



LICENSE AUTHORITY FILE
UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

March 2, 1984

Dockets Nos. 50-269, 50-270
and 50-287

DO NOT REMOVE

Posted
Amdt. 127
to DPR-47

Mr. Hal B. Tucker
Vice President - Steam Production
Duke Power Company
Post Office Box 33189
422 South Church Street
Charlotte, North Carolina 28242

Dear Mr. Tucker:

The Commission has issued the enclosed Amendments Nos. 127, 127, and 124 to Facility Operating Licenses Nos. DPR-38, DPR-47 and DPR-55 for the Oconee Nuclear Station, Units Nos. 1, 2 and 3. These amendments consist of changes to the Station's common Technical Specifications (TSs) in response to your request dated March 17, 1983.

These amendments revise the TSs to implement Limiting Conditions for Operation in the event one startup transformer is out of service. The open issue identified in my March 21, 1983 letter to you, namely the distribution of voltages at the safety buses when one unit startup transformer is shared between two units, is considered closed with the issuance of these amendments.

A copy of the Safety Evaluation is also enclosed. Notice of Issuance of the enclosed amendments will be included in the Commission's monthly notice.

Sincerely,

John F. Stolz, Chief
Operating Reactors Branch No. 4
Division of Licensing

Enclosures:

1. Amendment No. 127 to DPR-38
2. Amendment No. 127 to DPR-47
3. Amendment No. 124 to DPR-55
4. Safety Evaluation

cc: w/enclosures
See next page

Duke Power Company

cc w/enclosure(s):

Mr. William L. Porter
Duke Power Company
P. O. Box 33189
422 South Church Street
Charlotte, North Carolina 28242

Office of Intergovernmental Relations
116 West Jones Street
Raleigh, North Carolina 27603

Honorable James M. Phinney
County Supervisor of Oconee County
Walhalla, South Carolina 29621

Mr. James P. O'Reilly, Regional Administrator
U. S. Nuclear Regulatory Commission, Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30303

Heyward G. Shealy, Chief
Bureau of Radiological Health
South Carolina Department of Health
and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

Regional Radiation Representative
EPA Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30308

Mr. J. C. Bryant
Senior Resident Inspector
U.S. Nuclear Regulatory Commission
Route 2, Box 610
Seneca, South Carolina 29678

Mr. Robert B. Borsum
Babcock & Wilcox
Nuclear Power Generation Division
Suite 220, 7910 Woodmont Avenue
Bethesda, Maryland 20814

Manager, LIS
NUS Corporation
2536 Countryside Boulevard
Clearwater, Florida 33515

J. Michael McGarry, III, Esq.
Bishop, Liberman, Cook, Purcell & Reynolds
1200 17th Street, N.W.
Washington, D. C. 20036



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

DUKE POWER COMPANY

DOCKET NO. 50-269

OCONEE NUCLEAR STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 127
License No. DPR-38

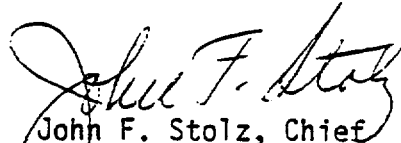
1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Duke Power Company (the licensee) dated March 17, 1983, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations 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;
 - 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 amended by 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:

3.B Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 127 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 the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



John F. Stolz, Chief
Operating Reactors Branch No. 4
Division of Licensing

Attachment:
Changes to the Technical
Specifications

Date of Issuance: March 2, 1984



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

DUKE POWER COMPANY

DOCKET NO. 50-270

OCONEE NUCLEAR STATION, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 127
License No. DPR-47

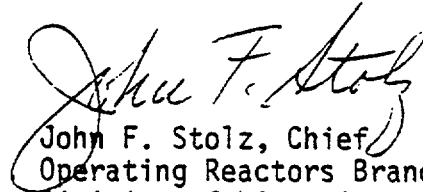
1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Duke Power Company (the licensee) dated March 17, 1983, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations 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;
 - 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 amended by 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:

3.B Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 127 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 the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



John F. Stolz, Chief
Operating Reactors Branch No. 4
Division of Licensing

Attachment:
Changes to the Technical
Specifications

Date of Issuance: March 2, 1984



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

DUKE POWER COMPANY

DOCKET NO. 50-287

OCONEE NUCLEAR STATION, UNIT NO. 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 124
License No. DPR-55

