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U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Document Control Desk

Subject: Oconee Nuclear Station
Docket Numbers 50-269, 270, and 287
Technical Specification Bases (TSB) Change

Please see attached a revision to Tech Spec Bases 3.4.9 which was implemented on July 25, 2005.

Attachment 1 contains the new TSB pages and Attachment 2 contains the marked up version of the Bases pages.

If any additional information is needed, please contact Graham Davenport at 864-885-3044.

Very truly yours,

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A001

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Attachment 1

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.9 Pressurizer

BASES

BACKGROUND

The pressurizer provides a point in the RCS where liquid and vapor are maintained in equilibrium under saturated conditions for pressure control purposes to prevent bulk boiling in the remainder of the RCS. Key functions include maintaining required primary system pressure during steady state operation and limiting the pressure changes caused by reactor coolant thermal expansion and contraction during normal load transients.

The pressure control components addressed by this LCO include the pressurizer water level, the required heaters, and their controls and emergency power supplies. Pressurizer safety valves are addressed by LCO 3.4.10, "Pressurizer Safety Valves."

The maximum water level limit has been established to ensure that a liquid to vapor interface exists to permit RCS pressure control during normal operation and proper pressure response for anticipated design basis transients. The water level limit thus serves two purposes:

a. Pressure control during normal operation maintains subcooled reactor coolant in the loops and thus is in the preferred state for heat transport; and

b. By restricting the level to a maximum, expected transient reactor coolant volume increases (pressurizer insurge) will not cause excessive level changes that could result in degraded ability for pressure control.

The maximum water level limit permits pressure control equipment to function as designed. The limit preserves the steam space during normal operation, thus both spray and heaters can operate to maintain the design operating pressure. If the level limits were exceeded prior to a transient that creates a large pressurizer insurge volume, the maximum RCS pressure might exceed the design Safety Limit (SL) of 2750 psig.

The pressurizer heaters are used to maintain a pressure in the RCS so reactor coolant in the loops is subcooled and thus in the preferred state for heat transport to the steam generators (SGs). This function must be

BASES

BACKGROUND (continued)

maintained with a loss of offsite power. Consequently, the emphasis of this LCO is to ensure that the essential power supplies and the associated heaters are adequate to maintain pressure for RCS loop subcooling with an extended loss of offsite power.

A minimum required available capacity of 400 kW ensures that the RCS pressure can be maintained. Unless adequate heater capacity is available, reactor coolant subcooling cannot be maintained indefinitely. Inability to control the system pressure and maintain subcooling under conditions of natural circulation flow in the primary system could lead to loss of single phase natural circulation and decreased capability to remove core decay heat.

The 400 kW of heater capacity exceeds the capacity required to be powered by the Standby Shutdown Facility (SSF) per the Technical Specification 3.10.1 BASES. The 400 kW limit is not unit specific and was conservatively established to bound future increases in pressurizer ambient heat loss.

APPLICABLE SAFETY ANALYSES

In MODES 1, 2, and 3 with the RCS temperature > 325°F, the LCO requirement for a steam bubble is reflected implicitly in the accident analyses. No associated safety analyses are performed in lower MODES. All analyses performed from a critical reactor condition assume the existence of a steam bubble and saturated conditions in the pressurizer. In making this assumption, the analyses neglect the small fraction of noncondensible gases normally present.

Safety analyses presented in the UFSAR do not take credit for pressurizer heater operation; however, an implicit initial condition assumption of the safety analyses is that the RCS is operating at normal pressure.

The maximum level limit is of prime interest for the startup accident and Loss of Main Feedwater (LOMFW) event. Conservative safety analyses assumptions for the startup accident indicate that it produces the largest increase of pressurizer level caused by an analyzed event. Thus this event has been selected to establish the pressurizer water level limit. For pressurizer levels > than 285 inches, the LOMFW event may be more limiting.

