May 25, 1999

Mr. W. R. McCollum, Jr.
Vice President, Oconee Site
Duke Energy Corporation
P. O. Box 1439
Seneca, SC 29679

SUBJECT: OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3 RE: TECHNICAL SPECIFICATION BASES CHANGE

Dear Mr. McCollum:

By letter dated May 12, 1999, you informed the staff of changes to the Oconee Nuclear Station, Units 1, 2, and 3 Improved Technical Specifications (ITS) Bases Sections 3.1.1 and 3.4.12. The purpose of the changes are to reflect provisions that were approved in Amendment No. 302 for each unit regarding a reduction of the minimum reactor coolant system temperature from 70 °F to 60 °F and changes to the low temperature overpressure (LTOP) settings and limits. In addition, the change to Bases 3.4.12 includes relocation of certain LTOP requirements from the Selected Licensee Commitments Manual to the TS Bases.

The purpose of this letter is to distribute the enclosed revised TS pages to the appropriate TS manual holders.

Sincerely,

Original signed by:

David E. LaBarge, Senior Project Manager, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

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

Enclosure:
(1) List of Bases Page Changes
(2) Revised Bases Pages

cc w/encl: See next page

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

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LIST OF TECHNICAL SPECIFICATION PAGE CHANGES

REMOVE	INSERT
B3.1.1-2	B3.1.1-2
B3.4.12-2	B3.4.12-2
B3.4.12-3	B3.4.12-3
B3.4.12-4	B3.4.12-4
B3.4.12-5	B3.4.12-5
B3.4.12-6	B3.4.12-6
B3.4.12-7	B3.4.12-7
B3.4.12-8	B3.4.12-8
B3.4.12-9	B3.4.12-9
B3.4.12-10	B3.4.12-10
B3.4.12-11	B3.4.12-11
B3.4.12-12	B3.4.12-12
---	B3.4.12-13
---	B3.4.12-14
---	B3.4.12-15

BASES

BACKGROUND (continued)

of a main steam line break (MSLB)in MODE 3, 4, or 5 when high steam generator levels exist.

APPLICABLE SAFETY ANALYSES

The minimum required SDM is assumed as an initial condition in safety analysis. The safety analysis (Ref. 2) establishes an SDM that ensures specified acceptable fuel design limits are not exceeded for normal operation and anticipated transients, with assumption of the highest worth CONTROL ROD stuck out following a reactor trip.

The criteria for SDM requirements are that specified acceptable fuel design limits are maintained. The SDM requirements must ensure that:

a. The reactor can be made subcritical from all operating conditions, transients, and other Design Basis Events;

b. The reactivity transients associated with postulated accident conditions are controllable with acceptable limits (departure from nucleate boiling ratio (DNBR), fuel centerline temperature limits for anticipated transients, and $\leq$ 280 cal/gm energy deposition for the rod ejection accident (Ref. 3)); and

c. The reactor will be maintained sufficiently subcritical to preclude inadvertent criticality in the shutdown condition.

The most limiting accident for the SDM requirements is based on an MSLB, as described in the accident analyses (Ref. 2). In addition to the limiting MSLB accident, the SDM requirement must also protect against other accidents described in UFSAR Chapter 15 (Ref. 2).

The basis for the shutdown requirement when high steam generator levels exist is the heat removal potential in the secondary system fluid and the positive reactivity added via MTC. At any given initial primary system temperature and its associated secondary system pressure, the secondary system liquid levels can be equated to a final primary system temperature assuming the entire secondary system mass is boiled away or reaches the thermal equilibrium with the primary system. A SDM at 60°F with the highest worth rod

(continued)

BASES

BACKGROUND (continued)

The LTOP approach to protecting the vessel by limiting coolant addition capability requires controls upon RCS makeup flow, the number of available pressurizer heater banks, and requires deactivating HPI, and isolating the core flood tanks (CFTs).

