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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION RELATED TO REQUEST FOR RELIEF FROM ASME BOILER AND PRESSURE VESSEL CODE REQUIREMENTS SECTION III RELATED TO BLOCK VALVES IN SERIES WITH OVERPROTECTION DEVICES

SOUTHERN NUCLEAR OPERATING COMPANY, INC.

JOSEPH M. FARLEY NUCLEAR PLANT, UNITS 1 AND 2

DOCKET NOS. 50-348 AND 50-364

1.0 INTRODUCTION

By letter dated January 29, 1996, relief was requested by Southern Nuclear Operating Company, Inc., et al. (the licensee), for the Joseph M. Farley Nuclear Plant (Farley), Units 1 and 2 (1(2)), from the requirements of 1968 ASME Section III, Article 9, Section N-910.8 and 1971 ASME Section III, Article NC-7000, Paragraph NC-7153. This relief would permit Farley to retain the installation of several block valves located in series with overprotection devices for the volume control tank (VCT) and the regenerative heat exchanger (RHE) by instituting positive administrative control over the block valves. Specifically, the licensee requested an alternative for the following components.

Volume Control Tank Relief Valve Line

Relief is being requested for manual block valves Q1(2)E21V311A, B, and C for Farley, Units 1 and 2. These block valves are installed in similar configurations on each unit. The block valves are installed in the discharge path of relief valve Q1(2)E1V261. The relief valve provides overpressure protection for volume control tank Q1(2)E21T004. The relief valve discharges into one of three available recycle hold-up tanks (RHTs) so that radioactive gas or liquid released will be contained within a closed system. The purpose of the block valves is to isolate individual RHTs for personnel safety during maintenance, to allow processing of individual RHT contents without uncontrolled discharges into an RHT, and to allow testing of individual RHTs without incapacitating the entire system or VCT overpressure protection.

Regenerative Heat Exchanger

Relief is being requested for manual block valve Q1(2)E21V143 for Farley, Units 1 and 2. This block valve is installed in a similar configuration on each unit. The block valve is installed in the discharge path of spring-loaded thermal relief check valve Q1(2)E21V114. The relief valve provides

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overpressure protection for the regenerative heat exchanger (RHE) Q1(2)E21H002 in the event of a chemical and volume control system malfunction. The relief valve discharges to the reactor coolant system. The purpose of the block valve is to facilitate maintenance of the RHE. The valve also serves as a hydrotest boundary between Class 1 and Class 2 piping.

Code Requirements

The RHEs are constructed to the requirements of ASME Code Section III with Addenda through Winter 1970. The Unit 1 VCT is constructed to the 1968 Edition of ASME Code Section III with Addenda through Winter 1969 and the Unit 2 VCT is constructed to the 1971 Edition with Addenda through Summer 1972. Overpressure protection requirements are stipulated in Article 9 of 1968 ASME Section III and Article NC-7000 of 1971 ASME Section III. Section N-910.8 of Article 9 and Paragraph NC-7153 of Article NC-7000 allow installation of stop valves or similar devices on the inlet or discharge of relief valves, but require positive "controls and interlocks." ASME Section III Code Interpretation III-I-80-67R states that "controls and interlocks ... are pressure sensing devices which would activate the stop valve to provide access to the relief valve, thereby assuring the pressure relieving function is met at all times." Interpretation III-I-80-67R also states that the administrative controls such as operating procedures governing the use and application of the system may not be construed as "controls." Therefore, the location of a manual block valve in series with a pressure relieving device without proper "controls and interlocks" does not conform to the ASME Code Section III requirements.

2.0 EVALUATION

The licensee is proposing an alternative to the "control and interlock" requirements of the 1968 Edition of ASME Code Section III, Article 9, Section N-910.8, and the 1971 Edition of ASME Code Section III, Article NC-7000, Paragraph NC-7153, which prohibit the placement of stop valves or similar devices on the inlet or discharge side of a protective device unless they are constructed and installed with positive controls and interlocks so that the relieving capacity requirements of these components are satisfied under all conditions of operation of the system.

