providing additional interlocks that will automatically close the breaker initially not aligned to the underground path. The concurrent conditions that will generate the closure signal are the following:

(1) tripping of the lockout relay on the Keowee output transformer to the overhead path

(2) tripping of the lockout relay on the opposite Keowee hydro unit

(3) an emergency start signal from the Keowee emergency start logic.

The licensee has proposed to add an additional surveillance requirement to the technical specifications to demonstrate annually the operability of the automatic closure circuitry.

2.2 LER 269/93-01

In LER 269/93-01, the licensee reported a scenario in which a Keowee hydro unit could be rendered inoperable after a load rejection resulting from a sudden disconnection from the grid during parallel operation. Specifically, when a hydro unit is operating in parallel with the grid at a high load, an emergency start will cause the unit to be separated from the grid and overspeed from the loss of load. If the load rejected were high enough, the overspeed condition could exceed the trip setpoint of the overspeed switch in the emergency start portion of the shutdown solenoid circuit so that the Keowee unit's field breaker would be opened and could not reclose because of the breaker's anti-pump circuitry. If both hydro units were operating at a high enough power level and this load rejection scenario occurred, both hydro units would lock out and not be capable of performing their intended safety functions. If only one unit were operating parallel to the grid, a load rejection would render that unit inoperable, but both units might not perform their safety functions if a single failure occurred on the other Keowee unit.

2.3 LER 269/93-01, REVISION 1

In Revision 1 to the LER, the licensee stated that, in addition to the overspeed condition, above-normal frequency of the Keowee output would result from a load rejection scenario. Specifically, if both units were operating at a high power level in parallel to the grid, a load rejection would cause the overspeed condition and both units would produce output voltages at

frequencies proportional to the unit's speed. During a LOCA and LOOP scenario and if the overspeed trip did not occur, the Keowee unit aligned to the underground path would supply the LOCA plant's emergency loads initially with above-normal frequency power. This could result in emergency core cooling pump motors having lower torques and longer acceleration times, which, in turn, might cause some of those motors to trip because of time-overcurrent relaying action. If a single failure of the underground path is assumed for the LOCA and LOOP scenario, the Keowee unit aligned to the overhead path would not be available soon enough to supply LOCA loads because the overfrequency condition could delay the transfer to the overhead path because of the overfrequency effects on the undervoltage relays in the transfer logic.

3.0 EVALUATION

3.1 Automatic Close Circuitry Surveillance

The licensee has proposed the following changes to the Oconee Unit 1, 2, and 3 Technical Specifications:

Change 1: Under Specification 4.6.2 add:

> c. Also, the ability of the Keowee Unit ACBs to close automatically to the underground path will be tested on an annual frequency.

Change 2: On Page 4.6-3 add the following at the end of the first paragraph under Bases:

> Also, the verification of the ability of the Keowee Unit ACBs to automatically close to the underground power path will be performed by the annual tests.

The above proposed technical specification surveillance requirement is intended to ensure the operability of the new interlock components (one time-delay relay and five relay contacts per breaker circuit) for the automatic closure circuitry. In a letter dated April 19, 1994, the licensee submitted a copy of the surveillance procedure that will be used for the post-modification functional testing of the new circuitry. Step 8.13 of that procedure calls for a check of the automatic closure of each underground path breaker for the simulated three concurrent conditions discussed above. Surveillance procedures for the annual testing will not be available until after the post-modification testing is completed.

Technical Specification 4.6.3 requires that the existing interlocks for the underground breakers be tested monthly. In the proposed technical specifications for the entire Oconee electrical system (onsite and offsite) currently being reviewed by the staff, the periodicity has been changed to semiannual. In response to staff questions, the licensee stated that the less frequent testing (annual) of the new automatic closure circuitry was justified because the new modification adds another function but is not needed to ensure independence between both Keowee hydro units as do the existing interlocks.

The staff finds the proposed changes to the technical specifications to be acceptable because of their consistency (format) with the existing technical specifications. The periodicity is also acceptable because it is consistent with the frequency specified in other surveillance requirements for similar functions. In light of the ongoing staff review of the entire technical specifications for the Oconee electrical systems, it should be noted that this specific surveillance requirement will be revisited as part of that effort.

The staff has also reviewed the electrical schematics for the new circuitry that provides the automatic closure function. It finds that the new design modification, intended as the long-term corrective action for a single-failure vulnerability, does indeed eliminate the design deficiency, introduces no new single-failure vulnerabilities, and is acceptable.

3.2 Overfrequency/Overspeed Modifications

As immediate corrective action, the licensee prohibited commercial operation of the Keowee hydro units. Subsequently, the licensee placed administrative limits on commercial operation of the hydro units with set maximum power levels for various net lake heads. In addition to the administrative controls, the licensee discussed a hardware modification in a letter of August 25, 1994. Specifically, frequency relays (combined in 2-out-of-3 logic per unit) will be added to prevent overfrequency voltages from being supplied to each Oconee plant's main feeder buses. These relays will provide permissives that only allow the output breakers on the Keowee hydro units to close after output frequency has returned to near normal level following a load rejection scenario. Because of single-failure concerns, the breakers downstream of the output breaker for the Keowee unit aligned to the underground path will also have additional logic to prevent their closure until the frequency has been restored. Existing time delays for the reclosure of breakers in the overhead path from Keowee will be increased, and the inherent time delay in the transfer to the overhead path will be shortened from 10 to 5 seconds. Also, the overspeed trip in the emergency start portion of the shutdown solenoid circuit will be removed and runaway unit detection and protection logic will be added to protect against governor failure. Testing of the new circuitry will be included in existing emergency power path operability tests.