Should one or more HPI pumps inject on an HPI actuation (HPI-ES) or a CFT discharge to the RCS, the pressurizer level and PORV may not prevent overpressurizing the RCS.

The administrative controls upon pressurizer level provides a compressible vapor space or cushion (either steam or nitrogen) that can accommodate a coolant insurge and prevent a rapid pressure increase, allowing the operator time to stop the increase. The PORV, with reduced lift setting, is the overpressure protection device that acts as backup to the operator in terminating an increasing pressure event.

With HPI-ES deactivated, the ability to provide RCS coolant addition is restricted. To balance the possible need for coolant addition, the LCO does not require the makeup system to be deactivated. Due to the lower pressures associated with the LTOP MODES and the expected decay heat levels, the makeup system can provide flow with the HPI pumps providing RCS makeup through the makeup control valve.

PORV Requirements

As required for LTOP, the PORV is signaled to open if the RCS pressure approaches a limit set in the LTOP actuation circuit. The LTOP actuation circuit monitors RCS pressure and determines when an overpressure condition is approached. When the monitored pressure meets or exceeds the setting, the PORV is signaled to open. Maintaining the setpoint within the limits of the LCO ensures the Reference 1 limits will be met in any event analyzed for LTOP.

When a PORV is opened in an increasing pressure transient, the release of coolant causes the pressure increase to slow and reverse. As the PORV releases steam, the RCS pressure decreases until a reset pressure is reached and the valve is signaled to close. The pressure continues to decrease below the reset pressure as the valve closes.

(continued)

BASES

BACKGROUND (continued)

Administrative Control Requirements

Administrative controls are necessary to assure the operator has at least ten minutes available to mitigate the most limiting LTOP event. These administrative controls include the following:

1) Limits on RCS pressure based on RCS temperature;

2) Limits upon pressurizer level;

3) Limits upon makeup flow capability;

4) OPERABLE Alarms;

5) Controls upon use of the High Pressure Nitrogen System; and

6) Restricting the number of available pressurizer heater banks.

Limiting RCS pressure based on RCS temperature provides a minimum margin to the RCS P/T limit. Restricting RCS makeup flow capability and pressurizer level and controls on the use of high pressure nitrogen limit the pressurization rate during an LTOP event. Restricting the number of available pressurizer heater banks limits the pressurization rate during an LTOP event. Alarms ensure early operator recognition of the occurrence of an LTOP event. The combination of minimum margin to the limit, limited pressurization rate and OPERABLE alarms ensure ten minutes are available for operator action to mitigate an LTOP event.

APPLICABLE SAFETY ANALYSES

Safety analyses (Ref. 3) demonstrate that the reactor vessel can be adequately protected against overpressurization transients during shutdown. In MODES 1, 2, and in MODE 3 with RCS temperature exceeding 325°F, the pressurizer safety valves will prevent RCS pressure from exceeding the Reference 1 limits. At nominally 325°F and below, overpressure prevention falls to an OPERABLE PORV, a restricted coolant level in the pressurizer and other administrative controls.

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

The actual temperature at which the pressure in the P/T limit curve falls below the pressurizer safety valve setpoint increases as vessel material toughness decreases due to neutron embrittlement. Each time the P/T limit curves are revised, the LTOP System will be re-evaluated to ensure that its functional requirements can still be met with the PORV and pressurizer level/administrative controls method.

Transients that are capable of overpressurizing the RCS have been identified and evaluated. These transients relate to either mass input or heat input: actuating the HPI System, discharging the CFTs, energizing the pressurizer heaters, failing the makeup control valve open, losing decay heat removal, starting a reactor coolant pump (RCP) with a large temperature mismatch between the primary and secondary coolant systems, and adding nitrogen to the pressurizer. LTOP limits and restrictions take into account the presence of nitrogen and/or air in the RCS during LTOP conditions.

