



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 35 TO

FACILITY OPERATING LICENSE NO. NPF-38

LOUISIANA POWER AND LIGHT COMPANY

WATERFORD STEAM ELECTRIC STATION, UNIT 3

DOCKET NO. 50-382

1.0 INTRODUCTION

By application dated January 28, 1988, Louisiana Power and Light Company (LP&L or the licensee) requested changes to The Technical Specifications (Appendix A to Facility Operating License No. NPF-38) for Waterford Steam Electric Station, Unit 3. The proposed changes addressed by this amendment would add provisions to allow the shutdown cooling flow to be reduced to 2000 gpm at 375 hours after the reactor is shut down.

2.0 DISCUSSION

On July 9, 1987, the NRC issued Generic Letter 87-12 "Loss of Residual Heat Removal (RHR) While the Reactor Coolant System (RCS) is Partially Filled" which, with other NRC and industry publications, noted the effect of shutdown cooling (SDC) flow rate upon the potential for vortexing at the connection of the SDC suction line to the RCS when the RCS is partially drained. The Generic Letter requested licensees to investigate the potential loss of residual heat removal (RHR) and the effects of such a loss on operations. As a part of the review, licensees have further requested technical specification changes to allow for reduced SDC flow to around 2000 gpm when decay heat and other considerations are appropriate. For the proposed amendment, LP&L has addressed decay heat and boron stratification concerns.

3.0 EVALUATION

The licensee has performed analyses to determine SDC flow rates required to remove decay heat during Mode 6 (refueling) at several different times following reactor shutdown. The heat removal rate of the SDC heat exchanger was determined at steady state RCS and SDC system conditions for several SDC flow rates. The decay heat curves were then used to determine the times after reactor shutdown when the decay heat rate equaled the heat exchanger power for the selected SDC flow rates. The licensee has chosen the flow rate of 2000 gpm at 375 hours after reactor shutdown as the next appropriate level for RHR operation; the Technical Specifications already address 3000 gpm after the reactor has been shutdown for at least 175 hours.

The licensee's analysis included conservatisms in the overall heat transfer coefficients and decay heat concerns, which contain a 10% conservatism, from NUREG-0800, Branch Technical Position ASB 9-2, Revision 2. No credit was taken for heat losses from the RCS and SDC system piping. The resulting analysis of 2000 gpm at 375 hours after reactor shutdown is, therefore, acceptable.

The licensee further analyzed the effects of reduced SDC system flow on the potential for boron stratification, i.e., inadequate boron mixing. Also of concern in the boron dilution event is the loop transit time or time to criticality with the most limiting flow. At 2000 gpm, the flow is still well within the turbulent flow regime and the loop transit time is less than half the minimum time to criticality for the most limiting dilution event. Therefore, the SDC flow rates at 2000 gpm and greater are acceptable.

The licensee has proposed to revise the Technical Specification to incorporate the additional SDC system flow of 2000 gpm at 375 hours after reactor shutdown and we find the proposed changes acceptable.

4.0 CONTACT WITH STATE OFFICIAL

The NRC staff has advised the Administrator, Nuclear Energy Division, Office of Environmental Affairs, State of Louisiana of the proposed determination of no significant hazards consideration. No comments were received.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment relates to changes in installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The staff has determined that the amendment involves no significant increase in the amounts and no significant change in the types of any effluents that may be released offsite and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that this amendment involves no significant hazards consideration and there has been no public comment on such finding. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of this amendment.

6.0 CONCLUSION

Based upon its evaluation of the proposed changes to the Waterford 3 Technical Specifications, the staff has concluded that: there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and such activities will be conducted in compliance with the Commission's regulations and the

issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public. The staff, therefore, concludes that the proposed changes are acceptable, and are hereby incorporated into the Waterford 3 Technical Specifications.

Dated: April 1, 1988

Principal Contributor: David L. Wigginton