



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

UNION ELECTRIC COMPANY

CALLAWAY NUCLEAR PLANT, UNIT 1

DOCKET NO. 50-483

INTRODUCTION

Technical Specification 4.0.5 for the Callaway Nuclear Plant, Unit 1, (Callaway) states that inservice inspection of ASME Code Class 1, 2, and 3 pumps and valves shall be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code and Applicable Addenda as required by 10 CFR Part 50, Section 50.55a(g), except where specific written relief has been granted by the Commission pursuant to 10 CFR Part 50, Section 50.55a(g)(6)(i). Certain requirements of applicable Code edition and addenda of Section XI are impractical to perform because of certain plant systems and components designs.

Regulation 10 CFR 50.55a(g)(6)(i) authorizes the Commission to grant relief from these requirements upon making the necessary findings. This Safety Evaluation (SE) contains the NRC staff's findings with respect to granting or not granting reliefs submitted as part of the licensee's Inservice Testing (IST) Program.

The Callaway first 10-year IST program, Revisions 8 and 9, were found acceptable by the NRC for implementation by letters dated August 19 and October 26, 1987. Subsequently, Union Electric Company (UE), by letter dated April 12, 1988, submitted Revision 10 of the first 10-year IST program and additional information related to requests for relief from certain code requirements which they determined to be impractical to perform on Callaway. Following a telephone conversation on April 29, 1988, the licensee, by letter dated May 5, 1988, resubmitted the relief requests to include additional information as requested. Revision 10 of Callaway's IST program involves one added and two revised relief requests, a change of stroke time for twelve valves, and a change of status of two valves from passive to active. The program for the first 10-year interval is based on the requirements of the 1980 Edition through the winter of 1981 Addenda of Section XI of the ASME code and these requirements remain in effect until December 19, 1994.

EVALUATION

The IST program Revision 10 and the relief requests from the requirements of Section XI that have been determined to be impractical to perform have been reviewed by the staff and are evaluated below. In addition, the staff reviewed the other program changes and finds them to be acceptable. A summary of the relief requests determinations is presented in Table 1.

## 1.0 PUMPS

### 1.0.1 RELIEF REQUEST NO. P03

The licensee has requested relief from the flow measurement requirements of Section XI, Paragraph IWP-3100, for the centrifugal charging pumps PBG05A and PBG05B. The licensee proposes to test these pumps quarterly by measuring and trending pump differential pressure and vibration. In addition, by utilizing an alternate path with installed flow instrumentation, the licensee proposes to measure pump differential pressure, flowrate, and vibration on a refueling frequency and trend against a second set of reference values established at or above the pumps' design flow point (approximately equal to 462 gpm).

### 1.0.2 LICENSEE'S BASIS FOR REQUESTING RELIEF

Technical Specification 4.5.2.f.1 states, "Each ECCS Subsystem shall be demonstrated OPERABLE by verifying that each centrifugal charging pump develops a discharge pressure greater than or equal to 2390 psid on recirculation flow when tested pursuant to Specification 4.0.5." Testing of these pumps is performed on the fixed resistance mini-flow path (approximately equal to 2500 psid, 60 gpm). At this flow rate, the pump curve for these pumps is relatively flat (approximately equal to 25 psid/60 gpm). Flow rate changes of  $\pm 50\%$  would result in less than a 1% change in pump differential pressure. Based on this, the licensee does not feel it is warranted to install additional instrumentation to ensure flow is maintained at the same point ( $\pm 2\%$  accuracy) for each quarterly test. Adequate flow is verified for protection of the pumps by monitoring the discharge pipe temperature changes. To further verify pump performance and monitor degradation, the licensee will run an additional test on a refueling frequency, at or above the design flow point for the pumps and monitor pump flow rate, differential pressure, and vibration. The flow measurement to be performed during these outages will be done utilizing an alternate flow path which is only available during outage conditions and has installed flow instrumentation. This flow instrumentation meets the requirements of ASME Section XI Subsection IWP.

### 1.0.3 EVALUATION

The licensee has demonstrated that it would not be practical to install instrumentation in the fixed resistance mini-flow path as there is an alternative flow path with flow instrumentation which is available during refueling outages.

Testing these pumps by utilizing normal charging flow is not practical as this could result in pressurizer level perturbations and subsequent reactor shutdown. Testing during cold shutdown is not practical because of insufficient surge volume which could result in reactor coolant system (RCS) low temperature over-pressurization concerns. Measuring pump flow rate, differential pressure, and vibration on a refueling outage frequency when an alternate flow path is available is a reasonable alternative to the Code requirements of quarterly measurement of pump flow rate. Because of the design of these systems, compliance with the Code would only be possible if the chemical and volume control and high head safety system were substantially redesigned. Based on the determination that the Code requirements are impractical and considering the licensee's

proposed alternative of measuring these pumps' flow rate, differential pressure, and vibration on a refueling outage frequency and the burden on the licensee if the Code requirements were imposed, relief may be granted as requested.

#### 1.1.1 RELIEF REQUEST NO. P09

The licensee has requested relief from the flow measurement requirements of Section XI, Paragraph IWP-3100, for the boric acid transfer pumps PBG02A and PBG02B and proposed to test these pumps quarterly by measuring and trending differential pressure and vibration. In addition, by utilizing an alternate flow path with installed flow instrumentation, the licensee proposes to measure pump differential pressure, flow rate and vibration on a cold shutdown frequency and trend against a second set of reference values established at or above the pumps' design flow point (approximately equal to 75 gpm).

