

June 23, 1993

Docket No. 50-298

Mr. Guy R. Horn
Nuclear Power Group Manager
Nebraska Public Power District
Post Office Box 499
Columbus, Nebraska 68602-0499

SUBJECT: EXEMPTION FROM APPENDIX J TO 10 CFR PART 50 TO ALLOW REVERSE
DIRECTION LOCAL LEAK-RATE TESTING OF 10 CONTAINMENT ISOLATION VALVES
AT COOPER NUCLEAR STATION (TAC NO. M86695)

Dear Mr. Horn:

The NRC staff has completed its review and evaluation of your letter dated June 7, 1993, requesting a schedular exemption from Appendix J to 10 CFR Part 50 to allow Type C (local leak-rate) testing of 10 containment isolation valves in the reverse direction instead of the forward direction until the next refueling outage.

Based on our evaluation, we are granting the schedular Exemption (Enclosure 1) from the Type C testing requirements of 10 CFR Part 50, Appendix J, Paragraph III.C.1. Our Safety Evaluation is given in Enclosure 2.

A copy of the Exemption is being filed with the Office of the Federal Register for publication.

Sincerely,

ORIGINAL SIGNED BY:
Terence L. Chan, Acting Director
Project Directorate IV-1
Division of Reactor Projects - III/IV/V
Office of Nuclear Reactor Regulation

Enclosures:

- 1. Exemption
- 2. Safety Evaluation

cc w/enclosures:
See next page

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

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A copy of the Exemption is being filed with the Office of the Federal Register for publication.

Sincerely,

A handwritten signature in black ink, appearing to read "Terence L. Chan".

Terence L. Chan, Acting Director
Project Directorate IV-1
Division of Reactor Projects - III/IV/V
Office of Nuclear Reactor Regulation

Enclosures:

1. Exemption
2. Safety Evaluation

cc w/enclosures:

See next page

Mr. Guy R. Horn
Nuclear Power Group Manager

Cooper Nuclear Station

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of
NEBRASKA PUBLIC POWER DISTRICT
(Cooper Nuclear Station)

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Docket No. 50-298

EXEMPTION

I.

Nebraska Public Power District (the licensee) is the holder of Operating License No. DPR-46, which authorizes operation of Cooper Nuclear Station (CNS). The operating license provides, among other things, that CNS is subject to all rules, regulations, and orders of the Commission now or hereafter in effect.

The facility consists of a boiling water reactor at the licensee's site in Nemaha County, Nebraska.

II.

One of the conditions of all operating licenses for water-cooled power reactors, as specified in 10 CFR 50.54(o), is that the primary containment shall meet the leakage-test requirements set forth in 10 CFR Part 50, Appendix J, Paragraph III.C.1: "Type C tests shall be performed by local pressurization. The pressure shall be applied in the same direction as that when the valve would be required to perform its safety function, unless it can be determined that the results from the tests for a pressure

applied in a different direction will provide equivalent or more conservative results."

By letter dated June 7, 1993, the licensee requested a one-time schedular exemption from Appendix J to 10 CFR Part 50 to allow Type C (local leak-rate) testing of 10 containment isolation valves in the reverse direction. As stated above, Paragraph III.C.1 of Appendix J requires that for Type C testing the test pressure must generally be applied to the valve from the same side as that when the valve would be required to perform its safety function (i.e., the inside-containment side, also called the accident direction or the forward direction). However, the regulation allows an exception if it can be determined that testing with the pressure applied in the reverse direction provides equivalent or more conservative results. In its letter dated June 7, 1993, the licensee stated that 10 containment isolation valves cannot now be shown to satisfy the equivalent-or-more-conservative requirement that permits reverse-direction testing. The licensee is taking steps to comply with Appendix J either by showing that the 10 valves meet the equivalent-or-more-conservative requirement or by modifying the plant to enable future Type C tests to be conducted by pressurization in the forward direction. To allow time for completion of these activities, the licensee has requested that these 10 valves be exempted from the forward-testing requirement until the next refueling outage, currently scheduled to begin in the fall of 1994. The licensee will then test them in the forward direction if it cannot show that reverse-direction testing is equivalent or more conservative.

III.

The subject valves are PC-MOV-305MV, PC-MOV-1304MV, PC-MOV-1306MV, RCIC-MOV-M015, RHR-MOV-M016A, RHR-MOV-M016B, RHR-MOV-M021A, RHR-MOV-M021B, RHR-MOV-M031A, and RHR-MOV-M031B. The licensee has committed to comply with Appendix J by making the plant modifications necessary to test these valves in the forward direction if the licensee cannot demonstrate that testing in the reverse direction is equivalent to or more conservative than testing in the forward direction. However, because there is insufficient time available to design, procure, and install these modifications prior to completion of the current refueling outage (currently scheduled to end in June 1993), the plant modifications will be made at the next refueling outage. Since the subject valves were tested in the reverse direction during the current outage, the exemption will allow testing in the forward direction to be deferred until the next refueling outage. The NRC staff has performed an evaluation of the exemption request and has determined that the licensee has provided adequate justification for the requested exemption.

IV.

