NRC FORM 195 (2-76) U.S. NUCLEAR REGULATORY COMMISSION

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DESCRIPTION

Ltr notarized 10-13-76....trans the follow:

ENCLOSURE

Amdt to OL/Change to Tech Specs: Consisting of revisions to tech specs with regard to limiting conditions for operation with regard to transmission line paths & monitorings.....

PLANT NAME: Oconee 1-3

ACKNOWLEDGED DO NOT

FOR ACTION/INFORMATION ENVIRO 10-19-76 ehf

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NRC FORM 195 (2-76)

DUKE POWER COMPANY
POWER BUILDING
422 SOUTH CHURCH STREET, CHARLOTTE, N. C. 28242

WILLIAM O. PARKER, JR.
VICE PRESIDENT
STEAM PRODUCTION

TELEPHONE: AREA 704
373-4083

October 13, 1976

Mr. Benard C. Rusche, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

RE: Oconee Nuclear Station
Docket Nos. 50-269, -270, -287

Dear Mr. Rusche:

Oconee Nuclear Station Technical Specifiation 3.7 identifies limiting conditions for operation of the Oconee Auxiliary Electrical Systems. The onsite power system is provided by two 87.5 MVA hydroelectric generators (Keowee Hydro Station) supplying power through two separate, redundant, diverse transmission paths. Additionally, combustion turbines located at the Lee Steam Station, using an isolated 100KV transmission path, provide a substitute power source primarily during periods when the hydro units are not available. Expected maintenance periods when both Keowee units are to be unavailable were stated in FSAR Section 8.2.3(c) as 24 hours each year plus 4 days once every 10 years. These outages are necessary for turbine and penstock inspection and maintenance.

Provisions have also been made in the specifications for instances when one Keowee units is unavailable for test or maintenance for periods not to exceed 24 hours. In instances where one Keowee generator is expected to be unavailable greater than 24 hours, the Lee combustion turbine is placed in operation at rated speed, with no load and is directly connected through the isolated 100KV transmission line to the Oconee standby buses for automatic selection in the event 230 KV power is lost. Continued reactor power operation or restart from hot conditions is permitted; however, present technical specifications preclude a reactor startup from cold conditions.

Inspections of the Keowee hydro units and similar hydro units on the Duke system have indicated that maintenance of several weeks duration may be necessary periodically. Techniques have been devised which will permit the removal from service of one Keowee hydro unit at a time for this maintenance. This will be accomplished by dewatering the common penstock of both hydro units, locking and sealing the wicket gates of the unit to be maintained and rewatering the penstock to return the remaining hydro to service. This operation will normally require less than 72 hours and the Lee Combustion Turbine will be in operation continuously from the beginning of this evolution until both hydro units are returned to an available status. The frequency of this maintenance is not expected to significantly affect the assumed periods of unavailability of both Keowee units.

In order to provide increased flexibility of operation and maintenance of the Oconee electrical system however, proposed revisions to the Oconee Nuclear Station Technical Specifications are requested pursuant to 10CFR50, §50.90. These revisions are indicated on the attached replacement pages. The time permitted for operation with one Keowee unit inoperable has been extended from 24 hours to 72 hours; however, testing of the remaining hydro unit is performed within one hour and every eight hours thereafter to provide assurance of its operability. The period for operation with the underground feeder circuit unavailable has also been increased from 24 to 72 hours. Additionally reactor heatup above 200°F is permitted when one Keowee hydro unit is available and the Lee Combustion Turbine is in operation on the isolated 100KV transmission line. This is considered to be an acceptable alternative due to the known availability of the dedicated running combustion turbine.

Your prompt consideration of this request is solicited in order to assist our planning.

Very truly yours,

William O. Parker, Jr.

