DUKE ENERGY®

Scott L. Batson
Vice President
Oconee Nuclear Station

Duke Energy
ON01VP | 7800 Rochester Hwy
Seneca, SC 29672

o: 864.873.3274
f: 864.873.4208
Scott.Batson@duke-energy.com

10 CFR 50.36

ONS-2015-057

May 18, 2015

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, Maryland 20852

Subject: Duke Energy Carolinas, LLC
Oconee Nuclear Station
Docket Numbers 50-269, 50-270, and 50-287
Technical Specification (TS) Bases Change

Please find attached changes to the Oconee Nuclear Station (ONS) Technical Specification (TS) Bases. These changes were processed in accordance with the provisions of TS 5.5.15, "Technical Specifications (TS) Bases Control Program."

TS Bases (TSB) Change 2014-02 revises TS Bases 3.8.3, DC Sources - Operating, to clarify that Conditions A and D cannot be exited until the batteries are restored to operability and that the 24 hour Completion Time of Required Actions A.1 and D.1 is cumulative before and after the equalization charge.

Any questions regarding this information should be directed to Boyd Shingleton, ONS Regulatory Affairs Group, at (873)864-4716.

Sincerely,

Scott L. Batson
Vice President
Oconee Nuclear Station

Attachment

A001
NRR

cc: Mr. Victor McCree, Regional Administrator
U.S. Nuclear Regulatory Commission, Region II
Marquis One Tower
245 Peachtree Center Ave., NE, Suite 1200
Atlanta, GA 30303-1257

Mr. James R. Hall, Senior Project Manager (ONS)
(By electronic mail only)
U. S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
11555 Rockville Pike
Mail Stop O-8G9A
Rockville, MD 20852

Mr. Jeffrey A. Whited, Project Manager (ONS)
(By electronic mail only)
U. S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
11555 Rockville Pike
Mail Stop O-8B1A
Rockville, MD 20852

Mr. Eddy Crowe
Senior Resident Inspector
Oconee Nuclear Station

DUKE ENERGY®

Oconee Nuclear Station

Duke Energy
7800 Rochester Hwy
Seneca, SC 29672

May 18, 2015

Re: Oconee Nuclear Station
Technical Specification Bases Change

Please replace the corresponding pages in your copy of the Oconee Technical Specifications Bases Manual as follows:

REMOVE THESE PAGES	**INSERT THESE PAGES**
List of Effective Pages (LOEP) 1- 17	List of Effective Pages (LOEP) 1- 17
TS Bases Page B 3.8.3-1 thru 10	TS Bases Page B 3.8.3-1 thru 10

If you have any questions concerning the contents of this Technical Specification Bases update, contact Boyd Shingleton (864) 873-4716.

Chris Wasik
Regulatory Affairs Manager

Attachment

Oconee Nuclear Station

Revised Technical Specification Bases Pages

OCONEE NUCLEAR STATION
TECHNICAL SPECIFICATIONS-BASES REVISED 04/28/15
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B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.3 DC Sources – Operating

BASES

BACKGROUND

The 125 VDC Vital I&C electrical power sources provide the AC emergency power system with control power. It also provides both motive power and control power for selected safety related equipment. Additionally, the 125 VDC Vital I&C electrical power sources provide DC electrical power through DC panelboards to the inverters, which in turn supply the AC Vital instrumentation power panelboards.

The 125 VDC Vital I&C electrical power system is a system consisting of six power sources shared by the three Oconee units. Each unit has its own two power sources with backup sources supplied to the unit's 125 VDC Vital Instrumentation distribution system from another unit using a network of isolating diode assemblies. This provides necessary redundancy and independence for the 125 VDC Vital I&C power sources. Each source consists of one 125 VDC battery, the associated battery charger (Normal or Standby) for each battery, the distribution center, the associated control equipment, isolating transfer diodes and interconnecting cabling. Additionally, there is one standby battery charger shared between each unit's batteries, which provides backup service in the event that the preferred (Normal) battery charger is out of service.