Evaluations performed for the design basis large break loss of coolant accident (LOCA), which assumed a higher maximum level than assumed for the startup accident, have been made. The higher pressurizer level

BASES

APPLICABLE SAFETY ANALYSES (continued)

assumed for the LOCA is the basis for the volume of reactor coolant released to the containment. The containment analysis performed using the mass and energy release demonstrated that the maximum resulting containment pressure was within design limits.

The requirement for emergency power supplies is based on NUREG-0737 (Ref. 2). The intent is to allow maintaining the reactor coolant in a subcooled condition with natural circulation at hot, high pressure conditions for an undefined, but extended, time period after a loss of offsite power. While loss of offsite power is an initial condition or coincident event assumed in many accident analyses, maintaining hot, high pressure conditions over an extended time period is not evaluated as part of UFSAR accident analyses.

The maximum pressurizer water level limit satisfies Criterion 2 of 10 CFR 50.36 (Ref. 1). Although the heaters are not specifically used in accident analysis, the need to maintain subcooling in the long term during loss of offsite power, as indicated in NUREG-0737 (Ref. 2), is the reason for providing an LCO.

LCO

The LCO requirement for the pressurizer to be OPERABLE with a water level $\leq$ 285 inches ensures that a steam bubble exists. Limiting the maximum operating water level preserves the steam space for pressure control. The LCO has been established to ensure the capability to establish and maintain pressure control for steady state operation and to minimize the consequences of potential overpressure transients. Requiring the presence of a steam bubble is also consistent with analytical assumptions.

The LCO requires a minimum of 400 kW of pressurizer heaters OPERABLE and capable of being powered from an emergency power supply. As such, the LCO addresses both the heaters and the power supplies. The minimum heater capacity required is sufficient to maintain the system near normal operating pressure when accounting for heat losses through the pressurizer insulation. By maintaining the pressure near the operating conditions, a wide margin to subcooling can be obtained in the loops. The design value of 400 kW will require the use of twenty-nine heaters rated at 14 kW (nominal) each. The amount needed to maintain pressure is dependent on the insulation losses, which can vary due to tightness of fit and condition.

BASES

APPLICABILITY

The need for pressure control is most pertinent when core heat can cause the greatest effect on RCS temperature, resulting in the greatest effect on pressurizer level and RCS pressure control. Thus Applicability has been designated for MODES 1 and 2. The Applicability is also provided for MODE 3 with RCS temperature > 325°F. The purpose is to prevent solid water RCS operation during heatup and cooldown to avoid rapid pressure rises caused by normal operational perturbations, such as reactor coolant pump startup. The temperature of 325°F has been designated as the cutoff for applicability because LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System," provides a requirement for pressurizer level ≤ 325°F. The LCO does not apply in MODE 4, 5 or 6 since either pressurizer level is under the control of LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System," or the RCS is open to the containment atmosphere.

In MODES 1, 2, and 3, there is the need to maintain the availability of pressurizer heaters capable of being powered from an emergency power supply. In the event of a loss of offsite power, the initial conditions of these MODES give the greatest demand for maintaining the RCS in a hot pressurized condition with loop subcooling for an extended period. For MODE 4, 5, or 6, it is not necessary to control pressure (by heaters) to ensure loop subcooling for heat transfer when the Decay Heat Removal loops are in service, and therefore the LCO is not applicable.

ACTIONS

A.1

With pressurizer water level in excess of the maximum limit, action must be taken to restore pressurizer operation to within the bounds assumed in the analysis. This is done by restoring the pressurizer water level to within the limit.

The 1 hour Completion Time is considered to be a reasonable time for draining excess liquid.

B.1 and B.2

If the water level cannot be restored, reducing core power constrains heat input effects that drive pressurizer insurge that could result from an anticipated transient. By shutting down the reactor and reducing reactor coolant temperature to at least MODE 3 with RCS temperature ≤ 325°F, the potential thermal energy of the reactor coolant mass for LOCA mass and energy releases is reduced.

