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

SAFETY EVALUATION BY THE OFFICE OF
NUCLEAR REACTOR REGULATION
RELATED TO REQUESTS FOR RELIEF FROM INSERVICE TESTING REQUIREMENTS

TOLEDO EDISON COMPANY
AND
CLEVELAND ELECTRIC ILLUMINATING COMPANY
DAVIS-BESSE NUCLEAR POWER STATION, UNIT 1
DOCKET NO. 50-346

I. Introduction

Paragraph 10 CFR 50.55a(g)(4) requires that throughout the service life of a boiling or pressurized water-cooled nuclear power facility, components (including supports) which are classified as ASME Code Class 1, Class 2 and Class 3 shall meet the requirements set forth in the applicable Section XI editions and addenda of the ASME Boiler and Pressure Vessel Code to the extent practical within the limitations of design, geometry and materials of construction of the components. Sub-paragraphs 10 CFR 50.55a(g)(4)(i) and (ii) require that operational testing prescribed in Section XI of the ASME Code include pumps and valves whose function is required for safety. Some non-Code Class components are required for safety and therefore must be tested in accordance with Section XI test requirements.

By letter dated June 27, 1977, supplemented by letter dated November 22, 1977, the licensee submitted a proposed Inservice Inspection Program for Davis-Besse Unit 1 with requests for relief from certain requirements of the ASME Code. The proposed program was based on the 1974 Edition of the ASME Code, Section XI through Summer 1975 Addenda. The NRC, on January 3, 1979, authorized the licensee to implement the proposed program on an interim basis pending completion of detailed NRC review.

By letter dated May 15, 1980, and supplemented by letters dated December 15, 1980, March 31, 1981, December 14, 1982, February 2, 1983, April 29, 1983, and June 2, 1983, the licensee proposed a new Inservice Inspection Program which was updated to meet the requirements of the 1977 Edition of the ASME Code, Section XI through Summer 1978 Addenda. In these submittals, the licensee has identified specific areas where conformance with certain Code requirements is impractical and has requested relief from those requirements. This report is our evaluation of those relief requests related to the Inservice Testing portion Section I entitled "Pumps" and Section II entitled "Valves", hereinafter referred to as the Inservice Testing (IST) Program of the revised Inservice Inspection Program. Sections III and IV of the revised Inservice Inspection Program were the subject of a Safety Evaluation transmitted to the Toledo Edison Company and Cleveland Electric Illuminating Company on

May 5, 1982. Our evaluation is pursuant to 10 CFR 50.55a(g)(6)(i) which authorizes the Commission to grant relief from ASME Section XI Code requirements upon making the necessary findings. It is based on the result of the NRC contractor's review of the submittals of May 15, 1980 and December 15, 1980; our review of the subsequent submittals through February 2, 1983; a meeting with the licensee in the Region III Office on March 29, 1983, and June 2, 1983. We have granted certain relief requests based on our evaluations in accordance with the intent of 10 CFR 50.55a(g)(4). The relief requests, their bases, our evaluations, findings, alternate testing requirements, and test requirement clarifications are found in the following Section II.A (for pumps) and Section II.B (for valves).

II. Evaluation of Relief Requests

A. Pump Testing

1. Relief Request (Test Frequency)

The licensee has requested relief from the monthly inservice test on all safety-related equipment cooling and emergency core cooling pumps in accordance with the requirements of Section XI. The licensee has proposed to test all pumps in compliance with Section XI once per quarter and to jog all pumps and measure flow monthly. The pumps are:

- Auxiliary Feedwater
- High Pressure Injection
- Low Pressure Injection
- Containment Spray
- Component Cooling
- Service Water

Code Requirement

An inservice test shall be conducted on all safety-related pumps, nominally once each month during normal plant operation. Each inservice test shall include the measurement, observation, and recording of all quantities in Table IWP-3100-1, except bearing temperature, which shall be measured during at least one inservice test each year.

Licensee's Basis for Requesting Relief

Monthly Section XI operability testing has been a Technical Specification requirement for these pumps since April 22, 1977. An analysis of the results of these tests and comparable data from other operating plants has shown no significant changes in performance.

Based on this analysis, the continuation of Section XI monthly testing would not significantly increase plant safety. The

Auxiliary Feedwater, High Pressure Injection, Low Pressure Injection, and Containment Spray pumps are standby pumps whose continuous operation is not required. The Service Water and Component Cooling Water pumps are continuously running, and any significant degradation will be detected during normal operation.

Alternate Testing: Pumps will be tested in compliance with ASME Section XI requirements once per quarter and will be jogged monthly with flow measured. This is in agreement with present changes that are being implemented in Subsection IWP of the Code.

Evaluation

The licensee has demonstrated through previously conducted testing that the proposed alternate test frequency is sufficient to determine pump degradation. The licensee's proposal to run the pumps monthly to measure flow rate, to ensure no pump head degradation, and of measuring all parameters quarterly meets the intent of Section XI. Additionally, the 1980 Code has gone to a quarterly schedule. Relief is granted as requested.