MST:ge

WILLIAM O. PARKER, JR., being duly sworn, states that he is Vice President of Duke Power Company; that he is authorized on the part of said Company to sign and file with the Nuclear Regulatory Commission this request for amendment of the Oconee Nuclear Station Technical Specifications, Appendix A to Facility Operating Licenses DPR-38, DPR-47 and DPR-55; and that all statements and matters set forth therein are true and correct to the best of his knowledge.

William O. Parker, Jr., Vice President

ATTEST:

John C. Goodman, Jr.
Assistant Secretary

Subscribed and sworn to before me this 13th day of October, 1976.

Edna B. Farmer
Notary Public

My Commission Expires:

October 24, 1977

3.7 AUXILIARY ELECTRICAL SYSTEMS

Applicability

Applies to the availability of off-site and on-site electrical power for station operation and for operation of station auxiliaries.

Objective

To define those conditions of electrical power availability necessary to provide for safe reactor operation and to provide for continuing availability of engineered safety features systems in an unrestricted manner and to prescribe safety evaluation and reporting requirements to be followed in the event that the auxiliary electric power systems become degraded.

Specification

3.7.1 Except as permitted by 3.7.2, 3.7.3, 3.7.4, 3.7.5, and 3.7.6, the reactor shall not be heated above 200°F unless the following conditions are met.

(a) At least two 230 kV or 525 kV transmission lines, on separate towers, shall be in service.

(b) Two startup transformers shall be operable and available to the unit's 4160 volt Main Feeder Buses No. 1 and No. 2.

(c) One operable Keowee hydro unit shall be available to supply power through the underground feeder bus, transformer CT-4 and the 4160 volt standby buses No. 1 and 2 to the unit's 4160 volt Main Feeder Buses No. 1 and 2.

(d) One of the following conditions shall be met.

1. The second Keowee hydro unit shall be available to supply power automatically through a startup transformer to the units 4160 volt Main Feeder Buses No. 1 and 2.

2. The 4160 volt standby buses shall be energized by one of the Lee gas turbines through the 100 KV transmission circuit which shall be electrically separate from the system grid and non-safety related loads.

(e) The two 4160 volt Main Feeder Buses shall be energized.

(f) The three 4160 volt Engineered Safety Features switchgear buses shall be energized.

(g) Three 600 volt load centers plus the three 600 volt-208V Engineered Safety Features MCC Buses shall be energized.

(h) For each unit, all 125 VDC instrumentation and control batteries with their respective chargers buses, diode monitors, and diodes supplying the unit's vital instrumentation and the four instrumentation and control panel boards shall be operable.

(i) The 125 VDC switching station batteries with their respective chargers, buses, and isolating diodes shall be operable.

(j) The Keowee batteries with their respective chargers, buses, and isolating diodes shall be operable.

(k) The level of the Keowee Reservoir shall be at least 775 feet above sea level.

3.7.2 During hot standby or power operation, provisions of 3.7.1 may be modified to allow any one of the following conditions to exist:

(a) One of the two required startup transformers may be removed from service for 48 hours provided it is expected to be restored to service within 48 hours and the other required startup transformer is available for automatic connection to the unit's main feeder bus.

(b) If two Keowee units had been operable and one Keowee unit should become unavailable for test or maintenance (corrective or preventative), the reactor may remain critical for 72 hours provided the remaining Keowee hydro unit is connected to the underground feeder and is verified operable within one hour of the loss and every eight hours thereafter.

(c) If one Keowee unit had been available and a Lee gas turbine was in operation and the Lee gas turbine should become unavailable, the reactor may remain critical for 72 hours provided the Keowee hydro unit is verified operable within one hour of the loss and every eight hours thereafter.

(d) If one Keowee unit had been available and a Lee gas turbine was in operation and the Keowee unit should become unavailable, the reactor may remain critical for 72 hours.

(e) The underground feeder circuit may be inoperable for 72 hours for test and maintenance.

(f) In each unit, the following items may be inoperable for periods not exceeding 24 hours:

1. One 4160 volt main feeder bus.

2. One complete single string of any unit's Engineered Safety Features 4160 volt switchgear bus, 600 volt load center - 600V-208V MCC and their loads.

