Nebraska Public Power District

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NLS9000008
January 11, 1990

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Gentlemen:

Subject: Proposed Change No. 85 to Cooper Nuclear Station Technical Specifications, Testable Check Valves
NRC Docket No. 50-298, DPR-46

In accordance with the applicable provisions of 10CFR50, the Nebraska Public Power District requests changes to the Cooper Nuclear Station Technical Specifications as specified in Attachment 1. This change reflects a proposed modification to the plant, which will remove the motor operated bypass valves and air operators from testable check valves in the Residual Heat Removal, Core Spray, Reactor Core Isolation Cooling and High Pressure Coolant Injection Systems.

Attachment 1 contains a detailed description of the proposed modification to the plant and the resultant proposed changes to the CNS Technical Specifications. A no Significant Hazards Consideration evaluation, conducted in accordance with 10CFR50.92, is also included in Attachment 1. The applicable revised Technical Specification page is attached. By copy of this letter and the attachments, the appropriate State of Nebraska Official is being notified of these proposed changes, in accordance with 10CFR50.91(b).

This proposed change incorporates all revisions to the CNS Facility Operating License through Amendment 130, dated May 24, 1989. The appropriate Safety Review Committees have reviewed this proposed change.

In addition to the signed original, 37 copies are also submitted for your use. Copies are being sent to the NRC Region IV Office and the CNS Resident Inspector in accordance with 10CFR50.4(b)(2).

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Should you have any questions or concerns, please contact this office.

Sincerely,

L. G. Kuncl
Nuclear Power Group Manager

LGK/mtb:cal 7362
Attachment

cc: U.S. Nuclear Regulatory Commission
Region IV
Arlington, TX

NRC Senior Resident Inspector
Cooper Nuclear Station

H. R. Borchert
State of Nebraska
Department of Health

STATE OF NEBRASKA)
)ss
PLATTE COUNTY)

L. G. Kuncl, being first duly sworn, deposes and says that he is an authorized representative of the Nebraska Public Power District, a public corporation and political subdivision of the State of Nebraska; that he is duly authorized to submit this request on behalf of Nebraska Public Power District; and that the statements contained herein are true to the best of his knowledge and belief.

L. G. Kuncl

Subscribed in my presence and sworn to before me this 11th day of January, 1990.

Colleen M. Kuta
NOTARY PUBLIC

GENERAL NOTARY-State of Nebraska
COLLEEN M. KUTA
My Comm. Exp. Aug. 4, 1990

REVISED TECHNICAL SPECIFICATION FOR
PROPOSED CHANGE NO. 85 - TESTABLE CHECK VALVES

Revised Page: 173

Description of the Change

The Nebraska Public Power District proposes to remove the air actuator and the associated motor-operated bypass valve from each testable isolation check valve in the Core Spray, Residual Heat Removal, Reactor Core Isolation Cooling and High Pressure Coolant Injection Systems, during the 1990 refueling outage. The single purpose of both the air actuator and the bypass valve is to allow remote testing of the check valve during power operation. The motor-operated bypass valve permits the pressure to equalize across the check valve and the air actuator provides the motive force to remotely cycle the check valve disc from the control room.

There are several reasons for the proposed removal of the air actuators and motor-operated bypass valves. The air actuators are oversized for the CS, HPCI and RCIC check valves, under current ASME Section XI criteria. The concern is not related to damage to the check valves, but that the force applied by the air actuator is excessive and may not give an accurate representation of valve operability under full flow accident conditions. Thus, the District proposes to remove the air actuators and conduct manual check valve testing locally during cold shutdown (HPCI and RCIC) or during cold shutdown when the drywell is deinerted (CS and RHR). Since the only purpose of the motor-operated bypass valves is to equalize pressure across the check valves during on-line testing, the bypass valves will also be removed.

The second reason that the District proposes to remove the air actuator from the testable check valves is that the air actuator itself has been shown, through a review of industry experience, to be a significant contributor to isolation check valve failures. The Nuclear Regulatory Commission, Office for Analysis and Evaluation of Operational Data (AEOD), conducted an Engineering Evaluation of an isolation check valve failure at a boiling water reactor, where air actuator interference was the cause of a stuck open valve. This evaluation is documented in AEOD Report E414.[1] A follow-up study was conducted by AEOD in 1985, documenting a review of all testable isolation check valve failures between 1975 and 1984.[2] In the follow-up study, AEOD/C502, the results showed that five of the eight events, in which testable check valves stuck open, were associated with interference by the attached air actuator. AEOD Report C502 concludes that "disabling the air actuator would eliminate about 40 percent of the causes for testable isolation check valves being stuck open." The District would also address the recommendations of the AEOD Report associated with disabling the air actuator, which are to conduct surveillance testing of the isolation check valves

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[1]AEOD Engineering Evaluation Report AEOD/E414, "Stuck Open Isolation Check Valve on the Residual Heat Removal System at Hatch Unit 2", dated May 31, 1984

[2]AEOD Case Study Report AEOD/C502, "Overpressurization of Emergency Core Cooling Systems in Boiling Water Reactors", dated September 1985.

by manual actuation using a force measuring device during cold shutdowns when the drywell is deinerted (CS/RHR) or during each cold shutdown (HPCI/RCIC) in accordance with ASME, Section XI, IWV-3522; and to retain closed position indication for the check valve disc in the control room.

