SAFETY EVALUATION REPORT

STEAM GENERATOR WATER HAMMER

TURKEY POINT UNIT NOS. 3 AND 4

DOCKET NOS. 50-250 AND 50-251

JANUARY 1980

1.0 INTRODUCTION

Steam generator water hammer has occurred in certain nuclear power plants as a result of the rapid condensation of steam in a steam generator feedwater line and the consequent acceleration of a slug of water which upon impact within the piping system causes undue stresses in the piping and its support system. The significance of these events varies from plant to plant. Since a total loss of feedwater could affect the ability of the plant to cool down after a reactor shutdown, the NRC is concerned about these events occurring, even though an event with potentially serious consequences is unlikely to happen.

Because of the continuing occurrence of water hammer events, the NRC, in September 1977, informed all PWR licensees that water hammer events due to the rapid condensation of steam in the feedwater lines of steam generators represented a safety concern and that further actions by licensees for Westinghouse and Combustion Engineering designed nuclear steam supply systems are warranted to assure that an acceptably low risk to public safety due to such events is maintained. Accordingly, these licensees were requested to submit proposed hardware and/or procedural modifications, if any, which would be necessary to assure that the feedwater lines and feedrings remain filled with water during normal as well as transient operating conditions. As the same time, the NRC provided each PWR licensee with a copy of its consultant's report, "An Evaluation of PWR Steam Generator Water Hammer," NUREG-0291

The evaluation of the potential for steam generator water hammer at the Turkey Point plants shows that the feedwater piping adjacent to the steam generator consists of a favorably short run of horizontal piping and that during five years of successful operation they have experienced those conditions that might induce steam generator water hammer but no water hammer has occurred.

2.0 EVALUATION

Our consultant, EG&G Idaho Inc., prepared the attached evaluation of steam generator water hammer at the Turkey Point Plants as part of our technical assistance program. (Letter from J.A. Dearien, EG&G, to R.E. Tiller, DOE, dated January 9, 1980.) We have reviewed this report together with the licensee's submittals listed under item 4.0.

3.0 CONCLUSION

Based on our knowledge of water hammer phenomena, and our review of the licensee's responses and the enclosed evaluation report, we concur with our consultants' conclusion that the potential for steam generator water hammer is sufficiently low to permit continued operation of these facilities. However, even though steam generator

water hammer is not likely to occur, the licensee should be vigilant and monitor for water hammers that might impose significant stresses on the piping systems or their supports. We will continue to monitor reports from this licensee for indications of possible water hammer. If such indications appear in the future, this matter will be reexamined and may result in additional requirements to reduce the probability of steam generator water hammer at these facilities.

We have concluded that steam generator water hammer is not likely to occur at these facilities and, therefore, we find no undue risk to the health and safety of the public as a result of the continued operation of the Turkey Point Unit Nos. 3 and 4.

4.0 REFERENCES

4.1 Robert E. Uhrig (FPL), letter to George Lear, NRC, Subject - "Water Hammer in PWR Feedwater System" July 3, 1975.

4.2 Robert E. Uhrig (FPL), letter to George Lear, NRC, Subject - "Water Hammer in PWR Feedwater Systems," January 3, 1978.

4.3 Robert E. Uhrig (FPL), letter to A. Schwencer, NRC, Subject - "Water Hammer," December 26, 1979.