HPI actuation and CFT discharge are the transients that may result in exceeding P/T limits within < 10 minutes in which time no operator action is assumed to take place. Starting an RCP and adding nitrogen to the pressurizer are self limiting events. In the rest, operator action after that time precludes overpressurization. The analyses demonstrate that the time allowed for operator action is adequate, or the events are self limiting and do not exceed P/T limits.

The following controls are required during the LTOP MODES to ensure that transients do not occur, which either of the LTOP overpressure protection means cannot handle:

a. Limiting RCS makeup flow capability;

b. Deactivating HPI-ES;

c. Immobilizing CFT discharge isolation valves in their closed positions; and

d. Limiting the number of available pressurizer heater banks.

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

The Reference 3 analyses demonstrate the PORV can maintain RCS pressure below limits when both makeup flow capability and the number of available pressurizer heater banks is restricted. Consequently, the administrative controls require makeup flow capability and the number of available pressurizer heater banks to be limited in the LTOP MODES.

Since the PORV cannot protect the reactor vessel for engineered safeguards actuation of one or more HPI pumps, or discharging the CFTs, the LCO also requires the HPI-ES actuation circuits be deactivated and the CFTs isolated. The isolated CFTs must have their discharge valves closed and the valve power breakers fixed in their open positions.

Fracture mechanics analyses established the temperature of LTOP Applicability at 325°F. Above this temperature, the pressurizer safety valves provide the reactor vessel pressure protection. The vessel materials were assumed to have a neutron irradiation accumulation equal to 26 effective full power years (EFPYs) of operation for Units 1, 2, and 3.

This LCO will deactivate the HPI-ES actuation when the RCS temperature is $\leq$ 325°F.

Reference 3 contains the acceptance limits that satisfy the LTOP requirements. Any change to the RCS must be evaluated against these analyses to determine the impact of the change on the LTOP acceptance limits.

PORV Performance

The fracture mechanics analyses show that the vessel is protected when the PORV is set to open at $\leq$ 460 psig. The setpoint is derived by modeling the performance of the LTOP system for different LTOP events. The PORV setpoint at or below the derived limit ensures the Reference 1 limits will be met.

The PORV setpoint is re-evaluated for compliance when the revised P/T limits conflict with the LTOP analysis limits. The P/T limits are periodically modified as the reactor vessel material toughness decreases due to embrittlement

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

induced by neutron irradiation. Revised P/T limits are determined using neutron fluence projections and the results of examinations of the reactor vessel material irradiation surveillance specimens. The Bases for LCO 3.4.3 discuss these examinations.

The PORV is considered an active component. Therefore, its failure represents the worst case LTOP single active failure.

Administrative Controls Performance

Limiting RCS pressure when RCS temperature is < 325°F provides a minimum margin to the RCS P/T limit. Restricting RCS makeup flow capability, the number of available pressurizer heater banks, pressurizer level, and controls on the use of high pressure nitrogen limit the pressurization rate during an LTOP event. Alarms ensure early operator recognition of the occurrence of an incipient LTOP event. The combination of minimum margin to the limit, limited pressurization rate and OPERABLE alarms ensure ten minutes are available for operator action to mitigate an LTOP event.

RCS Vent Requirements for Testing

With the RCS depressurized, analyses show:

a. For HPI System testing, a vent of $\geq$ 3.6 square inches is capable of mitigating the transient resulting from HPI-ES actuation testing in which three HPI pumps inject to the RCS through two injection flow paths.

b. For CFT Discharge Testing, a vent of $\geq$ 201 square inches is capable of mitigating the transient resulting for discharge of both CFTs to the RCS.

The capacity of vents of these minimum sizes is sufficient to limit the RCS pressure to $\leq$ 400 psig, which is less than the maximum allowable pressure at minimum RCS temperature.

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

The RCS vent size will also be re-evaluated for compliance each time P/T limit curves are revised based on the results of the vessel material surveillance.

These vents are passive and not subject to active failure.

The LTOP System satisfies Criterion 2 and Criterion 3 of 10 CFR 50.36 (Ref.6).

