



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  
IOWA ELECTRIC LIGHT AND POWER COMPANY  
CENTRAL IOWA POWER COOPERATIVE  
CORN BELT POWER COOPERATIVE  
DUANE ARNOLD ENERGY CENTER

DOCKET NO. 50-331

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 IST Program addressed in this SE covers the second 10-year inspection interval from February 1, 1985, to February 1, 1995. NRC Generic Letter (GL) 89-04, "Guidance on Developing Acceptable Inservice Testing Programs," was issued April 3, 1989, requesting licensees with no IST Safety Evaluation, or one not planned for the near term, to review their program against the positions delineated in Attachment 1 of GL 89-04 and respond in writing within six months stating their conformance with the positions. GL 89-04 approved relief requests issued prior to April 3, 1989, if these did not conflict with the positions in Attachment 1, and also approved relief requests which were shown to conform with the positions. By letter dated September 21, 1989, an extension for the licensee's response to GL 89-04, was requested. By letter dated January 5, 1990, Iowa Electric Light and Power Company submitted Revision 9 of the Duane Arnold Energy Center IST Program. Revision 9 incorporated NRC guidance contained in GL 89-04. Additional changes submitted by letters dated October 15, and December 31, 1990, and August 30, 1991, are included in this review. The licensee's program is based on the requirements of Section XI of the ASME Code, 1980 Edition, with addenda through winter 1981.

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## 2.0 EVALUATION

The licensee's IST program requests for relief from the requirements of Section XI have been reviewed by the staff with the assistance of its contractor, EG&G Idaho, Inc. (EG&G). In addition, EG&G and staff members met with licensee representatives on August 8, 1990, in a working session to discuss questions resulting from the review of an earlier program submittal. The Technical Evaluation Report (TER) EGG-NTA-9764, dated January 1992, provided as Attachment 1 is EG&G's evaluation of the licensee's IST program relief requests. The staff has reviewed the TER and concurs with the evaluations and conclusions contained in the TER. A summary of the pump and valve relief request determinations is presented in Table 1, which includes references to (1) relief requests preapproved by Paragraph B of GL 89-04, and (2) relief requests approved by a specific position in Attachment 1 of GL 89-04. These relief requests covered by GL 89-04 have not been further evaluated, but the issues involved are broadly discussed in Appendix A of the TER. The implementation of the guidelines in the applicable GL 89-04 position is subject to NRC inspection. The granting of relief is based upon the fulfillment of any commitments made by the licensee in its basis for each relief request and the alternative proposed testing.

The licensee should refer to the TER, Appendix A, for a discussion of anomalies identified during the review. The licensee should resolve all the items listed in Appendix A in accordance with the staff guidance therein. Program procedural changes covered by paragraphs in Appendix A, such as for provisionally granted relief requests, should be made in accordance with the schedule specified in the anomaly. If no schedule is specified, the items should be addressed within one year of receipt of this SE, or by the end of the next refueling outage, whichever is later. Relief granted for Relief Request 17 does not include the MSIVs, CRD valves, and service water valves (see Section 3.1.2.1 and Appendix A, Item 5, of the TER). The fail-safe testing for these valves should continue to be performed in compliance with Section XI. Details of the testing method for these valves were insufficient to determine if the testing is acceptable, or if relief is required. The licensee should review the testing within the quarter following receipt of this SE.

## 3.0 CONCLUSION

Based on the review of the licensee's IST program relief requests, the staff 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 staff has determined that granting relief, pursuant to 10 CFR 50.55a(a)(3)(i) or (g)(6)(i), as specified in Table 1, is authorized by law 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 staff has considered the alternate testing being implemented, compliance resulting in a hardship without a

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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
PR-005	2.1.1.1	IWP-3100: Pump test procedure requirements.	River water pumps: 1P-117A, B, C, D Core spray pumps: 1P-221A, B RCIC pump: 1P226 RHR pumps: 1P229A, B, C, D	Calculate differential pressure using linear interpolation.	Relief granted. (a)(3)(i)
PR-013	2.1.2.1	IWP-3200: Allowable ranges of test quantities.	River water pumps: 1P-117A, B, C, D Diesel fuel oil transfer pumps: 1P-44A, B Standby liquid control pumps: 1P-230A, B RCIC pump: 1P-226	Establish the upper Alert Range at 103% of reference and the upper Required Action Range at 105% of reference.	Relief not required.
PR-001	2.2.1.1	IWP-3100: Vibration measurement requirements.	Diesel fuel oil transfer pumps: 1P-44A, B	Disassemble, inspect, and rebuild these pumps every other refueling outage followed by pump surveillance testing prior to declaring the pump operable.	Provisional relief granted. (g)(6)(i)