BASES

ACTIONS (continued)

Twelve hours is a reasonable time based upon operating experience to reach MODE 3 from full power without challenging unit systems and operators. Further pressure and temperature reduction to MODE 3 with RCS temperature ≤ 325°F places the unit into a MODE where the LCO is not applicable. The 18 hour Completion Time to reach the nonapplicable MODE is reasonable based upon operating experience.

C.1

If the power supplies to the heaters are not capable of providing 400 kW, or the pressurizer heaters are inoperable, restoration is required in 72 hours. The Completion Time of 72 hours is reasonable considering the anticipation that a demand will not occur in this period.

D.1 and D.2

If pressurizer heater capability cannot be restored within the allowed Completion Time of Required Action C.1, 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 MODE 3 within 12 hours and to MODE 3 with RCS temperature ≤ 325°F within the following 6 hours. The Completion Time of 12 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging unit systems. Similarly, the Completion Time of 18 hours to be in MODE 3 with RCS temperature ≤ 325°F is reasonable based on operating experience to achieve power reduction from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE REQUIREMENTS

SR 3.4.9.1

This SR requires that during steady state operation, pressurizer water level is maintained below the nominal upper limit to provide a minimum space for a steam bubble. The Surveillance is performed by observing the indicated level. The 12 hour interval has been shown by operating practice to be sufficient to regularly assess the level for any deviation and verify that operation is within safety analyses assumptions. Alarms are also available for early detection of abnormal level indications.

SR 3.4.9.2

The SR verifies the power supplies are capable of producing the minimum power and the associated pressurizer heaters are at their design rating. (This may be done by testing the power supply output and heater current,

BASES (continued)

SURVEILLANCE REQUIREMENTS (continued)

or by performing an electrical check on heater element continuity and resistance.) The Frequency of 18 months is considered adequate to detect heater degradation and has been shown by operating experience to be acceptable.

REFERENCES

1. 10 CFR 50.36.

2. NUREG-0737, November 1980.

Attachment 2

BASES

BACKGROUND (continued)

maintained with a loss of offsite power. Consequently, the emphasis of this LCO is to ensure that the essential power supplies and the associated heaters are adequate to maintain pressure for RCS loop subcooling with an extended loss of offsite power.

A minimum required available capacity of 126 kW ensures that the RCS pressure can be maintained. Unless adequate heater capacity is available, reactor coolant subcooling cannot be maintained indefinitely. Inability to control the system pressure and maintain subcooling under conditions of natural circulation flow in the primary system could lead to loss of single phase natural circulation and decreased capability to remove core decay heat.

APPLICABLE SAFETY ANALYSES

In MODES 1, ~~and~~ 2, *and 3, with the RCS temperature > 325°F,* the LCO requirement for a steam bubble is reflected implicitly in the accident analyses. No associated safety analyses are performed in lower MODES. All analyses performed ~~from a critical~~ reactor condition assume the existence of a steam bubble and saturated conditions in the pressurizer. In making this assumption, the analyses neglect the small fraction of noncondensible gases normally present.

Safety analyses presented in the UFSAR do not take credit for pressurizer heater operation; however, an implicit initial condition assumption of the safety analyses is that the RCS is operating at normal pressure.

The maximum level limit is of prime interest for the startup accident and Loss of Main Feedwater (LOMFW) event. Conservative safety analyses assumptions for the startup accident indicate that it produces the largest increase of pressurizer level caused by an analyzed event. Thus this event has been selected to establish the pressurizer water level limit. For pressurizer levels > than 285 inches, the LOMFW event may be more limiting.

Evaluations performed for the design basis large break loss of coolant accident (LOCA), which assumed a higher maximum level than assumed for the startup accident, have been made. The higher pressurizer level assumed for the LOCA is the basis for the volume of reactor coolant released to the containment. The containment analysis performed using the mass and energy release demonstrated that the maximum resulting containment pressure was within design limits.

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