Attachment 4

Oconee Units 1, 2 and 3 Technical Specifications

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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 re-start of a shutdown reactor or within 72 hours of the loss of any one of the following:

1) Keowee Main Step-up Transformer (including both Keowee Auxiliary Transformers);
2) Both Keowee Auxiliary Transformers (1X and 2X);
3) Keowee Backup Auxiliary Transformer (CX);

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 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 overhead if using this Specification due to Keowee Backup Transformer (CX) unavailability. Generation to the system grid shall be prohibited except for periods of test.

If the overhead path is unavailable, the remaining Keowee Hydro Unit must be operable and 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~~ Energy Corporation 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:

In addition to the service test, the battery performance test may be conducted every 5 years (per IEEE standard 450), unless there are signs of degradation. Degradation is indicated when the battery capacity drops more than 10 percent of rated capacity from its average on previous performance tests, or is below 90 percent of manufacturer's rating. If there is degradation per above definition, the test should be conducted annually until the battery is replaced or until tests prove the battery is not in a degraded state.

Redundancy of AC Systems

There are three 4160 V engineered safety feature switchgear buses per unit. Each bus can receive power from either of the two 4160 V main feeder buses per unit. Each feeder bus in turn can receive power from the 230 kV switchyard through the start-up transformers, through the unit auxiliary transformer by backfeeding through the main step-up transformer, or from the 4160 V standby buses. Another unit's start-up transformer serving as an alternate supply can be placed in service in one hour.

Under normal unit auxiliary power system alignment, the main feeder buses shall be capable of receiving power automatically from:

1. The Keowee Unit aligned to the underground, through transformer CT-4, and through both standby buses; and

2. The redundant Keowee Unit, aligned through the overhead path; and through the respective Unit's startup transformer.

The standby buses 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~~ Energy Corporation system power distribution network.

In order to meet the single failure criteria for certain design basis scenarios, both standby buses (for the underground flow path), and both E_1 and E_2 breakers (for the overhead path) must be operable for the respective flow path to be considered operable.

Redundancy of DC System

A. 125 VDC Instrumentation and Control Power System

The 125 VDC Instrumentation and Control (I&C) Power System consists of two batteries, three battery chargers, and two I&C distribution centers per unit. 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 I&C distribution centers. The 125 VDC I&C distribution centers are normally supplied from their associated battery and charger. For one unit, in the event that only one of its batteries and associated chargers are operable, both I&C distribution centers will be tied together allowing operation of the DC loads from the unit's operable battery and charger. As shown above, one I&C battery (e.g., ICA) can supply both I&C distribution centers (e.g., IDCA and IDCB) and their associated

panelboard loads. Also, one of the three battery chargers for each unit can supply all connected ESF and reactor protection loads.

In order to find and correct a DC ground on the 125 VDC Instrumentation and Control system each unit's DC system must be separated from the other two units. This is due to the interconnected design of the system. With the backup function disabled, the units would be in a degraded mode but would in fact have all of its own DC system available if needed. Each unit's batteries either XCA or XCB is capable of carrying all the 125 VDC Instrumentation and Control loads on that unit.

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 seismic Category I design. 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 start up. 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~~ Energy Corporation (since 1919) which indicates that the cumulative need to dewater the penstock can be

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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 to CT-4. Credit can be taken for the operability of the SK and S breakers per the routine surveillance test. 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, both Keowee Auxiliary Transformers (1X and 2X), or Keowee Backup Auxiliary Transformer (CX) 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.

The power system of the Keowee Hydro station is designed to allow the alignment of each of the two units to the Oconee emergency power systems through either the underground feeder or the overhead path via the main step-up transformer. During an emergency start one of the Keowee units will be aligned to the underground feeder and the other to the overhead path. Each Keowee unit's 600 VAC auxiliaries are powered from the unit's generator through a 750KVA auxiliary transformer. Each auxiliary transformer is capable of handling auxiliary loads of both units. Unit's auxiliaries can be aligned to receive power from either transformer by a manual transfer capability at the load center level. A backup 750KVA auxiliary transformer (CX) is provided and powered from Oconee 4KV switchgear ITC through an underground feeder.

