

Reference (1142)

SEP 30 1988

PDR: PER R. EMPT

MEMORANDUM FOR: Victor Stello, Jr.  
Executive Director for Operations

FROM: Eric S. Beckjord, Director  
Office of Nuclear Regulatory Research

SUBJECT: RESOLUTION OF GENERIC ISSUE 43, AIR SYSTEMS RELIABILITY

References:

- (1) RES Office Letter No. 3, Procedure and Guidance for the Resolution of Generic Issues
- (2) Generic Letter 88-14, Instrument Air Supply System Problems Affecting Safety-Related Equipment (attached)
- (3) Prioritization of Generic Safety Issues, NUREG-0933, November 1983
- (4) Operating Experience Feedback Report Air Systems Problems, NUREG-1275, December 1987
- (5) AEOD Case Study C701, "Air Systems Problems at U.S. Light Water Reactor," March 1987.
- (6) Memorandum from Brian W. Sheron to Lawrence C. Shao, "Proposed Generic Letter on Instrument Air (IA) Problems," June 23, 1988

In accordance with Reference 1, Generic Issue 43, Air Systems Reliability, is hereby declared resolved. Note that sufficient bases for resolution are the ongoing NRC and industry activities to improve plant air systems. The planned industry and agency activities which include system design verification as noted in NRC Generic Letter 88-14 (Reference 2) and implementation of an air systems performance testing standard being developed as an ANSI/ASME standard will bear positively on assuring and maintaining high reliability of Instrument Air (IA) systems and the air-operated equipment which they serve.

A brief history of the issue follows: Generic Issue 43, Contamination of Instrument Air Systems was prioritized by NRR as "drop" in 1983 on the basis of low risk as described in Reference 3. Following issuance of NUREG-1275 Vol. 2 (Reference 4) and its predecessor, Case Study Report AEOD/C701, (Reference 5), the issue was reopened since these documents concluded there had been a multitude of important precursor events due to degraded or malfunctioning air systems. The generic issue was broadened in scope and retitled, Air Systems Reliability, since the concerns expressed in Reference 4 and 5 were manifold and not restricted to contamination. The RES Air Systems

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Reliability Technical Assistance (TA) Program has completed both an analysis of air systems and air-operated component operational data (including those identified in NUREG-1275 Vol. 2) and an analysis of the risk contribution from IA systems and air-operated components. Though there remain points of difference between AEOD and RES on the TA draft report, both offices agree that resolution of these differences will not result in a basis for requirements beyond those of Generic Letter 88-14, already issued. The offices are also in agreement that implementation of the verification activities outlined in Generic Letter 88-14, and implementation of performance testing to assure proper air quality will significantly reduce risk from air systems.

Licensee actions in response to Generic Letter 88-14 are expected to assure the compatibility between plant air systems and the equipment they serve. Prudent licensee actions will provide assurance that safety-related air-operated equipment will be capable of performing in accordance with plant safety analyses. Once the design verification activities outlined in the generic letter are completed, vigilance must be exercised to assure continued reliable performance of the pneumatic equipment. Implementation of a performance standard such as the forthcoming American National Standard Institute/American Society of Mechanical Engineers (ANSI/ASME) standard "Performance Testing for Nuclear Power Plant Instrument Air Systems," will assure continued satisfactory performance of air systems and the equipment served by them.

The two part approach, (design verification and performance testing) will help assure that air systems are adequate to meet their requirements over plant lifetime, i.e., they will not precipitate unacceptable losses or common cause failures of the components they serve, and that they do not compromise predicted plant response to design basis events. The proposed ANSI/ASME air systems performance standard will be considered for inclusion in an NRC overall maintenance standard, as proposed for implementation of the Maintenance Rule or considered for issuance as a separate Regulatory Guide, as appropriate.

