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MURLEY,T.E. Document Control Branch (Document Control Desk) 566

SUBJECT: Requests permanent code relief for testing of certain valves in inservice testing program.Three oversize drawings encl. DRWG

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AEP:NRC:09690
10 CFR50-55a
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Donald C. Cook Nuclear Plant Units 1 and 2
Docket Nos. 50-315 and 50-316
License Nos. DPR-58 and DPR-74
CODE RELIEF FOR RHR VALVES
IMO-340 and IMO-350

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

Attn: T. E. Murley

July 25, 1988

Dear Dr. Murley:

The purpose of this letter is to request permanent code relief for the testing of certain valves in the Inservice Testing (IST) Program. These valves, which are part of the residual heat removal (RHR) system, are presently excluded from the quarterly testing requirements of the ASME Boiler and Pressure Vessel Code, Section XI, 1983 Edition, Subsection IWV, Article IWV-3000. The exclusion was granted by the NRC in a letter from D. R. Muller (NRC) to M. P. Alexich (I&M), dated June 8, 1988. The relief provided by that letter, however, expires January 31, 1989.

Permanent relief for these valves is necessary since we believe that the valves cannot be full- or part- stroke exercised during plant operation without initiating a plant shutdown per the requirements of Technical Specification 3.0.3 or violating the requirements of the ASME code. Upon receipt of the relief, the IST Program for Units 1 and 2 of the Cook Nuclear Plant will be revised to require these valves to be full-stroke exercised during cold shutdown at a frequency described in paragraph IWV-3412(a) of the ASME Code, Section XI.

The valves affected by this request are:

IMO-340: Discharge from the East RHR pump (downstream of the heat exchanger) to the suction of the centrifugal charging pumps.

IMO-350: Discharge from the West RHR pump (downstream of the heat exchanger) to the suction of the safety injection pumps.

The attachment to this letter provides background information and justification for our request.

Date When Response Is Needed

Since the present relief for Unit 1 of the Cook Nuclear Plant expires January 31, 1989, we request that you respond to us by January 27, 1989 in order to avoid an unnecessary unit shutdown. (The current relief for Unit 2 does not expire until the end of the current Unit 2 steam generator replacement/refueling outage. The outage is expected to end in January 1989. The valves will be tested while that unit is in shutdown. Thus, quarterly testing at power will not be necessary until approximately April 1989). If we are not granted our request, we may be required to bring the unit to at least hot shutdown for up to 4 days to perform the tests.

Other Licensing Issues

Pursuant to the requirements of 10 CFR 170.12 (c), we have enclosed a check in the amount of $150.00 for review of the code relief extension request.

Attachment 1 to this letter contains drawings marked as proprietary to AEPSC. In accordance with the restrictions as to use set forth on the drawings, AEPSC hereby releases these documents to the NRC for its information and use in connection with the review of our submittal No. AEP:NRC:09690. AEPSC also permits the NRC to reproduce the drawings as necessary to facilitate review and distribution of the submittal to meet NRC requirements.

This document has been prepared following Corporate procedures which incorporate a reasonable set of controls to ensure its accuracy and completeness prior to signature by the undersigned.

Sincerely,

M. P. Alexich
Vice President

MPA/eh

Attachments

cc: D. H. Williams, Jr.
W. G. Smith, Jr. - Bridgman
R. C. Callen
G. Bruchmann
G. Charnoff
NRC Resident Inspector - Bridgman
A. B. Davis - Region III

Attachment to AEP:NRC:09690

Background Information and

Justification for Code Relief

Background

In our letter AEP:NRC:0969B, dated October 31, 1986, we requested permanent relief from the quarterly testing requirements of the ASME code for four valves in the residual heat removal (RHR) system. The valves affected by this request were IMO-330, 331, 340 and 350.

The relief was requested because of a change in the interpretation of the operability requirements of Technical Specification 3.5.2. Past testing methodology required closing the RHR cross-tie valves (IMO-314 and/or IMO-324), and thus limited RHR injection from a single pump to 2 loops. Under our present interpretation of operability, a single RHR pump must be able to deliver flow to all four reactor coolant loops. As detailed in Attachment 1 to AEP:NRC:0969B, testing of the subject valves was not considered prudent with the RHR cross-tie valves open. Since it is unlikely that testing of the valves can be completed in 1 hour, testing with the cross-tie valves closed would result in commencement of a plant shutdown to fulfill the requirements of T/S 3.0.3.