3. One complete single string of any unit's 125 VDC instrumentation and control batteries, chargers, buses, and all associated isolating and transfer diodes.

4. One 125 VDC instrumentation and control panel board and/or its associated loads.

(g) One complete single string of the 125 VDC switching station batteries, buses, chargers, and the related diode assemblies may be de-energized for test or maintenance for periods not exceeding 24 hours.

(h) One complete single string of the Keowee batteries, chargers, buses, and isolating diodes may be de-energized for test or maintenance for periods not exceeding 24 hours on the operable Keowee unit.

(i) One 4160 volt standby bus may be inoperable for test or maintenance for periods not exceeding 24 hours.

3.7.3 In the event that the conditions of Specification 3.7.1 are not met within the time specified in Specification 3.7.2, except as noted below in Specification 3.7.4, 3.7.5, 3.7.6, and 3.7.7, the reactor shall be placed in a hot shutdown condition within 12 hours. If the requirements of 3.7.1 are not met within an additional 48 hours, the reactor shall be placed in the cold shutdown condition within 24 hours.

3.7.4 In the event that all conditions in Specification 3.7.1 are met except that the underground feeder circuit to the standby buses is unavailable for longer than the test or maintenance period of 72 hours, the reactor shall be permitted to remain critical provided the following restriction is observed.

(a) Continued power operation is permitted provided within 1 hour of the determination that the underground feeder will be inoperable greater than the test or maintenance period of 72 hours, the 4160 standby buses shall be energized by one of the Lee gas turbines through the 100 KV transmission circuit. The Lee gas turbine and the 100 KV transmission circuit shall be electrically separate from the system grid and non-safety-related loads.

3.7.5 In the event that all conditions of Specification 3.7.1 are met except that all 230 KV transmission lines are lost, the reactor shall be permitted to remain critical or be restarted provided the following restrictions are observed:

(a) Prior to the restart of a shutdown reactor or within 1 hour of losing all 230 KV or 525 KV transmission lines for an operating reactor, the 4160 volt standby buses shall be energized by one of the Lee gas turbines through the 100 KV transmission circuit. The Lee gas turbine and the 100 KV transmission circuit shall be completely separate from the system grid and non-safety-related loads.

(b) The reactor coolant T_{avg} shall be above 525°F. Reactor coolant pump power may be used to elevate the temperature from 500°F to 525°F in the case of a restart. If T_{avg} decreases below 500°F, restart is not permitted by this specification.

3.7.6 In the event that all conditions of Specification 3.7.1 are met, both Keowee units may be made unavailable for planned tests or maintenance and the reactor shall be permitted to remain critical

for periods not to exceed 72 hours provided the 4160 volt standby buses are energized by one of the Lee gas turbines through the 100 KV transmission circuits. The Lee gas turbine and the 100 KV transmission circuit shall be completely separate from the system grid and non-safety-related loads.

3.7.7 Any degradation beyond Specification 3.7.2, 3.7.4, 3.7.5, or 3.7.6 above shall be reported to the Office of Inspection and Enforcement, Region II, within 24 hours. A safety evaluation shall be performed by Duke Power Company for the specific situation involved which justifies the safest course of action to be taken. The results of this evaluation together with plans for expediting the return to the unrestricted operating conditions of Specification 3.7.1 above shall be submitted in a written report to the Office of Nuclear Reactor Regulation with a copy to the Office of Inspection and Enforcement, Region II, within five days.

Bases

The auxiliary electrical power system are designed to supply the required Engineered Safeguards loads in one unit and safe shutdown loads of the other two units and are so arranged that no single contingency can inactivate enough engineered safety features to jeopardize plant safety. These systems were designed to meet the following criteria:

> "Alternate power systems shall be provided and designed with adequate independency, redundancy, capacity and testability to permit the functions required of the engineered safety features of each unit."