Pursuant to 10 CFR 50.55a(a)(2), reactor systems and components must meet the ASME Code requirements specified in 10 CFR 55.55a(b) through (g). Section 10 CFR 50.55a gives the NRC two methods for approving alternatives to the ASME Code requirements. The NRC may authorize alternatives to the requirements of the Code pursuant to 10 CFR 50.55a(a)(3)(i) or 10 CFR 50.55a(a)(3)(ii). Paragraph 10 CFR 50.55a(a)(3)(i) requires the licensee to demonstrate that its proposed Code alternative would provide an acceptable level of quality and safety. Paragraph 10 CFR 50.55a(a)(3)(ii) requires the licensee to demonstrate that complying with Code requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. The licensee proposed an alternative on the basis that complying with

Code requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

The licensee stated that the manual isolation valve and relief valve configurations were part of the vendor's original standard design. Instead of complying with the Code requirements, which would require backfit design modifications to install controls and interlocks for the subject manual isolation valves, the licensee has proposed maintaining the current as-built configuration with the following manual isolation valve administrative controls. These controls provide a high level of assurance that the valves will not be operated inadvertently.

Volume Control Tank Relief Valve Line

1. Physically lock-open one block valve Q1(2)E21V311A, B, or C when the VCT is in service to assure an open flow path for relief valve Q1(2)E21V261. Procedure FNP-1(2)-SOP-2.4, "Chemical and Volume Control, Boron Recycle System," specifies that the block valve for the inservice HRT is locked-open during system operation.

2. Procedure FNP-1(2)-STP-64.1, "Non-Safeguards Systems Locked Valve Verification," verifies quarterly that block valve Q1(2)E21V311A, B, or C for the inservice RHT is locked-open when the VCT is aligned for service, thereby ensuring that a VCT flow path to the RHT is maintained.

Regenerative Heat Exchanger Relief Valve Line

1. Procedure FNP-1(2)-SOP-2.1A, "CVCS System Operating Procedure Checklist," specifies that block valve Q1(2)E21V143 is in the locked-open position during CVCS operation.

2. Procedure FNP-1(2)-STP-64.0, "Safeguards Systems Locked Valve Verification," verifies quarterly that block valve Q1(2)E21V143 is in the locked-open position.

In addition, the licensee notes that the RHE relief valves are located in a restricted area inside containment that makes the potential for inadvertent closure highly remote.

Although the VCT and RHE functions are not safety-related, the licensee has evaluated the failure consequences of inadvertent closure of either all three VCT block valves or the RHE block valve on either unit. Inadvertent closure of these block valves would either defeat the pressure relief function of the relief valve that protects the VCT or the pressure relief function of the spring loaded check valve that protects the RHE on either of the units. The relief valves for the VCT and RHE functions do not have an active safety function and are not required to actively operate during or following an accident to perform a nuclear safety function.

Closure of the three block valves Q1(2)E21V311A, B, and C could result in VCT overpressurization, which could potentially result in VCT failure and a release of reactor coolant system (RCS) liquid and gases to the auxiliary building. (The licensee stated that actual RCS leakage into the auxiliary building would be minimized by the operation of isolation valves on the letdown system lines.) Closure of block valve Q1(2)E21V143 could result in RHE overpressurization which could also potentially result in RHE failure and a release of RCS liquid and gases to the containment. The licensee has stated that the actual RCS leakage into containment would be minimized by the normal operation of the RCS boundary check and isolation valves on the normal and alternate charging lines and pressurizer auxiliary spray line.

Both the letdown line supplying the VCT and the charging and letdown lines to and from the RHE are 3 inches in diameter. The licensee has evaluated the consequences of a break in any of these lines (including a rupture of either the VCT or RHE due to overpressurization) and determined that the small break loss-of-coolant accidents evaluated in Chapter 15 of the Updated Final Safety Analysis Report, with the limiting case being a 3-inch diameter pipe break in the cold leg, bound these events.

3.0 CONCLUSION

The staff has determined that the previously identified configurations of manual isolation valves installed in series with the overprotection devices for the VCT and the RHE do not meet all of the requirements of the 1968 Edition of ASME Code Section III, Article 9 and of the 1971 Edition of ASME Code Section III, Article NC-7000, respectively. These Code editions were originally applicable ASME Codes for the construction of Farley, Units 1 and 2. The staff has concluded that the alternative proposed by the licensee does not result in unacceptable consequences or impair the ability to shut the plant down during normal operation or accident conditions and that the alternative controls will provide a high level of assurance that the block valves will not be inadvertently closed. Since the licensee has demonstrated that compliance with the ASME Code requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety of the plant, pursuant to 10 CFR 50.55a(a)(3)(ii), the staff authorizes the proposed alternative to the ASME Code regarding control and interlock requirements for relief valve discharge line stop valves as required by 10 CFR 50.55a(a)(2).

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Date: April 15, 1996