In a safety evaluation report (SER) dated December 19, 1986, (letter from B. J. Youngblood to John E. Dolan), the NRC granted relief from the quarterly testing requirements, but only until the next scheduled refueling outages. The relief was only granted temporarily because we were revising the accident analyses such that operation of the Cook Nuclear Plant units with the RHR cross-tie valves closed would be supported. These analyses were submitted in our letters AEP:NRC:1024, dated March 23, 1987, and AEP:NRC:1024A, dated May 13, 1987. However, as indicated in our letter AEP:NRC:1024C, dated October 13, 1987, we were informed by our analyst, Westinghouse Electric Corporation (Westinghouse), that the analyses may be inadequate in that the effect that closing the cross-tie valves has on containment long-term calculated pressure was not included in the review.

The relief granted in the December 19, 1986 SER expired for Unit 1 with the Cycle 9-10 refueling outage, which ended in October 1987. The valves were successfully tested during the refueling outage, which meant that the next required quarterly test would have been due by December 13, 1987. Because we were unable to resolve the containment long-term pressure issue by that date, we submitted our letter AEP:NRC:0969I on November 20, 1987 asking that our previous relief for Unit 1 be extended. (No further relief was necessary for Unit 2, since the refueling outage currently in progress will last at least until December 1988, due to replacing all 4 steam generators.)

During the course of the NRC's review of our November 20, 1987, request, additional information was requested on the testing of valves IMO-340 and -350. While obtaining the information, it was realized that valves IMO-340 and -350 might not be testable at power, even when the cross-tie analyses were approved. The information requested by the NRC was supplied in our letter AEP:NRC:0969L, dated December 9, 1987. In that letter, we committed to investigate the need for permanent relief for valves IMO-340 and -350, and to inform the NRC of the outcome of our investigation. The code relief extension requested in AEP:NRC:0969I was granted by the NRC via an SER dated December 11, 1987. In that SER, the NRC extended the relief for Unit 1 through June 1988.

In our letter AEP:NRC:0969M, dated January 18, 1988, we provided the NRC with a proposed course of action for completing the containment analyses necessary to support closure of the RHR cross-tie valves. We proposed to provide the NRC by March 31, 1988, a qualitative evaluation, prepared by Westinghouse, which would assess the effect of RHR cross-tie closure on long-term containment integrity. The qualitative evaluation would have drawn upon Westinghouse's experience with other ice condenser plants and the benefits of later analytical models. The qualitative evaluation was to be followed, at a later date, by a plant specific containment analysis performed by Westinghouse as part of a program we are undertaking to allow operation of Unit 1 at reduced temperatures and pressures. (The analysis will bound both the Cook Nuclear Plant units.) During subsequent discussions with your staff, we were informed that the NRC preferred that we submit the plant specific analysis only, but on an expedited schedule. During discussions with your staff on April 8, 1988, we committed to providing the containment analyses by September 1, 1988. We were informed that the staff expected to complete their review of the analyses by January 1989. We therefore submitted a request for extension of the code relief for valves IMO-330, -331, -340, and -350 until January 31, 1989. The request was contained in our letter AEP:NRC:0969N, dated April 15, 1988. The extension requested was granted by the NRC in an SER dated June 8, 1988.

We have completed our investigation of the need for permanent relief for valves IMO-340 and -350, and determined that permanent relief will be necessary. The reasons for this are provided below. (Permanent relief is not necessary for IMO -330 and -331, since the cross-tie analyses will justify closure of the cross-tie valves, enabling us to stroke test the valves without placing the plant in jeopardy or violating T/S requirements.)

Reasons Why Quarterly Testing Is Impractical

We have included with this attachment AEPSC drawings 1-5104C-4 (Engineered Safety Systems Composite), 1-5142-25 (Safety Injection System), and 1-5143-39 (Residual Heat Removal System). These drawings depict the equipment described in the following paragraphs. (The drawings are specific to Unit 1, however, the equipment of concern is identical for Units 1 and 2).

