

*Southern California Edison Company*



P. O. BOX 800  
2244 WALNUT GROVE AVENUE  
ROSEMEAD, CALIFORNIA 91770

M.O. MEDFORD  
MANAGER, NUCLEAR LICENSING

TELEPHONE  
(213) 572-1749

March 27, 1984

Director, Office of Nuclear Reactor Regulation  
Attention: Mr. D. M. Crutchfield, Chief  
Operating Reactors Branch No. 5  
Division of Licensing  
U. S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Gentlemen:

Subject: Docket No. 50-206  
Operability of 6" Butterfly Valves Used For Containment Venting  
San Onofre Nuclear Generating Station  
Unit 1

Your letter of February 16, 1984 identified the NRC staff's concerns regarding the operability of the 6" butterfly valves which are used for containment venting. These valves are presently open during all phases of operation in order to maintain the containment pressure at or below atmospheric pressure. As part of the generic concerns of purging and venting of containment, it is the NRC staff's position that all isolation valves greater than 3" nominal diameter used for containment purge and venting operations be operable under the most severe design-basis accident flow condition loading. Furthermore, the valve opening must be such that the critical valve parts will not be damaged by DBA-LOCA loads and that the valves will tend to close when the fluid dynamic forces are introduced. If these conditions cannot be demonstrated, then the valves must be maintained closed whenever the reactor is not in cold shutdown or refueling.

Our letters of December 14, 1979, January 15, 1980 and February 29, 1980 provided commitments to operate in conformance with the NRC Interim Position regarding containment purging/venting. In addition, information demonstrating the operability of these valves was provided. However, your evaluation of this information has concluded that the ability of the 6" valves to close against the buildup of containment pressure in the event of a LOCA was not adequately demonstrated. This position stems from the lack of information provided in our previous correspondence regarding the capabilities of the valve actuator. More specifically, the valve operator's ability to generate and withstand the torques required, and consequently the operability of the combined valve/operator configuration was not presented.

As indicated in our letter of January 15, 1980, the valve actuators are capable of handling the torque generated by the valve at any angle opening under the design basis LOCA conditions. This information was determined through discussion, and correspondence with the valve vendor. More specific information regarding the capabilities of the valve operator through its range of operation is provided below.

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March 27, 1984

By letter dated December 27, 1979, the valve manufacturer, Fisher Controls, provided us with information about the 6" butterfly valves and their associated actuators. As indicated in Fisher's letter, these valves are provided with Fisher Type 656-60 pneumatic diaphragm actuators with a spring-close action upon loss of air. Table 1 contains information taken from Fisher Controls Catalog No. 71 regarding the torque outputs for the Fisher Type 656 diaphragm actuator. This information has been verified through discussions with the valve manufacturer.

Table 1. Torque Outputs (Inch-Pounds) for Type 656 Diaphragm Actuator.

60 Degree Maximum Disc Rotation	Stem Fully Retracted	2076
	Stem Fully Extended	1931
90 Degree Maximum Disc Rotation	Stem Fully Retracted	1197
	Stem Fully Extended	1113

As you are aware, equipment has been installed which limits the valve openings to approximately 50°. Although the torque output of the actuator at this opening was not readily available, the valve manufacturer has indicated the torque output for 50° maximum disc opening will be slightly higher throughout the range from open to closed than the 60° maximum disc opening, as given in Table 1. Since these torque values are far in excess of those which would be experienced by the valve shaft for an angle opening of 70° and a differential pressure of 50 psi (i.e., 592 inch-pounds), it is concluded that the valves will close under the design-basis LOCA conditions.

Also discussed in your Safety Evaluation is the Fisher analysis which was used to determine the maximum disc opening for a given differential pressure across the valve. As noted in your discussion, the analysis is based on model valve tests with straight inlets which do not account for asymmetric flow and forces due to elbows or other fittings upstream of the valve. Notwithstanding this deficiency, the NRC staff has concluded that the valve manufacturer has calculated enough margin to overcome any inaccuracy due to inlet configuration for valve opening angles up to 50°. This conclusion does not apply to angles greater than 50°. It should be noted that upon installation of equipment purchased from Fisher Controls to limit the valve openings to 50°, testing of the valves indicated that CV116 opened to 47° and CV10 opened to 53.5°. This deviation from 50° is not sufficient to reduce the margin of conservatism implicit in choosing a 50° maximum disc opening. Accordingly, the additional 3.5° opening will not prevent CV10 from closing in the event of a design basis LOCA.

Mr. D. M. Crutchfield

-3-

March 27, 1984

The final area of concern regarding the operability of these valves is that the effect of a seismic event has not been addressed. As discussed in your February 16, 1984 letter, this concern is being addressed as part of Unresolved Safety Issue A-46 ("Seismic Qualification of Equipment in Operating Plants"). We are currently a participating member of the Seismic Qualification Owners Group which is working closely with the NRC staff to resolve this issue.

Based on previous submittals and the information provided above, the 6" butterfly valves used for venting containment will be operable under the most severe design-basis accident flow condition loading. Therefore, it is not necessary to maintain these valves closed whenever the reactor is not in the cold shutdown or refueling mode, as would be required if San Onofre Unit were in non-compliance with your Interim Position on containment purging and venting.

If you have any questions or desire additional information, please call me.

Very truly yours,

*Mr. D. M. Crutchfield*