2. Relief Request (Bearing Temperature Measurement)

The licensee has requested relief from measuring bearing temperature on all safety-related equipment cooling and emergency core cooling pumps in accordance with the "duration of test" requirements of Section XI. The pumps are:

- Auxiliary Feedwater
- High Pressure Injection
- Low Pressure Injection
- Containment Spray
- Component Cooling
- Service Water.

Code Requirement

Each inservice test shall include the measurement and observation of all quantities in Table IWP-3100-1 except bearing temperatures, which shall be measured during at least one inservice test each year.

When measurement of bearing temperature is required, each pump shall be run until the bearing temperatures (IWP-4310) stabilize, and then the quantities specified shall be measured or observed and recorded. A bearing temperature shall be considered stable when three successive readings taken at 10 minute intervals do not vary by more than 3%.

Licensee's Basis for Requesting Relief

The referenced edition of the Code requires bearing temperature to be recorded annually. It has been demonstrated by experience that bearing temperature rise occurs only minutes prior to bearing failure. Therefore, the detection of possible bearing failure by a yearly temperature measurement is extremely unlikely. It requires at least an hour of pump operation to achieve stable bearing temperatures. The small probability of detecting bearing failure by temperature measurement does not justify the additional pump operating time required to obtain the measurements.

Alternate Testing: Bearing temperature will be observed and recorded during the Quarterly Pump Test to insure limits are not exceeded. The pumps shall be run a minimum of 30 minutes.

Evaluation

We agree that a yearly bearing temperature measurement is not likely to provide timely detection of bearing degradation; however, the measurement does provide an indication of bearing cooling adequacy and a means of detecting degradation in this area. The test frequency proposed is more conservative than required by the Code, while the test duration is less conservative. Overall adequacy of the testing depends on the response time of the bearing temperature rise, appropriate test techniques, and data evaluation that will reveal bearing cooling degradation. With good testing techniques, the alternate testing proposed can be more meaningful than that required by the Code.

Relief is granted from the Code required duration of testing for bearing temperature measurements. Continued relief is contingent on satisfactory experience with the alternate test duration and quarterly test interval proposed. A longer test duration period must be chosen if found necessary by the licensee or NRC.

B. Valve Testing

This section consists of two subsections. The first contains items of clarification and general relief request evaluations. The second contains our evaluations of the licensee's specific requests for relief from Code test requirements.

1. Items of Clarification and General Relief Requests

a. Testing of Valves Which Perform a Pressure Isolation Function

There are several fluid systems connected to the Reactor Coolant System (RCS) which have all or a portion of

their piping designed to a lower pressure rating than the RCS. Redundant valves are provided in series for pressure isolation between the RCS and these other systems. It is required that this redundancy be verified by periodic surveillance testing.

Check valves CF30, CF31, DH76 and DH77 are in this category and their closure testing has already been adequately addressed by an NRC Order dated April 20, 1981, related Technical Specifications, and the licensee's test procedure ST 5050.03. In addition to these valves, there are others which also perform a pressure isolation function, but for different safety considerations. Those identified are:

- CF28 Core Flood Tank Isolation Check
- CF29 Core Flood Tank Isolation Check
- HP48 High Pressure Injection Check
- HP49 High Pressure Injection Check
- HP50 High Pressure Injection Check
- HP51 High Pressure Injection Check
- HP56 High Pressure Injection Check
- HP57 High Pressure Injection Check
- HP58 High Pressure Injection Check
- HP59 High Pressure Injection Check

These valves must also be individually verified for closure capability. See item II.B.2.1 for the evaluation of the licensee's relief request with respect to closure testing of these valves.

b. Stroke Testing of Check Valves

The NRC position is that check valves which have a safety function to open are expected to be full stroke exercised. The following is a listing of those test methods which are currently being accepted in IST program reviews for any check valve in which the full stroke motion of the disc cannot be directly observed or where there is no position-indicating device:

(1) By demonstrating that the valve can pass the full flow which has been taken credit for in FSAR analyses.

(2) By showing that, for the measured flow, the pressure loss through the valve is such that the valve could only be fully open.

(3) By using a mechanical exerciser which can be observed to move through a full stroke.

(4) By partial disassembly of the valve and manually moving the disc through a full stroke.

We believe these stroke tests assure that the valve is exercised at least to the position required to fulfill its function and, therefore, the intent of ASME Section XI requirements is met. Specific valve test relief requests were evaluated according to this position.

c. Stroke Testing of Motor Operated Valves

The licensee has requested relief from the partial stroke exercising requirement of Section XI for all motor-operated valves. The licensee has stated that none of the Category A or B motor-operated valves identified can be partial stroke exercised because of the design logic of the operating circuits. These circuits are such that, when an open or close signal is received, the valve must complete a full stroke before the relay is released to allow the valve to stroke in the other direction. Hence, based on "to the extent practical within the limitation of design," per 10 CFR 50.55a(g)(4), the above relief request from partial stroke testing is granted.