Because of concerns about the use of the Keowee hydro units for commercial purposes, which could lead to possible unavailability of the only sources of emergency onsite power during design-basis events, the staff, in a letter of December 19, 1994, requested additional information pertaining to the adequacy of the licensee's corrective action and supporting analyses. Specifically, the staff requested a detailed discussion of the effects of overfrequency and overvoltage on safety-related motors, protective relays, and the time requirements of associated accident analyses during overspeed and overfrequency scenarios. The staff also requested a discussion of the calculations and administrative controls used to support commercial operation in light of the overspeed and overfrequency problems along with any safety evaluation related to the proposed hardware modification. The licensee responded to that request in a letter of January 4, 1995.

As a result of further review of the information provided, the staff requested, in a January 13, 1995, letter, additional information pertaining to (1) test results for validating the calculations, (2) overspeed trip setpoints and time delays, (3) worst-case load rejection sequence of events considering instrument uncertainties, and (4) administrative controls and modifications necessary to ensure that accident analyses remain bounding. A meeting was held on January 19, 1995, to enable the licensee to respond to the staff's questions (the licensee submitted a formal response in a letter of February 22, 1995). During that meeting the staff requested further information regarding the validation of the computer model used to predict the Keowee dynamic response to a load rejection and to support the determination of adequate administrative limits for commercial operation of the hydro units. The staff also sought further information pertaining to the instrumentation uncertainties used in the calculations and related to the implementation of the administrative control.

To obtain the requested information in an efficient manner, the NRC staff met with the licensee at the site on January 26-27, 1995. During the visit, the staff reviewed in detail the licensee's calculations and determination of instrument uncertainties. As a result, the licensee informed the staff in a January 27, 1995, letter that it needed to incorporate additional instrument uncertainties into the calculations and that this would result in lower administrative limits on the output power of a Keowee hydro unit during commercial operation.

During a conference call on February 2, 1995, the staff discussed with the licensee the planned testing, periodic surveillances, and technical specification changes needed to support the overfrequency hardware modification and administrative control on future commercial operation of the Keowee units. The licensee addressed these topics in an action plan attached to a March 15, 1995, letter. After its review of that proposed action plan, the staff discussed the details of that plan during a conference call on March 29, 1995. As a result of that discussion, the licensee submitted a revised action plan on April 19, 1995. The major areas covered by the action plan are summarized as follows:

- <u>Pre-Modification Testing</u>

  Eleven load rejection tests were performed on February 23, 1995, to obtain the dynamic response of the Keowee units as a function of the number of units operating, power levels, and lake levels. The data obtained will be used to support and validate calculations that determine the commercial operating limits for the Keowee units in the future.

- <u>Post-Modification Testing</u>

  Post-modification tests for the overfrequency hardware modification will be performed before the new circuitry is placed in operation. These tests will include an installation test and a functional test to verify that the newly installed hardware functions as designed. The functional test will include a maximum load rejection test based on the operating conditions of that day and calibration of related instrumentation.

- Periodic Surveillance

  Periodic testing and surveillance will be performed for the new hardware installed with the overfrequency modification. This will be accomplished by revising existing procedures and/or developing new procedures. Load rejection tests will also be performed periodically to ensure that the Keowee units' dynamic response has not changed beyond an expected uncertainty. If necessary, calculations and the associated operating limits may be changed. Additionally, related instrumentation, meters, and relays will be periodically calibrated.

- Technical Specifications

  The licensee will request an amendment to the plants' technical specifications within 90 days after the overfrequency modification is implemented. The technical specification change in concert with a Selected Licensee Commitment (SLC) will control the operating restrictions on the Keowee hydro units when they are used for commercial purposes. Additionally, the technical specifications will require surveillance of the new overfrequency hardware (overspeed breaker interlock and governor failure sensing logic) and a load rejection test every refueling outage.

- Restrictions on Keowee Commercial Operation

  The limits on commercial operation will be in the Keowee Modes of Operating Procedure and the Oconee SLC manual. These administrative controls will be in effect before the hardware modification is placed into service. Future changes to the operating limits will be controlled by the 10 CFR 50.59 process.

In a letter dated May 5, 1995, the licensee submitted the latest calculations (KC Unit 1-2-0106, Revision 1) that determine the commercial operating limits for the Keowee hydro units. This determination is based on the 11 load rejection tests (discussed under "Pre-Modification Testing" above) with some limited support from the dynamic computer model for the Keowee units. As stated above, these operating limits will be controlled and placed in operating procedures. Future changes to these limits will be based on additional load rejection testing.

The staff has reviewed the electrical schematics for the new circuitry that prohibits overfrequency effects during overspeed conditions and detects governor failure. It finds that the new circuitry, intended as part of the long-term corrective action for overfrequency and overspeed concerns, does indeed eliminate those concerns, introduces no new single-failure vulnerabilities, and is acceptable conditioned on the proposal of technical specifications as discussed above.

The staff has also reviewed the action plan as discussed above and the supporting calculations for the Keowee commercial operating limits and finds that implementation of the action plan, along with the installation of the hardware modification, will ensure Keowee units are capable of performing their intended safety functions within the time required to meet the plant's accident analyses following a load rejection scenario. All concerns associated with overfrequency and overspeed following Keowee unit load rejection are therefore resolved.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the South Carolina State official was notified of the proposed issuance of the amendments. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change surveillance requirements. The NRC staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding (59 FR 14887 dated March 30, 1994). Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

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