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June 25, 1982

W3P82-1749  
3-A20.17

Mr. Robert L. Tedesco  
Assistant Director of Licensing  
Division of Licensing  
Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Subject: WATERFORD SES UNIT NO. 3  
DOCKET NO. 50-382  
ENVIRONMENTAL QUALIFICATION BRANCH QUESTIONS

Reference: F. J. Miraglia to L. V. Maurin letter, dated January 19, 1982,  
same subject

Dear Mr. Tedesco:

The referenced letter requested, via Environmental Qualification Branch questions 270.7 through 270.11, additional information on the operability of the Waterford-3 containment purge valves. Attached are responses to these questions which will be documented in FSAR Amendment 28, currently scheduled for docketing in mid-July, 1982.

We hope that this will allow EQB to close out this open issue. However, if you have any further concerns, please let us know.

Very truly yours,

L. V. Maurin

LVM/MJM/pco

Attachment

cc: S. Black (NRC-PLM)  
M. Haughey (NRC-EQB)

Boo!

ATTACHMENT

Question No.

270.7

Non-uniform approach flow resulting from pipe elbows immediately upstream of a butterfly valve has been shown to have a significant effect on torques. For this reason concern has been raised for the non-uniform approach flow created by a partially open butterfly valve upstream of a second butterfly valve. Show how this effect has been considered and accounted for.

Response

Fisher Controls Company has stated and past laboratory tests\* have verified that dynamic torques at open positions up through 60° tend to close butterfly valves. For partially open valves located in series, these laboratory tests show that the valves will still have a tendency to close. Consequently, the non-uniform approach flow is not considered to significantly degrade the containment purge valve's ability to close.

\*Escher-Wyss News Volume IX No. 1 Jan-March 1936  
Published by the Escher-Wyss Engineering Works Ltd.  
"Aerodynamic model tests on butterfly valves"  
By Dr. Ing C. Keller and Dr. Ing F. Salamann

Question No.

270.8

CSB Branch Technical Position 6-4 requires a 5 second closure time for these valves. Describe how these valves are verified to close within the required 5 seconds. Since closure time may increase under pressure loads, increased closure time tests are performed in the unloaded condition. As closure time may increase with time and use, periodic inspection should be performed to verify closure time is still within the 5 second required period. Describe the Tech. Spec. requirements for periodic testing of closure time of these valves and show how these requirements satisfy the concerns above.

Response

Per the original purchase order specification Fisher Controls Company demonstrated purge valve stroking times of less than 5 seconds prior to shipment. Closure time is periodically verified pursuant to plant Technical Specification 3/4.6.4 - Containment Isolation Valves. They shall be demonstrated operable prior to returning a purge valve to service after maintenance, repair or replacement work is performed on them or at least once per 3 months by cycling the valves through one complete cycle of travel and verifying the maximum 5 second closure.

Pursuant to the requirements of NUREG-0737, Item II.E.4.2 (6) a valve operability study was performed. As a result the maximum opening of the purge valves is mechanically limited to 40°. This study assumed that the valves had to close against peak containment pressure (44 psig). In reality these valves will close against a lower pressure during a LOCA or MSLB. Since these valves are designed to close against a larger pressure, we feel that pressure loads will not significantly affect closure time. Furthermore, valve closure time is now expected to decrease substantially since:

- 1) the valves "distance-to-close" is reduced by more than 50%, and
- 2) a 40° open valve has a natural tendency to close.  
(Refer to response to Question 170.7.)

Reference

Technical Specification 3/4.6.4  
FSAR Figures 6.2-1, 6.2-3, 6.2-7a

Question No.

270.9

The seismic report submitted as part of the qualification package only described a test program on the Bettis model T420-SR1-M3 actuator. Testing was performed using a fixture to represent valve body mounting. No loading other than seismic appears to have been imposed during the tests. The acceptance criteria was to verify that the torque output of the actuator will not vary under seismic loads. No seismic qualification of the valve, solenoid, or limit switch (indicated to be qualified in a separate report) was submitted. Show how seismic loads were considered with other dynamic loads to verify that no part of the valve assembly, (valve, operator, and appurtenances) or associated equipment is overstressed during and following an accident condition.

Response

Operability evaluation of the Waterford 3 containment purge isolation valves and accessories considered normal operating loads, SSE loads, and actuator torque loads. MSLB and LOCA conditions are included in the valves' design specification. The valves are located in a moderate energy system; thus pipe break loads are not imposed. Operability is, therefore, concluded on the basis of seismic qualification.

Fisher Controls Company has seismically qualified these valves by dynamic testing of the actuators. (Submitted with original qualification package). Justification for this is based on Fisher's experience in past dynamic tests.

The ASCO solenoids (NP831664V series) and the NAMCO limit switches (EA 180 series) have been qualified by seismic testing. Refer to the "Qualification Summary of Equipment" sheets, submitted to SQRT under separate cover, for further detail.

In addition, the purge valves and their accessories are environmentally qualified per the recommendations of NUREG-0588. Refer to "Response to NUREG-0588", which has been submitted under separate cover, for detailed information.

Reference

FSAR Subsection 3.9.3.2.2 and associate appendices 3.9A and 3.9C  
FSAR Question 270.1 through 270.6

Question No.

270.10

Where operator units are equipped with handwheels some provision must be made to assure these valves are not left in the handwheel mode following some maintenance, test, etc., operation. Describe what steps have been taken to assure valves equipped with handwheels are not left in this mode. Some valve designs may provide for automatic re-engagement of the operator.

Response

In accordance with Technical Specification 3/4.6.4 the containment purge valves will be demonstrated operable prior to returning the valve to service after maintenance, repair or replacement work is performed on the valve or its associated actuator, control or power circuit by performance of a cycling test and verification of isolation time.

Question No.

270.11 Describe preventative maintenance, inservice inspection, and replacement part programs to be performed on the valves, operators, solenoid valves, and associated equipment.

Response

The containment purge valves are inspected and tested pursuant to the Waterford-3 Inservice Inspection Program which follows the requirements of ASME XI-1980 Edition through the Winter 1980 Addendum. These valves are subject to operability tests, stroke time tests and leak tests for isolation valves on a periodic basis. Test results will indicate any valve degradation and subsequently any repair, replacement or maintenance work necessary.

Furthermore, preventive maintenance for the valves and its associated equipment will be performed per all manufacturer's recommendations. Including, as detailed in our response to NUREG-0588, a replacement part schedule as follows:

- 1) Limit Switches - replaced every five years
- 2) Solenoids - replaced every four years