



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO THE INSERVICE TESTING PROGRAM AND REQUESTS FOR RELIEF  
CAROLINA POWER & LIGHT COMPANY  
H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2  
DOCKET NO. 50-261

1.0 INTRODUCTION

The Code of Federal Regulations, 10 CFR 50.55a(g), requires that inservice testing (IST) of certain American Society of Mechanical Engineers (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) compliance with applicable provisions of the ASME Code is impractical for the 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 Inservice Testing (IST) Program are contained in this Safety Evaluation (SE).

The IST program addressed in the SE covers the third ten-year inspection interval from February 19, 1992, to February 18, 2002. The licensee's program, which is described in a letter dated August 1, 1991, supersedes all previous submittals. The licensee's program is based on the requirements of Section XI of the ASME Code, 1986 Edition.

2.0 EVALUATION

The licensee's requests for relief from the requirements of Section XI of the ASME Code have been reviewed by the NRC staff with the assistance of contractors, EG&G Idaho, Inc. (EG&G). The Technical Evaluation Report (TER) provided as an attachment to this SE, EGG-NTA-10099, is EG&G's evaluation of the licensee's relief requests. The staff has reviewed the TER and concurs with the evaluations and conclusions therein except as noted below in sections 2.1, 2.2, and 2.3. A summary of the pump and valve relief request determinations is presented in Table 1 of this SE. The granting of relief is based upon fulfillment of any commitments made by the licensee in its basis for each relief request and the proposed alternative testing.

### 2.1 Relief Request GVRR-1

The licensee requested relief (TER Section 3.1.1.1) from the leak testing requirements of Section XI of the ASME Code, Paragraph IWV-3420, for the containment isolation valves served by the isolation valve seal water system (IVSW). As an alternative, the licensee proposed to test the valves in accordance with 10 CFR 50, Appendix J and HBR2 Technical Specifications. The NRC SE, dated April 23, 1979, concluded that it is acceptable to use the IVSW to conduct Appendix J, Type C tests on the valves served by that system. The IVSW is designed to pressurize containment penetrations higher than containment design pressure, so that leakage would be from the penetrations into the containment. With this type of design, the testing of these valves as part of IVSW in accordance with the SE, dated April 23, 1979, provides an acceptable level of safety. The alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(i), provided these valves are tested according to the Type C requirements applicable to valves served by a seal water system.

### 2.2 Relief Request SI-VRR-3

In NRC's July 9, 1991, Safety Evaluation for the inservice testing program relief requests, Relief Request 5.3.14 was evaluated for safety injection check valves SI-875A/B/C which are the subject valves for SI-VRR-3 in the revised inservice testing program. In the 1991 SE, interim relief was granted for a period of one year from the date of the SE or until the end of the next refueling outage following receipt of the SE, whichever was later. The interim relief expired July 9, 1992, based on completion of the spring 1992 refueling outage. Actions which were to be taken in the interim period were described in Appendix B of the TER attached to the 1991 SE, Anomaly 12.

These check valves are located in parallel branches of safety injection to the reactor coolant system. The licensee had proposed to stroke test the valves at a flow less than maximum design accident flow rate. The 1991 SE in Anomaly 12 requested the licensee pursue the use of nonintrusive techniques to verify full stroke exercising of these valves.

Relief Request SI-VRR-3 is evaluated in Section 3.4.1.1 of the attached TER. Additionally, Anomaly 13 of the attached TER, provides further discussion of the relief request, indicating that application of nonintrusive techniques would be required to ensure full stroke exercising of these valves at a flow rate less than accident flow.

As confirmed by teleconference June 17, 1992, the licensee performed full stroke exercising of check valves SI-875A/B/C using ultrasonic nonintrusive techniques to verify disc movement during the flow test. This addresses the concerns of the July 9, 1991, SE, and should be documented in the licensee's response to Anomaly 13 of Appendix B of the attached TER.

The use of nonintrusive testing methods is considered as an "other positive means" in accordance with IWV-3522, and relief for the test method is not required. Performance of this testing during refueling outages requires relief from the requirements of IWV-3521 for the test frequency. Due to the impracticality in the design limitations of injecting substantial flow of low pressure water into the reactor coolant system during normal operations and during cold shutdown conditions, the testing must be performed during refueling outages. The part-stroke exercising and reverse flow closure verification performed each cold shutdown and the full stroke exercising during refueling outages provide adequate assurance of the operational readiness of these valves. Therefore, rather than interim relief as stated in Section 3.4.1.1.2, relief is granted per 10 CFR 50.55a(g)(6)(i).