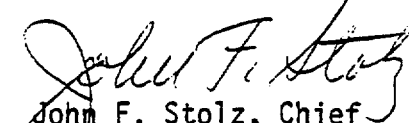
1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Duke Power Company (the licensee) dated March 17, 1983, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations 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;
 - 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 amended by 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:

3.B Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 124 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 the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION


John F. Stolz, Chief
Operating Reactors Branch No. 4
Division of Licensing

Attachment:
Changes to the Technical
Specifications

Date of Issuance: March 2, 1984

ATTACHMENTS TO LICENSE AMENDMENTS

AMENDMENT NO. 127 TO DPR-38

AMENDMENT NO. 127 TO DPR-47

AMENDMENT NO. 124 TO DPR-55

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

Replace the following pages of the Appendix "A" Technical Specifications with the attached pages. The revised pages are identified by amendment numbers and contain vertical lines indicating the area of change.

Remove Pages

Insert Pages

vi
3.7-1
3.7-2
3.7-4
3.7-5
3.7-6
3.7-7
3.7-8
3.7-9
3.7-10
3.7-11
3.7-12
3.7-13
3.7-14

vi
3.7-1
3.7-2
3.7-4
3.7-5
3.7-6
3.7-7
3.7-8
3.7-9
3.7-10
3.7-11
3.7-12
3.7-13
3.7-14

LIST OF TABLES

<u>Table No.</u>		<u>Page</u>
2.3-1A	Reactor Protective System Trip Setting Limits - Unit 1	2.3-11
2.3-1B	Reactor Protective System Trip Setting Limits - Unit 2	2.3-12
2.3-1C	Reactor Protective System Trip Setting Limits - Unit 3	2.3-13
3.5-1-1	Instruments Operating Conditions	3.5-4
3.5-1	Quadrant Power Tilt Limits	3.5-14
3.5.5-1	Liquid Effluent Monitoring Instrumentation Operating Conditions	3.5-36
3.5.5-2	Gaseous Process and Effluent Monitoring Instrumentation Operating Conditions	3.5-38
3.7-1	Operability Requirements for the Emergency Power Switching Logic Circuits	3.7-14
3.17-1	Fire Protection & Detection Systems	3.17-5
4.1-1	Instrument Surveillance Requirements	4.1-3
4.1-2	Minimum Equipment Test Frequency	4.1-9
4.1-3	Minimum Sampling Frequency and Analysis Program	4.1-10
4.1-4	Radioactive Effluent Monitoring Instrumentation Surveillance Requirements	4.1-16
4.2-1	Oconee Nuclear Station Capsule Assembly Withdrawal Schedule at Crystal River Unit No. 3	4.2-3
4.4-1	List of Penetrations with 10 CFR 50 Appendix J Test Requirements	4.4-6
4.11-1	Radiological Environmental Monitoring Program	4.11-3
4.11-2	Maximum Values for the Lower Limits of Detection (LLD)	4.11-5
4.11-3	Reporting Levels for Radioactivity Concentrations in Environmental Samples	4.11-8
4.17-1	Steam Generator Tube Inspection	4.17-6
6.1-1	Minimum Operating Shift Requirements with Fuel in Three Reactor Vessels	6.1-6

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.

Specifications

- 3.7.1 Except as permitted by 3.7.2, 3.7.3, 3.7.4, 3.7.5, 3.7.6, 3.7.7, and 3.7.8, the reactor shall not be above 200°F unless the following conditions are met.
- (a) At least two 230KV transmission lines, on separate towers, shall be in service.
 - (b) Two independent on-site emergency power paths shall be operable and shall consist of:
 - 1. One Keowee hydro unit; through the underground feeder path; through transformer CT4; and to one 4160V standby bus.
 - 2. The second Keowee hydro unit; through the Keowee main step-up transformer; through the overhead path and breaker PCB9; the 230KV switchyard yellow bus and safety related PCB-18, -27, or -30; through the respective operating unit's startup transformer (CT-1, 2, or 3) or the aligned and connected alternate startup transformer. One startup transformer may not be aligned to supply power to more than one unit.
 - (c) The Emergency Power Switching Logic (EPSL) circuitry shall be operable as specified by the conditions of Table 3.7-1 for normal operation. Furthermore, if the reactor is subcritical, the conditions of Table 3.7-1 for normal operation shall be satisfied before the reactor is returned to criticality.
 - (d) Two 4160 volt main feeder buses shall be energized.
 - (e) The three 4160 volt Engineered Safety Features switchgear buses (TC, TD, and TE), three 600 volt load centers (X8, 9, and 10), and the three 600-208 volt Engineered Safety Features MCC Buses shall be energized.
 - (f) For each unit, the 125 VDC Instrumentation and Control Power System shall be operable as specified below:

1. Both 125 VDC instrumentation and control distribution centers (DCA and DCB);
2. All four 125 VDC instrumentation and control panelboards (DIA, DIB, DIC, and DID), including the associated isolating transfer diodes and diode monitors (ADA 1 & 2, ADB 1 & 2, ADC 1 & 2, ADD 1 & 2);
3. All four 120 VAC vital instrumentation power panelboards (KVIA, KVIB, KVIC, and KVID), including the associated static inverters;
4. The 240/120 VAC regulated power panelboard (KRA).

Additionally, the 125 VDC instrumentation and control batteries with an associated charger shall be operable as follows:

1. For operation of Unit 1 only, 1CA or 1CB, and 3CA and 2CB
Unit 2 only, 2CA or 2CB, and 3CA and 3CB
Unit 3 only, 3CA or 3CB, and 1CA and 1CB
 2. For operation of any two units, 1CA or 1CB, 2CA or 2CB, and 3CA or 3CB.
 3. For operation of all three units, five of the six batteries with their associated chargers.
- (g) Both of the 125 VDC 230KV switching station batteries (SY-1, SY-2), with associated chargers, distribution centers, and panelboards shall be operable.
- (h) Both of the 125 VDC Keowee batteries (Bank 1 & 2) with associated chargers and distribution centers (1DA & 2DA) shall be operable.
- (i) The level of Keowee Reservoir shall be at least 775 feet above sea level.

3.7.2 With the reactor above 200°F, provisions of 3.7.1 may be modified to allow the following conditions to exist:

- (a) One of the two independent on-site emergency power paths, as defined in 3.7.1(b), may be inoperable for periods not exceeding 72 hours for test or maintenance, provided the alternate power path is verified operable within one hour of the loss and every eight hours thereafter.
- (b) The circuits or channels of any single functional unit of the EPSL may be inoperable for test or maintenance for periods not exceeding 24 hours, provided that:
 1. The conditions of Table 3.7-1 for degraded operation are satisfied for that specific functional unit; and
 2. The conditions of Table 3.7-1 for normal operation are satisfied for all other functional units.

an equalizer charge after the surveillance requirements of Specification 4.6.10.

1. 230 KV Switching Station 12SVDC Power System
 2. Keowee Hydro Station 12SVDC Power System
 3. Each unit's 12SVDC Instrumentation and Control Power System, provided that the unit's remaining battery is operable. However, for operation of 1 or 2 units, no more batteries than those allowed to be inoperable per 3.7.1 (f) may be removed from service. For operation of 3 units, at least 4 of the 6 station I&C batteries shall be operable.
- (h) One 120 VAC vital instrumentation power panelboard per unit and/or its associated static inverter may be inoperable for periods as specified below:

<u>Panelboard</u>	<u>Maximum Allowed Period of Inoperability</u>
KVIA	4 hours
KVIB	4 hours
KVIC	24 hours
KVID	24 hours

A single vital bus static inverter per unit may continue to be inoperable beyond the specified period, but no longer than 7 days total, provided that its associated 120 VAC vital instrumentation power panelboard is connected to the 240/120 VAC Regulated Power System and verified to be operable once every 24 hours.

- (i)
1. A startup transformer may be inoperable for periods not exceeding 72 hours for test or maintenance, provided the underground feeder path, through transformer CT4; and to one 4160V standby bus is verified operable within one hour of loss and every eight hours thereafter. The remaining operable startup transformers can be shared between units within the same 72 hours of the above startup transformer being determined inoperable. Prior to exceeding 72 hours, they shall be aligned and connected such that each one is providing a path for power to one and only one unit.
 2. In the event that a startup transformer becomes inoperable for unplanned reasons, then one unit shall be in cold shut-down within 72 hours with its loads powered from the standby buses. The remaining operable startup transformers can be shared between units within the same 72 hours of the above startup transformer being determined inoperable. Prior to exceeding 72 hours, they shall be aligned and connected such that each one is providing a path for power to one and only one unit.