The 125 VDC I&C batteries of a unit are physically separated in separate enclosures from batteries of another unit to minimize their exposure to any damage. The battery chargers and associated DC distribution centers and switchgear of a unit are located in separate rooms from the battery chargers and associated DC distribution centers of another unit in the auxiliary building and physical separation is maintained between redundant equipment.

During normal operation, the 125 VDC Vital I&C loads are powered from the battery chargers with the batteries floating on the system. In case of loss of power to a battery charger, the associated DC loads are automatically powered from the 125 VDC Vital I&C battery. Each battery has adequate storage capacity to carry the required load continuously for at least 1 hour.

BASES

BACKGROUND (continued)

Each 125 VDC Vital I&C power source has ample power output capacity for the steady state operation of connected loads required during normal operation, while at the same time maintaining its battery bank fully charged. Each battery charger also has sufficient capacity to restore the battery from the design minimum charge to its fully charged state while supplying normal steady state loads.

The 230 kV switchyard 125 VDC Power System provides power to power circuit breakers, protective and control relays, indicating lights, annunciators, carrier equipment and other switchyard equipment requiring an uninterrupted power source.

The 230 kV switchyard 125 VDC Power System consists of two sources. Each source consists of one 125 VDC battery, the associated battery charger (Normal or Standby) for each battery, distribution panel, and associated control equipment and interconnecting cabling. Redundant batteries are located in separate rooms and redundant chargers, distribution centers and panelboards are located on different walls of the 230 kV switchyard relay house. Additionally, there is one standby battery charger shared between the sources, which provides backup service in the event that the preferred (Normal) battery charger is out of service.

During normal operation, the 230 kV 125 VDC loads are powered from the battery chargers with the batteries floating on the system. In case of loss of power to a battery charger, the associated DC load is automatically powered from the 230 kV 125 VDC battery. Each battery has adequate storage capacity to carry the required load continuously for at least 1 hour. Therefore, the temporary alignment of both battery chargers to the same train of input power for testing or maintenance is allowed provided both batteries meet the requirements for energizing their respective panelboards as stated in the Bases for LCO 3.8.8, "Distribution System – Operating."

Each 230 kV 125 VDC power source has ample power output capacity for the steady state operation of connected loads required during normal operation, while at the same time maintaining its battery bank fully charged. Each battery charger also has sufficient capacity to restore the battery from the design minimum charge to its fully charged state while supplying normal steady state loads.

The 125 VDC Vital I&C power and 230 kV 125 VDC power distribution systems are described in more detail in the Bases for LCO 3.8.8, "Distribution System – Operating," and for LCO 3.8.9, "Distribution Systems – Shutdown."

BASES (continued)

APPLICABLE SAFETY ANALYSES

The initial conditions of accident and transient analyses in the UFSAR, Chapter 6 (Ref. 1) and Chapter 15 (Ref. 2), assume that Engineered Safeguards (ES) systems are OPERABLE. The 125 VDC Vital I&C electrical power system provides normal and emergency DC electrical power for the emergency auxiliaries, and control and switching during all MODES of operation.

The 230 kV switchyard 125 VDC Power System provides control power for circuit breaker operation in the 230 kV switchyard as well as DC power for degraded grid voltage protection circuits during all MODES of operation.

The OPERABILITY of the DC sources is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This includes maintaining the DC sources OPERABLE during accident conditions in the event of:

a. An assumed loss of all offsite AC power or all onsite AC power; and

b. A worst-case single failure.

The DC sources satisfy Criterion 3 of 10 CFR 50.36 (Ref. 3).

LCO

Each required 125 VDC electrical source consisting of one battery, associated battery charger (Normal or Standby), distribution center and the corresponding control equipment and interconnecting cabling supplying power to the associated panelboards is required to be OPERABLE to ensure the availability of the required power to shut down the reactor and maintain it in a safe condition after an anticipated transient or an accident. The battery chargers are OPERABLE when they are energized or available to be energized during a power source transfer.

