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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

MAY 30 1989

MEMORANDUM FOR: Raymond F. Fraley, Executive Director  
Advisory Committee on Reactor Safeguards

FROM: Victor Stello, Jr.  
Executive Director for Operations

SUBJECT: RESOLUTION OF GENERIC ISSUE 43, AIR SYSTEM RELIABILITY

This is in response to the January 19, 1989, letter from Forrest J. Remick, Chairman, Advisory Committee on Reactor Safeguards to Chairman Lando W. Zech, Jr. regarding the subject generic issue.

In dealing with issues and problems involving air systems and air-operated components, the staff considers it essential to differentiate between the two. The air system is a distinct collection of components whose purpose is to provide clean, dry air under pressure as a motive force. Other systems contain air-operated components which are loads on the air system. Air-operated components, like electrically operated components, should be maintained to achieve a reliability commensurate with their safety significance. This is a function of the roles they fulfill in the front-line or support systems wherein they operate. In nuclear plant reliability and safety analyses, these components should be modeled as elements in their respective front-line or support systems and not as elements in the air system. Thus, the ability of loads on an instrument air system to cope with a gradual loss of air pressure is not a question of air system reliability. It is a question of reliability of air-operated components and is properly considered in the evaluation of the front-line or support systems in which their functioning or nonfunctioning are factors in those systems' successes or failures. This is the approach being applied to motor operated valves. The electrical distribution system is not required to be tested at degraded voltages. However, degraded voltage is one of the conditions that must be considered in assuring the operability of MOVs.

Thus, a gradual loss of air pressure test will reveal nothing whatsoever about air system reliability. Rather, the objective of such a test would be to identify the existence of failures in air-operated components. These failure causes could include design, procurement and replacement, or maintenance errors, any of which could induce either full or partial failures in various combinations of air-operated components. The question then becomes one of risk significance of the concurrent existence of these full or partial failure modes in other systems. Although reduced air pressure could exacerbate some situations, the same root causes (e.g., valve stem packing too tight after maintenance) could induce the same air-operated component failure modes regardless of air system status. Because of this, the staff does not believe it is appropriate to take action with respect to the air system alone in order to alleviate the root causes of failure in air-operated components.

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The question of concern; i.e., risk significance of combinations of failures and partial failures of air-operated components, is fundamental to probabilistic risk analysis (PRA). The question is being addressed for MOVs because operating experience has shown that degraded voltage has not always been properly considered in determining the sizing and switch settings of MOVs. We have not reviewed the operating experience of air-operated components and do not know whether failures due to degrading pressures have had a significant effect on safety system reliability. However, we will propose this as a new generic issue and review the results of the prioritization with you when it is completed.

The staff therefore still considers that Generic Letter 88-14 is sufficient to resolve the original approved scope of Generic Issue 43, Air System Reliability, without inclusion of a slow bleed test requirement. The broader question of potentially significant combinations of full and partial failures of air-operated components will be considered a separate generic issue and will be prioritized and evaluated separately.

Original signed by  
Victor Stello, Jr.

Victor Stello, Jr.  
Executive Director  
for Operations

cc: Chairman Zech  
Commissioner Roberts  
Commissioner Carr  
Commissioner Rogers  
Commissioner Curtiss  
S. Chilk, SECY

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