According to 10 CFR 50.12(a)(2), the Commission will not consider granting the exemption unless special circumstances are present. Pursuant to 10 CFR 50.12(a)(2)(v), special circumstances are present whenever the exemption would provide only temporary relief from the applicable regulation and the licensee has made good faith efforts to comply with the regulation. The exemption would provide only temporary relief by

permitting the licensee to delay compliance with the leakage test requirements set forth in 10 CFR Part 50, Appendix J, Paragraph III.C.1, until the next refueling outage, currently scheduled to begin in the fall of 1994. The NRC staff believes that the licensee has taken prudent steps to improve the containment integrity and that, if compliance did not require extending the refueling outage, the licensee would comply with Appendix J. The licensee has only recently found that its earlier determination, that reverse direction testing is equivalent or conservative, may not be correct. The licensee has not had enough time to make the modifications necessary to allow forward-direction testing without extending the current refueling outage.

Based on our evaluation, the NRC staff has concluded that the licensee has made a good-faith effort to comply with the requirements of Appendix J and that special circumstances as described in 10 CFR 50.12(a)(2)(v) exist.

Therefore, the Commission has determined that the requested schedular exemption from the Appendix J forward-direction testing requirements for the subject valves should be granted.

V.

Accordingly, the Commission has determined, pursuant to 10 CFR 50.12(a), that this exemption is authorized by law and will not present an undue risk to the public health and safety, and is consistent with the common defense and security. Therefore, the Commission hereby approves the following exemption request.

A schedular exemption is granted from the requirements of Paragraph III.C.1 that a local leak-rate test be conducted in the forward direction for containment isolation valves PC-MOV-305MV, PC-MOV-1304MV, PC-MOV-1306MV, RCIC-MOV-M015, RHR-MOV-M016A, RHR-MOV-M016B, RHR-MOV-M021A, RHR-MOV-M021B, RHR-MOV-M031A, and RHR-MOV-M031B. For good cause shown, this exemption will allow testing of the subject valves in the forward direction to be deferred until the end of the next refueling outage.

Pursuant to 10 CFR 51.32, the Commission has determined that the granting of this exemption will have no significant impact of the quality of the human environment (58 FR 33286).

This exemption becomes effective upon issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Original signed by:

Jack W. Roe, Director
Division of Reactor Projects - III/IV/V
Office of Nuclear Reactor Regulation

Dated at Rockville Maryland
this 23rd day of June 1993

* See previous concurrence

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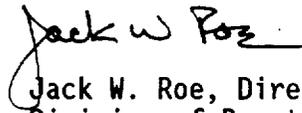
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A schedular exemption is granted from the requirements of Paragraph III.C.1 that a local leak-rate test be conducted in the forward direction for containment isolation valves PC-MOV-305MV, PC-MOV-1304MV, PC-MOV-1306MV, RCIC-MOV-M015, RHR-MOV-M016A, RHR-MOV-M016B, RHR-MOV-M021A, RHR-MOV-M021B, RHR-MOV-M031A, and RHR-MOV-M031B. For good cause shown, this exemption will allow testing of the subject valves in the forward direction to be deferred until the end of the next refueling outage.

Pursuant to 10 CFR 51.32, the Commission has determined that the granting of this exemption will have no significant impact of the quality of the human environment (58 FR 33286).

This exemption becomes effective upon issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Jack W. Roe, Director
Division of Reactor Projects - III/IV/V
Office of Nuclear Reactor Regulation

Dated at Rockville Maryland
this 23rd day of June 1993



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO SCHEDULAR EXEMPTION FROM APPENDIX J

TO ALLOW REVERSE-DIRECTION LOCAL LEAK RATE TESTING OF

10 CONTAINMENT ISOLATION VALVES

NEBRASKA PUBLIC POWER DISTRICT

COOPER NUCLEAR STATION

DOCKET NO. 50-298

1.0 INTRODUCTION

By letter dated June 7, 1993, the Nebraska Public Power District (the licensee) requested a schedular exemption from Appendix J to 10 CFR Part 50 to allow Type C (local leak-rate) testing of 10 containment isolation valves in the reverse direction until the next refueling outage, currently scheduled to begin in the fall of 1994. Section III.C.1 of Appendix J requires that for Type C testing, the test pressure must generally be applied to the valve from the same side or direction as pressure would be applied from during an accident. That is, the pressure is usually applied from the inside-containment side. This is called the accident direction, or the forward direction. However, the regulation allows testing in a direction other than the forward direction if it can be shown that such testing is equivalent to, or more conservative than, testing in the forward direction.

As a result of testing conducted during the 1993 refueling outage, the licensee has determined that its previous determination that reverse direction testing is acceptable may not be correct for certain valves at the Cooper Nuclear Station (CNS). The licensee has also determined that 10 of the CNS containment isolation valves cannot be shown at this time to be acceptable when tested in the reverse direction and cannot be tested in the forward direction without plant modifications. Therefore, the licensee has requested that a schedular exemption be granted for these 10 valves, exempting them from the forward-testing requirement of Appendix J until the next refueling outage. At that time, the licensee will make the plant modifications necessary to perform the forward-direction testing if it has not been able to establish that reverse-direction testing is acceptable.