d. Valves Identified for Cold Shutdown Exercising

The Code permits valves to be exercised during cold shutdown where it is not practical to exercise them quarterly during plant operation. The licensee has specifically identified the applicable valves, and they are full-stroke exercised during cold shutdowns, thereby meeting the requirements of the ASME Code. Since the licensee is meeting the requirements of the ASME Code, it is not necessary to grant relief; however, during our review of the licensee's IST program, we verified that it is not practical to exercise these valves during power operation. It should be noted that the NRC differentiates, for valve testing purposes, between the cold shutdown mode and the refueling mode. That is, for valves identified for testing at cold shutdowns, it is expected that the tests will be performed both during cold shutdowns and during each refueling outage. However, when relief is granted to perform tests on a refueling outage frequency, testing is expected only during each refueling outage. In addition, for extended refueling outages, tests being performed are expected to be maintained as closely as practical to the Code specified frequencies.

e. Valves Important to Safety

This review was limited to valve testing relief requests of those valves which are important to safety. Valves important to safety are defined as those valves that are necessary to mitigate the consequences of an accident and/or to shutdown the reactor and to

maintain the reactor in a shutdown condition. Valves in this category typically include certain ASME Code Class 1, 2, and 3 valves and include some non-Code Class valves. It should be noted that the licensee may have included non-safety-related valves in its IST program to expand the scope of its program.

f. Conditions for Valve Testing During Cold Shutdowns

Inservice valve testing at cold shutdowns is acceptable when the following conditions are met:

(1) It is understood that the licensee is to commence testing as soon as the cold-shutdown condition is achieved but not later than 48 hours after achieving cold shutdown, and continue testing until complete or plant is ready to return to power. Completion of all valve testing is not a prerequisite to return to power.

(2) Any testing not completed at one cold shutdown should be performed during any subsequent cold shutdowns that may occur before the next refueling to meet the Code specified testing frequency.

(3) For planned cold shutdown, where the licensee will complete testing all the valves identified in its IST program for testing in the cold shutdown mode, exception to the requirement to commence testing within 48 hours may be taken.

g. Category A Valve Leak Check Requirements for Containment Isolation Valves (CIVs)

All CIVs shall be classified as Category A valves. The Category A valve leak rate test requirements of IWV-3420 through 3425 are adequately met by Appendix J requirements for CIVs. The NRC has concluded that the applicable leak test procedures and requirements for CIVs are determined by 10 CFR 50, Appendix J. Relief from Paragraphs IWV-3420 through -3425 for CIVs presents no safety problem since the intent of IWV-3420 through -3425 is met by Appendix J requirements.

The licensee shall comply with Paragraph IWV-3426, Analysis of Leakage Rates, and IWV-3427, Corrective Action, unless relief is requested and granted.

h. Application of Appendix J Testing to the IST Program

The Appendix J review for this plant is a review separate from the IST program review. However, the determinations made by that review are directly applicable to the IST

program. Our review has determined that the current IST program as submitted by the licensee correctly reflects our interpretation of Section XI vis-a-vis Appendix J. The licensee has agreed that, should the Appendix J program be amended, it will amend its IST program accordingly.

i. Pressurizer Power Operated Relief Valves

The NRC has adopted the position that the pressurizer power operated relief valves should be included in the IST program as Category B valves and tested to the requirements of Section XI. However, since the PORVs have shown a high probability of sticking open and are not needed for overpressure protection during power operation, the NRC has concluded that routine exercising during power operation is "not practical" and, therefore, not required by IWV-2412(a).

The following test schedule is recommended:

(1) Full stroke exercising should be performed at each cold shutdown if more than three months have elapsed since the previous test or, as a minimum, once each refueling cycle.

(2) Stroke timing should be performed at each cold shutdown if more than three months have elapsed since the previous test or, as a minimum, once each refueling cycle.

(3) Fail safe actuation testing is permitted by the Code to be performed at each cold shutdown if the valves cannot be tested during power operation. This testing should be performed at each cold shutdown.

(4) The PORV block valves should be included in the IST program to provide protection against a small break LOCA should a PORV fail open.

The Davis-Besse Unit 1 design utilizes one PORV and an associated block valve. The licensee has included these valves in the IST program along with a request for relief from the Section XI, Category B, testing requirements for the PORV that describes the testing and position monitoring program (refer to Section II.B.2.c.).

j. Manual Stop/Check Valves

The licensee has defined manual stop/check valves Cateogry C, passive, in the IST program. The purpose of this categorization is to ensure proper administrative and procedural control of the valve operator position. The active portion of the valve, the disk, is being exercised

as per the requirements of Section XI unless identified otherwise in this report.

k. Power Operated Valve Stroke Time

Section XI of the ASME Code, Paragraph IWV-3413, requires that the limiting value of full stroke time of each power operated valve be specified by the owner. This necessitates an understanding both of valve limits and system response time limits. The more restrictive of the two should be selected.

