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

ENCLOSURE

# SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

# RELATED TO A REQUEST FOR RELIEF FOR THE INSERVICE TESTING PROGRAM

# CAROLINA LIGHT & POWER COMPANY

# H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

# DOCKET NUMBER 50-261

## 1.0 Introduction

Section 50.55a of 10 CFR requires that inservice testing (IST) of certain American Society of Mechanical Engineers Boiler and Pressure Vessel Code (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 alternatives are authorized or relief is granted by the Commission pursuant to 10 CFR 50.55a(a)(3)(i), (a)(3)(ii), or (f)(6)(i). In order to obtain authorization or 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 is impractical for its facility. NRC guidance contained in Generic Letter (GL) 89-04, "Guidance on Developing Acceptable Inservice Testing Programs," provided alternatives to the ASME Code requirements determined to be acceptable to the staff. When an alternative meeting GL 89-04 guidance is proposed and is documented in the IST program, no further evaluation is required; however, implementation of the alternative is subject to NRC inspection.

Furthermore, in rulemaking to 10 CFR 50.55a, effective September 8, 1992, (See 57 Federal Register 34666), the 1989 edition of ASME Code, Section XI, was incorporated in 10 CFR 50.55a(b). The 1989 edition provides that the rules for IST of pumps and valves shall meet the requirements set forth in ASME Operations and Maintenance Standards Part 6 (OM-6), "Inservice Testing of Pumps in Light-Water Reactor Power Plants," and Part 10 (OM-10), "Inservice Testing of Valves in Light-Water Reactor Power Plants." Pursuant to 10 CFR 50.55a(f)(4)(iv), portions of editions or addenda may be used provided that all related requirements of the respective editions or addenda are met, and, therefore, relief is not required for those inservice tests that are conducted in accordance with OM-6 and OM-10, or portions thereof. Whether or not all related requirements are met is subject to NRC inspection.

Section 50.55a authorizes the Commission to approve alternatives or grant relief from ASME Code requirements upon making the necessary findings. The

NRC staff's findings with respect to relief requested and alternatives proposed as part of the licensee's IST program are contained in this Safety Evaluation (SE).

This SE concerns revised IST relief requests and associated information submitted in letters dated December 28, 1992, and September 20, 1993, by the Carolina Power & Light Company (the licensee) for the H. B. Robinson Steam Electric Plant, Unit No. 2 (HBR2). The licensee's letter dated December 28, 1992, was submitted in response to the September 16, 1992, SE which identified anomalies in the licensee's IST program and request for relief. The response addressed actions taken for the denied relief requests GPRR-6, GVRR-3, GPRR-4, IVSW-VRR-1, and SI-VRR-1. The letter also provided additional information relating to a June 17, 1992, conference call concerning relief requests SI-VRR-3 and SI-VRR-6. On September 20, 1993, the licensee provided clarification with regard to relief request SI-VRR-3 addressing disassembly inspections on check valves SI-875 A/B/C.

The IST program addressed in this SE covers the third ten-year IST interval from February 19, 1992, to February 18, 2002. The licensee's program is based on the requirements of Section XI of the ASME Code, 1986 Edition.

## 2.0 Revised Relief Request GPRR-4

The licensee requested relief from the requirements of ASME Code, Section XI, Paragraph IWP-4110, which requires the accuracy of flow rate instruments to be ±2% of full scale, and Paragraph IWP-4120, which requires the full-scale range of flow instrumentation to be three times reference value or less.

Components

Charging Pumps A, B, and C
Component Cooling Water Pumps A, B, and C
Diesel Fuel Oil Transfer Pumps A and B
Residual Heat Removal Pumps A and B
Service Water Pumps A, B, C, and D
Containment Spray Pumps A and B
Safety Injection Pumps A, B, and C
Boric Acid Pumps A and B

## 2.1 Licensee's Basis for Requesting Relief

Because of the early design of HBR2, calibrated flow instrumentation was not provided to meet ASME Code, Section XI, requirements for assessing safety-related component performance. In order to better assess component condition, and to be in compliance with the ASME Code requirements, digital flow instruments were installed. Prior to permanent installation, these instruments were initially calibrated to a ±2% accuracy. Flow ranges were specified for this calibration based on three times the anticipated reference value for each test application. Site-specific calibrations, traceable to National Institute of Standards and Technology (NIST) standards or the equivalent, were performed in the manufacturer's test facility for each test arrangement for the components specified above. Based on manufacturer's

documentation, these instruments will also demonstrate an intrinsic accuracy of ±3% or better of actual readings without a special calibration being performed. Based on calculations, an intrinsic ±3% accuracy for actual flow readings would be equivalent to or better in accuracy than the ASME Code requirement of ±2% of full-scale. Therefore, if a ±2% accurate instrument becomes disabled, the temporary use of an instrument capable of ±3% of actual reading is requested. This relief is considered necessary because of the special calibration conditions, i.e., a flow loop arrangement in the manufacturer's facility, that would be required to restore a ±2% accurate instrument to service.

