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W. R. McCollum, Jr.  
Vice President

May 13, 2002

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 revisions to Technical Specification Bases (TSB) to TSB 3.9.4 (DHR and Coolant Circulation - High Water Level) which was approved by Station Management on 4/16/02 and implemented on 4/25/02.

Attachment 1 contains the new TSB pages and Attachment 2 contains the markup version of the Bases page.

If any additional information is needed, please contact Larry E. Nicholson, at (864-885-3292).

Very truly yours,

W. R. McCollum, Jr., Vice President  
Oconee Nuclear Site

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cc: Mr. L. N. Olshan  
Office of Nuclear Reactor Regulation  
U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555

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Attachment 1

## B 3.9 REFUELING OPERATIONS

### B 3.9.4 Decay Heat Removal (DHR) and Coolant Circulation – High Water Level

#### BASES

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**BACKGROUND** The purposes of the DHR Loops in MODE 6 are to remove decay heat and sensible heat from the Reactor Coolant System (RCS), to provide mixing of borated coolant, to provide sufficient coolant circulation to minimize the effects of a boron dilution accident, and to prevent boron stratification. Heat is removed from the RCS by circulating reactor coolant through the LPI heat exchanger(s), where the heat is transferred to the Low Pressure Service Water (LPSW) System via the LPI heat exchanger(s). The coolant is then returned to the reactor vessel via the core flood tank injection nozzles. Operation of a DHR Loop for normal cooldown or decay heat removal is manually accomplished from the control room. The heat removal rate is adjusted by control of the flow of reactor coolant through the LPI heat exchanger(s), bypassing the heat exchanger(s) and throttling of LPSW through the heat exchangers. Mixing of the reactor coolant is maintained by this continuous circulation of reactor coolant through the DHR Loop.

**APPLICABLE SAFETY ANALYSES** If the reactor coolant temperature is not maintained below 200°F, boiling of the reactor coolant could result. This could lead to inadequate cooling of the reactor fuel as a result of a loss of coolant in the reactor vessel. Additionally, boiling of the reactor coolant could lead to a reduction in boron concentration in the coolant due to boron plating out on components near the areas of the boiling the activity, and because of the possible addition of water to reactor vessel with a lower boron concentration than is required to keep the reactor subcritical. The loss of reactor coolant and the reduction in boron concentration in the reactor coolant would eventually challenge the integrity of the fuel cladding, which is a fission product barrier. One loop of DHR is required to be operational in MODE 6, with the water level  $\geq 21.34$  feet above the top of the reactor vessel flange, to prevent this challenge. The LCO does permit de-energizing the DHR pump for short durations under the condition that the boron concentration is not diluted. This conditional de-energizing of the DHR pump does not result in a challenge to the fission product barrier. The DHR loop satisfies Criteria 4 of 10 CFR 50.36 (Ref. 2).

BASES

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LCO

Only one DHR loop is required for decay heat removal in MODE 6 with a water level  $\geq 21.34$  feet above the top of the reactor vessel flange. Only one DHR Loop is required to be operable because the volume of water above the reactor vessel flange provides backup decay heat removal capability. At least one DHR loop must be OPERABLE and in operation to provide:

- a. Removal of decay heat;
- b. Mixing of borated coolant to minimize the possibility of criticality; and
- c. Indication of reactor coolant temperature.

To be considered OPERABLE, a DHR loop must include a pump, a heat exchanger, valves, piping, instruments, and controls to ensure an OPERABLE flow path and to determine the temperature. The flow path starts in one of the RCS hot legs and is returned to reactor vessel via either one or both of the Core Flood tank injection nozzles when using an LPI pump. The BWST recirculation crossover line through valves LP-40 and LP-41 may be part of a flow path if it provides adequate decay heat removal capability. The operability of the operating DHR loop and the supporting heat sink is dependent on the ability to maintain the desired RCS temperature. LPSW and ECCW are required to support the DHR train.

Additionally, to be considered OPERABLE, a DHR loop must be capable of being manually aligned (remote or local) in the DHR mode for removal of decay heat. Operation of one loop can maintain the reactor coolant temperature as required. The LCO is modified by a Note that allows the required DHR loop to be removed from operation for up to 1 hour in an 8 hour period, provided no operation that would cause reduction of the RCS boron concentration is in progress. Boron concentration reduction is prohibited because uniform concentration distribution cannot be ensured without forced circulation, etc. This allowance permits operations such as core mapping, alterations or maintenance in the vicinity of the reactor vessel hot leg nozzles and RCS to LPI isolation valve testing. During this 1 hour period, decay heat is removed by natural convection.