For operation of any Oconee unit, three of four 125 VDC Vital I&C Sources capable of supplying the unit's DC distribution system shall be OPERABLE as follows:

Unit 1: 1CA, 1CB, 2CA, 2CB
Unit 2: 2CA, 2CB, 3CA, 3CB
Unit 3: 3CA, 3CB, 1CA, 1CB

and aligned to at least one panelboard provided that a power source is not the only source for two or more of the Unit's panelboards. The three of four requirement ensures that a single failure will not result in a loss of

BASES

LCO (continued)

power to more than one 125 VDC Vital I&C panelboard. This requirement ensures supported safety functions are not vulnerable to a single failure.

When any other unit is in MODES 1, 2, 3, or 4, two additional 125 VDC Vital I&C Sources are required to be OPERABLE as modified by LCO Note 2. When no other Unit is in MODES 1, 2, 3, or 4, one additional 125 VDC Vital I&C power source is required to be OPERABLE as modified by LCO Notes 2 and 3. These additional requirements ensure sufficient capacity and voltage for supported DC loads assuming a single failure.

The requirement that two 230 kV 125 VDC sources be OPERABLE ensures that supported safety functions are not vulnerable to a single failure.

The LCO is modified by three Notes. Note 1, which applies to Units 2 and 3 only, indicates that no single 125 VDC Vital I&C source shall be the only source for panelboards 1DIC and 1DID. This is necessary since vital I&C panelboards 1DIC and 1DID supply power for SK and SL breaker control, protective relaying for both standby buses, breaker control for both standby breakers for the three Oconee units, and retransfer to startup source logic circuits for the three Oconee units. The requirement that no single 125 VDC source be the only source of power for panelboards 1DIC and 1DID ensures than a single failure will not result in a loss of power to both panelboards. This requirement ensures supported safety functions are not vulnerable to a single failure.

Note 2 indicates that each additional 125 VDC Vital I&C source required by part b or part c of the LCO shall be connected to at least one panelboard associated with the unit where the source is physically located. For example, when applying the LCO requirements to Unit 1, an additional source from Unit 2 must be connected to at least one Unit 2 panelboard and an additional source from Unit 3 must be connected to at least one Unit 3 panelboard. If the additional sources are from Unit 3, each additional source need only be connected to at least one Unit 3 panelboard. Note 3 specifies that the additional 125 VDC Vital I&C power source required by LCO 3.8.3 part c shall not be a power source that is available to meet the three of four requirement of LCO 3.8.3 part a. This ensures that there is one source physically located on each unit not in MODES 1, 2, 3, or 4. For example, when applying the LCO requirements to Unit 1, the additional source cannot be a Unit 1 or Unit 2 power source since these are available to meet the three of four requirement. Therefore, a Unit 3 power source must be OPERABLE. Note 2 and 3 requirements are necessary to assure assumptions in the DC capacity and voltage drop analyses for the operating unit are valid.

BASES (continued)

APPLICABILITY

The DC electrical power sources are required to be OPERABLE in MODES 1, 2, 3, and 4 to ensure safe unit operation and to ensure that:

a. Acceptable fuel design limits and reactor coolant pressure boundary limits are not exceeded as a result of transients and accidents; and

b. Adequate core cooling is provided, and containment integrity and other vital functions are maintained in the event of a postulated accident.

The DC electrical power requirements for MODES 5 and 6 are addressed in the Bases for LCO 3.8.4, "DC Sources – Shutdown."

ACTIONS

The ACTIONS are modified by a Note indicating that the Completion Times for Required Actions A through D are reduced when in Condition L of LCO 3.8.1. Condition L limits the Completion Time for restoring inoperable power sources to 4 hours when emergency power source(s) or offsite power source(s) are inoperable for extended time periods or for specific reasons.