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PR-015	2.3.1.1	IWP-3100: Pump test procedure requirements.	HPCI pump: 1P-226	Use empirically derived pump curve as reference values over a limited range of pump operation in lieu of varying the system resistance until the independent variable equals the reference value.	Provisional relief granted. (a)(3)(i)
PR-004	NA	IWP-3100: Suction pressure measurement requirements.	RHR service water pumps: 1P-22A, B, C, D ESW pumps: 1P-99A, B River water pumps: 1P-117A, B, C, D Diesel fuel oil pumps: 1P-44A, B Standby liquid control pumps: 1P-230A, B	Calculate suction pressure.	Preapproved GL 89-04, relief request not evaluated in TER.
PR-007	NA	IWP-4110: Instrument accuracy requirements.	Core spray pumps: 1P-211A, B High pressure coolant injection pump: 1P-216	Measure pressure and speed using instruments with loop accuracies that are less than or equal to +/- 2.26 percent.	Preapproved GL 89-04, relief request not evaluated in TER.

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PR-011	NA	IWP-4120: Instrument full-scale range requirements.	All pumps.	Take vibration measurements with instrument range selection at lowest possible scale that includes the measured parameter.	Preapproved GL 89-04, relief request not evaluated in TER.
PR-012	NA	IWP-4120: Instrument full-scale range requirement.	Core spray pumps: 1P-211A, B RHR service water pumps: 1P22A, B, C, D HPCI pump: 1P-216 RC1C pump: 1P-226	Use electronic instruments with accuracies based on actual reading instead of the full-scale range.	Preapproved GL 89-04, relief request not evaluated in TER.
PR-014	NA	IWP-4310: Bearing temperature measurement requirements.	All pumps.	None.	Preapproved GL 89-04, relief request not evaluated in TER.
VR-005	3.1.1.1	IWV-3512: Relief valve testing requirements.	Numerous safety and relief valves.	Test safety and relief valves in accordance with ANSI/ASME OM-1-1981 in lieu of ASME/PTC 25.3-1976.	Provisional relief granted. (a)(3)(i)
VR-017	3.1.2.1	IWV-3415: Valve fail-safe test requirements.	All valves for which fail-safe testing is required.	For most valves, normal stroking to fail-safe position considered fail-safe test. MSIVs, CRD valves, and Service water valves tested to fail-safe position by means other than normal stroking.	Partial relief granted. (a)(3)(i)

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VR-051	3.2.1.1	IWV-3520: Check valve exercising frequency and method requirements.	Numerous HPCI and RCIC system check valves.	Disassembly and inspection every refueling outage for individually listed valves and sample disassembly and inspection for groups of identical valves in similar applications.	Provisional relief granted per GL 89-04 for open position. Interim relief granted for valves V-23-009, -010, -012 for closed position. (a)(3)(i)
VR-021	3.3.1.1	IWV-3520: Check valve exercising frequency and method requirements.	HPCI pump suction check valve from the suppression pool: V-23-001	Disassemble and inspect during refueling outages and verify reverse flow closure capability following reassembly.	Provisional relief granted per GL 89-04 for testing to open position. Relief granted for testing to closed position. (a)(3)(i)
VR-021	3.4.1.1	IWV-3520: Check valve exercising frequency and method requirements.	RCIC pump suction check valve from the suppression pool: V-25-001	Disassemble and inspect during refueling outages and verify reverse flow closure capability following reassembly.	Provisional relief granted per GL 89-04 for testing to open position. Relief granted for testing to closed position. (a)(3)(i)