The auxiliary power system meets the above criteria and the intent of AEC Criterion 17. The adequacies of the AC and DC systems are discussed below as are the bases for permitting degraded conditions for AC power.

Capacity of AC Systems

The auxiliaries of two units in hot shutdown (6.0 MVa each) plus the auxiliaries activated by ESG signal in the other unit (4.8 MVa) require a total AC power capacity of 16.8 MVa. The continuous AC power capacity available from the on-site power systems (Keowee Hydro Units) is 20 MVa (limited by transformer CT4) if furnished by the underground circuit or 30 MVa (limited by CT1 or CT2) if furnished through the 230 kV off-site transmission lines. Capacity available from the backup 100 kV off-site transmission line (Lee Station Gas Turbine Generator) is 20 MVa (limited by CT5).

Thus, the minimum available capacity from any one of the multiple sources of AC power, 20 MVa, is adequate.

Capacity of DC Systems

Normally, for each unit AC power is rectified and supplies the DC system buses as well as keeping the storage batteries on these buses in a charged state. Upon loss of this normal AC source of power, each unit's DC auxiliary systems important to reactor safety have adequate stored capacity (ampere-hours) to independently supply their required emergency loads for at least one hour. One hour is considered to be conservative since there are redundant sources of AC power providing energy to these DC auxiliary systems. The loss of all AC power to any DC system is expected to occur very infrequently, and for very short periods of time. The following tabulation demonstrates the margin of installed battery charger rating and battery capacity when compared to one hour of operation (a) with AC power (in amps) and (b) without AC power (in ampere hours) for each of the three safety-related DC systems installed at Oconee:

A. 125 VDC Instrumentation and Control Power System

Charger XCA, XCB, or XCS	a. 600 amps each
Battery 1CA and 1CB Combined Capacity (X = 1, 2, or 3)	b. 698 ampere-hours
Actual active loads on both 125 VDC I & C buses XDCA and XDCB during 1st hour of LOCA (X = 1, 2, or 3)	a. First min. - 1371 amps next 59 min. - 568.5 amps
	b. 581.9 ampere-hours

B. 125 VDC Switching Station Power System

Charger SY-1, SY-2, or SY-S Rating	a. 50 amps each
Battery SY-1 or SY-2 Capacity	b. 14.4 ampere-hours

Actual active load per battery during 1st hour of LOCA	a. First min. - 130 amps next 59 min. - 10 amps b. 12 ampere-hours

C. 125 VDC Keowee Station Power System

Charger No. 1, No. 2 or Standby Rating	a. 200 amps each
Battery No. 1 or No. 2 Capacity	b. 233 ampere-hours
Actual active load per battery during 1st hour of LOCA	a. First min. - 1031 amps next 59 min. - 179.4 amps b. 193.6 ampere-hours

Redundancy of AC Systems

There are three 4160 engineered safety feature switchgear buses per unit. Each bus can receive power from either of the two 4160 main feeder buses per unit. Each feeder bus in turn can receive power from the 230 kV switchyard through the startup transformers, through the unit auxiliary transformer by backfeeding through the main step-up transformer, or from the 4160V standby bus. Another unit's startup transformer serving as an alternate supply can be placed in service in one hour. The standby bus can receive power from the Hydro Station through the underground feeder circuit or from a combustion turbine generator at the Lee Steam Station over an isolated 100 kV transmission line. The 230 kV switchyard can receive power from the on-site Keowee Hydro station or from several off-site sources via transmission lines which connect the Oconee Station with the Duke Power system power distribution network.

Redundancy of DC Systems

A. 125 VDC Instrument and Control Power System

All reactor protection and engineered safety features loads on this system can be powered from either the Unit 1 and Unit 2 or Unit 2 and Unit 3 or Unit 3 and Unit 1 125 VDC Instrument and Control Power Buses. The units' 125 VDC Instrument and Control Power Buses can be powered from two battery banks and three battery chargers. As shown above, one battery (e.g., 1CA) can supply all loads for one hour. Also, one battery charger can supply all connected ESF and reactor protection loads.