A.1

With one of the required 125 VDC Vital I&C sources inoperable, the remaining sources are fully capable of providing adequate voltage to the four unit DC panelboards and will assure alignment of power to at least three panelboards. Three panelboards are necessary to shut down the operating unit and maintain it in a safe shutdown condition. However, overall reliability is reduced because an additional failure could result in the minimum required ES functions not being supported. Therefore, the inoperable source must be restored to OPERABLE status within 24 hours. Required Action A.1 is modified by a Note indicating that it is not applicable for up to 72 hours to perform an equalization charge after completion of a performance test or service test. This note allows a maximum Completion Time of 96 hours (a cumulative 24 hours for an inoperable battery due to performing a service or performance test plus 72 hours to perform an equalization charge). The allowed 24 hours includes the amount of time prior to and after the equalization charge.

The Completion Time for this Required Action is based on engineering judgment, taking into consideration the extent of degradation involved, the likelihood of events or failures which could challenge the system, and the time required to complete the equalization charge.

BASES

ACTIONS (continued)

B.1

In this condition, a single failure of a battery (or its associated equipment) could cause loss of more than one unit panelboard during an accident, so that required safety functions might not be supported. Specifically, if a single source were providing the only power source for panelboards DIA and DIB, single failure of the source would result in failure of both ES digital channels. Vulnerability of the ES digital channels to single failure for 24 hours is considered acceptable due to the limited scope of potential failures. Similarly, if the panelboards are isolated from their backup Unit (e.g., the Unit's DC system is isolated from the other Units), a single failure could result in loss of two or more panelboards so that required safety functions may not be supported. If the panelboards are isolated from their backup Unit when one of that Unit's batteries are inoperable (and the DC buses are cross tied), the remaining battery has the capacity to support all required loads, however, a single failure could result in loss of all four panelboards so that required safety functions may not be supported. Therefore, within 24 hours after such a condition arises, affected equipment shall be restored and aligned such that no single source is the only battery power supply for more than one 125 VDC Vital I&C panelboard for the unit under consideration. The 24 hour Completion Time is based on engineering judgement taking into consideration the time to complete the Required Action and the redundancy available in the 125 VDC Vital I&C System.

C.1

With a single source providing the only power supply for 125 VDC Vital I&C panelboards 1DIC and 1DID, a single failure of a battery (or its associated equipment) could cause loss of both panelboards, so that required automatic EPSL functions for all three units may not be supported. These panelboards provide primary and backup control power for the SK and SL breaker control power, standby bus protective relaying, standby breaker control power and retransfer to startup logic. Therefore, within 24 hours after such a condition arises, affected equipment shall be restored and aligned such that no single source is the only battery power supply for both DC panelboards 1DIC and 1DID.

The Completion Time is based on engineering judgement, provides a reasonable time to complete repairs and considers the redundancy available in the 125 VDC Vital I&C DC System.

This Condition is modified by a Note indicating that this ACTION is only applicable to Units 2 and 3. For Unit 1 the appropriate action is specified in ACTION B.

BASES

ACTIONS (continued)

D.1

With one of the required 230 kV switchyard DC power sources inoperable, the remaining source is fully capable of providing adequate voltage to the associated panelboards and is fully capable of powering the necessary panelboards. However, another failure of a DC source or panelboard could result in failure of the overhead emergency power path. In addition, in the event of grid voltage degradation the station and onsite emergency power sources could fail to separate from the grid. Therefore, the inoperable source must be restored to OPERABLE status within 24 hours.

The Completion Time for this Required Action is based on engineering judgment, taking into consideration the extent of degradation involved, the likelihood of events or failures which could challenge the system, and the time required to complete the required actions.

Required Action D.1 is modified by two notes. Note 1 indicates that Required Action D.1 is not applicable for up to 72 hours to perform an equalization charge after completion of a performance test or service test. This note allows a maximum Completion Time of 96 hours (a cumulative 24 hours for an inoperable battery due to performing a service or performance test plus 72 hours to perform an equalization charge). The allowed 24 hours includes the amount of time prior to and after the equalization charge.