#### 1.1.2 LICENSEE'S BASIS FOR REQUESTING RELIEF

Quarterly testing of these pumps is performed on the fixed resistance mini-flow path (approximately equal to 112 psid, 15 gpm). At this flowrate, the pump curve for these pumps is relatively flat (8 psid/42 gpm). Flowrate changes of  $\pm 25\%$  would result in less than a 1% change in pump differential pressure. Based on this, the licensee does not feel it is warranted to install additional instrumentation to ensure flow is maintained at the same point ( $\pm 2\%$  accuracy) for each quarterly test. Adequate flow is verified for protection of the pumps by monitoring discharge pipe temperature changes. To further verify pump performance and monitor pump degradation, the licensee will run an additional test on a cold shutdown frequency, at or above the design flow point for the pumps and monitor pump differential pressure, flowrate, and vibration. The flow measurement to be performed during these outages will be done utilizing an alternate flow path which is only available during outage conditions and has installed flow instrumentation. This flow instrumentation meets the requirements of ASME Section XI Subsection IWP.

#### 1.1.3 EVALUATION

Utilizing the system flow meter quarterly is not possible as this would require injection of highly concentrated boric acid into the RCS which could result in reactor shutdown. The licensee has demonstrated that it would not be practical to install instrumentation in the fixed resistance mini-flow path as there is an alternate flow path with installed flow instrumentation which is only available during cold shut-down. Measuring pump flow rate during cold shutdown is a reasonable alternative to the Code requirements of quarterly measurement of pump flow rate. Because of the design of this system, compliance with the Code requirements is impractical and conformance with the Code would only be possible if the boric acid transfer system was substantially redesigned. Based on the determination that the Code requirements are impractical, and considering the licensee's proposed alternate of measuring these pumps' flow during cold shutdown and the burden on the licensee if the Code requirements were imposed, relief may be granted as requested.

## 2.0 VALVES

### 2.0.1 RELIEF REQUEST NO. V06

The licensee has requested relief from power-operated valve stroke time trending requirements of Section XI, Paragraph IWV-3417(a) for rapid acting power-operated valves BB-PCV-0455A and BB-PCV-0456A, whose function is safety related. The licensee has proposed to apply a maximum stroke time limit of 2 seconds to these valves and to correct them in accordance with IWV-3417(b) if they exceed the limit.

### 2.0.2 LICENSEE'S BASIS FOR REQUESTING RELIEF

The trending requirements of IWV-3417(a) specify that valve test frequencies shall be increased to monthly for valves with stroke times 10 seconds or less when stroke times increased by 50%. Valves normally stroking rapidly can increase by 50% and show a relatively small numerical stroke time increase, thereby not indicating degradation.

### 2.0.3 EVALUATION

It is not practical to obtain accurate measurements of the stroke times for power operated valves that operate in 2 seconds or less. Variability of stroke times of rapid acting power-operated valves is frequently a function of the timing method and this variability would not be a reliable indicator of valve degradation. Following the Code requirements for these valves may result in declaring these valves inoperable unnecessarily. Based on the design of these valves, the staff has concluded that assigning a maximum stroke time of 2 seconds is a reasonable alternative to the Code requirements for these valves. The licensee has committed to declare these valves inoperable if the maximum stroke time is exceeded. Therefore, since the Code requirements for these valves are impractical and considering the burden on the licensee if the Code requirements are imposed, and since the licensee's proposed testing is a reasonable alternative to the Code requirements for providing assurance of valve operability, relief may be granted as requested.

### CONCLUSION

Based on the review of the licensee's IST revisions and relief requests, the staff concludes that the IST program will provide reasonable assurance of the operational readiness of the pumps and valves covered by the IST program to perform their safety-related functions. The staff has determined that, pursuant to 10 CFR 50.55a(g)(6)(i), granting relief where the Code requirements are impractical is authorized by law and will not endanger life or property, or the common defense and security. The staff has also concluded that granting relief is otherwise in the public interest considering the burden that could result if the requirements were imposed on the facility. During the review of the licensee's revised Inservice Testing Program, the staff has not identified any significant misinterpretations or omissions of Code requirements. Thus, the IST program Revision 10 transmitted by letters dated April 12 and May 5, 1988, is acceptable for implementation. Relief requests contained in any subsequent revisions may not be implemented unless approved by the staff.

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Date: June 14, 1988

CALLAWAY STATION, UNIT 1  
 SER SUPPLEMENT TABLE 1  
 SUMMARY OF RELIABLE REQUESTS

RELIEF REQUEST NUMBER	SER SECTION	SECTION XI REQUIREMENT & SUBJECT	EQUIPMENT IDENTIFICATION	ALTERNATE METHOD OF TESTING	ACTION BY USNRC
P03	1.0.1	IWP-3100 measure pump flow rate quarterly	Centrifugal charging pumps PBG05A & PBG05B	Measure pump flow rate during refueling outages	Relief Granted
P09	1.1.1	IWP-3100 measure pump flow rate quarterly	Boric acid transfer pumps PBG02A & PBG02B	Measuring flow rate during cold shutdown	Relief Granted
V06	2.0.1	IWV-3417(a) corrective action for power operated valves	BB-PCV-0455A & BB-PCV-0456A	Declare in- operable if stroke exceeds maximum value	Relief Granted