3.7.3 In the event that the conditions of Specifications 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, 3.7.7, and 3.7.8, the reactor shall be placed in a hot shutdown condition within 12 hours. If these requirements 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 one of the two Keowee hydro units is expected to be unavailable for longer than the test or maintenance period of 72 hours, the reactor may be heated above 200°F if previously shutdown or be permitted to remain critical or be restarted provided the following restrictions are observed.

- (a) Prior to heating the reactor above 200°F or prior to the restart of a shutdown reactor or within 72 hours of the loss of one Keowee hydro unit, the 4160 volt standby buses shall be energized by a Lee gas turbine through the 100 kV circuit. The Lee gas turbine and 100 kV transmission circuit shall be electrically separate from the system grid and offsite non-safety-related loads.
- (b) The remaining Keowee hydro unit shall be connected to the underground feeder circuit and this path shall be verified operable within 1 hour and weekly thereafter.
- (c) The remaining Keowee hydro unit shall be available to the overhead transmission circuit but generation of the system grid shall be prohibited except for periods of test.
- (d) Operation in this mode is restricted to periods not to exceed 45 days and the provisions of this specification may be utilized without prior NRC approval only once in three years for each Keowee hydro unit. The U.S. NRC Regional Office, Region II, will be notified within 24 hours.

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 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 100kV transmission circuit shall be completely separate from the system grid and offsite non-safety-related loads.
- (b) The reactor coolant T_{avg} shall be above 525°F. Reactor coolant pump power may be used ^{avg} to elevate the temperature from 500°F to 525° in the case of restart. If T_{avg} decreases below 500°F, restart is not permitted by this specification.

- (c) If all 230 kV transmission lines are lost, restore at least one of the inoperable 230 kV offsite sources to operable status within 24 hours or be in at least hot standby within the next 6 hours. With only one offsite source restored, restore at least two 230 kV offsite circuits to operable status within 72 hours from time of initial loss or be in at least hot standby within the next 6 hours and in cold shutdown within the following 30 hours.
- (d) After loss of all 230 kV transmission lines, this information shall be reported within 24 hours to the U.S. NRC Regional Office, Region II. If the outage is expected to exceed 24 hours, a written report shall be submitted detailing the circumstances of the outage and the estimated time to return the 230 kV transmission lines to operating condition.

3.7.6 In the event that all conditions of Specification 3.7.1 are met, and planned tests or maintenance are required which will make both Keowee units unavailable, the 4160 volt standby buses shall first be energized by a Lee gas turbine through the 100 kV transmission circuit and shall be separate from the system grid and offsite non-safety-related loads. The reactor shall then be permitted to remain critical for periods not to exceed 72 hours with both Keowee units unavailable.

Prior to hot restart of a reactor from a tripped condition, the causes and the effects of the shutdown shall be established and analyzed. A restart will be permitted if the cause of such trips is the result of error or of minor equipment malfunctions. A restart will not be permitted if the trip is a result of system transients or valid protection system action.

3.7.7 In the event that all conditions of Specification 3.7.1 are met except that both Keowee hydro units become unavailable for unplanned reasons, the reactor shall be permitted to remain critical for periods not to exceed 24 hours provided the 4160 volt standby buses are energized within 1 hour by the Lee gas turbine through the 100 kV transmission circuit and it shall be separate from the system grid and all offsite non safety-related loads.

Prior to hot restart of a reactor from a tripped condition, the causes and the effects of the shutdown shall be established and analyzed. A restart will be permitted if the cause of such trips is the result of error or of minor equipment malfunctions. A restart will not be permitted if the trip is a result of system transients or valid protection system action.

3.7.8 In the event that all conditions in Specification 3.7.1 are met except that the Keowee Main Step-up Transformer is expected to be unavailable for longer than the test or maintenance period of 72 hours, as allowed by 3.7.2(a), the reactor may be heated above 200 degrees F if previously shutdown or be permitted to remain critical or be restarted provided the following restrictions are observed:

- (a) Prior to heating the reactor above 200 degrees F or prior to the restart of a shutdown reactor or within 72 hours of the loss of the Keowee Main Step-up Transformer, the 4160 volt standby buses shall be energized by a Lee gas turbine through the 100kV circuit. The Lee gas turbine and 100kV transmission circuit shall be electrically separate from the system grid and off-site and non-safety-related loads.
- (b) A Keowee hydro unit shall be connected to the underground feeder circuit and this path shall be verified operable within 1 hour and weekly thereafter.
- (c) The remaining Keowee Hydro Unit shall be available to the underground feeder circuit.
- (d) Operating in this mode is restricted to periods not to exceed 28 days and the provisions of this specification may be utilized without prior NRC approval. The U.S. NRC Regional Office, Region II, will be notified within 24 hours.

