



UNITED STATES  
 NUCLEAR REGULATORY COMMISSION  
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO INSERVICE TESTING PROGRAM EXIGENT RELIEF REQUEST V-50

PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE

SEABROOK STATION

DOCKET NO. 20-443

1.0 INTRODUCTION

The Code of Federal Regulations, 10 CFR 50.55a(g), requires that inservice testing (IST) of certain 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 Subsections (a)(3)(i), (a)(3)(ii), or (g)(6)(i) of 10 CFR 50.55a. In requesting relief, the licensee must demonstrate that: (1) the proposed alternatives provide an acceptable level of quality and safety; (2) compliance would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety; or (3) conformance with certain requirements of the applicable Code edition and addenda is impractical for its facility.

These regulations authorize the Commission to grant relief from ASME Code requirements upon making the necessary findings. The NRC staff's findings with respect to granting or not granting the relief requested as part of the licensee's IST Program are contained in this Safety Evaluation (SE).

The original Safety Evaluation Report for the Seabrook IST Program was provided in NUREG-0896, Appendix S. Contained within were the following two relief request evaluations which apply to valve RC-FV-2881, the subject of V-50:

(1) Section 3.2.1, Solenoid Operated Valve Position Indicator Verification, which granted relief to perform valve position indication verification by monitoring normal system parameters such as flow, temperature, or pressure.

(2) Section 3.2.2, Rapid Action Power Operated Valves, which granted relief to assign a limiting value of 2 seconds, and take corrective action when this limiting value is exceeded, rather than comparing test results to previous test data.

The Seabrook Station IST Program was developed in accordance with the requirements in the 1983 Edition with addenda through the Summer 1983 Addenda.

Stroke-time measurements of power operated valves are required by Paragraph IWV-3410, Valve Exercising Test. Paragraph IWV-3300 requires valve position indicator verification at least once every 2 years.

New Hampshire Yankee's (NHY) letter of April 6, 1992, submitted Relief Request V-50. Review was requested on an exigent basis due to entry into Technical Specification 3.4.11, Action A, Limiting Condition of Operation, for an inoperable reactor coolant system vent path, which requires plant shutdown within 30 days (expires April 24, 1992) if the system is not restored to operable. The determination of inoperability of the vent path was based on the inability to meet the requirements of ASME Section XI to adequately measure the reactor vessel head vent valve RC-FV-2881 closure time due to the lack of position indication for the closed position of the valve. The relief was requested for an interim period until the next refueling outage. NHY has committed to implement design changes to correct the condition during the next refueling outage.

The staff has completed their review of Relief Request V-50 and the licensee's proposed alternative actions for an interim period. The results of this review are provided in the following evaluation.

## 2.0 RELIEF REQUEST V-50

During a review of component testing performed under the Seabrook IST Program, NHY identified a discrepancy with certain solenoid valves remote position indicating lights that had been utilized to perform valve exercise and stroke-time testing. The discrepancy involved the wiring of the solenoid valves, such that the remote indicating light that indicates the valve "closed" is actuated by utilizing the "open" limit switch. Therefore, the IST valve close stroke-time testing was measuring only the time interval from the control switch initiation to the valve "not full-open" position, rather than the intended time interval of the control switch initiation to the valve "full-closed" position as required by ASME Section XI.

The condition existed for twenty solenoid operated valves. For nineteen of the valves, NHY was able to utilize status monitoring lights actuated by the "closed" limit switch and perform stroke-time measurements which met the requirements of ASME Section XI, IWV-3410, with satisfactory performance of all nineteen valves. The remaining valve did not have a status monitoring light which could be utilized for "closed" position indication and stroke-timing the valve.

Because the requirements of IWV-3410 for stroke-time measurement of reactor vessel head vent valve RC-FV-2881 could not be met, and therefore Technical Specification (TS) 4.0.5 which specifies inservice testing requirements could not be met, the vent path which includes this valve was declared inoperable. Relief from the requirements of IWV-3413(a), Valve Exercising for Power Operated Valves, has been requested for an interim period. Upon the granting of relief by NRC, the licensee will be in compliance with TS 4.0.5 which specifies that inservice testing be performed in accordance with ASME Section XI except where relief has been granted by NRC.

