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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO REQUEST FOR CODE RELIEF FOR RHR SYSTEM VALVES

INDIANA MICHIGAN POWER COMPANY

DONALD C. COOK NUCLEAR PLANT, UNITS NOS. 1 AND 2

DOCKETS NOS. 50-315 AND 50-316

INTRODUCTION

By letter dated July 25, 1988, the Indiana Michigan Power Company (the licensee) requested permanent relief from the requirement to stroke test Residual Heat Removal (RHR) valves IMO-340 and -350 quarterly. These valves are presently excluded from the quarterly testing requirements of the ASME Boiler and Pressure Vessel Code, Section XI, 1983 Edition, Subsection IWV, Article IWV-3000. The present exclusion was granted by the NRC in a letter from D. R. Muller (NRC) to the licensee dated June 8, 1988. The relief provided by that letter expires January 31, 1989.

The licensee has requested permanent relief for IMO-340 and -350 since the valves cannot be full- or part-stroke exercised during plant operation without rendering both trains of safety injection (SI) pumps inoperable and thus initiating a plant shutdown per the requirements of Technical Specification (TS) 3.0.3, or violating the requirements of Section XI of the ASME code.

The Code of Federal Regulations, 10 CFR 50.55a(g), requires that inservice testing of ASME Code Class 1, 2, and 3 pumps and valves be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code and applicable addenda, except where specific written relief has been requested by the licensee and granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). The need for relief from stroke testing requirements for IMO-340 and -350 was originally requested by the licensee in a letter dated October 31, 1986. The letter requested relief for the subject valves, as well as for valves IMO-330 and -331. The licensee's request stated that relief was necessary since stroke testing the valves required closure of the RHR cross-tie valves (IMO-314 and/or -324), which is not consistent with the assumptions of the safety analysis in the Updated FHSR. The licensee stated that revised Emergency Core Cooling System (ECCS) analyses were being pursued to support cross-tie valve closure. (Closure of the cross-tie valves limits ECCS injection to two, instead of four, reactor coolant system loops. This requires reanalysis of small and large break Loss of Coolant Accidents (LOCAs), as well as containment pressure).

The NRC staff granted temporary relief for the four valves to allow the licensee to complete the analyses. The relief was granted on December 19, 1986, and was subsequently extended on December 11, 1987, and June 8, 1988, in order to allow the licensee time to complete the required analyses.

The analyses justifying closure of the RHR cross-tie valves was submitted by the licensee, and NRC staff review was completed. The staff found the analyses acceptable. The Safety Evaluation for the analyses was transmitted

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to the licensee under separate cover. However, the licensee has determined that the revised analyses will only allow stroke testing of IMO-330 and -331. Stroke testing of IMO-340 and -350 still cannot be performed with the unit operating, for reasons described below.

EVALUATION

The ASME Code, Section XI, allows testing valves at cold shutdown, in lieu of quarterly testing, if the licensee can demonstrate that testing the valves during power operation is not practical.

Valve IMO-340 is located in the discharge from the East RHR pump (downstream of the heat exchanger) to the suction of the centrifugal charging pumps. IMO-350 is located in the discharge from the West RHR pump (downstream of the heat exchanger) to the suction of the SI pumps. Both of these valves are normally closed during power operation and would be opened during the recirculation phase of a LOCA to allow the RHR pumps to transfer water from the containment recirculation sump to the charging pump (IMO-340) and SI pump (IMO-350) suctions. The valves are each interlocked with valves IMO-262 and -263. IMO-262 and -263 are located in series in the SI pump miniflow (recirculation) line to the refueling water storage tank. These normally open valves protect the SI pumps from dead-heading in the event the pumps start while the reactor coolant system pressure is above the pump shutoff pressure, and are required by Technical Specification (TS) 4.5.2.a to be open, with control power locked out, while the unit is in Modes 1, 2, or 3. In order to open IMO-340 or -350, it is necessary to first close either IMO-262 or -263. Since IMO-262 and -263 are in series, closing these valves renders both SI pumps inoperable, and thus places the unit in TS 3.0.3, which allows one hour to restore the SI pumps to operable status or initiate a unit shutdown.

The licensee has reviewed the equipment lineup necessary to perform testing of IMO-340 and -350 and has concluded that the complexity makes it highly unlikely that the lineup and testing can be accomplished within the one hour time limit of TS 3.0.3. Regardless, NRC policy, as stated in a June 17, 1987 memorandum from T. E. Murley to the Regional Administrators, is that TS 3.0.3 is not intended to be used as an operational convenience which permits redundant safety systems to be out of service for a limited period of time.

The licensee has given consideration to jumpering the interlocks associated with IMO-262 or -263 in order to allow testing of IMO-340 and -350. However, jumpering the interlocks would be considered maintenance per Article IWV-3200 of Section XI of the ASME code. This article would then require testing of the interlock function (including closing IMO-262 and -263) once the jumpers were removed before the equipment could be considered operable. This post-maintenance testing would require entry into TS 3.0.3, for the reasons described above, and thus places the unit in the same position as does testing without jumpering out the interlocks.

The licensee has also addressed the possibility of part-stroke exercising IMO-340 and -350 during power operation. This is not possible since the valves are not equipped with intermediate stop capability.

The licensee has reviewed test records for IMO-340 and -350 and has found the valves to be highly reliable. Only one failure to meet the inservice test acceptance criteria was recorded, this being Unit 2 IMO-340 stroking at 28 seconds versus the 15 seconds required. This failure occurred in July, 1981. No other problems with that valve have since occurred.

Flow from the RHR pumps to the SI and charging pump suctions is also provided by a cross-tie connection between the suction headers of the SI and charging pumps via valves IMO-360, -361, and -362. This flow path serves as an alternative in case of failure of IMO-340 or -350 to open as required. The Cook Nuclear Plant Emergency Operating Procedures (EOPs) already have provisions for establishing this flowpath.

CONCLUSION

Based on the above evaluation, the staff concludes that quarterly testing of IMO-340 and -350 is impractical since such testing would violate the TS requirements or the requirements of the ASME code. It is further concluded that testing of the valves at a cold shutdown frequency provides an acceptable level of quality and safety. This latter conclusion is based on the excellent test record of the valves and the presence of an alternative flow path should valve failure occur.