REFUELING OPERATIONS

3/4.9.8 RESIDUAL HEAT REMOVAL AND COOLANT CIRCULATION

HIGH WATER LEVEL

LIMITING CONDITION FOR OPERATION

3.9.8.1 At least one residual heat removal loop shall be OPERABLE and in operation.*

APPLICABILITY: MODE 6, when the water level above the top of the reactor vessel flange is greater than or equal to 23 feet.

ACTION:

With no residual heat removal loop OPERABLE and in operation, suspend all operations involving an increase in the reactor decay heat load or a reduction in boron concentration of the Reactor Coolant System and immediately initiate corrective action to return the required residual heat removal loop to OPERABLE and operating status as soon as possible. Close all containment penetrations providing direct access from the containment atmosphere to the outside atmosphere within 4 nours.

SURVEILLANCE REQUIREMENTS

4.9.8.1 At least one residual heat removal loop shall be verified in operation and circulating reactor coolant ~~at a flow rate of greater than or equal to 3000 gpm~~ at least once per 12 hours.

*The residual heat removal loop may be removed from operation for up to 1 hour per 8-hour period during the performance of CORE ALTERATIONS in the vicinity of the reactor vessel hot legs.

REFUELING OPERATIONS

LOW WATER LEVEL

LIMITING CONDITION FOR OPERATION

3.9.8.2 Two independent residual heat removal loops shall be OPERABLE, and at least one residual heat removal loop shall be in operation.*

APPLICABILITY: MODE 6, when the water level above the top of the reactor vessel flange is less than 23 feet.

ACTION:

a. With less than the required residual heat removal loops OPERABLE, immediately initiate corrective action to return the required residual heat removal loops to OPERABLE status, or establish greater than or equal to 23 feet of water above the reactor vessel flange, as soon as possible.

b. With no residual heat removal loop in operation, suspend all operations involving a reduction in boron concentration of the Reactor Coolant System and immediately initiate corrective action to return the required residual heat removal loop to operation. Close all containment penetrations providing direct access from the containment atmosphere to the outside atmosphere within 4 hours.

SURVEILLANCE REQUIREMENTS

4.9.8.2 At least one residual heat removal loop shall be verified in operation and circulating reactor coolant ~~at a flow rate of greater than or equal to 3000 gpm~~ at least once per 12 hours.

*Prior to initial criticality, the residual heat removal loop may be removed from operation for up to 1 hour per 8-hour period during the performance of CORE ALTERATIONS in the vicinity of the reactor vessel hot legs.

Attachment 2

Discussion, No Significant Hazards Analysis and
Environmental Impact Statement

DISCUSSION, NO SIGNIFICANT HAZARDS ANALYSIS AND ENVIRONMENTAL IMPACT STATEMENT

The proposed amendment would:

> Change the requirements for Residual Heat Removal to allow reduced flow during times when the Reactor Coolant System is partially drained. The change would delete the specific requirement to maintain Residual Heat Removal flow at greater than or equal to 3000 gpm as required by specification surveillances 4.9.8.1 and 4.9.8.2.

Each unit at Catawba Nuclear Station has two independent Residual Heat Removal (ND) Systems. The normal function of the ND System is to remove heat energy from the core and Reactor Coolant (NC) System during cooldown and refueling operations. The ND System is also used to transfer refueling water between the Refueling Water Storage Tank and refueling cavity at the beginning and end of refueling operations. The ND System is also used as part of the Safety Injection System and Containment Spray System during an accident condition. Detailed information concerning the ND System may be found in section 5.4.7 of the Catawba FSAR.

As stated in the bases of the Technical Specifications on page B 3/4 9-2, the ND System and the required flow rates for the ND System serve two purposes. The flow rate ensures sufficient cooling capacity is available to remove decay heat and maintain the water in the reactor vessel below 140° F as required during refueling. The flow rate also ensures sufficient coolant circulation is maintained through the core to minimize the effect of a boron dilution incident and prevent boron stratification.

On October 17, 1988 the NRC issued Generic Letter (GL) 88-17 to licensees. On page 5 of the attachment to the GL, program enhancement (5) Technical Specifications, recommended that licensees identify and submit appropriate changes to Technical Specifications that restrict or limit the safety benefit of actions identified in GL 88-17. On pages 5 and 6 of Enclosure 1 to the GL in section 2.1.2, vortexing is discussed. Vortexing at the junction of the ND System suction line and the NC System will occur if water level is too low, a situation to be avoided since this may introduce air into the ND System pump suction. Vortexing can occur more easily when flow is high. As stated in section VII.E. of NUREG-1269 on page 32, reduced ND System flow rate would provide a greater margin against vortexing and preclude an inadvertent loss of decay heat removal capability due to air entrainment and cavitation of the ND System pumps. This amendment will allow lower flow rates and reduce our susceptibility to vortexing.

