UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO A REQUEST FOR RELIEF REGARDING 10 CFR 50.55a INSERVICE TESTING

OF MAIN STEAM SAFETY/RELIEF VALVES

ENTERGY OPERATIONS, INC., ET. AL.

GRAND GULF NUCLEAR STATION, UNIT 1

DOCKET NO. 50-416

1.0 INTRODUCTION

By letter dated May 9, 1996, Entergy Operations, Inc. (the licensee) submitted a request for relief from certain requirements in the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code) pertaining to inservice testing (IST) testing of the main steam safety/relief valves (S/RVs) at Grand Gulf Nuclear Station, Unit 1 (GGNS). The plant IST program requires that the testing meet the requirements of the ASME Code Section XI, 1980 Edition. The licensee stated that relief was requested from the ASME Code requirements in that compliance with the ASME Code would result in a hardship or unusual difficulty without a compensating increase in the level of quality and safety.

In the letter of May 9, 1996, the licensee also proposed a change to the surveillance requirements in the GGNS Technical Specifications (TSs). The proposed change to the TSs will be addressed in a separate letter.

These valves were the subject of a recent action which increased the safety function lift setpoint tolerances that are listed in Surveillance Requirement (SR) 3.4.4.1 of the GGNS TSs. The tolerances were increased from plus/minus 1 percent to plus/minus 3 percent. The amendment to the license is Number 123 and was approved in the staff's letter of June 12, 1996. The licensee's application for this amendment was submitted February 22, 1996.

2.0 BACKGROUND

The Code of Federal Regulations, 10 CFR 50.55a, requires that IST of certain ASME Code Class 1, 2 and 3 pumps and valves be performed in accordance with Section XI of the ASME Code and applicable addenda, except where relief has been requested and granted, or proposed alternatives have been authorized, by the Commission pursuant to Paragraphs (a)(3)(i), (a)(3)(ii), or (f)(6)(i) of 10 CFR 50.55a. In proposing alternatives or requesting relief, the licensee

must demonstrate that: (1) the proposed alternative provides an acceptable level of quality and safety (Paragraph (a)(3)(i)); (2) compliance would result in a hardship or unusual difficulty without a compensating increase in the level of quality and safety (Paragraph (a)(3)(ii)); or (3) conformance is impractical for the facility (Paragraph (f)(6)(i)).

After evaluation of the determination, pursuant to 10 CFR 50.55a(g)(6)(i), the Commission may grant relief and may impose alternative requirements that are determined to be authorized by law, will not endanger life, property, or the common defense and security, and are otherwise in the public interest, giving due consideration to the burden upon the licensee that could result if the requirements were imposed.

3.0 EVALUATION

In its letter of May 9, 1996, the licensee requested relief from performing Category B stroke and stroke time testing to the safety-related position at least once every 3 months in accordance with paragraph IWV-3411 of the ASME Code, and remote position indication verification at least once every 2 years in accordance with IWV-3300 of the ASME Code. There are a total of 20 S/RVs in the main steam system and are identified as described below:

- S/RVs with Automatic Depressurization System (ADS) function:

  Q1B21F041D, F, and K
  Q1B21F047A and L
  Q1B21F051A, B, and C

- S/RVs without ADS function:

  Q1B21F041A, B, C, E, and G
  Q1B21F047C, D, G, and H
  Q1B21F051D, F, and K

The S/RVs are the overpressure protection for the reactor coolant system (i.e., reactor vessel, main steam lines, and associated piping) and are discussed in Section 5.2.2 of the Updated Final Safety Analysis Report (UFSAR) for GGNS. As explained in the UFSAR and in the licensee's letter of February 22, 1996, each S/RV performs its intended function through two modes of operation:

- Safety mode by direct action of the steam pressure against a single spring-loaded disk that will open when the valve inlet pressure force exceeds the spring force. The safety function set pressure is determined by changing the value of the compressed spring force.

- Relief mode by using an auxiliary actuating device consisting of a pneumatic piston/cylinder and a mechanical linkage assembly which opens the valve by overcoming the spring force.