3.7.9 Any degradation beyond Specifications 3.7.2, 3.7.4, 3.7.5, 3.7.6, 3.7.7, and 3.7.8 above shall be reported to the U.S. NRC Regional Office, 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 U.S. NRC Regional Office, Region II, within five days.

Bases

The auxiliary electrical power systems 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 Criterion 17 of Appendix A to 10 CFR Part 50. 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 (6.0MVA each) plus the auxiliaries activated by ESG signal in the other unit (4.3 MVA) require a total AC power capacity of 16.3 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.

The adequacy of the Oconee electrical distribution system voltages has been evaluated. Under the conservative assumptions of the analysis, it has been established that a single startup transformer should not be shared between two operating units. In the event a startup transformer becomes inoperable, it effectively causes one onsite emergency power path to the affected unit to become inoperable. The time frames for the degraded mode of an inoperable startup transformer are thus consistent with those for an inoperable onsite emergency power path. Because the preferred mode of unit shutdown is with reactor coolant pumps providing forced circulation and because of the low likelihood of an accident during a 72 hour period, the unit which is being shut down is allowed to share a startup transformer with another unit until the unit is in cold shutdown with loads being powered from the standby buses.

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 XCA or XCB Capacity (X = 1, 2, or 3)	b. 600 ampere-hours each
Combined total connected loads on both 125 VDC	a. Inrush (2 sec) - 1160 amps
I & C buses XDCA and XDCE during 1st hour of LOCA (x = 1, 2, or 3)	next 59 min. - 506 amps b. 516.9 ampere-hours

B. 125 VDC Switching Station Power System

Charger SY-1, SY-2, or SY-3 Rating	a. 50 amps each
Battery SY-1 or SY-2 Capacity	b. 14.4 ampere-hours
Active load per battery during 1st hour of LOCA	a. Inrush (2 seconds) - 130 amps next 59 min. - 10 amps

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). Except for the support racks for the batteries, all safety-related equipment and the relay house in which it is located are seismic Category I design. The support racks for the batteries will be upgraded to seismic Category I as soon as possible. Each sub-system 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 seismic Category I 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 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. However, the operation of the onsite hydro-station is under the direct control of the Oconee Station and requires no offsite power to startup. Therefore, an onsite backup source of auxiliary 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.

Operation with one Keowee Hydro unit out of service for periods less than 72 hours is permitted. The operability of the remaining Keowee hydro unit is verified within one hour by starting the unit and energizing the standby buses through the underground feeder circuit. This action is repeated once every eight hours thereafter until the Keowee hydro unit is restored to service and will provide additional assurance of the operability of the remaining unit.

Provisions have been established for those conditions in which long term preventative maintenance of a Keowee Hydro unit are necessary. The primary long term maintenance items are expected to be hydro turbine runner and discharge ring welding repairs which are estimated to be necessary every six to eight years. Also, generator thrust and guide bearing replacements will be necessary. Other items which manifest as failures are expected to be extremely rare and could possibly be performed during the permitted maintenance periods. Time periods of up to 45 days for each Keowee Hydro unit are permitted every three years. During these outages the remaining Keowee Hydro unit will be verified to be operable within one hour and weekly thereafter by starting the unit and energizing the underground feeder circuit. The remaining Keowee hydro unit will also be available through the overhead transmission path and will not be used for system peaking. Additionally, the standby buses will be energized continuously by one of the Lee gas turbines through the 100 kV transmission circuits.

This transmission circuit would be electrically separated from the system grid and all off-site non-safety-related loads. This arrangement provides a high degree of reliability for the emergency power systems.

Operation with both Keowee Hydro units out of service is permitted for planned or unplanned outages for periods of 72 or 24 hours respectively. Planned outages are necessary for the inspection of common underwater areas such as the penstock and to enable the removal of one Keowee unit from service. This would be a controlled evolution in which the availability and condition of the offsite grid, startup transformers and weather would be evaluated and a Lee gas turbine would be placed in operation on the isolated 100 kV transmission line prior to commencement of the outage.

A time period of 24 hours for unplanned outages of both Keowee units is acceptable since a Lee gas turbine will be started within one hour and will energize the standby buses through the dedicated 100 kV transmission line. This period of time is reasonable to determine and rectify the situation which caused the loss of both Keowee units.