The proposed amendment will not change the bases for specifications 3.9.8.1 and 3.9.8.2. Operations procedures and guidelines will ensure, for the required core condition, ND flow is satisfactory to maintain NC System temperature below 140° F, the effect of a boron dilution incident is minimized and boron stratification is prevented. Depending on the status of the NC System (i.e. whether the head is on or off, water level in NC system), the temperature of

the system can be monitored using the incore thermocouples, the wide range RTDs or the temperature indication at the inlet and the discharge of the ND System heat exchangers. When the NC system is at its lowest level the temperature indication at the inlet and the discharge of the ND System heat exchangers is used. In other words, the required flow rate for the ND system will be dictated by the status of the core (e.g. refueling completed - low decay heat, recently shut down - high decay heat removal) and the level of water in the NC System. Allowing the flow rates to be reduced will aid in preventing vortexing and air entrainment into the ND and NC Systems. As long as a ND pump is running, even at minimum flow rates, there is enough mixing in the flow to ensure no boron stratification occurs in the NC System. The ND pumps are also needed to minimize the effect of boron dilution scenario. This is accomplished by mixing the flow to ensure uniform distribution of the boron in the NC System. Mitigation of a boron dilution scenario is performed by a boron injection flow path, a centrifugal charging pump and a borated water source. These are required operable by specifications 3.1.2.1, 3.1.2.3 and and 3.1.2.5 during periods of reduced NC System inventory.

This amendment will also make the surveillance requirements for Technical Specifications 4.9.8.1 and 4.9.8.2 the same as the surveillance requirements for Technical Specifications 4.4.1.4.1.2 and 4.4.1.4.2. This would aid in eliminating operator confusion for the operating requirements of the ND System. Vortexing is not a concern when the water level above the top of the reactor vessel flange is greater than or equal to 23 feet (reference specification 3/4 9.8.1). The surveillance requirement 4.9.8.1 is being modified to be consistent with surveillance requirements 4.9.8.2, 4.4.1.4.1.2 and 4.4.1.4.2.

10 CFR 50.92 states that a proposed amendment involves no significant hazards considerations if operation in accordance with the proposed amendment would not:

(1) Involve a significant increase in the probability or consequences of an accident previously evaluated; or

(2) Create the possibility of a new or different kind of accident from any accident previously evaluated; or

(3) Involve a significant reduction in a margin of safety.

This change, which would allow the flow requirements for the ND System to be reduced to prevent vortexing in the ND System, does not involve a significant increase in the probability or consequences of an accident previously evaluated. The reduction in flow will not keep the ND System from fulfilling its safety functions. The ND System will continue to remove enough residual heat to maintain the NC System below 140° F, prevent boron dilution and prevent boron stratification. Two ND pumps (trains) will still be required operable when there is less than 23 feet of water above the reactor vessel flange. This will ensure that a single failure of the operating residual heat removal pump (train) will not result in a complete loss of ND System capability. This change will reduce the probability of an accident since it will reduce the chances of a loss of the ND System due to vortexing or air entrainment.

The change to the flow requirements for the ND System will not create the possibility of a new or different kind of accident from any accident previously evaluated. The ND System will still be operated as before except at lower flow rates. The lower flow rates will still allow the ND System to fulfill its safety functions. Therefore, no new or different kind of accident from any accident previously evaluated will be created.

The proposed change to the flow requirements for the ND System will not involve a significant reduction in a margin of safety. No functional change is being made to the ND System. The lowering of the flow rate requirements will reduce the chances of rendering the ND System inoperable. This will increase the margin of safety.

Environmental Impact

The proposed Technical Specification change has been reviewed against the criteria of 10 CFR 51.22 for the environmental considerations. As shown above, the proposed change does not involve a significant hazards consideration, nor increase the types and amounts of effluents that may be released offsite, nor increase individual or cumulative occupational radiation exposures. Based on this, the proposed Technical Specification change meets the criteria given in 10 CFR 51.22(c)(9) for a categorical exclusion from the requirement for an Environmental Impact Statement.