System limits are normally more obvious because they are specified in plant Technical Specifications and the FSAR. Valve (or valve operator) limits are not as visible and, yet, may be more restrictive. Before system response time limits are reached, significant equipment degradation may already be indicated by increasing valve stroke times. For instance, air valve operation can frequently slow considerably, due to mechanical binding or foreign material in the air lines, before system limits are reached. Motor operators that slow down draw increased current flow that can overheat the motor as well as causing the valve to operate too closely to torque switch limits that may stop valve travel prematurely under dynamic load conditions. Conversely, the sudden reduction in valve stroke time can also be indicative of a valve problem.

While the Code requires that the owner shall specify only valve stroke time limits, the NRC requires that the limits selected consider both valve and valve operator limits as well as system response time limits. This is in the expectation that the evaluation of valve stroke time test data be sensitive to detecting valve degradation prior to total failure.

2. Specific Relief Requests

a. Relief Request (Power Operated Valve Stroke Timing)

The licensee has requested relief from measuring the stroke time to within 10% for power operated valves operating in 10 seconds or less.

Code Requirements

The stroke time of all power-operated valves shall be measured to the nearest second or 10% of the maximum allowable stroke time, whichever is less, whenever such a valve is full-stroke tested.

Licensee's Basis for Requesting Relief

For valves with stroke times less than 10 seconds, this would require measuring stroke times to within a fraction of a second. Valve timing is performed using a stop watch either by directly observing valve movement or by observing remote position indicators. Neither method can be relied upon to yield results with accuracy of less than a second.

Alternate Testing: The stroke time of all power operated valves shall be measured to the nearest second.

Evaluation

The licensee is using generally accepted stopwatch timing techniques for measuing stroke times and indicates that these techniques are only accurate to within one second. While this accuracy tolerance appears large for valves operating within ten seconds, it is mainly the measurement repeatability and observation of stroke time differences and trends that is important to Section XI testing for the detection of valve degradation. This function should not be significantly hampered by the measurement accuracy stated. There is a concern, however, for total valve stroke time limits. Hence, the relief requested is granted with the following understanding:

> The relief granted does not imply that more accurate measurements will not be needed in some cases. The licensee must still assure that upper and/or lower valve stroke time limits are not exceeded as specified in the Davis-Besse FSAR or Technical Specifications, or, as properly determined by the "Owner" per Section XI, IWV-3413. If a valve stroke time is near its limit, measurement techniques must be appropriately accurate to assure that the limit is not exceeded.

b. Relief Request (MSIV Testing)

The licensee has requested relief from using the main steam isolation valve (MS-100 and MS-101) partial stroke test feature during power operation and doing full stroke testing during cold shutdown. Instead, they have proposed to do full stroke testing in the plant hot standby condition.

Code Requirement

If only limited operation is practical during plant

operation, the valve shall be part-stroke exercised during plant operation and full-stroke exercised during cold shutdowns.

Licensee's Basis for Requesting Relief

The licensee has pointed out that the partial close test feature must be performed near the valves and that this area becomes a hostile environment requiring evacuation in the event the valve under test inadvertently closes, causing main steam safety and relief valve lifing. Also, inadvertent closing one of the two main steam lines at full power will result in a plant transient requiring trip of the reactor. Reactor operating instructions require a manual trip if an automatic trip has not occurred.

Also, the licensee has indicated that partial stroke testing of the main steam isolation valves is of little value in determining overall valve operability, that this was of little value to the plant safety margin, and that inadvertent valve closure would be a negative factor both for plant safety and economic plant operation.

Alternate Testing: The licensee has proposed to do full stroke valve tests whenever the plant goes to a hot standby condition and the last previous test was done three months or more earlier. Time between tests will not exceed twelve months.

Evaluation

Generally, we believe the licensee's concern for inadvertent closure of the main steam isolation valves during partial stroke testing and the test personnel environment problem should be resolved by proper design, with attention to test panel location and equipment reliability. Also, contrary to the licensee's statement, we believe that partial stroke valve testing does provide a worthwhile measure of operability assurance not available with testing only at cold shutdown. However, we are granting the relief as requested because:

(1) The licensee does have a problem with the current partial stroke test design,
(2) The alternate testing proposed is a reasonable alternative in that the full stroke test is better than partial stroking and the resultant test frequency will be greater than for cold shutdowns, and
(3) The potential for plant transients associated with testing is reduced.

Alternate testing required includes a full stroke test of each main steam isolation valve any time the plant goes to the hot standby condition and more than three months has elapsed since the last full stroke test. Testing may be done any time after a hot standby condition is reached but before going to power operation again. More than twelve months shall not lapse between tests. It is highly recommended that a test be done after each refueling cycle, before returning to power, to provide early discovery of any failure mechanisms that may have developed during the outage.

c. Relief Request (Pressurizer PORV Stroke Test)

The licensee has requested specific relief from stroke timing Category B valve RC2A, pressurizer power-operated relief valve (PORV), in accordance with the requirements of Section XI.

Code Requirement

The limiting value of full stroke time of each power-operated valve shall be specified by the Owner. The stroke time of all power-operated valves shall be measured to the nearest second or 10% of the maximum allowable stroke time, whichever is less, whenever such a valve is full-stroke tested.