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Transformer CX is capable of backing up one or both unit's auxiliary transformers.

Each Keowee unit has a generation capacity of 87.5 MVA and the main step up transformer is rated for 230 MVA. This power capacity exceeds the Oconee emergency power requirements. In addition to supplying emergency power for Oconee, the Keowee Hydro units provide peaking power to the Duke ~~Power~~ Energy Corporation generation system. During periods of commercial power generation, the Keowee Hydro units are operated within the acceptable region of the Keowee Hydro operating restrictions. This will ensure that the Keowee Hydro units will be able to perform their emergency power functions from an initial condition of commercial power generation. The Keowee Hydro operating restrictions for commercial power generation are contained in the Selected Licensee Commitment manual. Changes to these operating restrictions would be performed in accordance with 10 CFR 50.59, which would include an evaluation to determine if any unreviewed safety questions exist.

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 on the EPSL and that the affected portion remains operable although degraded.

Emergency power system components (transformers, buses, Keowee Hydro Units, etc.) which become inoperable for testing or maintenance cause their associated circuitry (functional units) of the EPSL to become ineffective. Therefore, the operability of these associated functional units is irrelevant and not required. In these cases the controlling Technical Specification for the LCO will be the one associated with the inoperability of the emergency power system component(s). However, all other functional units unaffected by the inoperability of the emergency power system component(s) must meet the requirements of Table 3.7-1 to ensure the operability of the remaining emergency power system.

In the event a 125 VDC instrumentation and control power panelboard becomes inoperable (for planned or unplanned reasons) as allowed by Technical Specification 3.7.2(e) (4), circuits or channels of more than one functional unit of EPSL may become inoperable. In this case, continued operation is allowed under the LCO of T.S. 3.7.2(e) (4), provided that no functional units' circuits, etc., addressed by Table 3.7.1 are out of service, which would not have been out of service due to inoperability of the panelboard. This assures that no functional unit of Table 3.7.1 is degraded beyond the requirements for degraded operation, and that the EPSL is capable of performing its intended function.

≥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.

4.6.13 At least once every 18 months, the ability of the Keowee Hydro units to supply emergency power from an initial condition of commercial power generation shall be verified.

4.6.14 At least once every 18 months, the Keowee Hydro units load rejection response will be verified to be bounded by the design criteria used to develop the Keowee operating restrictions.

Bases

Energy Corporation

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

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Energy Corporation

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.

In order to ensure that the Keowee Hydro units are operable during periods of commercial power generation, the protection circuitry will be tested at least once every 18 months. This surveillance will ensure that the adverse effects of overspeed following a load rejection will be precluded and the appropriate emergency power paths will be aligned. In addition, the speed sensing governor failure logic will be verified during this surveillance. Failure to meet the acceptance criteria will be evaluated in the corrective action program to determine the impact on the operability of the emergency power paths. The Keowee Watt/Var meter, frequency relays, and governor magnetic speed switch will be calibrated prior to the performance of this surveillance.

A maximum power dual unit load rejection will be performed at least once every 18 months. This surveillance will verify that the Keowee Hydro units response to a load rejection is bounded by the design criteria used to develop the Keowee operating restrictions. The design criteria are defined in the calculation that determines the Keowee operating restrictions. A power level for the dual unit load rejection will be defined based on the operating conditions for the day of the test. In addition, a revision of the operating restrictions for simultaneous operation of both Keowee units will require that a maximum power dual unit load rejection test be performed prior to implementing the revision. A revision of the operating restrictions for a single Keowee unit will require only a maximum power single unit load rejection as defined by the conditions for the day of the test. However, if a load rejection test is performed to support a revision to the operating restrictions, then no additional load rejection test will be required until the next surveillance. The Keowee Watt/Var meter and frequency relays will be calibrated prior to the performance of this surveillance.