### 2.1 Licensee's Basis for Relief

The licensee states in Relief Request V-50: "Reactor vessel head vent valve RC-FV-2881 currently cannot be full-stroke time closed from initiation of the actuating signal to the end of the actuating cycle due to the remote position indicating lights wiring circuitry design. RC-FV-2881 is a rapid-acting solenoid operated valve in a 100 mR/hr neutron field. Both the open and close remote position indicating lights are currently wired on an open valve position contact, thus the closed indicating light illuminates when the valve begins close travel. RC-FV-2881 closed remote position indicating light will be wired to a close valve position contact during the next refueling outage, currently scheduled for September 1992."

### 2.2 Proposed Alternative Testing

The licensee states in Relief Request V-50: "This valve will be full open stroke timed, open and closed exercised, and fail-safe tested every 3 months. Full closure of RC-FV-2881 will also be verified every 3 months using a downstream temperature sensor."

### 2.3 Additional Information

The licensee provided additional information in their letter submitting Relief Request V-50. They determined that RC-FV-2881 has a "close" limit switch, but it is not utilized to actuate any remote position indicating or status lights. In discussions with the valve manufacturer and by reviewing design drawings, NHY determined the following:

- (1) The full travel of the valve disc is 200 mils.
- (2) A properly adjusted open limit switch is set in the upper 50 mils of full open travel.
- (3) With the use of other components of the reactor vessel head vent system, the current design can be used to verify both full open and close exercise position of the valve. Both the full open stroke time, as well as closure of the valve pilot and initiation of disc movement in the close direction can be verified.
- (4) Full closure of RC-FV-2881 can be verified by opening downstream valve RC-V323 and verifying no temperature rise at downstream temperature element TE-7377. This procedure for verification of full closure has been approved by the Station Operation Review Committee and will be performed to establish the operational capability of the valve to close.

NHY has concluded that the reactor vessel head vent valve is fully capable of performing its intended function of venting noncondensable gases from the reactor coolant system following an accident. This conclusion is based on the information discussed in the paragraph above and on a review performed pursuant to 10 CFR 50.59 which addressed the lack of main control board position indication for the closed position of the valve and the inability to time the closing stroke.

The 10 CFR 50.59 evaluation did, however, reveal a discrepancy between the Updated Final Safety Analysis Report (UFSAR) and the actual plant configuration. Contrary to Section 5.2.6 of the UFSAR, there is no control room alarm from the downstream temperature element. The licensee concluded that the alarm function would serve to indicate inadvertent vent valve opening, but not affect the ability of the valve to vent, and therefore the lack of the alarm introduces no unreviewed safety question. The vent lines are designed such that in the event of a vent path line break, the flow out the break could not exceed the makeup capability to the reactor coolant system, therefore, not resulting in Emergency Core Cooling System actuation. Additionally, other instrumentation such as pressurizer relief tank (vent path discharge) level, temperature, and pressure, exists to alert the operator of an open vent valve.

#### 2.4 Evaluation

Valve RC-FV-2881 is a rapid-acting (operates in less than 2 seconds) solenoid operated valve with a safety function in both the "open" and "close" direction. It is installed in a Class 2 (the class break from Class 1 to Class 2 is at a 1"-to 3/4" reducer with a 3/8" flow restricting orifice upstream of the valve), 3/4" line off the reactor vessel head, discharging to the pressurizer relief tank. The safety function of the valve to open is to allow venting of noncondensable gases from the reactor coolant system which may inhibit core cooling by natural circulation. The valve also has a safety function to close, is normally closed, and fails closed, as a reactor coolant pressure boundary valve. A downstream motor-operated valve, V323, provides the second boundary. The capability to vent the reactor coolant system was identified as Item II.B.1 of the TMI-2 Action Plan Requirements, NUREG-0660 with clarification in NUREG-0737.

There are several design provisions of the reactor coolant system vents that are listed in NUREG-0737, Item II.B.1, including provisions for positive indication of valve position in the control room, and a test provision for Category B valves per ASME Section XI IWV. With the current condition of the position indication of the valve, these design and testing provisions are not met. However, the licensee has evaluated the capability of the system to meet its intended safety function, and concluded that the lack of these provisions does not result in an unreviewed safety question. While it is not the purpose of this SE to evaluate the 10 CFR 50.59 review performed by the licensee, the results of their review provide part of the basis for the acceptability of granting relief.