B. 125 VDC Switching Station Power System

There are two essentially independent subsystems each complete with an AC/DC power supply (battery charger), a battery bank, a battery charger bus, motor control center (distribution panel). All safety-related equipment and the relay house in which it is located are Class I (seismic) design. Each subsystem provides the necessary DC power to:

a. Continuously monitor operations of the protective relaying,

b. Isolate Oconee (including Keowee) from all external 230 kV grid faults,

c. Connect on-site power to Oconee from a Keowee hydro unit or,

d. Restore off-site power to Oconee from non-faulted portions of the external 230 kV grid.

Provisions are included to manually connect a standby battery charger to either battery/charger bus.

C. 125 VDC Keowee Station Power System

There are essentially two independent physically separated Class I (seismic) subsystems, each complete with an AC/DC power supply (charger) a battery bank, a battery/charger bus and a DC distribution center. Each subsystem provides the necessary power to automatically or manually start, control and protect one of the hydro units.

An open or short in any one battery, charger or DC distribution center cannot cause loss of both hydro units.

The 230 KV and 500 KV sources, while expected to have excellent availability, are not under the direct control of the Oconee station and, based on past experience, cannot be assumed to be available at all times.

The operation of the on-site hydro-station is under the direct control of the Oconee Station and requires no off-site power to startup. Therefore, an on-site backup source of auxiliary power not subject to failure from the same cause as off-site power is provided in the form of twin hydro-electric turbine generators powered through a common penstock by water taken from Lake Keowee. The use of a common penstock is justified on the basis of past hydro plant experience of the Duke Power Company (since 1919) which indicates that the cumulative need to dewater the penstock can be expected to be limited to about one day a year, principally for inspection, plus perhaps four days every tenth year.

In instances in which extended maintenance is required for one Keowee hydro unit, the remaining hydro unit will be available for service through the underground feeder circuit and the Lee gas turbine will be in operation through the isolated 100 kV transmission circuit.

In the event that only one hydro unit is available to backup the off-site power sources, continued power operation is acceptable since the operability of the remaining Keowee unit is immediately verified and verified periodically thereafter. If the hydro unit is unavailable longer than 72 hours, the Lee gas turbine will be placed in operation on the isolated 100 kV transmission circuit to assure a continued supply of shutdown power in the event that an external event should cause loss of all off-site power.

In a similar manner, in the event that none of the sources of off-site power are available and it is considered important to continue to maintain an Oconee Unit reactor critical or return it to criticality from a hot shutdown condition, a Lee Station gas turbine can be made available as an additional backup source of power, thus assuring continued availability as an auxiliary power to perform an orderly shutdown of a unit should a problem develop requiring shutdown of both hydro units.

Infrequent instances exist in which both Keowee hydro units must be removed from service for short periods of time to perform inspections or maintenance. These are controlled evolutions in which the Lee gas turbine will be in operation prior to the removal from service of the hydro units. Additionally, availability of the 230 kV and 500 kV offsite power sources, startup transformers, and weather conditions will be evaluated prior to commencement of the inspection or maintenance.

In the rare occasion where both hydro units are unexpectedly lost there may be compelling reasons to maintain the Oconee reactors critical or return them to criticality from hot shutdown conditions for a specific period of time rather than require it to remain subcritical or be shut down. Factors to consider in justification of such a rare, limited period of criticality without the hydro station available would include number of off-site 230 kV and 500 kV power sources available, availability of the other unit's startup transformer, availability of the Lee gas turbine, weather conditions and all other factors which could bear on potential for loss of these power sources. Also, the evaluation should show that reactor safety will not be compromised if during operation under such further degradation, an additional loss of AC power should be suffered.