6.0 ADMINISTRATIVE CONTROLS

6.1 ORGANIZATION, REVIEW, AND AUDIT

6.1.1 Organization

Onsite and offsite organizations shall be established for unit operation and corporate management, respectively. The onsite and offset organizations shall include the positions for activities affecting the safety of the nuclear power plant.

6.1.1.1 Lines of authority, responsibility, and communication shall be established and defined for the highest management levels through intermediate levels to and including all operating organization positions. These relationships shall be documented and updated, as appropriate, in the form of organization charts, functional descriptions of departmental responsibilities and relationships, and job descriptions for key personnel positions, or in equivalent forms of documentation. These requirements shall be documented in the FSAR.

6.1.1.2 The Station Manager shall be responsible for overall plant safe operation and shall have control over those onsite activities necessary for safe operation and maintenance of the plant and shall delegate in writing the succession to this responsibility during his absence.

6.1.1.3 The Vice President, Oconee Nuclear Site, shall have corporate responsibility for overall plant nuclear safety and shall take any measures needed to ensure acceptable performance of the staff in operating, maintaining, and providing technical support to the plant to ensure nuclear safety.

The Senior Vice President, Nuclear Generation Department will be the Senior Nuclear Executive and have corporate responsibility for overall nuclear safety.

6.1.1.4 Incorporated in the staff of the station shall be personnel meeting the minimum requirements encompassing the training and experience described in Section 4 of ANSI/ANS-3.1-1978, "Selection and Training of Nuclear Power Plant Personnel" except for the Radiation Protection Manager, the Operations Superintendent and the Shift Operations Manager.

The Radiation Protection Manager shall have a bachelor's degree in a science or engineering subject or the equivalent in experience, including some formal training in radiation protection, and shall have at least five years of professional experience in applied radiation protection of which three years shall be in applied radiation protection work in one of Duke ~~Power Company's~~ Energy Corporation nuclear stations.

A qualified individual who does not meet the above requirements, but who has demonstrated the required radiation protection management capabilities and professional experience in applied radiation protection work at one of Duke ~~Power Company's~~ Energy Corporation multi-unit nuclear stations, may be appointed to the position of Radiation Protection Manager by the Station Manager, based on the recommendations of.

the Nuclear Technical Services Manager and as approved by the Site Vice President, Nuclear Operations.

The Operations Superintendent shall have a minimum of eight years of responsible nuclear or fossil station experience, of which a minimum of three years shall be nuclear station experience. A maximum of two years of the remaining five years of experience may be fulfilled by academic training, or related technical training, on a one-for-one time basis. The Operations Superintendent shall hold or have held a Senior Reactor Operator license.

The Shift Operations Manager shall have a minimum of eight years of responsible nuclear or fossil station experience, of which a minimum of three years shall be nuclear station experience. A maximum of two years of the remaining five years of experience may be fulfilled by academic training, or related technical training on a one-for-one time basis. The Shift Operations Manager shall hold a Senior Reactor Operator license.

6.1.1.5 The individuals who train the operating staff and those who carry out radiation protection and quality assurance functions may report to the appropriate onsite manager; however, they shall have sufficient organizational freedom to ensure their independence from operating pressures.

6.1.1.6 Minimum operating shift crew requirements shall be as specified in Table 6.1-1.

6.1.1.7 Retraining and replacement of station personnel shall be in accordance with Section 5.5 of the ANSI/ANS-3.1-1978, "Selection and Training of Nuclear Power Plant Personnel."

6.1.1.8 A training program for the fire brigade shall meet or exceed the requirements of Section 27 of the NFPA Code-1975, except that training sessions may be held quarterly.

6.1.1.9

The Shift Manager is an experienced SRO, who has been instructed in additional academic subjects, and will be assigned on-shift to provide the accident assessment capability.

The operating experience assessment function will be provided by the Station Safety Review Group.

