Norelius

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
799 ROOSEVELT ROAD
GLEN ELLYN, ILLINOIS 60137

JUN 2 4 1982

MEMORANDUM FOR: D. Eisenhut, Director, Division of Licensing

FROM: C. E. Norelius, Director, Division of Engineering and Technical Programs

SUBJECT: INSERVICE TEST PROGRAMS - FULL STROKE EXERCISING OF NORMALLY CLOSED SWING OR TILTING DISK CHECK VALVES

Licensees conducting inservice testing of valves in accordance with 10 CFR 50.55a, and applying the ASME Code, Section XI, edition and addenda combinations allowed by 10 CFR 50.55a(6)(2)(i) are required to full stroke exercise normally closed check valves whose safety function is to permit flow upon reversal of differential pressure (e.g. check in ECCS injection line). The ASME Code requires that, for swing or tilting disk check valves, if the test is made by use of fluid flow through the valve (as opposed to using a mechanical exercisor), the pressure differential for equivalent flow shall be no greater than that observed during the preoperational test.

During a recent inspection of Toledo Edison Company's Davis Besse Nuclear Power Plant, Mr. K. Connaughton of this office determined that flow through the check valves was the only parameter used to satisfy the full stroke exercising requirements referenced above. This practice is not uncommon among licensees. Acceptance criterion vary. Some licensees may specify "design flow" while others use "minimum flow for check valve lift" or merely "observe flow." Under design conditions, observation of design flow may be adequate to demonstrate that a valve is capable of fulfilling its safety function. Corrections to measured flow for off-design conditions (e.g. check in ECCS injection line being tested in the Refueling Mode) must be made in order to provide a similar demonstration. The observation of "minimum flow for check valve lift" (presumably established for a particular model of valve when new) or some arbitrary flow does not, in our opinion, provide any information as to the condition of the valve unless, of course, the valve has failed in some manner as to deny practically any flow.

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We are not aware of any licensees having submitted written requests for relief from this particular requirement. While we realize that preoperational test data on differential pressure across individual valves at reference flows is all but nonexistent, we feel that the use of differential pressure as the test parameter may have greater technical merit than current practice. Please inform us of the staff's positions on:

1) the applicability and enforceability of the requirement considering: the lack of preoperational test data and; the absence of requests for relief from this requirement.

2) whether or not licensees should be required (as an alternative to the test method and acceptance criterion described in the ASME Code) to: demonstrate that under design conditions, the valves will permit design flows and are therefore capable of performing their intended function or; establish, by test and measurement, appropriate baseline differential pressures at reference flows which can be used in place of nonexistent preoperational test data.

On May 17, 1982, W. D. Shafer and K. Connaughton of this office discussed these matters, via telephone, with J. Page of your staff (MEB). Your efforts in resolving these concerns are greatly appreciated.

for C. E. Norelius, Director
Division of Engineering and
Technical Programs

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MEMORANDUM FOR: Richard Spessard, Director
Division of Engineering &
Technical Programs
Region III, NRC

FROM: Darrell G. Eisenhut, Director
Division of Licensing, NRR

SUBJECT: STOPWATCHES CALIBRATION AND ASME REQUIREMENTS ON TRANSIENTS ANALYSES

In your letter of September 7, 1982, you requested NRR assistance to evaluate the use of uncalibrated timing devices in safety-related applications and to clarify an apparent inconsistency between transient analyses and ASME requirements regarding valve closure times which are defined in the Technical Specifications. Our Reactor Systems Branch evaluated the main steam isolation valves (MSIV) closure, and its impact on minimum critical power ratio (MCPR) as determined in the FSAR analyses. Our Procedure and Test Review Branch provided the requirements for the stopwatches. This review was performed pursuant to TIA 82-58.

The ASME code allows rounding of measured closure times for MSIV's to the nearest 1.0 second or the use of a timing device with an accuracy of 1.0 second. This makes it possible for a measured closing time of 2.0 seconds to appear as 3.0 seconds which would satisfy the allowable technical specification value and the FSAR analyses.

We evaluated the impact of a 2.0 second closure time versus a 4.0 second closure time on vessel pressure and MCPR for the MSIV closure event. In the analysis, an MSIV position switch scram was assumed for the effect on MCPR and a high flux scram was assumed for the assessment of the effect on overpressure protection.

The results of these analyses indicate that for closure times of 2.0 seconds or greater, the impact on MCPR and vessel pressure is insignificant and will not challenge safety limits. For the limiting cases, vessel dome pressure was calculated to increase 170 psi and the MCPR was calculated to be four percent of the initial MCPR valve. For a typical boiling water reactor operating at 1100 psig and an initial MCPR of 1.24, this results in a peak vessel pressure (bottom of pressure) of less than 1300 psig and a MCPR OF 1.19. The respective safety limits are: pressure must be less than 1375 psig and MCPR must be greater than 1.06. On this basis, we conclude that the interpretation of the ASME code which allow as much as 1.0 second error in MSIV closure time is of no safety concern for plants with a technical specification minimum allowable MSIV closure time of 3.0 seconds or greater.

With respect to the use of stopwatches for measurement of time intervals for validating operability of safety-related equipment, this method is acceptable where it can be shown that this method of measurement provides the required accuracy. Therefore, the results of the above analyses indicates that a 1.0 second total deviation on MSIV closure time is acceptable. The stopwatches must be calibrated and controlled as required by 10 CFR Part 50, Appendix B, Article XII, and the the required accuracy is determined from the technical specification bases. ANSI/ANS-58.4-1979, "American National Standard Criteria for Technical Specifications for Nuclear Power Plants," paragraph 5.1.(6) states:

> "Errors, from instrumentation or other sources, assumed in the development of the technical specification limits shall be discussed in the bases to provide a clear relationship between the technical specification and the safety analysis values."

Our technical specification basis does not provide a discussion of measurement error, and the limit does not include an allowance for measurement error. It is necessary to include a measurement error allowance in the surveillance test acceptance criteria.

For the operator error component of the error associated with the use of stopwatches, we consider 200 milliseconds to be an acceptable assumption.

We trust that the information provided is responsive to your concern, and the NRR responsibilities under TIA No. 82-58 have been completed.

Original signed by:

Darrell G. Eisenhut, Director
Division of Licensing
Office of Nuclear Reactor Regulation

cc: R. Starostecki, R-I
J. Olshinski, R-II
J. Gagliardo, R-IV
J. Crews, R-V