BASES

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**APPLICABILITY** One DHR loop must be OPERABLE and in operation in MODE 6 with the water level  $\geq 21.34$  ft above the top of the reactor vessel flange, to provide decay heat removal. The 21.34 ft level was selected because it corresponds to the 21.34 ft requirement established for fuel movement in the fuel handling accident analysis. Requirements for the DHR Loops in other MODES are covered by LCOs in Section 3.4, Reactor Coolant System (RCS), and Section 3.5, Emergency Core Cooling Systems (ECCS). DHR loop requirements in MODE 6, with the water level  $< 21.34$  ft above the reactor vessel flange, are located in LCO 3.9.5, "Decay Heat Removal (DHR) and Coolant Circulation-Low Water Level."

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**ACTIONS**

A.1

If DHR loop requirements are not met, there will be no forced circulation to provide mixing to establish uniform boron concentrations. Reduced boron concentrations can occur by adding water with a lower boron concentration than that contained in the RCS. Therefore, actions that reduce boron concentration shall be suspended immediately.

A.2

If DHR loop requirements are not met, actions shall be taken immediately to suspend the loading of irradiated fuel assemblies in the core. With no forced circulation cooling, decay heat removal from the core occurs by natural convection to the heat sink provided by the water above the core. A minimum refueling water level 21.34 feet above the reactor vessel flange provides an adequate available heat sink. Suspending any operation that would increase decay heat load, such as loading an irradiated fuel assembly, is prudent under this condition.

BASES

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ACTIONS  
(continued)

A.3

If DHR loop requirements are not met, actions shall be initiated immediately in order to satisfy DHR loop requirements.

Restoration of one decay heat removal loop is required because this is the only active method of removing decay heat. Dissipation of decay heat through natural convection should not be relied upon for an extended period of time. Reliance on natural convection can lead to boiling which results in inventory loss. Sustained inventory loss can eventually result in inadequate decay heat removal from the core with subsequent release of fission products from the core to the reactor building atmosphere. The immediate Completion Time reflects the importance of restoring an adequate heat cooling loop.

A.4

If DHR loop requirements are not met, all containment penetrations providing direct access from the containment atmosphere to outside atmosphere shall be closed within 4 hours.

If no means of decay heat removal can be restored, the core decay heat could raise temperatures and cause boiling in the core which could result in uncovering the core and the release of radioactivity to the reactor building atmosphere. Closure of penetrations providing access to the outside atmosphere will prevent uncontrolled release of radioactivity to the environment.

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SURVEILLANCE  
REQUIREMENTS

SR 3.9.4.1

This Surveillance demonstrates that the DHR loop is in operation and circulating reactor coolant. Verification includes flow rate, temperature, or pump status monitoring, which help assure that forced flow is providing heat removal. The Frequency of 12 hours is sufficient, considering the flow, temperature, pump control, and alarm indications available to the operator in the control room for monitoring the DHR System.

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REFERENCES

1. 10 CFR 50.36.
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Attachment 2

## B 3.9 REFUELING OPERATIONS

### B 3.9.4 Decay Heat Removal (DHR) and Coolant Circulation – High Water Level

#### BASES

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**BACKGROUND** The purposes of the DHR Loops in MODE 6 are to remove decay heat and sensible heat from the Reactor Coolant System (RCS), to provide mixing of borated coolant, to provide sufficient coolant circulation to minimize the effects of a boron dilution accident, and to prevent boron stratification. ~~Heat may be removed from the RCS by two methods. In the first method, h~~Heat is removed *from the RCS* by circulating reactor coolant through the LPI heat exchanger(s), where the heat is transferred to the Low Pressure Service Water (LPSW) System via the LPI heat exchanger(s). The coolant is then returned to the reactor vessel via the core flood tank injection nozzles. Operation of a DHR Loop for normal cooldown or decay heat removal is manually accomplished from the control room. The heat removal rate is adjusted by control of the flow of reactor coolant through the LPI heat exchanger(s), bypassing the heat exchanger(s) and throttling of LPSW through the heat exchangers. Mixing of the reactor coolant is maintained by this continuous circulation of reactor coolant through the DHR Loop.

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**APPLICABLE SAFETY ANALYSES** If the reactor coolant temperature is not maintained below 200°F, boiling of the reactor coolant could result. This could lead to inadequate cooling of the reactor fuel as a result of a loss of coolant in the reactor vessel. Additionally, boiling of the reactor coolant could lead to a reduction in boron concentration in the coolant due to boron plating out on components near the areas of the boiling the activity, and because of the possible addition of water to reactor vessel with a lower boron concentration than is required to keep the reactor subcritical. The loss of reactor coolant and the reduction in boron concentration in the reactor coolant would eventually challenge the integrity of the fuel cladding, which is a fission product barrier. One loop of DHR is required to be operational in MODE 6, with the water level  $\geq 21.34$  feet above the top of the reactor vessel flange, to prevent this challenge. The LCO does permit de-energizing the DHR pump for short durations under the condition that the boron concentration is not diluted. This conditional de-energizing of the DHR pump does not result in a challenge to the fission product barrier. The DHR loop satisfies Criteria 4 of 10 CFR 50.36 (Ref. 2).

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