Valve IMO-340 is located in the discharge from the East RHR pump (downstream of the heat exchanger) to the suction of the centrifugal charging pumps. IMO-350 is located in the discharge from the West RHR pump (downstream of the heat exchanger) to the suction of the safety injection (SI) pumps. Both of these valves are normally closed during power operation, and would be opened during the recirculation phase of a LOCA to allow the RHR pumps to provide water from the containment recirculation sump to the charging pump (IMO-340) and SI pump (IMO-350) suctions. The valves are each interlocked with valves IMO-262 and -263. IMO-262 and -263 are located in series in the safety injection pump mini-flow (recirculation) line to the refueling water storage tank. These normally open valves protect the SI pumps from dead-heading in the event the pumps start while the reactor coolant system pressure is above the pump shutoff pressure, and are required by Technical Specification (T/S) 4.5.2.a to be open, with control power locked out, while the unit is in Modes 1, 2, or 3. In order to open IMO-340 or -350, it is necessary to first close either IMO-262 or -263. Since IMO-262 and -263 are in series, closing these valves renders both SI pumps inoperable, and thus places the unit in T/S 3.0.3, which allows one hour to restore the SI pumps to operable status or begin a unit shutdown.

The valve and equipment lineup necessary to perform testing of IMO-340 and -350 is complex because of the various interlocks associated with the valves. (In addition to the interlocks above, several other interlocks are present including some associated with containment sump isolation valves.) In addition to both SI pumps being inoperable, one train of RHR would also be rendered inoperable by the required valve lineup. The complicated lineup makes it unlikely that the testing can be completed within the one hour time limit of T/S 3.0.3. For this reason, we do not believe valves IMO-340 and 350 can be tested without having to institute a unit shutdown. Even if the testing could be completed in the one-hour limit of T/S 3.0.3, it is our understanding that NRC policy is that T/S 3.0.3 is not intended to be used as an operational convenience which permits redundant safety systems to be out of service for a limited period of time. (June 17, 1987 memorandum from T. E. Murley of NRR to the Regional Administrators regarding intentional entry into T/S 3.0.3).

We note that it may be possible to perform the testing of IMO-340 and -350 by jumpering the interlocks associated with IMO-262 or -263, thus avoiding having to close these valves. However, jumpering the valve interlocks would be considered maintenance per Article IWV-3200 of Section XI of the ASME Boiler and Pressure Vessel Code. This article would then require testing of the interlock function (including closing IMO-262 and -263) once the jumpers were removed before the equipment could be considered operable. This post-maintenance testing would require entry into T/S 3.0.3, and thus places the unit in the same position as does testing without jumpering out the interlocks.

The valves cannot be part-stroke exercised during power operation because they are not equipped with intermediate stop capability.

Past Testing Methodology

The testing requirements for IMO-340 and -350 date back to 1981. The valves were originally tested by closing IMO-262, thus making up the interlock logic and allowing the valves to be stroked. In late 1984, the adverse impact this had on the safety injection pumps' operability requirements was recognized and the procedure changed to allow jumpering of the interlocks for IMO-262. For the reasons cited above, jumpering the interlocks is not a satisfactory solution either, since the code requires testing to assure that the interlock function has been properly restored. Since we do not believe the valves can be stroked at power without violating T/S or code requirements, we believe permanent relief is necessary.

Safety Justification

IMO -340 and -350 are normally closed valves. The valves are used during the recirculation phase of a LOCA to align the safety injection and charging pump suctions from the refueling water storage tank to the discharge of the RHR pumps. The valve manipulation is done by the operators from the control panel; it does not occur automatically. Flow from the RHR pumps to the SI and centrifugal charging pump suctions is also provided by a cross-tie connection between the suction headers of the SI and charging pumps, via valves IMO -360, -361, and -362. The emergency operating procedures require this flow path to be provided for the case in which only one RHR train is available. The emergency operating procedures require both flow paths to be established for the normal case (i.e., both RHR trains available) so that a flow path to the SI and charging pumps continues to exist in case one RHR train should fail.

Review of test records for IMO-340 and -350 have shown the valves to be highly reliable, with little occurrence of failure. The only failure recorded was IMO-340 in Unit 2 stroking at 28 seconds versus the 15 seconds required. This failure occurred on July 4, 1981. No other problems with that valve have since occurred.

Based on the presence of an alternate flow path, and the excellent test history of the valves, we believe the requested relief will not significantly reduce margins of safety, nor will it significantly impact public health and safety.