### 2.3 Relief Request SI-VRR-6

In NRC's July 9, 1991, Safety Evaluation for the inservice testing program relief requests, Relief Request 5.3.4 was evaluated for safety injection check valves SI-874A/B which are the subject valves for SI-VRR-6 in the revised inservice testing program. In the 1991 SE, provisional relief was granted provided the licensee performs testing in accordance with guidance delineated in GL 89-04, Position 1. In Section 3.4.2.4 of the attached TER, the evaluation indicates that testing these valves in parallel does not conform to the guidance of GL 89-04, Position 1, and the corresponding anomaly (number 14) refers to the 1991 SE.

The licensee had proposed testing these valves in parallel which will not verify full flow through each valve. Per teleconference June 17, 1992, the licensee indicated that the valves were tested during the spring 1992 refueling outage, and that full flow was monitored for both valves individually. Therefore, the relief request is approved per GL 89-04, provided the testing conforms with the guidance delineated in Position 1 for full flow testing. This addresses the concerns of the July 9, 1991, SE, and should be documented in the licensee's response to Anomaly 14 of Appendix B of the attached TER.

### 3.0 CONCLUSION

Based on the review of the licensee's IST program relief requests, the NRC concludes that the relief requests as evaluated and modified by this SE will provide reasonable assurance of the operational readiness of the pumps and valves to perform their safety related functions. The NRC has determined that the proposed alternatives are authorized, pursuant to 10 CFR 50.55a(a)(3)(i) and (a)(3)(ii), and relief is granted pursuant to (g)(6)(i), and will not endanger life or property, or the common defense and security and is otherwise in the public interest. In making this determination the NRC has considered the alternate testing being implemented, compliance resulting in a hardship without a compensating increase in safety, and the impracticality of performing the required testing considering the burden if the requirements were imposed. The last column of Table 1 identifies the regulation under which each requested relief is granted.

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SUMMARY OF RELIEF REQUESTS

RELIEF REQUEST NUMBER	TER SECTION	SECTION XI REQUIREMENT & SUBJECT	EQUIPMENT IDENTIFICATION	ALTERNATE METHOD OF TESTING	ACTION BY USNRC
Pump GPRR-1	2.1.1.1	IWP-4500: Measure vibration amplitude	All pumps in program	Measure pump vibration velocity and use acceptance criteria of ASME/ANSI OMa-1988.	Relief Granted with provision (a)(3)(i)
Pump GPRR-2	2.1.2.1	IWP-3100: Measure bearing temperature	All pumps in program	Measure vibration velocity quarterly.	Relief Granted (a)(3)(ii)
Pump GPRR-3	2.1.3.1	IWP-4110: Instrument accuracy	All pumps in program	Use ultrasonic flow instruments accurate to 3% of reading.	Interim Relief Granted (a)(3)(ii), for one year or until the next refueling outage.
Pump GPRR-4	2.1.4.1	IWP-4110 and -4120: Instrument accuracy and range	All pumps in program	Use digital instruments accurate to 3% of reading at owner's discretion.	Relief Granted with provision for inst. range (a)(3)(i). General Relief Denied.
Pump GPRR-5	2.1.5.1	IWP-3100: Measure inlet pressure during tests	Safety injection, containment spray, boric acid, RHR, and service water pumps	Calculate inlet pressure based on head of water above pump suction.	Relief Granted (g)(6)(i)
Pump GPRR-6	2.1.6.1	IWP-3230(b): Corrective actions	All pumps in program	Allow 72 hour evaluation prior to declaring pumps inoperable.	Relief Denied
Pump CS-PRR-1	2.2.1.1	IWP-3100: Establish reference flow or dP	Containment spray pumps A and B	Evaluate "as found" flow rates and differential pressures.	Relief Granted (g)(6)(i)

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Pump RHR-PRR-1	2.3.1.1	IWP-4120: Instrument full-scale range	RHR pumps A and B	Use installed 1% accuracy pressure gauge that exceeds range requirement.	Relief Granted (g)(6)(i)
Valve GVRR-1	3.1.1.1	IWV-3420: Leak rate testing	Containment isolation valves (CIVs) served by the isolation valve seal water (IVSW) system	Test CIVs by testing IVSW per Appendix J.	Provisional Relief Granted (a)(3)(i)
Valve GVRR-1	3.1.1.2	IWV-3420: Leak rate testing	All CIVs except those served by the IVSW system	Assign leakage rate limits to penetrations, take corrective action if limits are exceeded.	Relief Granted with provision (a)(3)(ii)
Valve GVRR-2	3.1.2.1	IWV-3520: Exercising method	All nitrogen and air supply check valves except those in GVRR-4	Functionally test valves by testing associated components or systems.	Interim Relief Granted (g)(6)(i), for one year or until the next refueling outage.
Valve GVRR-3	3.1.3.1	IWV-3417(b): Corrective actions	All power operated valves	Allow 72 hour evaluation period prior to declaring valves inoperable.	Relief Denied
Valve GVRR-4	3.1.4.1	IWV-3520: Exercising method	IVSW system valves, SA-80, IA-525, IVSW-68A, -68B, -68C, and -68D	Functionally test valves by testing associated components or system.	Interim Relief Granted (g)(6)(i), for one year or until the next refueling outage.

