

ENCLOSURE

Safety Evaluation of Residual Heat Removal (RHR)

System Relief Line Loads for

Grand Gulf, Unit 1

In Supplement 3 to the Safety Evaluation Report, the NRC staff evaluated concerns regarding the Mark III containment that were raised by Mr. John Humphrey, a former engineer with the General Electric Company.

One of the so-called Humphrey concerns under review by the staff is the use of the RHR system in the steam condensing mode and the associated potential for hydrodynamic loads in the suppression pool resulting from the opening of the RHR heat exchanger relief valve. Mississippi Power & Light Company (MP&L), the Grand Gulf licensee, had committed not to use the RHR system in the steam condensing mode until they had completed an analysis of the system and received an acceptable determination by the staff.

In a letter dated September 13, 1984, from L. Dale, MP&L to H. Denton, NRC, approval was requested from the NRC of a proposal by MP&L to operate the RHR system (Division 1 only) in the steam condensing mode during the Startup Test Program for Grand Gulf, Unit 1. It is MP&L's intention to operate the RHR system in this mode only for brief periods during the test program and not during normal plant operation, until the NRC concurs with the resolution of all outstanding issues. The following considerations have prompted MP&L's request to utilize the steam condensing mode of RHR operation during the Startup Test Program. First, the optimization of the control system for steam condensing mode has historically been a difficult effort, one which is best done by the NSSS vendor engineers assigned to the site during the Startup Test Phase. Second, the Startup Test Program is an NRC recognized operator training opportunity, in which plant operators gain familiarity with plant operation. A third consideration is that the test phase provides a closely structured step-by-step approach to power ascension. The RHR steam condensing mode is scheduled to be initially "tuned up" at a low power level in order to minimize reactivity effects on the reactor, as well as to prevent impacting turbine generator operation as steam loads are varied.

MP&L has provided the staff with a detailed analysis of the hydrodynamic loads associated with the potential opening of the RHR heat exchanger relief line. The latest information on this issue was transmitted via a letter, dated September 7, 1984, from L. Dale, MP&L, to H. Denton, NRC. It contains MP&L's evaluation of the condensation oscillation loads that could occur following the opening of the RHR heat exchanger relief valve. With the above cited submittal, MP&L has completed its evaluation of all the potential hydrodynamic loads associated with this issue and concludes that the use of the steam condensing mode of RHR operation will not present any safety concern.

In reviewing MP&L's request for authorization to operate the RHR system in the steam condensing mode, the NRC staff has examined the possible hydrodynamic loads resulting from the opening of the RHR heat exchanger relief line to the suppression pool. These loads include air/water relief loads, chugging and condensation loads on the pool boundary and submerged structures, and the lateral tip loads on the relief line itself. The review approach used by the staff in evaluating MP&L's request is the same approach the staff has used in the initial evaluation of the use of the RHR system in the steam condensing mode for Mark I containment plants. For the Mark I plants, the staff reviewed the basic assumptions made by the Mark I owners and the thoroughness of the analysis performed and concluded that sufficient justification existed for the continued use of this mode of RHR operation until the staff could complete its full confirmatory review of this issue.

Based on the same review approach as was used for the Mark I plants, the staff concludes that MP&L has satisfactorily addressed the staff's concerns regarding the basic assumptions and analysis techniques for evaluating the potential hydrodynamic loads associated with the use of the RHR system in the steam condensing mode and that the use of this mode of RHR operation during the Startup Test Program will not present a safety concern. Because of the advantages of testing this mode of operation during the Startup Test Program as detailed above, the staff agrees that MP&L be allowed to use this system in the manner proposed in its September 13, 1984, letter.

The staff will continue its review of the analysis provided by the Grand Gulf licensee on this matter and will provide a comprehensive report of the potential hydrodynamic effects from the actuation of the RHR heat exchanger relief line at a later date. The staff considers this follow-up review to be confirmatory in nature.