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Attachment 5

Oconee Units 1, 2, and 3

Technical Specifications

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3.7-13	3.7-13
3.7-14	3.7-14
4.6-3	4.6-3
4.6-4	4.6-4
6.1-1	6.1-1
6.1-1a	6.1-1a

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 any one of the following:

1) Keowee Main Step-up Transformer (including both Keowee Auxiliary Transformers);
2) Both Keowee Auxiliary Transformers (1X and 2X);
3) Keowee Backup Auxiliary Transformer (CX);

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 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 overhead if using this Specification due to Keowee Backup Transformer (CX) unavailability. Generation to the system grid shall be prohibited except for periods of test.

If the overhead path is unavailable, the remaining Keowee Hydro Unit must be operable and 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 Energy Corporation 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:

In addition to the service test, the battery performance test may be conducted every 5 years (per IEEE standard 450), unless there are signs of degradation. Degradation is indicated when the battery capacity drops more than 10 percent of rated capacity from its average on previous performance tests, or is below 90 percent of manufacturer's rating. If there is degradation per above definition, the test should be conducted annually until the battery is replaced or until tests prove the battery is not in a degraded state.

Redundancy of AC Systems

There are three 4160 V engineered safety feature switchgear buses per unit. Each bus can receive power from either of the two 4160 V main feeder buses per unit. Each feeder bus in turn can receive power from the 230 kV switchyard through the start-up transformers, through the unit auxiliary transformer by backfeeding through the main step-up transformer, or from the 4160 V standby buses. Another unit's start-up transformer serving as an alternate supply can be placed in service in one hour.

Under normal unit auxiliary power system alignment, the main feeder buses shall be capable of receiving power automatically from:

1. The Keowee Unit aligned to the underground, through transformer CT-4, and through both standby buses; and

2. The redundant Keowee Unit, aligned through the overhead path; and through the respective Unit's startup transformer.

The standby buses 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 Energy Corporation system power distribution network.

In order to meet the single failure criteria for certain design basis scenarios, both standby buses (for the underground flow path), and both E_1 and E_2 breakers (for the overhead path) must be operable for the respective flow path to be considered operable.

Redundancy of DC System

A. 125 VDC Instrumentation and Control Power System

The 125 VDC Instrumentation and Control (I&C) Power System consists of two batteries, three battery chargers, and two I&C distribution centers per unit. 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 I&C distribution centers. The 125 VDC I&C distribution centers are normally supplied from their associated battery and charger. For one unit, in the event that only one of its batteries and associated chargers are operable, both I&C distribution centers will be tied together allowing operation of the DC loads from the unit's operable battery and charger. As shown above, one I&C battery (e.g., ICA) can supply both I&C distribution centers (e.g., IDCA and IDCB) and their associated panelboard loads. Also, one of the three battery chargers for each unit can supply all connected ESF and reactor protection loads.

In order to find and correct a DC ground on the 125 VDC Instrumentation and Control system each unit's DC system must be separated from the other two units. This is due to the interconnected design of the system. With the backup function disabled, the units would be in a degraded mode but would in fact have all of its own DC system available if needed. Each unit's batteries either XCA or XCB is capable of carrying all the 125 VDC Instrumentation and Control loads on that unit.

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 seismic Category I design. 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 start up. 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 Energy Corporation (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 to CT-4. Credit can be taken for the operability of the SK and S breakers per the routine surveillance test. 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, both Keowee Auxiliary Transformers (1X and 2X), or Keowee Backup Auxiliary Transformer (CX) 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.

The power system of the Keowee Hydro station is designed to allow the alignment of each of the two units to the Oconee emergency power systems through either the underground feeder or the overhead path via the main step-up transformer. During an emergency start one of the Keowee units will be aligned to the underground feeder and the other to the overhead path. Each Keowee unit's 600 VAC auxiliaries are powered from the unit's generator through a 750KVA auxiliary transformer. Each auxiliary transformer is capable of handling auxiliary loads of both units. Unit's auxiliaries can be aligned to receive power from either transformer by a manual transfer capability at the load center level. A backup 750KVA auxiliary transformer (CX) is provided and powered from Oconee 4KV switchgear ITC through an underground feeder. Transformer CX is capable of backing up one or both unit's auxiliary transformers.