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Valve IVSW-VRR-1	3.2.1.1	IWV-3411 and -3521: Test frequency	All IVSW system valves in program	Exercise valves during refueling outages.	Relief Granted for check valves (g)(6)(i). Relief Denied for power operated valves.
Valve DA-VRR-1	3.3.1.1	IWV-3413: Measure stroke times	Diesel air start valves, DA-19A, -19B, -23A, and -23B	Test alternate air start trains during monthly diesel testing.	Relief Granted (g)(6)(i)
Valve DA-VRR-2	3.3.2.1	IWV-3520: Test method	Diesel air receiver check valves, DA-9A, -9B, -33A, and -33B	Verify closure of each set of series check valves quarterly.	Relief Granted (g)(6)(i)
Valve DA-VRR-3	3.3.1.2	IWV-3413: Measure stroke times	Diesel day tank supply valves, EV-1963A-1, -1963A-2, -1963B-1, and -1963B-2	Verify that valves operate to fill day tank during monthly diesel testing.	Interim Relief Granted (g)(6)(i), for one year or until the next refueling outage.
Valve SI-VRR-1	3.4.2.1	IWV-3521: Test frequency	Safety injection (SI) check valves, SI-873A thru -873F, -874A, and -874B	Full-stroke exercise with flow at refueling outages.	Relief Granted (g)(6)(i)
Valve SI-VRR-1	3.4.2.2	IWV-3521: Test frequency	SI charging return line check valve, SI-849	Full-stroke exercise with flow at refueling outages.	Relief Denied
Valve SI-VRR-2	3.4.2.3	IWV-3521: Test frequency	SI pump discharge check valves, SI-879A, -879B, and -879C	Part-stroke open and verify closure quarterly. Full-stroke during refueling outages.	Relief Granted (g)(6)(i)

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Valve SI-VRR-3	3.4.1.1	IWV-3520: Test method and frequency	SI combined injection check valves, SI-875A, -875B, and -875C	Exercise open with less than full flow at refueling outages. Exercise closed and leak test at cold shutdowns.	Relief Granted (g)(6)(i) Reference 2.2 of Safety Evaluation
Valve SI-VRR-4	3.4.1.2	IWV-3521: Test frequency	SI high head injection check valves, SI-876A, -876B, and -876C	Part-stroke and leak test at cold shutdowns. Full-stroke with flow at refueling outages.	Relief Granted (g)(6)(i)
Valve SI-VRR-5	3.4.1.3	IWV-3420: Leak rate testing	Boron injection tank discharge check valves, SI-873A, and -873D	Leak test series check valves as a pair at cold shutdowns.	Relief Granted (g)(6)(i)
Valve SI-VRR-6	3.4.2.4	IWV-3520: Test method and frequency	SI hot leg injection check valves, SI-874A and -874B	Pass full flow through parallel valve pair each refueling outage.	Provisional Relief Granted per GL 89-04 Reference 2.3 of Safety Evaluation
Valve CVC-VRR-1	3.5.2.1	IWV-3521: Test frequency	Emergency boration check valves, CVC-351, and -357	Part-stroke exercise quarterly. Full-stroke exercise each refueling outage.	Relief Granted (g)(6)(i)
Valve CVC-VRR-2	3.5.2.2	IWV-3520: Test frequency	RCP seal water supply check valves, CVC-298A thru -298F	Verify valve closure each refueling outage.	Relief Granted (g)(6)(i)

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Valve CVC-VRR-3	3.5.1.1	IWV-3520: Test frequency	Charging header check valve, CVC-312C	Exercise closed and leak test each refueling outage.	Relief Granted (g)(6)(i)
Valve PPS-VRR-1	3.6.1.1	IWV-3412 and -3413: Exercise valves and measure stroke times	Penetration pressurization system solenoid valves	Verify proper valve operation by Appendix J leak rate testing associated CIVs.	Interim Relief Granted (g)(6)(i), for one year or until the next refueling outage.
Valve FW-VRR-1	3.7.1.1	IWV-3520: Test frequency	Main feedwater header check valves, FW-8A, -8B, and -8C	Verify valve closure each refueling outage.	Relief Granted (g)(6)(i)
Valve RCS-VRR-1	3.8.1.1	IWV-3300: Verify valve position indication	RCS vent valves, RC-567, -568, -569, -570, -571, -572	No alternate testing is proposed.	Interim Relief Granted (g)(6)(i), for one year or until the next refueling outage.