Licensee's Basis for Requesting Relief

Full stroke exercising cannot be visually verified on this valve since the valve mechanism is all internal. A test can be performed by closing the block valve and seeing if RC2A solenoid energizes and de-energizes properly. Stroke timing is impractical as the valve mechanism is all internal and the valve is pilot actuated. The position of the pilot can be measured but not of the valve itself. This is not a motor operated valve. There is no fail-safe position of this valve. RC2A is tested in PT 5164.02, Pressurizer Power Relief Valve Periodic Test, in conjunction with ST 5030.04, RCS Pressure to the RPS Refueling Period Calibration Procedure, at least once per 18 months. This test verifies that RC2A will open when its associated solenoid is energized and will close when the solenoid is de-energized. This test is normally run with the RCS pressure at 2155 psig but can also be performed at less than 2155 psig but greater than 500 psig in the RCS. This test also verifies that the solenoid associated with RC2A will be energized at a signal equivalent to an RCS pressure of 2400 ± 16 psig and de-energized by a signal equivalent to an RCS pressure of 2350 ± 16 psig. This phase is run by simulating output signals from the RPS to PSHL-RC2-5 in the NNI

cabinets and verifying proper operation of the solenoid at RC2A. ST 5030.04 will verify that the instrument strings for the RPS pressure transmitters selectable for use in the NNI are calibrated from the pressure transmitters to the output of the RPS cabinets. An acoustic monitor is used to verify valve opening and closing. This valve may be effectively partial stroke exercised during normal operation in response to pressurizer conditions. This valve will be full stroke exercised at refueling during performance of plant procedure PT 5164.02, which also verifies pressure setpoint. No valve timing is possible.

Evaluation

We agree with the licensee's basis and, therefore, grant relief for Category B valve RC2A from the stroke timing requirements of Section XI. The licensee has demonstrated that, due to design, this valve cannot be accurately timed and that stroke timing will not provide meaningful data for valve degradation. The licensee's test and position monitoring program detailed above is acceptable in that it meets the NRC recommendations outlined in Section II.B.1.i. We conclude that the proposed alternate test and monitoring program is consistent with NRC recommendations and should demonstrate proper valve operability.

d. Relief Request (Check Valve Stroke Testing)

The licensee has identified the following Category A/C check valves for reverse closure verification during refueling outages. Relief is requested from the Code requirement for exercizing these valves to their safety function position (closed in this case) at more frequent intervals.

Valve	Valve Function
SA502	Station Air Containment Isolation Check Valve
IA501	Instrument Air Containment Isolation Check Valve
NN58	Nitrogen Supply Containment Isolation Check Valve
CV124	Containment Atmosphere Sample Check Valve
VC125	Containment Atmosphere Sample Check Valve
MU242	Reactor Coolant Pump Seal Water Containment Isolation Check Valve
MU243	Reactor Coolant Pump Seal Water Containment Isolation Check Valve
MU244	Reactor Coolant Pump Seal Water Containment Isolation Check Valve
MU245	Reactor Coolant Pump Seal Water Containment Isolation Check Valve
CF15	Core Flood Tank Nitrogen Supply Containment Isolation Check Valve

CF16 Core Flood Tank Nitrogen Supply Containment Isolation Check Valve

RC113 Pressurizer Quench Tank Recirculation Line Containment Isolation Check Valve

Code Requirement

Check valves shall be exercised to the position required to fulfill their function unless such operation is not practical during plant operation. If only limited operation is practical, during plant operation the check valve shall be part-stroke exercised during plant operation and full-stroke exercised during cold shutdowns. Valves that cannot be exercised during plant operation shall be specifically identified by the Owner and shall be full-stroke exercised during cold shutdowns.

Licensee Basis for Requesting Relief

Verification of reverse flow closing can only practicably be accomplished by leak testing which can only be performed at refueling.

Alternate Testing: These valves will be reverse flow closure tested at refueling outages during the performance of an Appendix J, Type C, test.

Evaluation

We agree with the licensee's basis and grant relief from the exercising requirements of Section XI. Because of plant systems design, the only method to verify valve closure (the safety-related position) is by leak testing of these valves. The proposed alternate testing under 10 CFR 50, Appendix J, to verify closure by performance of containment isolation valve leak rate testing at refueling outages is adequate to demonstrate proper valve operability.

e. Relief Request (Core Flood Tank Check Valve Stroking)

The licensee has determined that Category C core flood tank outlet check valves CF28 and CF29 cannot be full-stroke or part-stroke exercised during plant operation. Relief is requested to allow only part-stroke exercising at refueling outage intervals.

Code Requirements

Valves that cannot be exercised during plant operation shall be specifically identified by the Owner and shall be full-stroke exercised during cold shutdowns.

Licensee's Basis for Requesting Relief

Forward flow cycling cannot be performed during normal operation or cold shutdown when the RCS is filled and pressurized to pressure greater than that of the core flood tank. Full-stroke is precluded by system design.