2.2 Alternative Testing

To the maximum extent possible, digital flow instrumentation calibrated to an accuracy of ±2% of actual flow will be utilized during test activities on the above pumps. The ±3% accurate instruments would only be used to meet ASME Code-required testing intervals if a ±2% accurate instrument becomes disabled. This would be a temporary arrangement until the ±2% instrument could be restored.

2.3 Evaluation

The licensee requested relief from the Code requirements for flow rate instrumentation accuracy and range for the pumps listed in the relief request. The licensee proposed to use digital instruments with accuracies of ±2% and ±3% of actual reading. The ±3% accurate instruments will only be used on a temporary basis in the event the ±2% accurate instruments become disabled. This relief request was revised, as called for in the NRC SE dated September 16, 1992, to document specific applications where digital instruments that are less accurate than ±2% are to be used.

Section XI, Paragraph IWP-4110, and OM-6, Paragraph 4.6.1.1, provide the Code requirements for instrument accuracy. Section XI effectively allows uncertainty in the measurements as much as ±6% since it requires a flow rate instrument accuracy of ±2% of full scale and a full-scale range of three times reference value or less. However, digital instruments are calibrated for actual readings; therefore, the full-scale range requirements of IWP-4120 are not appropriate for these instruments when used within the calibrated range as specified by the manufacturer. OM-6, which may be used pursuant to 10 CFR 50.55a(f)(4)(iv), specifically calls for ±2% accuracy, over the calibrated range (i.e., ±2% of the reading), for digital flow rate instrumentation.

Because the normal digital instrumentation has an accuracy of ±2% of reading, the test results may need to be adjusted when using the temporary instruments to account for the additional 1% inaccuracy to ensure repeatable results. However, even with this adjustment, the accuracy of the readings would be within the acceptable range for monitoring for degrading conditions and, therefore, the need for adjustments of the data would be as determined by the licensee. If data adjustments are made, the test procedures should be so designated.

Complying with the accuracy requirements of OM-6 would be a hardship for the licensee because of the special calibration conditions--i.e., a flow loop arrangement in the manufacturer's facility--that would be required for the normal instrumentation, possibly causing a delay in performing testing and complying with surveillance requirements for the affected equipment. Additionally, for meeting the Section XI, IWP-4110, requirements (which do not address digital instrumentation), there would be no increase in the level of safety afforded by imposing the requirements on the licensee in that the inaccuracy that could result with an analog instrument with a ±2% accuracy and a full-scale range of 3 times the reference (up to 6% of reading inaccuracy) would be higher than the ±3% of reading inaccuracy using the temporary digital instruments.

2.4 Conclusion

The proposed alternative to use temporary digital flow instruments when the normal digital flow instruments are unavailable is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) based on the hardship to the licensee that would result, if the Code requirements were imposed, without a compensating increase in the level of safety.

3.0 Revised Relief Request IVSW-VRR-1

In the licensee's submittal of relief request IVSW-VRR-1 on August 1, 1991, they requested relief from the test frequency requirements of Section XI for check valves and power-operated valves in the isolation valve seal water system. The relief was granted in the NRC SE dated September 16, 1992, to relax the ASME Code exercising frequency to every refueling outage for the check valves. The portion of the request pertaining to power-operated valves, however, was denied because of inadequate basis.

The power-operated valves have been removed from the revised relief request IVSW-VRR-1, submitted in the letter dated December 28, 1992. The power-operated valves in question are now being tested at cold shutdown intervals. The licensee's action adequately addresses the NRC concerns identified in the SE dated September 16, 1992, for this denied portion of the relief request; however, the licensee should document the impracticality of quarterly testing of this valve in a cold shutdown justification. During NRC inspections, cold shutdown justifications are subject to review.

4.0 Revised Relief Request SI-VRR-1

In the licensee's submittal of August 1, 1991, SI-VRR-1 requested relief from the test frequency requirements of Section XI for certain check valves in the safety injection (SI) system. The portion of the request pertaining to the SI test line check valve, SI-849, was subsequently denied in the NRC SE dated September 16, 1992, because of inadequate basis. Relief was granted to relax the ASME Code exercising frequency to every refueling outage for other check valves in the relief request.