LCO

The LCO requires an LTOP System OPERABLE with a limited coolant input capability and a pressure relief capability. The LCO requires HPI to be deactivated and the CFTs to be isolated. For pressure relief, it requires the pressurizer coolant at or below a maximum level and the PORV OPERABLE with a lift setting $\leq$ the LTOP limit.

The PORV is OPERABLE when its block valve is open, its lift setpoint is set at $\leq$ 460 psig and testing has proven its ability to open at that setpoint, and power is available to the two valves and their control circuits.

An RCS vent path capable of mitigating the most limiting LTOP event (except for HPI-ES actuation or CFT discharge) has a minimum equivalent diameter of 1-3/32 inches, which is equal to the inner throat diameter of the PORV.

Implementation of the following administrative controls assure that $\geq$ 10 minutes are available for operator action to mitigate an LTOP event:

1. RCS pressure:

   < 320 psig when RCS temperature $\leq$ 220°F

   < 430 psig when RCS temperature > 220°F and $\leq$ 325°F

2. Pressurizer level is maintained within the following limits:

   a. RCS pressure is > 100 psig:

      $\leq$ 220 inches when RCS temperature $\leq$ 325°F

(continued)

BASES

LCO (continued)

b. RCS pressure is ≤ 100 psig:

≤ 310 inches when RCS temperature ≤ 220°F.

≤ 380 inches while filling or draining the RCS when RCS temperature ≤ 160°F and no HPI pumps are running.

When the RCS pressure is ≤ 100 psig, pressurizer level is normally maintained ≤ 220 inches except for certain RCS evolutions. The specified pressurizer level limits provide assurance that at least 10 minutes is available for operator action during those evolutions. The temperature limits are based on operational limits for the evolutions and are used in the analyses to determine allowable pressurizer levels.

3. Makeup flow is restricted with the HP-120 (makeup control valve) travel stop set to ≤ 90.0 gpm for all three units.

4. Three audible pressurizer level alarms at ≤ 225 inches, ≤ 260 inches, and ≤ 315 inches from the temperature compensated pressurizer level indication.

5. Two audible RCS pressure alarms at 320 psig and 430 psig.

6. High pressure nitrogen system is administratively controlled to prevent inadvertent pressurization of the RCS.

7. Core Flood Tank(s) are isolated as required by the LCO by closing the appropriate isolation valve(s) (either CF-1 and/or CF-2), tagging open the valve breaker(s), and tagging the valve(s) in the closed position.

8. The HPI safety injection flowpaths must be deactivated.

(continued)

BASES

LCO (continued)

a. Deactivating Train A of HPI is accomplished by either:

1) Shutting and deactivating valve HP-26 by tagging open the valve breaker and tagging the valve handwheel in the closed position, shutting valve HP-410 and tagging the valve switch in the closed position.

2) Deactivating all HPI pumps aligned to HPI train A and tagging the pump breakers open.

b. Deactivating Train B of HPI is accomplished by either:

1) Shutting and deactivating valve HP-27 by tagging open the valve breaker and tagging the valve handwheel in the closed position, shutting valve HP-409 and tagging the valve switch in the closed position.

2) Deactivating all HPI pumps aligned to HPI train B and tagging the pump breakers open.

9. Pressurizer heater bank 3 or 4 must be deactivated.

Operational parameters identified in TS 3.4.12 and this TS Bases include allowances for instrument uncertainty.

APPLICABILITY

This LCO is applicable in MODE 3 when any RCS cold leg temperature is $\leq$ 325°F, and in MODES 4, 5 and 6 when an RCS vent capable of mitigating the most limiting LTOP event is not open. The Applicability temperature of 325°F is established by fracture mechanics analyses. The pressurizer safety valves provide overpressure protection to meet LCO 3.4.3 P/T limits above 325°F. With the vessel head off, overpressurization is not possible. With an RCS vent capable of mitigating the most limiting LTOP event open, an LTOP event (including HPI-ES actuation or CFT discharge) is incapable of pressurizing the RCS above the RCS P/T limits.