The third reason that justifies removal of the air actuator and bypass valves from the testable isolation check valves is the interfacing Loss-of-Coolant Accident (LOCA) concern. This concern is addressed in the AEOD Report C502 and, more recently, in NRC Information Notice 89-73, "Potential Overpressurization of Low Pressure Systems." In the case of the RHR and CS systems, cycling the testable isolation check valve during power operation results in intentionally removing one of the two isolation boundaries between the high pressure reactor coolant system and the low pressure emergency core cooling system. Considering that ASME Section XI requirements can be followed without on-line testing, the additional risk of an interfacing system LOCA to conduct on-line check valve testing is not justified. This is also a concern for the HPCI and RCIC systems due to the low pressure suction piping, although two additional redundant isolation valves in series with the check valve provide additional protection for these systems.

For the reasons delineated above, the District proposes to modify the Core Spray, Residual Heat Removal, High Pressure Coolant Injection and Reactor Core Isolation Cooling Systems to eliminate the remote, on-line test capability of the testable isolation check valves. This modification includes the following actions:

1) remove the air actuators from the check valves,
2) remove the actuator solenoid valves and limit switches and the conduit and cabling back to the nearest junction box,
3) cut and cap the pipes on each end and remove the motor-operated bypass valves,
4) remove the bypass valve motor operators and the conduit and cabling back to the nearest junction box.
5) remove the bypass valve and actuator position indicator lights and test switches from control room panels 9-3 and 9-4,
6) remove the electric/control cable for the bypass valve and actuator position indicator and test switches from the control room back to the nearest junction box,
7) rework the control panels in accordance with the Detailed Control Room Design Review guidelines, including relocating and providing a new power supply for the check valve disc position indicating lights, and
8) redesign and modify the check valve disc position indicating reed switches from an open and closed indication to two parallel redundant closed indications.

The District proposes to conduct future testing of these check valves in accordance with ASME, Section XI, IWV-3522 requirements. This would mean testing the HPCI and RCIC check valves during cold shutdown, since these valves are located in the steam tunnel. For the CS and RHR check valves, located inside the primary containment, the District proposes to test during cold shutdowns when the drywell is deinerted.

The safety functions performed by the testable isolation check valves are to provide an isolation boundary between the reactor pressure vessel and the emergency core cooling and RCIC systems and to open during ECCS/RCIC injection. Failure of these check valves could prevent an individual ECCS system or the RCIC system from injecting into the reactor vessel if the valve failed in the closed position. Failure of the check valve in the open position poses the risk of reactor coolant system water backflow into an ECCS system or the RCIC system. This is of particular concern in the low pressure ECCS system (CS and RHR) due to the risk of overpressurization and is also a concern for HPCI and RCIC due to the low pressure suction piping. The proposed modification to remove the air actuator and motor-operated bypass valves associated with the isolation check valves does not affect in any way the safety function of the check valves. Following the modifications their safety functions continue to be isolation between the reactor vessel and ECCS/RCIC systems and opening sufficiently to allow full flow injection. The failure modes of the check valves will not be affected by this modification. This modification, therefore, has no negative effect on the safety function of the isolation check valves.

The only result of this modification, that could adversely affect safety, is a reduction in the frequency of surveillance testing since testing will only be able to be performed during cold shutdown when the drywell is deinerted (CS/RHR) or during each cold shutdown (HPCI/RCIC). Considered alone, this could reduce the reliability of these testable isolation check valves. However, by removing the air actuator and bypass valves, several benefits are also achieved. First, the proper opening force on the check valve disc can be assured during cold shutdown, significantly improving the testing by verifying that the valve will perform properly under accident flow conditions. Second, as discussed previously and documented in AEOD/C502, disabling the air actuator should eliminate about 40 percent of the causes of isolation check valve failures. Finally, by not testing these check valves on-line, the risk of interfacing system LOCAs is significantly reduced. From the above, it is clear that the benefits derived from removal of the air actuators and bypass valves and testing on a reduced frequency outweigh any reduction in check valve reliability caused by the reduced test frequency. Further, it is possible to meet the intent of ASME, Section XI, without testing on-line, which indicates that valve reliability is not significantly reduced by this modification.