Note 2 indicates that Required Action D.1 is not applicable for up to 10 days for replacement of an entire battery bank and the performance of necessary tests to restore the battery to service. Relief from Required Action D.1 for 10 days during the replacement of a battery bank is based on taking the compensatory measures listed below:

1. The Switchyard batteries will be replaced one bank at a time. The health of the in-service battery will be evaluated prior to beginning the replacement. Once good health is established, the loads will be tied together on the remaining, in-service battery which is fully capable of powering all of the loads.
2. Verify the grid reliability for the duration of the evolution.
3. Verify that the transmissions operator's Real Time Contingency Analysis Program is functioning.
4. Ensure that work on the Lee circuit is restricted during the evolution and that it is protected.
5. Verify the underground path circuit from Keowee is available and protected.
6. Ensure the standby charger is aligned to the alternate power source from the inservice battery charger.
7. Treat the 480 VAC Power system as a protected train.

BASES

ACTIONS

D.1 (continued)

8. No discretionary maintenance or testing will be performed in the Standby Shutdown Facility, Emergency Feedwater System, and 230kV Relay House.

E.1 and E.2

If the inoperable DC electrical power source cannot be restored to OPERABLE status within the required Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 12 hours and to MODE 5 within 84 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE REQUIREMENTS

SR 3.8.3.1

This Surveillance verifies that the distribution centers are functioning properly, with the correct circuit breaker alignment to the isolating transfer diodes. The correct breaker alignment ensures the appropriate separation and independence is maintained, and the appropriate voltage is available to each required isolating transfer diode. The verification of proper voltage availability on the distribution centers ensures that the required voltage is readily available for isolating transfer diodes connected to these distribution centers. The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.

SR 3.8.3.2

Verifying battery terminal voltage while on float charge for the batteries helps to ensure the effectiveness of the charging system and the ability of the batteries to perform their intended function. Float charge is the condition in which the charger is supplying the continuous charge required to overcome the internal losses of a battery (or battery cell) and maintain the battery (or a battery cell) in a fully charged state. The voltage requirements are based on the nominal design voltage of the battery and are consistent with the initial voltages assumed in the battery sizing calculations. The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.3.3

Visual inspection of the battery cells, cell plates, and battery racks provides an indication of physical damage or abnormal deterioration that could potentially degrade battery performance. The presence of physical damage or deterioration does not necessarily represent a failure of this SR, provided an evaluation determines that the physical damage or deterioration does not affect the OPERABILITY of the battery (its ability to perform its design function).

The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.

SR 3.8.3.4

Visual inspection of inter-cell, inter-rack, inter-tier, and terminal connections provide an indication of physical damage or abnormal deterioration that could indicate degraded battery condition. The anticorrosion material is used to help ensure good electrical connections and to reduce terminal deterioration. The visual inspection for corrosion is not intended to require removal of and inspection under each terminal connection.

The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.

SR 3.8.3.5

A battery service test is a special test of the battery capability, as found, to satisfy the design requirements (battery duty cycle) of the DC electrical power system. The discharge rate and test length should correspond to the design duty cycle requirements as specified in Reference 4.

The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.3.6

This SR requires battery capacity be verified in accordance with the Battery Discharge Testing Program. A battery performance discharge test is a test of constant current capacity of a battery, normally done in the as found condition, after having been in service, to detect any change in the capacity determined by the acceptance test.

The test is intended to determine overall battery degradation due to age and usage.

The Surveillance Frequencies for this test are in accordance with the Battery Discharge Testing Program and are consistent with the recommendations in IEEE-450 (Ref. 5). These periodic frequencies are based on the outcome of the previous battery capacity test.

REFERENCES

1. UFSAR, Chapter 6.
2. UFSAR, Chapter 15.
3. 10 CFR 50.36.
4. UFSAR, Chapter 8.
5. IEEE-450-1987.
6. Regulatory Guide 1.32, February 1977.
7. Regulatory Guide 1.129, December 1974.