(continued)

BASES

APPLICABILITY (continued)

A RCS vent $\geq$ 3.6 square inches is capable of mitigating a HPI-ES actuation of three pumps through two flow paths to the RCS. A RCS vent $\geq$ 201 square inches is capable of mitigating a discharge of both CFTs.

LCO 3.4.3 provides the operational P/T limits for all MODES. LCO 3.4.10, "Pressurizer Safety Valves," requires the pressurizer safety valves OPERABLE to provide overpressure protection during MODES 1, 2, and 3 above 325°F.

The Applicability is modified by two Notes. Note 1 states that CFT isolation is only required when the CFT pressure is more than or equal to the maximum RCS pressure for the existing RCS temperature, as allowed in LCO 3.4.3. This Note permits the CFT discharge valve surveillance performed only under these pressure and temperature conditions.

Note 2 permits the PORV to be inoperable when no HPI pumps are running and RCS pressure is < 100 psig. PORV operability is not required when RCS pressure is < 100 psig and HPI pumps are not operating since credible LTOP events progress relatively slowly, thus giving the operator ample time to respond.

ACTIONS

A.1

With the HPI activated, immediate actions are required to deactivate HPI. Emphasis is on immediate deactivation because inadvertent injection with one or more HPI pump OPERABLE is the event of greatest significance, since these events cause the greatest pressure increase in the shortest time.

The immediate Completion Times reflect the urgency of quickly proceeding with the Required Actions.

(continued)

BASES

ACTIONS (continued)

B.1, C.1, and C.2

An unisolated CFT requires isolation within 1 hour only when the CFT pressure is at or more than the maximum RCS pressure for the existing temperature allowed in LCO 3.4.3.

If isolation is needed and cannot be accomplished in 1 hour, Required Action C.1 and Required Action C.2 provide two options, either of which must be performed in 12 hours. By placing the unit in MODE 4 with the RCS temperature > 233°F, the CFT pressure of 650 psig cannot exceed the LTOP limits if both tanks are fully injected. Depressurizing the CFTs below the LTOP limit of 373 psig also prevents exceeding the LTOP limits in the same event.

The Completion Times are based on operating experience that these activities can be accomplished in these time periods and on engineering judgement indicating that a limiting LTOP event is not likely in the allowed times.

D.1, E.1, and E.2

With the PORV inoperable, overpressure relieving capability is lost, and restoration of the PORV within 1 hour is required.

If restoration cannot be completed within 1 hour, either Required Action E.1 or Required Action E.2 must be performed. Required Action E.1 requires increasing RCS temperature within 23 hours to exit the Applicability of the specification. With RCS temperature > 325°F, the CFTs are not required to be isolated. Required Action E.2 requires the RCS be depressurized to less than 100 psig within 35 hours. With reactor pressure < 100 psig more time is available for operator action to mitigate an LTOP event.

These Completion Times also consider these activities can be accomplished in these time periods. A limiting LTOP event is not likely in these times.

(continued)

BASES

ACTIONS (continued)

F.1 and G.1

With Administrative Controls that assure ≥ 10 minutes are available to mitigate the consequences of an event not implemented, the capability for operator action to mitigate an LTOP event may be lost. In this circumstance, compensatory measures must be established to monitor for initiation of an LTOP event. Establishing a dedicated operator within 4 hours to monitor for initiation of an LTOP event is sufficient to compensate for inoperability of makeup flow restrictions, having too many pressurizer heater banks available, inoperability of required alarms, or deviation from pressure, temperature or level limits. Establishing a dedicated operator is not sufficient to compensate for not deactivating HPI or isolating CFTs. If the Required Action and associated Completion Time of Condition F is not met, the RCS must be depressurized and an RCS vent path capable of mitigating the most limiting LTOP event must be established within 12 hours. These Completion Times also consider that these activities can be accomplished in these time periods. A limiting LTOP event is not likely in these periods.