The licensee identified that the valve has a "close" limit switch at the valve which currently provides no indication remotely. It would not be possible to have an operator verify the position of the valve using this limit switch because the location of the valve in an approximate 100 mR/hr neutron field prohibits access during power operations. It would also be prohibitive to attempt to correct the wiring discrepancy during power operations due to the location of the valve. However, the licensee can verify that the valve is closed during normal operations by opening motor-operated valve RC-V323 and monitoring for a temperature increase in the line downstream of valve RC-FV-2881.

Valve RC-FV-2881 does not have a specified open or close stroke time in the safety analysis of the reactor coolant vent system. The venting is actuated manually and receives no automatic initiation. Venting of the reactor coolant system would be required only following a design basis accident when natural circulation is providing core cooling. There are no other plant conditions which would require the operators to open valve RC-FV-2881. The probability of a design basis event is low, and the probability of the emergency core cooling systems failing to provide adequate core cooling, requiring natural circulation, is also low. Therefore, though long-term relief could not be considered, relief for a short period of time could be considered.

Though the valve could be susceptible to inadvertent opening, valve RC-V323 would also have to open spuriously before an open vent path would result. Even if both valves failed open due to spurious conditions, the vent path has a flow restricting orifice to prevent an open path causing a loss-of-coolant accident requiring emergency core cooling systems. Additionally, opening of the valve is indicated in the control room. The position indication that cannot be relied on is only the closed indication.

The plant is currently operating at full-power normal operating conditions. The next refueling outage is scheduled for September 1992 (approximately six months). During the period between now and the refueling outage, the licensee will perform a test to verify the valve is closed prior to declaring the vent path operable, and will perform Code required quarterly inservice tests except for the stroke time test for the closing direction. As part of the inservice test procedure, the valve will be verified closed, after the open and close exercise, using the downstream temperature monitor and opening RC-V323.

The measurement of valve stroke times is included in the ASME Section to verify the capability of a valve to stroke within any required limiting value of safety analyses, and to monitor for degrading conditions indicated by an increasing stroke time. Valve RC-FV-2881 does not have a specified stroke time relative to a safety analysis value. Stroke timing will be done in one direction (open) which would provide indication of degrading conditions which would affect either direction, such as internal sticking. Therefore, the capability to measure the stroke time in the closing direction, as well, would not provide a significant increase in the level of safety for the short time until the refueling outage.

If the NRC immediately required the licensee to meet the Code requirements for measuring the closing stroke time of valve RC-FV-2881, a plant shutdown and cooldown would be required. It has not been the intent of ASME Section XI or the NRC to require unplanned, unscheduled outages solely to perform inservice testing. Any plant shutdown challenges systems and introduces additional cycles on components. Plant shutdowns are also a major burden on the licensee's total capacity of electrical production. Based on these considerations, the licensee should not be required to shutdown the plant because there are no immediate concerns with the safety of continued operation. For valve RC-FV-2881, there is adequate assurance of the operational readiness of the valve with the proposed additional testing to

verify closure by monitoring downstream temperature and continuing the Code required testing, except for measuring closing stroke time, to allow continued operation for a short term period.

### 3.0 CONCLUSION

Relief is granted for not measuring the stroke time of reactor coolant system vent valve RC-FV-2881 in the closing direction for an interim period. The granting of this relief is pursuant to 10 CFR 50.55a(a)(3)(ii) since imposition of the Code requirements would result in a hardship on the licensee without a compensating increase in the level of safety. A plant shutdown would be required to complete the testing in accordance with ASME Section for measuring the stroke time of valve RC-FV-2881 in the closing direction. For the period of time the plant will continue to operate until the next refueling outage (approximately 6 months), the valve will be exercised open and closed, and fail-safe tested; the opening stroke time will be measured; and the valve will be verified closed following inservice testing by opening a downstream valve and monitoring the downstream temperature. These actions will provide adequate assurance of the operational readiness of the valve for the interim period, and will avert a plant shutdown solely to perform inservice testing. The granting of relief does not alleviate the need for the licensee to take appropriate corrective actions if, during this interim period, the testing indicates that the valve cannot perform as required.

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