If the overhead power path from Keowee is inoperable for more than 72 hours due to an extended outage of the Keowee main step-up transformer, operation is permitted provided that certain actions are taken to ensure the quick availability of emergency power. These actions include: continuous energization of the standby buses by a Lee gas turbine through the 100kV transmission circuits; connection of a Keowee unit to the underground feeder path and periodic verification of its operability; and, availability of the remaining Keowee unit to the underground feeder path. Operation in this mode is permitted for a maximum of 28 days, which allows a reasonable period of time to remove the existing transformer and install a replacement.

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 reactor critical or return it to criticality from a hot shutdown condition, one of the Lee gas turbines 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.

Emergency Power Switching Logic Circuits

The Emergency Power Switching Logic (EPSL) in conjunction with its associated circuits, is designed with sufficient redundancy to assure that power is supplied to the unit Main Feeder Buses and, hence, to the unit's essential loads, under accident conditions. The logic system monitors the normal and emergency power sources and, upon loss of the normal power source (the unit auxiliary transformer), the logic will seek an alternate source of power.

Operation of the unit with certain circuits or channels of the EPSL inoperable for test or maintenance is permitted for periods of up to 24 hours, provided that the inoperable circuits/channels are in only one portion, or functional unit, of the EPSL and provided that a sufficient number of circuits/channels in the affected functional unit remain operable such that the functional unit does not lose its ability to perform its designed safety function. These provisions ensure that only one portion of the EPSL is degraded at a time for test or maintenance and that the affected portion remains operable although degraded.

If the circuits or channels of more than one functional unit are inoperable, continued operation is permitted provided that the inoperability results from a loss of power due to the inoperability of a 125 VDC instrumentation and control panelboard. In addition, the affected functional units must remain capable of performing their designed safety functions in spite of the inoperable circuits/channels. By itself, the inoperability of a 125 VDC instrumentation and control panelboard will not cause the complete loss of any EPSL functional unit. It will, however, degrade some of the functional units because of the resulting loss of power to some of the circuits/channels. If other circuits/channels of the EPSL functional units are already inoperable, then a 125 VDC instrumentation and control panelboard becoming inoperable could cause a loss of function in portions of the EPSL. For that reason, operation is permitted with an inoperable panelboard only if the EPSL was not in a degraded mode prior to the panelboard becoming inoperable.

In the event that the EPSL is in a degraded mode while the reactor is subcritical, a return to criticality may not be made until the EPSL is returned to a normal operational status. This ensures the availability of the EPSL during all reactor startups.

120 VAC Vital Instrument Power Panelboards

For each unit, four redundant 120 VAC vital instrument power panelboards are provided to supply power in a predetermined arrangement to vital power, instrumentation, and control loads under all operating conditions. Each panelboard is supplied power separately from a static inverter connected to one of the four 125 VDC instrumentation and control power panelboards. In addition, a tie with breakers is provided to each of the 120 VAC vital panelboards from the alternate 120 VAC regulated bus to provide backup for each vital panelboard and to permit servicing of the inverters.

For each unit, each of the four redundant channels of the nuclear instrumentation and reactor protective system (RPS) equipment is supplied power from a separate 120 VAC vital panelboard. Also for each unit, each of the three redundant engineered safety features actuation system (ESFAS) analog channels and each of the two redundant ESFAS digital channels are powered from separate vital panelboards.

The period allowed for corrective action on an inoperable vital panelboard depends on the loads carried by the affected panelboard. For example, panelboards KVIA and KVIB are allowed to be inoperable for only four hours because they provide power to the digital ESFAS channels, which are in turn allowed to be inoperable for only four hours by Technical Specification 3.5.1. In contrast, panelboards KVIC and KVID carry loads which do not necessarily become inoperable upon loss of power (e.g., RPS channels and ESFAS analog channels go to a tripped state upon loss of power) and thus do not necessitate immediate corrective action. Thus, these panelboards have been limited to a period of inoperability which does not exceed that allowed for their normal source of power, the 125 VDC instrumentation and control panelboards.

In the event that failure of a static inverter results in the inoperability of its associated vital panelboard, the affected panelboard may be tied to the 240/120 VAC regulated power system and unit operation may continue for seven days. This specification allows sufficient time for the inverter to be repaired without penalizing unit operation by permitting the use of alternate power sources.