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VR-006	3.5.1.1	IWV-3411: Valve exercising requirements. IWV-3417(a): Stroke time trending requirements.	Numerous ADS, safety relief, and solenoid valves.	Remove, test, disassemble, inspect, and rebuild at least half the valves every cycle. Exercise in situ once every refueling outage during plant startup.	Relief granted. (a)(3)(i)
VR-007	3.6.1.1	IWV-3413: Stroke time measurement requirements. IWV-3417: Stroke time trending and corrective action requirements.	Diesel generator air start solenoid valves: SV-3261A, B, -3262A, B	Start diesels on AC valve train monthly and on DC valve train quarterly, both without stroke time measurement. Ensure that diesels start within Tech. Spec. time limit using DC valve train every six months.	Provisional relief granted. (g)(6)(i)
VR-012	3.7.1.1	IWV-3521: Check valve exercising frequency requirements.	Reactor recirculation pump seal water supply check valves from the control rod drive hydraulic system: V-17-083, -096	Verify the closure capability of these valves with Appendix J, Type C leak rate tests during refueling outages.	Relief granted. (g)(6)(i)
VR-032	3.8.1.1	IWV-3413(b): Valve stroke timing requirements. IWV-3417(a): Stroke time corrective action requirements.	Numerous containment atmosphere monitoring system containment isolation valves.	Exercise and verify valve positions quarterly.	Interim relief granted. (g)(6)(i)

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VR-035	3.9.1.1	IWV-3417(a): Stroke time corrective action requirements.	ESW return valves from the control building chillers: CV-1956A, B ESW supply valves to the emergency diesel generators: CV-2080, -2081	Estimate stroke times based on valve stem movement and compare results to maximum limiting stroke time.	Provisional relief granted. (g)(6)(i)
VR-053	3.10.1.1	IWV-3520: Check valve exercising requirements.	A side control building HVAC instrument air supply check valves: V-73-006, -007	Backflow test these series valves as a unit quarterly and verify that the total backleakage through the pair does not exceed a specific maximum amount.	Provisional relief granted. (g)(6)(i)
VR-002	NA	IWV-3412, -3413, -3417(a): Valve exercising method, stroke timing, and corrective action requirements.	All solenoid and air-pilot operated control valves without individual position indication.	Verify that the main valve has stroked within its respective time limits.	Preapproved GL 89-04, relief request not evaluated in TER.



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VR-003	NA	IWV-3521: Check valve exercising frequency requirements.	RHR to recirculation system check valves: V-19-0149 and V-20-0082	Part-stroke exercise one valve with flow during cold shutdowns and manually full-stroke exercise both valves during refueling outages.	Preapproved GL 89-04, relief request not evaluated in TER.
VR-008	NA	IWV-3420: Valve leak rate test requirements. IWV-3521: Check valve exercising frequency requirements.	All excess flow check valves.	Test valves in accordance with DAEC Technical Specification 4.7.D.	Preapproved GL 89-04, relief request not evaluated in TER.
VR-011	NA	IWV-3426: Valve leak rate trending requirements.	Suppression chamber vacuum breaker valves: CV-4327A, B, C, D, E, F, G, H	Verify leak tightness of these valves during containment integrity testing.	Preapproved GL 89-04, relief request not evaluated in TER.
VR-013	NA	IWV-3411: Valve exercising frequency requirements. IWV-3413: Stroke time measurement requirements. IWV-3417: Corrective action requirements.	Numerous control rod drive hydraulic system air and solenoid operated valves.	Test valves once each cycle per Tech. Spec. 4.3.C, compare scram time data to acceptance criteria of Tech. Spec. 3.3.C, verify that backup scram valves energize to vent scram pilot air header upon receipt of a scram signal.	Preapproved GL 89-04, see anomaly No. 10.

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VR-013	NA	IWV-3411: Valve exercising frequency requirements. IWV-3413: Stroke time measurement requirements. IWV-3417: Corrective action requirements.	Scram discharge volume vent and drain valves' solenoid valves: SV-1868A, B, -1869A, B	Test solenoid valves with the associated scram discharge volume vent and drain valves during the Mode Switch Placed in Shutdown Test performed each refueling outage.	Preapproved GL 89-04, see anomaly No. 9.
VR-013	NA	IWV-3521: Check valve exercising frequency requirements.	Backup scram check valve: V-17-0062	Exercise each refueling outage by verifying that the backup scram valves vent air when energized.	Preapproved GL 89-04, see anomaly No. 11.
VR-013	NA	IWV-3521: Check valve exercising frequency requirements.	Control rod drive check valves to the scram discharge header: V-18-1453 through -1541	Test valves each operating cycle per Tech. Spec. 4.3.C, compare scram time data to acceptance criteria of Tech. Spec. 3.3.C.	Preapproved GL 89-04, relief request not evaluated in TER.
VR-013	NA	IWV-3521: Check valve exercising frequency requirements.	Charging water header to control rod drive check valves: V-18-0118 through -0206	Verify closure capability by depressurizing the control rod drive charging header and verifying that each hydraulic control unit accumulator remains in a charged condition during the test.	Preapproved GL 89-04, relief request not evaluated in TER.