Credit is taken for the dual purpose S/RVs in the valves' ASME Code qualified modes of safety operation. This is to say, when system pressure increases to the relief pressure setpoint of a group of S/RVs having the same relief setpoint, half of these valves are assumed to operate in the relief mode. They are opened by pneumatic power actuation. If the system pressure increases to the spring setpoint of a group of valves, those valves not already open are assumed to begin opening and to reach full-open at 103 percent of the setpoint.

Therefore, these valves have both a safety mode and a relief mode of operation. The safety mode is the self-actuating function which is necessary to relieve system overpressure. The relief mode is accomplished by an automatic or manual control circuit which applies electric power to solenoids which provide control air to the pneumatic actuator piston. The safety mode is a ASME Code Category C function. The relief mode is a ASME Code Category B function and is the subject of this relief request.

3.1 Basis for Relief

The licensee stated in its request that the ASME Code Category B IST requirements are impractical because opening the valves during power operation would cause unnecessary transients in the reactor coolant system and, should a valve fail in the open position, a loss-of-coolant accident (LOCA) would result. The licensee stated that the stroke time of the valves cannot be measured due to the rapid S/RV actuation characteristic and the lack of position indication. The licensee further stated that, in order to prevent seat leakage from occurring, it is not desirable to open the S/RVs once they are installed at the plant. Seat leakage causes undesirable contamination and heating in the containment and contributes to further valve seat damage. The licensee also stated that performance trending data shows that the S/RVs have a high probability of leaking and experiencing safety mode setpoint drift in the negative direction each time they are stroked.

3.2 Proposed Alternative Testing

As an alternative to meeting the above Code-required stroking and position indication verification IST requirements, the licensee proposed to exercise the S/RVs to the open position by manual actuation of the valves during setpoint testing and certification activities on the test bench. The licensee proposed that, during installation in the plant following testing, the valve stems be uncoupled from their actuators. The actuators would be exercised (without lifting the valve stems) to verify control signal continuity and proper air system configuration followed by recoupling of the actuators to the valve stems. This decoupled actuator test would also be performed following any maintenance or repair activity which could affect the relief mode of the S/RVs.

3.3 Evaluation of Relief Request

The alternative testing proposed by the licensee provides for actual stroking of the S/RV disks after performing the ASME Code Category C setpoint testing,

combined with stroking of the S/RV actuators after certified valves have been installed. This is an acceptable alternative test method since the only portion of the currently performed ASME Code testing which would not be incorporated into the proposed alternative is verification that the stem is properly coupled to the actuator. However, the licensee has stated that, for the past seven cycles, all of the S/RVs have been removed and installed with only a single relocation failure which resulted in a solenoid valve failing to reposition. The licensee determined that, for this occurrence, the failure would have been detected by the proposed testing.

The staff finds that the licensee's good installation history adequately addresses concerns relative to the necessary repositioning of the stem nut. The opening the valves during power operation could cause an undesirable transient in the reactor coolant system, and the failure of an S/RV to reclose would result in a LOCA. Further, without the installation of additional instrumentation, the stroke time of the valves cannot be measured. Thus, in light of the installation history and the alternative proposed, the increase in safety provided by code compliance is not commensurate with the hardship of compliance.

The staff notes that the S/RVs will be stroked and remote position indication verification will be performed at a nominal frequency of approximately every 5 years versus the 3-month stroking and 2-year remote position indication verification required by the 1980 Edition of Section XI. However, more recent editions of the ASME Operations and Maintenance Code provide for S/RV stroking only when setpoint tests, or maintenance or repair activities, are performed. Therefore, the licensee's proposal is consistent with the more recent ASME Code for these testing requirements.

4.0 CONCLUSION

Based on the above evaluation, the staff has determined that, in accordance with 10 CFR 50.55a (a)(3)(ii), the alternative proposed in relief request B21-3 should be and hereby is authorized. As described above, the staff has determined that the licensee has demonstrated that compliance with the applicable ASME Code testing requirements would result in a hardship or unusual difficulty without a compensating increase in the level of quality and safety.

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Date: November 18, 1996