Each Keowee unit has a generation capacity of 87.5 MVA and the main step up transformer is rated for 230 MVA. This power capacity exceeds the Oconee emergency power requirements. In addition to supplying emergency power for Oconee, the Keowee Hydro units provide peaking power to the Duke Energy Corporation system. During periods of commercial power generation, the Keowee Hydro units are operated within the acceptable region of the Keowee Hydro operating restrictions. This will ensure that the Keowee Hydro units will be able to perform their emergency power functions from an initial condition of commercial power generation. The Keowee Hydro operating restrictions for commercial power generation are contained in the Selected Licensee Commitment manual. Changes to these operating restrictions would be performed in accordance with 10 CFR 50.59, which would include an evaluation to determine if any unreviewed safety questions exist.

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 on the EPSL and that the affected portion remains operable although degraded.

Emergency power system components (transformers, buses, Keowee Hydro Units, etc.) which become inoperable for testing or maintenance cause their associated circuitry (functional units) of the EPSL to become ineffective. Therefore, the operability of these associated functional units is irrelevant and not required. In these cases the controlling Technical Specification for the LCO will be the one associated with the inoperability of the emergency power system component(s). However, all other functional units unaffected by the inoperability of the emergency power system component(s) must meet the requirements of Table 3.7-1 to ensure the operability of the remaining emergency power system.

In the event a 125 VDC instrumentation and control power panelboard becomes inoperable (for planned or unplanned reasons) as allowed by Technical Specification 3.7.2(e) (4), circuits or channels of more than one functional unit of EPSL may become inoperable. In this case, continued operation is allowed under the LCO of T.S. 3.7.2(e) (4), provided that no functional units' circuits, etc., addressed by Table 3.7.1 are out of service, which would not have been out of service due to inoperability of the panelboard. This assures that no functional unit of Table 3.7.1 is degraded beyond the requirements for degraded operation, and that the EPSL is capable of performing its intended function.

≥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.

4.6.13 At lease once every 18 months, the ability of the Keowee Hydro units to supply emergency power from an initial condition of commercial power generation shall be verified.

4.6.14 At lease once every 18 months, the Keowee Hydro units load rejection response will be verified to be bounded by the design criteria used to develop the Keowee operating restrictions.

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 Energy Corporation 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 Energy Corporation 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.

In order to ensure that the Keowee Hydro units are operable during periods of commercial power generation, the protection circuitry will be tested at least once every 18 months. This surveillance will ensure that the adverse effects of overspeed following a load rejection will be precluded and the appropriate emergency power paths will be aligned. In addition, the speed sensing governor failure logic will be verified during this surveillance. Failure to meet the acceptance criteria will be evaluated in the corrective action program to determine the impact on the operability of the emergency power paths. The Keowee Watt/Var meter, frequency relays, and governor magnetic speed switch will be calibrated prior to the performance of this surveillance.

A maximum power dual unit load rejection will be performed at least once every 18 months. This surveillance will verify that the Keowee Hydro units response to a load rejection is bounded by the design criteria used to develop the Keowee operating restrictions. The design criteria are defined in the calculation that determines the Keowee operating restrictions. A power level for the dual unit load rejection will be defined based on the operating conditions for the day of the test. In addition, a revision of the operating restrictions for simultaneous operation of both Keowee units will require that a maximum power dual unit load rejection test be performed prior to implementing the revision. A revision of the operating restrictions for a single Keowee unit will require only a maximum power single unit load rejection as defined by the conditions for the day of the test. However, if a load rejection test is performed to support a revision to the operating restrictions, then no additional load rejection test will be required until the next surveillance. The Keowee Watt/Var meter and frequency relays will be calibrated prior to the performance of this surveillance.

