Docket No. 50-416 February 28, 1994

Mr. C. Randy Hutchinson
Vice President, Operations GGNS
Entergy Operations, Inc.
Post Office Box 756
Port Gibson, Mississippi 39150

Dear Mr. Hutchinson:

SUBJECT: CHANGE TO TECHNICAL SPECIFICATION BASES SECTION 3/4.2.3 GRAND GULF NUCLEAR STATION (TAC NO. M88363)

By letter dated November 23, 1993, Entergy Operations Inc., proposed a change to the Bases for the Grand Gulf Nuclear Station Technical Specifications (TS). The change to Bases Section 3/4.2.3 "MINIMUM CRITICAL POWER RATIO." The change deletes reference to the exposure component of the minimum critical power ratio (MCPR), $MCPR_e$, and adds a statement that describes the use of the power component of the MCPR, $MCPR_p$. These changes describe modifications to the definition of the MCPR that were developed in the safety evaluation carried out for the Cycle 7 reload at Grand Gulf Nuclear Station.

The staff has reviewed the proposed Bases change and agrees that the change is appropriate. Accordingly the change is acceptable. Enclosed are the revised Bases pages B 3/4 2-4 and B 3/4 2-6.

Sincerely,

ORIGINAL SINGED BY:

Paul W. O'Connor, Senior Project Manager
Project Directorate IV-1
Division of Reactor Projects - III/IV/V
Office of Nuclear Reactor Regulation

Enclosures:
TS pages B 3/4 2-4
and B 3/4 2-6

cc w/enclosures: See next page

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NUCLEAR REGULATORY COMMISSION
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Enclosures:
TS pages B 3/4 2-4
and B 3/4 2-6

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3/4.2.3 MINIMUM CRITICAL POWER RATIO

The required operating limit MCPRs at steady state operating conditions as specified in Specification 3.2.3 are derived from the established fuel cladding integrity Safety Limit MCPR, and an analysis of abnormal operational transients. For any abnormal operating transient analysis evaluation with the initial condition of the reactor being at the steady state operating limit, it is required that the resulting MCPR does not decrease below the Safety Limit MCPR at any time during the transient assuming instrument trip setting given in Specification 2.2.

To assure that the fuel cladding integrity Safety Limit is not exceeded during any anticipated abnormal operational transient, the most limiting transients have been analyzed to determine which result in the largest reduction in CRITICAL POWER RATIO (CPR). The type of transients evaluated were loss of flow, increase in pressure and power, positive reactivity insertion, and coolant temperature decrease. The limiting transient yields the largest delta CPR. When added to the Safety Limit MCPR, the required operating limit MCPR of Specification 3.2.3 is obtained. The power-flow map of Figure B 3/4 2.3-1 defines the analytical basis for generation of the MCPR operating limits (References 2 and 3).

MCPR operating limits are defined as functions of flow ($MCPR_f$), and power ($MCPR_p$). The limit to be used at a given operating state is the highest of these two limits.

The purpose of the $MCPR_e$ is to define operating limit is for all anticipated exposures during the Cycle. The $MCPR_e$ limits are established for a set of exposure intervals. The limiting transients are analyzed at the limiting exposure for each interval.

The $MCPR_e$ operating limits are established based on the largest delta-CPR calculated at the limiting exposure and ensure that the MCPR safety limit will not be exceeded during the most limiting transient in each of the exposure intervals.

The purpose of the $MCPR_f$ and $MCPR_p$ is to define operating limits at other than rated core flow and power conditions for all exposures during the cycle.

The $MCPR_f$s are established to protect the core from inadvertent core flow increases such that the 99.9% MCPR limit requirement can be assured. The reference core flow increase event used to establish the $MCPR_f$ is a hypothesized slow flow runout to maximum, that does not result in a scram from neutron flux overshoot exceeding the APRM neutron flux-high level (Table 2.2.1-1 item 2). The result of a single failure or single operator error during Loop Manual operation is the runout of one loop because the two recirculation loops are under independent control. With this basis, the $MCPR_f$ curve was generated from

MINIMUM CRITICAL POWER RATIO (Continued)

was assumed to be constant. The generic flow control line is used to define several core power/flow states at which to perform steady-state core thermal-hydraulic evaluations.

The Loop Manual mode of operation were analyzed. Consistent with the single failure/single operator error criterion, one loop runout was postulated for Loop Manual operation. The maximum core flow at loop runout was assumed to be 110% of rated flow. Peaking factors were selected such that the MCPR for the bundle with the least margin of safety would not decrease below the MCPR Safety Limit.

The $MCPR_p$ is established to protect the core from plant transients other than core flow increase including the localized rod withdrawal error event. The $MCPR_p$ limits are established for a set of exposure intervals. The limiting transients are analyzed at the limiting exposure for each interval. Core power dependent setpoints are incorporated (incremental control rod withdrawal limits) in the Rod Withdrawal Limiter (RWL) System Specification (3.3.6). These setpoints allow greater control rod withdrawal at lower core powers where core thermal margins are large. However, the increased rod withdrawal requires higher initial MCPR's to assure the MCPR safety limit Specification (2.1.2) is not violated. The analyses that establish the power dependent MCPR requirements that support the RWL system are presented in Reference 4. For core power below 40% of RATED THERMAL POWER, where the EOC-RPT and the reactor scrams on turbine stop valve closure and turbine control valve fast closure are bypassed, separate sets of $MCPR_p$ limits are provided for high and low core flows to account for the significant sensitivity to initial core flows. For core power above 40% of RATED THERMAL POWER, bounding power-dependent MCPR limit were developed. The abnormal operating transients analyzed for single loop operation are discussed in Reference 5 and the appropriate cycle-specific documents. No change to the MCPR operating limit is required for single loop operation.

At THERMAL POWER levels less than or equal to 25% of RATED THERMAL POWER, the reactor will be operating at minimum recirculation pump speed and the moderator void content will be very small. For all designated control rod patterns which may be employed at this point, operating plant experience indicates that the resulting MCPR value is in excess of requirements by a considerable margin.