TABLE 3.7-1

OPERABILITY REQUIREMENTS FOR THE
EMERGENCY POWER SWITCHING LOGIC CIRCUITS

Functional Unit	Minimum Operable Circuits/Channels	
	Normal Operation Per Spec 3.7.1(c)	Degraded Operation Per Spec 3.7.2(b)
1. Normal Source Voltage Sensing Circuits (One per Phase)	3	2
2. Startup Source Voltage Sensing Circuits (One per Phase)	3	2
3. Standby Bus Voltage Sensing Circuits (One per Phase on each bus)	6	4 ^a
4. Main Feeder Bus Undervoltage Relays (Three per bus)	6	4 ^a
5. Load Shed and Transfer to Standby Circuits (Channels A and B)	2	1
6. Keowee Emergency Start Circuit (Channels A and B)	2	1
7. Normal Source Breakers N1 and N2 Control Circuitry	4 ^b	2 ^c
8. Startup Source Breakers E1 and E2 Control Circuitry	4 ^b	2 ^c
9. Standby Bus to Main Feeder Bus Breakers, S1 and S2, Control Circuitry (Including Retransfer to Startup Circuits)	4 ^b	2 ^c
10. Standby Bus Keowee Feeder Breakers, SK1 and SK2, Control Circuitry	4 ^b	2 ^c

Notes: a. 2 per bus.
b. 1 primary and 1 secondary* for each breaker.
c. 1 primary and 1 secondary* on the same breaker.

*A primary circuit includes the closing coil and one trip coil. A secondary circuit includes only one trip coil.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
SUPPORTING AMENDMENT NO. 127 TO FACILITY OPERATING LICENSE NO. DPR-38

AMENDMENT NO. 127 TO FACILITY OPERATING LICENSE NO. DPR-47

AMENDMENT NO. 124 TO FACILITY OPERATING LICENSE NO. DPR-55

DUKE POWER COMPANY

OCONEE NUCLEAR STATION, UNITS NOS. 1, 2, AND 3

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

INTRODUCTION

The NRC staff previously reviewed and found acceptable the Adequacy of Station Electric Distribution System Voltages for Oconee Nuclear Station, Units Nos. 1, 2 and 3. The staff's Safety Evaluation and associated Technical Evaluation Report were transmitted to Duke Power Company (DPC or the licensee) via correspondence dated March 21, 1983. The voltage analysis submitted by DPC as part of the documentation to be reviewed by the staff indicated that when a unit startup transformer is shared between two or more generating units, the distribution voltages at the safety buses become unacceptable. DPC agreed to implement Technical Specification (TS) changes which would prohibit the connection of more than one generating unit's load to a single startup transformer.

EVALUATION

In a letter dated March 17, 1983, DPC submitted proposed TS changes which incorporate Limiting Conditions for Operation in the event of loss of a startup transformer. The limiting conditions are:

1. Technical Specification paragraph 3.7.2(i)1 states a startup transformer may be inoperable for a period not to exceed 72 hours for test or maintenance provided the underground feeder from Keowee Hydro Station, Transformer CT4 and one 4160V standby bus is verified operable within one hour of loss of the transformer, and every eight hours thereafter. During the above 72 hours, the remaining operable startup transformers can be shared between units. However, prior to exceeding 72 hours, each unit must be aligned only to its assigned startup transformer.
2. Technical Specification paragraph 3.7.2(i)2 states that in the event a startup transformer is disabled due to an unplanned reason, one unit shall be placed in cold shutdown within 72 hours with its loads powered from the standby buses. The remaining operable startup transformers can be shared between generating units during the same 72 hours. However, prior to exceeding 72 hours, each unit must be aligned only to its assigned startup transformer.

SUMMARY

The above proposed TS changes, when implemented, will assure adequate distribution of voltages at the Class IE buses in the event of loss of a startup transformer. We, therefore, find the proposed TS changes acceptable.

ENVIRONMENTAL CONSIDERATION

We have determined that the amendments do not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendments involve an action which is insignificant from the standpoint of environmental impact, and pursuant to 10 CFR §51.5(d)(4), that an environmental impact statement, or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of these amendments.

CONCLUSION

We have 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, and (2) such activities will be conducted in compliance with the Commission's regulations and the issuance of these amendments will not be inimical to the common defense and security or to the health and safety of the public.

Dated: March 2, 1984

Principal Contributors:
H. Emami and J. Suermann