Alternate Testing: These valves will be partial-stroke exercised at refueling outages when the contents of the core flood tank can be partially dumped into the RCS while monitoring core flood tank level.

Evaluation

The partial stroke exercise at the refueling frequency is not adequate to meet the intent of the Code nor does it meet NRC's position requiring full-stroke testing. The requested relief is not granted.

While the refueling cycle test frequency is acceptable, considering system limitations in performing valve exercising tests, there remains a need to verify full-stroke capability for the valves. The licensee must either develop an acceptable full-stroke test to replace the part-stroke test proposed or supplement the part-stroke testing with periodic, partial disassembly of the valves for visual inspection.

On disassembly, if this is chosen, the valves must be inspected for good mechanical condition and the internals moved through a full-stroke to verify freedom of movement. While the current NRC position is that this inspection be done each refueling outage, this interval may be extended. However, the NRC has deferred its decision concerning the acceptability of lengthening that interval pending satisfactory results of the initial inspection. In order to pursue this matter, the licensee should furnish the NRC with the results of the initial inspection so an acceptable inspection interval can be established.

f. Relief Request (Auxiliary Feedwater Check Valve Stroking)

The licensee has identified Category C auxiliary feedwater check valves AF39, 43, 72, 73, 74 and 75 as "valves that cannot be exercised during plant operation" per IWV-3522 of Section XI. Relief is requested from the full-stroke requirement and from the cold shutdown test period for full-stroke testing.

Code Requirement

Valves that cannot be exercised during plant operation

shall be specifically identified by the Owner and shall be full-stroke exercised during cold shutdowns.

Licensee Basis for Requesting Relief

The licensee indicates that cycling these valves during normal operation or at cold shutdown when the steam generators may still be at elevated temperatures, is not desirable in that the cold auxiliary feedwater pumped will cause unnecessary thermal shocks to the auxiliary feedwater nozzles. The valves can be cycled during refueling, using the auxiliary boiler as the power for the auxiliary feedwater pump turbines. However, the turbine speed developed in this manner is thought to be inadequate to develop full pump flow conditions, only allowing a partial valve stroke test.

Alternate Testing: Valves will be partial-stroke forward flow cycled during refueling when the steam generator is cold.

Evaluation

The partial stroke exercise at the refueling frequency is not adequate to meet the intent of the Code nor does it meet NRC's position requiring full-stroke testing. The requested relief is not granted.

While the refueling cycle test frequency is acceptable, considering the licensee's concern for minimizing the number of cold shocks to the auxiliary feedwater nozzles, there remains a need to verify full-stroke capability for the valves. The licensee must develop either an acceptable full-stroke (or full flow) test to replace the part-stroke test proposed or supplement the part-stroke testing with periodic, partial disassembly of the valves for visual inspection.

On disassembly, if this is chosen, the valves must be inspected for good mechanical condition and the intervals moved through a full stroke to verify freedom of movement. While the current NRC position is that this inspection be done each refueling outage, this interval may be extended. However, the NRC has deferred their decision concerning the acceptability of lengthening that interval pending satisfactory results of the initial inspection. In order to pursue this matter, the licensee should furnish the NRC with the results of the initial inspection so an acceptable inspection interval can be established.

g. Relief Request (Safety Injection Line Check Valves)

The licensee has determined that Category C high pressure injection check valves HP48, 49, 50, 51, 56, 57, 58 and 59 cannot be full-stroke or partial-stroke exercised during plant operation. The Code requires full-stroking at cold shutdown in this case. Relief is requested to extend the full-stroke test interval to refueling outages.

Code Requirements

Valves that cannot be exercised during plant operation shall be specifically identified by the Owner and shall be full-stroke exercised during cold shutdowns.

Licensee's Basis for Requesting Relief

These valves can only be cycled by high pressure injection flow. High pressure injection during normal operation or cold shutdown could introduce cold water into the significantly hotter reactor coolant system. This would thermal shock the high pressure injection nozzles. Additionally, high pressure injection during cold shutdown could subject the reactor coolant system to pressures higher than allowed in the cold shutdown mode. System operation precludes partial-stroke exercising these valves during normal operation.

Alternate Testing: These valves will be forward flow cycled at refueling outages when the reactor vessel head is removed to provide an adequate expansion volume.

Evaluation

We agree with the licensee's basis, in particular that testing during cold shutdown creates the possibility of a low temperature overpressurization condition on the RCS. Relief is granted to allow full flow testing of these valves during refueling outages.

h. Relief Request (Hydrogen Dilution Check Valves)

The licensee has requested relief from exercising Category A/C valves CV209 and 210, hydrogen dilution air containment checks, in accordance with the requirements of Section XI and proposed to exercise them open during cold shutdown and verify closure during refueling.

Code Requirement

Check valves shall be exercised to the position required to fulfill their function unless such operation is not practical during plant operation. If only limited operation is practical during plant operation, the check valve

shall be part-stroke exercised during plant operation and full-stroke exercised during cold shutdowns. Valves that cannot be exercised during plant operation shall be specifically identified by the Owner and shall be full-stroke exercised during cold shutdowns.

