

NRC DIVISION 1 ROOM 443-2181
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PROPOSED RULE

*PR-Misc. Notice
Reg. Guide*

June 11, 1979



Mr. Guy A. Arlotto, Director
Division of Engineering Standards
Office of Standards Development
United States Nuclear Regulatory Commission
5650 Nicholson Lane
Rockville, Maryland 20853

Subject: Draft of Regulatory Guide and Value/Impact Statement
Division 1 Task SC 704-5

Dear Mr. Arlotto:

The date of May 10 for response has passed, but I wish to offer these remarks in the spirit of being helpful to the overall objective.

1. I agree that there should be one set of comprehensive requirements for a valve assembly, whether it is manually operated or remotely controlled.
2. I concur with the Regulatory position as outlined in Section C Regulatory Position, in principle, and when I make this reservation, it is simply because I have not taken the time to check out each detail or to determine whether additional detail is required to achieve the purpose.
3. It is my opinion that the problem with this subject is that there are too many variables being squeezed into one jar, and the experience of the effort from 1972 to 1979 demonstrates this.

Depending on who is talking, there are a minimum of thirty and an approximate maximum of 150 valve assemblies where maximum functional performance can not be compromised.

There is a second ground involving perhaps 1000 or more valves that are being classified as "safety related", but which can not, by "safety" or economic considerations, warrant the same demanding approach that must be applied to the first group.

Finally, there is a third group that should be reexamined and classified as safety related - reexamined in the context of "real safety".

4. It is the belief of many engineers that reliability or operability has to be built into the design. Testing should be viewed as a verification process and not as an end in itself.

Acknowledged by card. *6/25*

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Elastic movement and maintenance of clearances between moving parts is the sine quo non of operability. Many current valve and actuator designs accept loads that take certain areas of the design into the plastic range under testing or other postulated loading conditions above those associated with design operating conditions. Extrapolation is dangerous with such designs, particularly when no strain data is collected and analyzed as part of the test of the prototype or, as some people call it, a parent valve.

The real key to design for operability is to limit the stresses and strains in the areas involving moving parts to a number well below the elastic limit. Simple formulas are appropriate and well established for many parts and areas. The engineering profession currently possesses analytical methods that permit control of the strain where needed in remote areas removed from the surfaces. Fortunately, surface readings of strain can then be mathematically translated to the condition in areas that must be controlled. This is a meticulous and costly process, and one which must be validated by physical testing. This involves the collection of strain data under a series of individual and combinations of concurrent loadings. It frequently involves adjustment of design, mathematical model or proportions, until acceptable results are achieved.

The advantage is that once done, the design system may then be applied to a whole family of sizes and pressure classes of the same geometric proportion.

Extrapolation of test results has been a subject of much controversy and inconclusive results. These problems fall apart and disappear when the stresses/strains at the vital points can be preestablished and controlled by test verified design.

5. The following recommendations are offered to Industry and to the NRC:
 - a. Insist upon only a test verified analytical approach under concurrent loading for the first category of safety related services.
 - b. Permit something like the current draft of proposed N278.2.4 for the second group (in terms of criticality) provided no extrapolation is permitted. This means that only a parent valve is acceptable, and if the tests are conducted under concurrent loadings.
 - c. Permit the current N278.2.4 draft with Appendix H mandatory for what I call Class 3 needs.

FRANK S. G. WILLIAMS

I will be glad to discuss this with you and your associates anytime after June 18, as I feel that this subject is at a turning point with action on these comments as a crucial factor for progress.

Respectfully submitted,

A handwritten signature in cursive script, appearing to read "Frank S. G. Williams".

Frank S. G. Williams

FSGW/dp

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