As a result of this proposed plant modification, the District proposes to revise the Cooper Nuclear Station (CNS) Technical Specifications to reflect the proposed hardware changes. On page 173 of the CNS Technical Specifications, Table 3.7.4, the air operated testable check valves listed as HPCI-AO-18 and RCIC-AO-22 are changed to HPCI-29CV and RCIC-26CV, to reflect removal of the air actuator. Also, the associated motor-operated bypass valves HPCI-MO-57 and RCIC-MO-17 are deleted from the table to reflect the removal of the bypass valves. The Core Spray System and Residual Heat Removal System testable check valves are not specifically listed in the Technical Specifications, but are a part of the CNS In-Service Testing Program.

Evaluation of this Amendment with Respect to 10CFR50.92

A. The Proposed License Amendment is judged to involve no significant hazards based on the following:

1. Does the Proposed License Amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

Evaluation

Removing the air actuator and bypass valves from the isolation check valves in the ECCS and RCIC systems does not alter the safety function of the check valve in any way. The check valve disc must have free travel to open upon system injection and must be seated when reactor coolant system pressure exceeds pressure in the ECCS/RCIC system. The proposed modification only eliminates on-line, remote testing capability of the check valves. This modification not only has no affect on the check valve safety function, but also has no negative effect on the previously analyzed failure modes of these check valves. The previously analyzed failure modes of these check valves are a stuck open valve or a stuck closed valve.

The stuck open check valve has no effect on the probability or consequences of previously analyzed accidents, since in the stuck full open position, both ECCS and RCIC injection would be possible. Thus, both the ECCS and RCIC Systems could perform their safety function to mitigate the consequences of an accident. The single failure of a valve, such as the isolation check valve stuck closed, has been considered in the design of the Cooper Nuclear Station. This is the reason for the redundant systems/trains provided to ensure single failure proof emergency core cooling throughout the spectrum of loss-of-coolant accidents.

Thus, the consequences of a stuck closed check valve failure have been considered in the CNS design for the accidents previously analyzed. Since this proposed modification does not affect the safety function or failure modes of the check valves, this change does not increase the probability or consequences of any accidents previously analyzed.

2. Does the Proposed License Amendment create the possibility for a new or different kind of accident from any accident previously evaluated?

Evaluation:

The single purpose for the air actuator and motor-operated bypass valve associated with the testable check valves is to allow remote testing during power operation.

Removal of the air actuator and bypass valve will not in any way affect the capability or function of the check valve. The safety functions of the check valves are to provide isolation between the reactor coolant system and the ECCS/RCIC systems to prevent backflow and to open sufficiently to allow ECCS/RCIC injection to the reactor vessel. Since these check valves will be manually tested during cold shutdown (RCIC and HPCI valves) or cold shutdown with the drywell deinerted (RHR and CS valves) in accordance with the ASME Section XI

requirements, removal of the air actuator and bypass valve cannot create any new or different kind of accident.

3. Does the Proposed License Amendment involve a significant reduction in a margin of safety?

Evaluation:

Removing the air actuators and motor-operated bypass valves from the testable check valves eliminates on-line testing of the check valves, and therefore, reduces testing frequency. This change has no other affect on the safety function of the check valves or the capability of the valves to perform their safety function. Therefore, the only possible effect this change could have on a safety margin is due to the potential reduction in isolation check valve reliability due to a reduction in testing frequency. However, by eliminating remote check valve testing with the air actuator, during power operation, several benefits are achieved. First, it has been shown that air actuator interference is a major contributor to isolation check valve failures. This is documented in the Nuclear Regulatory Commission Office for the Analysis and Evaluation of Operational Data (AEOD) Case Study Report, AEOD/C502, "Overpressurization of Emergency Core Cooling Systems in Boiling Water Reactors," dated September 1985. This Case Study reviewed testable isolation check valve failures between 1975 and 1984, and found that air actuators were a significant contributor to failures and concluded that 40 percent of the causes of testable isolation check valve failures could be eliminated by disabling the air actuator. Eliminating this significant contributor to isolation check valve failures provides an increase in the margin of safety. Further, by controlling the force during manual testing, increased assurance of valve operability under full flow accident conditions is achieved. This also improves the margin of safety. While isolation check valve test frequency is reduced, the requirements of ASME, Section XI, for cold shutdown testing will be followed for the HPCI and RCIC valves (and cold shutdown with the drywell deinerted for CS and RHR), which demonstrates that valve reliability will be maintained within analyzed, acceptable limits. Therefore, this change does not involve a significant reduction in any margin of safety.

B. Additional basis for proposed no significant hazards consideration determination:

The Commission has provided guidance concerning the application of standards for determining whether a significant hazards consideration exists by providing certain examples (48CFR14870). The examples include: (iii) A change that constitutes an additional limitation..., and (vi) A change which...may reduce in some way a safety margin, but where the results of the change are clearly within all acceptable criteria...The District considers this change to fall within these two examples. Whereas reducing testing frequency on the check valves may in some way reduce the safety margin, the valves will be tested per ASME, Section XI, requirements. Further, by

reducing the force on the valve discs and eliminating a major cause of check valve failure, additional, conservative limitations are imposed.