Licensee's Basis for Requesting Relief

Cycling can only be performed by injecting air from the hydrogen dilution blowers into the containment. This air must be purged from the containment to the environment. Purge time is limited to 90 hours per year during normal operation. Testing could cause excessive purging with resulting increase in releases to the environment. No partial stroke exercising is possible during normal operation without injecting air into the containment. Verification of reverse flow can only be performed at refueling outages.

Alternate Testing: These valves will be cycled at cold shutdown and reverse flow closure tested at refueling outages during performance of an Appendix J, Type C, leak test.

Evaluation

We agree with the licensee's basis and, therefore, grant relief for Category A/C valves CV209 and 210 from the exercising requirements of Section XI. The licensee has demonstrated that these valves have two safety-related positions depending upon plant conditions. These valves are required to open to admit post-accident hydrogen dilution air to the containment and to close to provide containment isolation. They cannot be exercised open during power operation without injecting air into the containment isolation which must be purged to the environment. Purge time during power operation is limited to no more than 90 hours per year by NRC directive. Due to plant design, the only available method to verify valve closure is during leak testing. We conclude that the proposed alternate testing frequency of exercising valves CV209 and 210 open during cold shutdown and verifying valve closure during the performance of leak rate testing at refueling outages should demonstrate proper valve operability.

i. Relief Request (Service Water Check Valve)

The licensee has requested relief from exercising Category C service water isolation check valve SW57 at cold shutdown and has proposed to do this testing during refueling.

Code Requirement

Valves that cannot be exercised during plant operation shall be specifically identified by the Owner and shall be full-stroke exercised during cold shutdowns.

Licensee's Basis for Requesting Relief

Reverse flow cycling requires stopping cooling water flow through the turbine plant cooling water heat exchangers which could result in extensive equipment damage. System operation precludes partial stroke exercising this valve during normal plant operation.

Alternate Testing: This valve will be reverse flow cycled at refueling outages when cooling water is not required.

Evaluation

We agree with the licensee's basis, and therefore, grant relief for Category C valve SW57 from the exercising requirements of Section XI. The licensee has demonstrated that due to plant design, the only method available to verify valve closure (its safety-related position) is by securing service water flow through the "cooling water heat exchanger." These coolers serve the turbine building equipment. Service water cannot be secured during power operation without possible equipment damage. Turbine building equipment cooling requirements may be such that service water flow cannot be secured during cold shutdown. We conclude that the proposed alternate testing frequency of verifying valve closure during refueling outages when service water flow can be secured should demonstrate proper valve operability.

j. Relief Request (Emergency Sump Valve Test Cycle)

The licensee has determined that Category B containment emergency sump valves DH9A and 9B cannot be full or partial-stroke exercised during normal plant operation. Relief is requested from the full-stroke requirement at cold shutdown to allow this to be done during refueling outages.

Code Requirement

Valves that cannot be exercised during plant operation shall be specifically identified by the Owner and shall be full-stroke exercised during cold shutdown.

Licensee's Basis for Requesting Relief

Cycling these valves would introduce borated water from the borated water storage tank directly into the containment emergency sump. These valves are interlocked with DH7A and 7B and can only be tested when the borated water storage tank can be isolated. These valves cannot be partial stroke tested during normal operation without injecting borated water into the containment emergency sump. These valves will be cycled at refueling outages when the borated water storage tank can be isolated.

Evaluation

We agree with the licensee's basis for not testing the sump valves during plant power operation because of the valve interlocks involved and the problem that exercising the valves would result in dumping water into and out of the sump. The next consideration, testing at cold shutdown, would involve entering the sump to install and remove blank flanges on the sump recirculation piping, removing water from the sump that is caught between the blank flanges and valves when the valves are exercised, reinstating the sump to operational readiness condition, and filling and venting drained sections of sump piping closed off by the valves after testing. The benefit gained by this testing does not appear to warrant such an evolution. Hence, we grant the relief, as requested, to allow this testing to be done during refueling outages.

k. Relief Request

The licensee has identified the following as valves that cannot be exercised during normal power operation and is requesting relief from the Section XI requirements to test the valves at cold shutdown. The licensee is proposing to test the valves at cold shutdown only if the cold shutdown proceeds to the point of stopping the reactor coolant pumps.

- Category B, component cooling water isolation valves 1411A and 1407A.
- Category A, component cooling water containment isolation valves 1411B and 1407B.
- Category A, reactor coolant pumps seal water containment isolation valves MU66A, B, C, D; MU 59A, B, C, D; MU 38.

Code Requirement

Valves that cannot be exercised during plant operation shall be specifically identified by the Owner and shall be full-stroke exercised during cold shutdowns.

Licensee's Basis for Requesting Relief

Cycling the component cooling water valves during normal operation requires shutting off cooling water to the reactor coolant pumps which would cause extensive damage to the pumps.

