Enclosure

VOGTLE ELECTRIC GENERATING PLANT UNITS 1 AND 2
SAFETY EVALUATION FOR ELIMINATING ARBITRARY INTERMEDIATE PIPE BREAKS IN FEEDWATER SYSTEMS

I. INTRODUCTION

In Reference 1 the applicant for the Vogtle plant, Georgia Power Co. (GPC), requested the NRC approval for adopting an alternate approach to the existing guidelines in SRP 3.6.2 Branch Technical Position (BTP) MEB 3-1 regarding the postulation of intermediate pipe breaks (Ref. 2). The alternate approach proposed to eliminate from design considerations those breaks generally referred to as "arbitrary intermediate breaks" that are defined as those break locations, which, based on piping stress analysis results, are below the stress and fatigue limits specified in BTP MEB 3-1 but are selected to provide a minimum of two postulated breaks between the terminal ends of a piping system. After reviewing the applicant's request, the staff approved the alternative pipe break criteria proposed by the applicant except for the breaks in the main feedwater (FW) piping (Ref. 3). The applicant has now provided additional technical information regarding the safety features incorporated into the design of the Vogtle plant to minimize the potential for water hammer in the main FW system (Ref. 4). Reference 4 also discusses the stress analyses performed to determine the effects of water hammer, and the ability of the piping system to withstand such a transient. The staff has reviewed the applicant's recent submittal (Ref. 4) and the FSAR Section 10.4.7 and summarizes its findings below.

II EVALUATION OF THE APPLICANT"S SUBMITTAL ON WATER HAMMER

As stated in FSAR Section 10.4.7, the FW system is designed with features to preclude the potential for damaging flow instabilities (water hammer). The Vogtle units have a steam generator (SG) design (Westinghouse Model F) that has top discharge feedrings with J-tubes. The applicant has described in Reference 4 the various features that minimize water hammer potential. During normal power operation, approximately 92 per cent of the feedwater is supplied through the 16-inch main FW line, and the remainder is supplied through the 6-inch bypass (auxiliary) feedwater (AFW) line that has its own inlet nozzle on the SG. This split flow scheme provides a continuous flow through the bypass piping to the bypass nozzle which effectively prevents the backflow of steam or hot water from the SG. During heatup, cooldown and hot standby (flow less than 15 per cent of rated flow and temperature less than 250°F), feedwater is supplied only through the 6-inch bypass (auxiliary) nozzle. Unheated feedwater, whether from the main FW system or from the auxiliary FW system, will be supplied to the SG through the 6-inch bypass auxiliary FW nozzle, thus reducing the likelihood of water hammer occurring in the main FW piping and the SG main feed nozzle and feedring.

The arrangement of both the feedwater piping and the auxiliary FW system is such as to reduce the probability of draining the feedwater into the SG as described in Reference 4. Also, the applicant has introduced design features that will prevent or monitor backleakage. A check valve, located between the main FW isolation valve and the main FW nozzle, will be closed to isolate the main FW nozzle when not in use. Temperature sensors are provided in the main and auxiliary FW system piping close to their respective nozzles so as to alarm and alert the operator of backleakage so that prompt corrective action can be taken. Forward flow will be maintained through the 6-inch bypass nozzle as much as possible even during heatup, hot standby and cooldown. Temperature sensors are also provided on the discharge piping close to each auxiliary FW pump to alarm and alert the operator of backleakage so that corrective action can be taken.

The applicant will perform preoperational testing (as stated in the FSAR Section 10.4.7) when it will use the plant operating procedures, and verify that the prescribed operating procedures for each unit do not result in water hammer in the main or auxiliary FW system.

III CONCLUSION

Based on a review of the applicant's submittal (Ref. 4) regarding the special features built into the design and operation of the FW systems and the FSAR Section 10.4.7, the staff finds that there is a sufficient basis for concluding that an adequate level of safety exists in the applicant's provisions for minimizing the potential for water hammer in the FW systems. Therefore, the staff concludes that the pipe rupture postulation and the associated effects are adequately considered in the design of the Vogtle plant, and thus finds the proposed deviation from the SRP acceptable.

IV REFERENCES

1. Letter from D. O. Foster, GPC, to H. Denton, NRC, subject, Vogtle Electric Generating Plant, Units 1 & 2, Arbitrary Intermediate Pipe Breaks, April 26, 1984.

2. Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants, NUREG-0800 (Rev. 1), July 1981.

3. Letter from T. M. Novak, NRC, to D. O. Foster, GPC, subject, Vogtle Electric Generating Plant, Units 1 and 2, Arbitrary Intermediate Pipe Breaks, June 28, 1984.

4. Letter from D. O. Foster, GPC, to E. G. Adensam, NRC, subject, Vogtle Electric Generating Plant, Units 1 and 2, April 24, 1985.