The valve, SI-849, has been removed from the revised relief request SI-VRR-1, submitted in the letter dated December 28, 1992. The licensee stated that

SI-849 is currently being tested at cold shutdown intervals. The licensee's action adequately addresses the NRC concerns identified in the SE dated September 16, 1992, for this denied portion of the relief request; however, the licensee should document the impracticality of quarterly testing of this valve in a cold shutdown justification. During NRC inspections, cold shutdown justifications are subject to review.

5.0 Withdrawn Relief Requests GPRR-6 and GVRR-3

Relief requests GPRR-6 and GVRR-3 were withdrawn, thereby resolving the staff concerns.

6.0 Relief Request SI-VRR-3

In Section 2.2 of the SE dated September 16, 1992, NRC staff requested that the licensee submit information to verify that the check valves SI-875 A/B/C are full-stroke exercised as discussed during a teleconference on June 17, 1992. This verification would have closed out Anomaly 13 identified in the SE dated September 16, 1992. However, the licensee made the following statements regarding the conference call:

> The SE contains discussion of a June 17, 1992, conference call which differs with CP&L's understanding of that discussion. Section 2.2 of the SE discusses testing of the check valves SI-875 A/B/C; it states that the licensee performed full-stroke exercising of these valves using ultrasonic non-intrusive techniques to verify disk movement during the flow test. In fact, the check valves were tested using ultrasonic non-intrusive techniques; however, the test utilized Controlotron meters to verify adequate flow to achieve full disk movement versus direct disk movement. This test was performed in accordance with the third ten-year IST program for which interim approval was granted by a June 1, 1992, letter. Additionally, valve SI-875C was disassembled and inspected during the 1992 refueling outage.

This statement differs from the staff's understanding reached during the teleconference that full-stroke testing was performed on these valves. These check valves were apparently stroked at less than design basis flow in accordance with the third ten-year IST program submittal dated August 1, 1991. The non-intrusive technique mentioned was used to measure flow; however, direct disk movement or obturator position was not verified; and pressure, which can be analyzed to verify full-stroke at less than design basis flow, was apparently not measured. As indicated in Anomaly 13, disassembly and inspection per GL 89-04, Position 2, is an acceptable alternative if full-stroke testing is not practical. However, the licensee did not include a discussion on testing using other check valve nonintrusive techniques as requested in the anomaly. The statement, above, regarding the disassembly and inspection does not commit to following Position 2 of GL 89-04.

In a letter dated September 20, 1993, the licensee documented a teleconference conducted with NRC staff on September 3, 1993. The licensee informed the NRC that the IST program has been modified to provide for disassembly and inspection of the subject safety injection check valves in accordance with the

guidance of GL 89-04. Based on the information that was presented, relief for SI-VRR-3 can be granted to follow the alternative testing delineated in position 2 of GL 89-04, pursuant to 10 CFR 50.55a(g)(6)(i). Implementation of testing in accordance with GL 89-04, position 2, is subject to NRC inspection.

7.0 Relief Request SI-VRR-6

The licensee made the following statements regarding the discussion of the relief request SI-VRR-6 during the conference call of June 17, 1992:

> Additionally, Section 2.3 of the SE discusses the testing of check valves 874A and B; it states that the valves were tested, and that full flow was monitored for both valves individually. In fact, the testing done during the 1992 refueling outage was in accordance with the third ten-year IST program, relief request SI-VRR-6, as submitted by letter dated August 1, 1991, for which interim approval was granted by the June 1, 1992, letter. This test verified full flow through the valves in parallel. This relief request is being withdrawn and further testing of these valves will be in accordance with the provision of the Generic Letter 89-04. Currently being prepared are procedural changes, which will allow individual full-stroke testing during the next refueling outage.

The licensee's proposal to full-stroke test the valves during the next refueling outage in accordance with the provisions of the GL 89-04 would be consistent with OMa-1988 Part 10, Paragraph 4.3.2.2, which allows full-stroke exercising that is not practicable during power operation or cold shutdown to be deferred to refueling outages. Accordingly, the alternative testing proposed by the licensee is covered by the rulemaking, effective September 8, 1992. The proposed alternative meets a portion of the later ASME Code requirements that the staff finds acceptable and is approved pursuant to 10 CFR 50.55a(f)(4)(iv), provided the licensee implements the related requirements of Part 10, Paragraphs 4.3.2.2 and 6.2. Implementation of related requirements is subject to NRC inspection.

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