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VR-013	NA	IWV-3521: Check valve exercising frequency requirements.	Control rod drive cooling water supply check valves: V-18-0919 through -1007	Verify closure capability by normal rod motion as required by Tech. Spec. 4.3.A.2.a.	Preapproved GL 89-04, relief request not evaluated in TER.
VR-019	NA	IWV-3521: Check valve exercising frequency requirements.	Main steam isolation valve and ADS relief valve accumulator supply check valves: V-14-009, 014, 015, 016, 032, 100, 104, 108, 112, 116, 120, 124	Exercise to the closed position during refueling outages.	Preapproved GL 89-04, relief request not evaluated in TER.
VR-020	NA	IWV-3521: Check valve exercising frequency requirements.	Stanby liquid control injection line containment isolation valves: V-26-008, 009	Exercise open and closed each operating cycle in accordance with DAEC Technical Specifications 4.4.A.2.b and 4.7.A.2.c.	Preapproved GL 89-04, relief request not evaluated in TER.
VR-025	NA	IWV-3521: Check valve exercising frequency requirements.	Drywell nitrogen supply line containment isolation valve: V-43-214	Verify closure capability by during refueling outages by Appendix J, Type C, leak testing.	Preapproved GL 89-04, relief request not evaluated in TER.

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VR-031	NA	IWV-3521: Check valve exercising frequency requirements.	TIP system nitrogen purge line containment isolation valve: 1S266/CK	Verify closure capability of Appendix J, Type C, leak rate testing each operating cycle.	Preapproved GL 89-04, relief request not evaluated in TER.
VR-033	NA	IWV-3521: Check valve exercising frequency requirements.	Core spray injection check valves to the reactor vessel: V-21-072, -073	Full-stroke exercise each refueling outage.	Preapproved GL 89-04, relief request not evaluated in TER.
VR-034	NA	IWV-3417(a): Stroke time corrective action requirements.	Numerous CAD, TIP, PASS, and RHR containment isolation valves.	Assign maximum limiting stroke time of 2 seconds to these valves in accordance with GL 89-04, Position 6.	Approved per GL 89-04, Position 6. Relief request not evaluated in TER.
VR-037	NA	IWV-3427(b): Valve leakage rate trending requirements.	All containment isolation valves six inches or greater in size.	None	Approved per GL 89-04, Position 10. Relief request not evaluated in TER.
VR-040	NA	IWV-3200: Test requirements following valve replacement, repair, and maintenance.	Feedwater supply line outside containment isolation valves: MO-4441, -4442	Perform leak rate test to ensure these valves will perform their containment isolation function when they are subjected to repair or maintenance that could affect their performance.	Preapproved GL 89-04, relief request not evaluated in TER.

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VR-041	NA	IWV-3200: Test requirements following valve replacement, repair, and maintenance.	Feedwater supply line inside containment isolation valves: V-14-001, -003	Perform leak rate test to ensure these valves will perform their containment isolation function when they are subjected to repair or maintenance that could affect their performance.	Preapproved GL 89-04, relief request not evaluated in TER.
VR-050	NA	IWV-3521: Check valve exercising frequency requirements.	Suppression chamber vacuum breaker check valves: CV-4327A, B, C, D, F, G, H	Part-stroke exercise quarterly using installed air operators and mechanically full-stroke exercise to open and closed positions at least once each refueling cycle.	Preapproved GL 89-04, relief request not evaluated in TER.
VR-051	NA	IWV-3520: Check valve exercising frequency and method requirements.	RHR and core spray pump minimum flow recirculation line check valves: V-19-014, -016 V-20-006, -008 V-21-009, -012	Part-stroke open quarterly, verify full-stroke open capability using disassembly and inspection on a sampling basis during refueling outages.	Approved per GL 89-04, Position 2. Relief request not evaluated in TER.