2.0 EVALUATION

The licensee is applying for schedular exemptions for each of the following valves at CNS: PC-MOV-305MV, PC-MOV-1304MV, PC-MOV-1306MV, RCIC-MOV-M015,

RHR-MOV-M016A, RHR-MOV-M016B, RHR-MOV-M021A, RHR-MOV-M021B, RHR-MOV-M031A, and RHR-MOV-M031B. PC-MOV-305MV, PC-MOV-1304MV, and PC-MOV-1306MV are solid wedge gate valves; the others are flexible wedge gate valves. For their containment isolation function, these valves are required to isolate flow away from the primary containment utilizing the disc seating surface on the opposite side from which the primary containment pressure would be applied (outboard seating surface). To adequately test this outboard seating surface in the reverse direction, the valve stem thrust must be sufficient to seat this side of the disc against the test pressure. Unless the seating force provided by the stem thrust is significantly greater than the force from the test pressure applied in the reverse direction, the measured leakage may be through the seating surface on the opposite (inboard) side of the disc. Contrary to the requirements of Appendix J, the test results from the reverse direction testing of these valves may not provide equivalent or more conservative results.

In order to justify exemption for the individual valves, the licensee has identified factors based on calculations of seating force ratios to accident pressure and on evaluation of past Type A (integrated leak-rate) and Type C test results. For valves that do not have thrust test data available, seating-force-to-test-pressure-force ratios are based on comparisons to similar valves for which such thrust data is available.

Thus, the 10 valves may be divided into two categories: those for which valve-specific data is available to determine the ratio of seating force to test pressure force, and those for which the ratio is estimated using data for similar valves. The table below lists the valves in these two categories and also provides the ratio for each valve:

<u>Valves with specific data</u>	<u>Ratio, seating force to test pressure force</u>
RCIC-MOV-M015	5.9 to 1
RHR-MOV-M031A	1.28 to 1
RHR-MOV-M031B	2.0 to 1
RHR-MOV-M016A	3.27 to 1
RHR-MOV-M016B	3.86 to 1
PC-MOV-305MV	8.75 to 1
 <u>Valves with estimated data</u>	
RHR-MOV-M021A	3.56 to 1
RHR-MOV-M021B	3.56 to 1
PC-MOV-1304MV	24 to 1
PC-MOV-1306MV	24 to 1

Although the ratio for the last two valves in the table is high enough to assure equivalent seat leakage in either direction, the information is only an estimate, so these valves are included in the schedular exemption request.

As a general guideline, the staff considers reverse-direction testing conservative for gate valves if the seating force is 10 times the calculated test pressure force. While this ensures that the leak geometry is dominated by the seating force instead of the test direction, there is no rigorous calculation for determining what other seating force may be acceptable. For the interim of the scheduler exemption, the staff believes that with the above seating forces these tests will provide reasonable leak-rate data. Although the ratios for valves RHR-MOV-MO31A and B are quite low, an additional factor supports the granting of the scheduler exemption for these two valves. They are part of the residual heat removal system, which can be considered to be a closed system outside containment since leakage through these valves during an accident would enter the closed system and likely be contained there rather than entering the environment. Further, all 10 valves were tested in the accident direction during the 1991 Type A (integrated leak-rate) test. Although the Type A test is not performed as frequently as Type C tests, the Type A test does provide an indication of overall containment leak tightness, including penetrations.

Even if the forward-direction leak rates of these 10 valves were greater than the measured reverse-direction leak rates, there is a considerable margin for error. The sum of the leak rates for the 10 valves, from 1993 Type C testing, is 15.21 standard cubic feet per hour (scfh), and some fraction of this may actually be going through 12 other valves that are tested simultaneously with the 10 valves. The 10 CFR Part 50, Appendix J limit for the sum of all local leak rates (Types B and C) is 189 scfh (0.6 La). The 1991 Type A leak rate was 102.5 scfh, and the most recently available sum of local leak rates (Types B and C) was 99.11 scfh. It is apparent that there is considerable margin for potential error in the measurement of the leak rates of the 10 valves in question.

Therefore, the staff finds that there is reasonable assurance that, in the interim until the next refueling outage, the 10 valves in question will be sufficiently leak-tight that the leak rate objective of Appendix J will be satisfied, even with the 10 valves being tested in the reverse direction.

3.0 CONCLUSION

Based on the above evaluation, the NRC staff finds that, for good cause shown, CNS containment isolation valves PC-MOV-305MV, PC-MOV-1304MV, PC-MOV-1306MV, RCIC-MOV-MO15, RHR-MOV-MO16A, RHR-MOV-MO16B, RHR-MOV-MO21A, RHR-MOV-MO21B, RHR-MOV-MO31A, and RHR-MOV-MO31B may be exempted from the forward-direction testing requirement of Appendix J for Type C tests until restart following the next refueling outage. At that time the valves will be tested in the forward direction if the licensee cannot establish that reverse-direction testing is equivalent to or more conservative than forward-direction testing and that the valves therefore meet Appendix J requirements.

Principal Contributor: J. Pulsipher

Date: June 23, 1993