H.1 and H.2

With administrative controls which assure ≥ 10 minutes are available to mitigate the consequences of an LTOP event not implemented and the PORV inoperable; or the LTOP System inoperable for any reason other than cited in Condition A through G, the system must be restored to OPERABLE status within one hour. When this is not possible, Required Action H.2 requires the RCS depressurized and vented within 12 hours.

One or more vents may be used. A vent path capable of mitigating the most limiting LTOP event is specified. Because makeup may be required, the vent size accommodates inadvertent full makeup system operation. Such a vent keeps the pressure from full flow of the makeup pump(s) with a wide open makeup control valve within the LCO limit.

(continued)

BASES

ACTIONS

H.1 and H.2 (continued)

The Completion Time is based on operating experience that these activity can be accomplished in this time period and on engineering judgement indicating that a limiting LTOP transient is not likely in this time.

SURVEILLANCE REQUIREMENTS

SR 3.4.12.1 and SR 3.4.12.2

Verifications must be performed that HPI is deactivated, and the CFTs are isolated. These Surveillances ensure the minimum coolant input capability will not create an RCS overpressure condition to challenge the LTOP System. The Surveillances are required at 12 hour intervals. The 12 hour intervals are shown by operating practice to be sufficient to regularly assess conditions for potential degradation and verify operation within the safety analysis.

SR 3.4.12.3

Verification that the pressurizer level is less than the volume necessary to assure ≥ 10 minutes are available for operator action to mitigate an LTOP event by observing control room or other indications ensures a cushion of sufficient size is available to reduce the rate of pressure increase from potential transients.

The 30 minute Surveillance Frequency during heatup and cooldown must be performed for the LCO Applicability period when temperature changes can cause pressurizer level variations. This Frequency may be discontinued when the ends of these conditions are satisfied, as defined in plant procedures. Thereafter, the Surveillance is required at 12 hour intervals.

These Frequencies are shown by operating practice sufficient to regularly assess indications of potential degradation and verify operation within the safety analysis.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.12.4

Verification that the PORV block valve is open ensures a flow path to the PORV. This is required at 12 hour intervals.

The interval has been shown by operating practice to be sufficient to regularly assess conditions for potential degradation and verify operation is within the safety analysis.

SR 3.4.12.5

A CHANNEL FUNCTIONAL TEST is required within 12 hours after decreasing RCS temperature to $\leq$ 325°F and every 31 days thereafter to ensure the setpoint is proper for using the PORV for LTOP. PORV actuation is not needed, as it could depressurize the RCS.

The 12 hour Frequency considers the unlikelihood of a low temperature overpressure event during the time. The 31 day Frequency is based on industry accepted practice and is acceptable by experience with equipment reliability.

SR 3.4.12.6

Verification that administrative controls, other than limits for pressurizer level, that assure $\geq$ 10 minutes are available for operator action to mitigate the consequences of an LTOP event are implemented is necessary every 12 hours. This verification consists of a combination of administrative checks for alarm availability, verification that pressurizer heater bank 3 or 4 is deactivated, appropriate restrictions on pressurizer level, controls for High Pressure Nitrogen, etc., as well as visual confirmation using available indications that associated physical parameters are within limits.

The Frequency is shown by operating practice sufficient to regularly assess indications of potential degradation and verify operation within the safety analysis.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.12.7

The performance of a CHANNEL CALIBRATION is required every 18 months. The CHANNEL CALIBRATION for the LTOP setpoint ensures that the PORV will be actuated at the appropriate RCS pressure by verifying the accuracy of the instrument string. The calibration can only be performed in shutdown.

The Frequency considers a typical refueling cycle and industry accepted practice.

REFERENCES

1. 10 CFR 50, Appendix G.
2. Generic Letter 88-11.
3. UFSAR, 5.2.3.7.
4. 10 CFR 50.46.
5. 10 CFR 50, Appendix K.
6. 10 CFR 50.36.