Cycling the seal water isolation valves during normal operation would interrupt flow to reactor coolant pump seals and is not permitted by plant operating procedure. Valve design in either case precludes partial stroke testing during normal operation.

Alternative Testing: Valves will be full stroke tested during those entries into cold shutdown when normal cold shutdown proceeds to reactor coolant pump shutdown. The Category A valves will be leak tested at refueling per Technical Specification during Appendix J, Type C Test.

Evaluation

We recognize that isolating either component cooling water or seal water to the reactor coolant pumps when the pumps are running is undesirable. Hence, relief is granted as requested with alternate testing to be done at cold shutdown intervals if the cold shutdown proceeds to the point of turning off the pumps. Appendix J, Type C, leak testing is an acceptable substitute for the Section XI leak test requirements for the Category A valves noted above.

1. Relief Request

The licensee has requested relief from individual valve closure testing of high pressure safety injection line check valve pairs HP48 and 50; HP49 and 51; HP 56 and 58; and HP 57 and 59.

Code Requirement

The Code does not clearly require closure testing of these valves to the same extent NRC does under the provision for augmented test requirements of 10 CFR 50.55a (g)(6)(ii).

The valves listed here perform a pressure isolation function between high and low pressure systems and the staff has determined that verification of this capability, beyond the exercising requirements of the Code, by the licensee is necessary. The licensee is expected to select a method to be used in determining the condition of each of these valves and submit it for staff review within six months of the date of this report. Possible methods include pressure monitoring, leak testing, radiography and

ultrasonic testing. If leak testing is selected as the desirable method, these valves should be classified as A or AC and tested in accordance with IWV-3420 of the Code.

Licensee's Basis for Requesting Relief

Reverse flow cycling during normal operation, cold shutdown, and refueling is precluded by system design for individual check valves. Upstream of these valves are motor-operated, normally closed valves which are designed and analyzed as seismic Class I. These motor operated valves HP-2A, B, C, and D are stroked and timed at cold shutdown. The system normal operating pressure is continually monitored in the Control Room by a high pressure alarm set at 375 psig.

Alternative Testing: As an interim condition, no alternative testing is proposed until resolution of alternatives is complete.

Evaluation

The licensee's relief request is unacceptable in that no description of alternate testing is given or schedule proposed for resolution. Interim relief is granted for six months or until the end of the next refueling outage, whichever occurs earlier when the licensee will be expected to comply with the requirements noted above or submit acceptable aternatives.

n. Relief Request

The licensee has requested relief from quarterly reverse flow stroking service water check valves SW83, SW85, SW91, SW93, SW99, SW101, SW107, SW109, SW115, SW117, SW370, SW372, SW380, SW382, SW329, SW82, SW335, SW43, SW44, and SW57.

Code Requirement

Check valves shall be exercised to the position required to fulfill their function unless such operation is not practical during plant operation. If only limited operation is practical during plant operation, the check valve shall be part-stroke exercised during plant operation and full-stroke exercised during cold shutdowns. Valves that cannot be exercised during plant operation shall be specifically identified by the Owner and shall be full-stroke exercised during cold shutdown.

Licensee's Basis for Requesting Relief

Present system design configuration does not permit isolation required for testing.

Alternative Testing: No further alternative testing is proposed at this time System modifications are being considered to permit testing. The modifications are presently being planned for implementation during the 1984 Refueling Outage.

Evaluation

The licensee's relief request is denied. Within ninety days of the date of issuance of this evaluation, the licensee must submit a reasonable basis for assuming service water system operability until proposed system modifications and valve testing are implemented. Alternate testing details must be proposed in this submittal.

III. Conclusions

We have concluded that the licensee's commitment to Inservice Testing per the requirements of the 1977 Edition of Section XI Code including Addenda through Summer 1978 except where the written relief is granted. provides for an acceptable program for use during the remainder of the ten-year inspection interval which began on November 21, 1977. Relief is granted based on our finding that certain specific requirements of Section XI of the ASME Boiler and Pressure Vessel Code, 1977 Edition through Summer 1978 addenda, are impractical to implement and would result in unusual difficulties without a compensating increase in the level of quality and safety. The granting of this relief is in the public interest giving due consideration to the burden upon the licensee if the requirements were imposed. We further conclude that granting this relief will not endanger life or property or common defense and security and is authorized by law.

We have determined that the granting of relief does not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that granting relief involves an action which is insignificant from the standpoint of environmental impact and that an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with the granting of this relief.

IV. References

A. Licensee letter dated May 15, 1980 (Serial No. 616).
B. Licensee letter dated December 15, 1980 (Serial No. 671).

C. Licensee letter dated March 31, 1981 (Serial No. 702).
D. Licensee letter dated December 14, 1982 (Serial No. 882).
E. Licensee letter dated February 2, 1983 (Serial No. 908).
F. Licensee letter dated April 29, 1983 (Serial No. 939).
G. Licensee letter dated June 2, 1983 (Serial No. 953).

The following NRC personnel have contributed to this Safety Evaluation:

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Dated: May 18, 1984