6.0 ADMINISTRATIVE CONTROLS

6.1 ORGANIZATION, REVIEW, AND AUDIT

6.1.1 Organization

Onsite and offsite organizations shall be established for unit operation and corporate management, respectively. The onsite and offset organizations shall include the positions for activities affecting the safety of the nuclear power plant.

6.1.1.1 Lines of authority, responsibility, and communication shall be established and defined for the highest management levels through intermediate levels to and including all operating organization positions. These relationships shall be documented and updated, as appropriate, in the form of organization charts, functional descriptions of departmental responsibilities and relationships, and job descriptions for key personnel positions, or in equivalent forms of documentation. These requirements shall be documented in the FSAR.

6.1.1.2 The Station Manager shall be responsible for overall plant safe operation and shall have control over those onsite activities necessary for safe operation and maintenance of the plant and shall delegate in writing the succession to this responsibility during his absence.

6.1.1.3 The Vice President, Oconee Nuclear Site, shall have corporate responsibility for overall plant nuclear safety and shall take any measures needed to ensure acceptable performance of the staff in operating, maintaining, and providing technical support to the plant to ensure nuclear safety.

The Senior Vice President, Nuclear Generation Department will be the Senior Nuclear Executive and have corporate responsibility for overall nuclear safety.

6.1.1.4 Incorporated in the staff of the station shall be personnel meeting the minimum requirements encompassing the training and experience described in Section 4 of ANSI/ANS-3.1-1978, "Selection and Training of Nuclear Power Plant Personnel" except for the Radiation Protection Manager, the Operations Superintendent and the Shift Operations Manager.

The Radiation Protection Manager shall have a bachelor's degree in a science or engineering subject or the equivalent in experience, including some formal training in radiation protection, and shall have at least five years of professional experience in applied radiation protection of which three years shall be in applied radiation protection work in one of Duke Energy Corporation's nuclear stations.

A qualified individual who does not meet the above requirements, but who has demonstrated the required radiation protection management capabilities and professional experience in applied radiation protection work at one of Duke Energy Corporation's multi-unit nuclear stations, may be appointed to the position of Radiation Protection Manager by the Station Manager, based on the recommendations of the Nuclear Technical Services Manager and as approved by the Site Vice President, Nuclear Operations.

The Operations Superintendent shall have a minimum of eight years of responsible nuclear or fossil station experience, of which a minimum of three years shall be nuclear station experience. A maximum of two years of the remaining five years of experience may be fulfilled by academic training, or related technical training, on a one-for-one time basis. The Operations Superintendent shall hold or have held a Senior Reactor Operator license.

The Shift Operations Manager shall have a minimum of eight years of responsible nuclear or fossil station experience, of which a minimum of three years shall be nuclear station experience. A maximum of two years of the remaining five years of experience may be fulfilled by academic training, or related technical training on a one-for-one time basis. The Shift Operations Manager shall hold a Senior Reactor Operator license.

6.1.1.5 The individuals who train the operating staff and those who carry out radiation protection and quality assurance functions may report to the appropriate onsite manager; however, they shall have sufficient organizational freedom to ensure their independence from operating pressures.

6.1.1.6 Minimum operating shift crew requirements shall be as specified in Table 6.1-1.

6.1.1.7 Retraining and replacement of station personnel shall be in accordance with Section 5.5 of the ANSI/ANS-3.1-1978, "Selection and Training of Nuclear Power Plant Personnel."

6.1.1.8 A training program for the fire brigade shall meet or exceed the requirements of Section 27 of the NFPA Code-1975, except that training sessions may be held quarterly.

6.1.1.9 The Shift Manager is an experienced SRO, who has been instructed in additional academic subjects, and will be assigned on-shift to provide the accident assessment capability.

The operating experience assessment function will be provided by the Station Safety Review Group.