Some events, noted in NUREG-1275 Vol. 2, involved front-line system design flaws which misapplied air-operated components or tended to increase their risk-significance. One such design flaw, potentially causing loss of diesel generator room cooling upon loss of IA, was identified at multiple units, and was subsequently flagged for NRR by RES in Reference 6. Documents being produced or modified under the resolution of Generic Issue B-56, Diesel Generator Reliability, will specifically address this particular problem. In addition, attention by individual licensees to the third paragraph of Generic Letter 88-14 verification requirements should help identify and eliminate similar situations. Such front-line system design errors that lend risk-significance to air-operated components cannot be identified by other than a plant-specific search. This is not a situation unique to air-operated components, but is a situation that can be true of other types of components or support systems as well. When a front-line function is relatively weak, the risk-importances of all systems and components supporting that function may be correspondingly increased. These plant-specific searches for front-line system weaknesses and significant dependencies are intrinsic to

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both Safety System Functional Inspections (SSFIs) and the Individual Plant Evaluations (IPE). For PRAs performed as IPEs, and for in-depth inspections such as SSFIs, there is evidence to support confidence that front line system features causing undue risk significance of support systems and components (including air types) will be uncovered. In addition, the RES evaluation of the IDCOR IPE methodology, to be issued shortly, will include the air system as one of those to be examined for system interdependencies.

From the combined effects of Generic Letter 88-14, and other agency and industry initiatives as discussed herein, sufficient attention is being given, and is expected to be given in the future, to air systems and related problems to declare the recommendations of Reference 4 fulfilled and Generic Issue 43, Air Systems Reliability, resolved.

Original Signed By  
Theris P. Speis

for Eric S. Beckjord, Director  
Office of Nuclear Regulatory Research

Enclosure:  
As stated

cc: T. Murley, NRR  
W. Kerr, ACRS  
E. Jordan, CRGR

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

AUG 08 1988

TO ALL HOLDERS OF OPERATING LICENSES OR  
CONSTRUCTION PERMITS FOR NUCLEAR POWER REACTORS

SUBJECT: INSTRUMENT AIR SUPPLY SYSTEM PROBLEMS AFFECTING SAFETY-RELATED  
EQUIPMENT (GENERIC LETTER 88-14)

The NRC has been studying the problems associated with instrument air systems for a number of years. The results of these studies, including concerns relating to adverse effects on safety-related equipment caused by instrument air system failures, were most recently identified in NRC Information Notice 87-28, Supplement 1, dated December 28, 1987. This information notice transmitted to all licensees and applicants a report that addresses these concerns, NUREG-1275, Volume 2 "Operating Experience Feedback Report-Air Systems Problems." This report indicates that the performance of the air-operated safety-related components may not be in accordance with their intended safety function because of inadequacies in the design, installation, and maintenance of the instrument air system. The report also indicates that anticipated transient and system recovery procedures are frequently inadequate and that operators are not well trained for coping with loss of instrument air conditions.

The purpose of this generic letter is to request that each licensee/applicant review NUREG-1275, Volume 2, and perform a design and operations verification of the instrument air system.

This verification should include:

1. Verification by test that actual instrument air quality is consistent with the manufacturer's recommendations for individual components served.
2. Verification that maintenance practices, emergency procedures, and training are adequate to ensure that safety-related equipment will function as intended on loss of instrument air.
3. Verification that the design of the entire instrument air system including air or other pneumatic accumulators is in accordance with its intended function, including verification by test that air-operated safety-related components will perform as expected in accordance with all design-basis events, including a loss of the normal instrument air system. This design verification should include an analysis of current air operated component failure positions to verify that they are correct for assuring required safety functions.

In addition to the above, each licensee/applicant should provide a discussion of their program for maintaining proper instrument air quality.

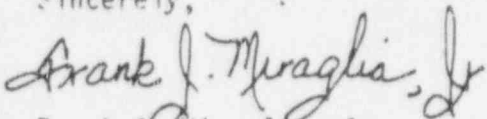
The NRC staff requires each licensee/applicant to provide a response to the staff within 180 days that confirms that verification as described above has been performed. The staff recognizes that some instrument air system testing as indicated in Item 3 above may have potentially adverse consequences on plant power operation, and therefore, such testing should be performed at a refueling or other scheduled outage in order to avoid adverse system interactions. If instrument air system testing cannot be completed within 180 days, it may be deferred until the next scheduled outage. However, the licensee/applicant should indicate in its response those tests which have been completed and those which will be completed at a subsequent outage.

In accordance with the provisions of 10 CFR 50.54(f), the response should consist of a submittal signed under oath or affirmation which indicates that the above actions have been completed or that the licensee's plan/schedule has been provided. The submittal should also identify any components that cannot accomplish their intended safety function, and state the corrective action taken or to be taken. When all requirements of this generic letter have been implemented, a written notification should be provided stating that all actions are complete. Each licensee/applicant should retain the documentation assembled for this verification for future audit by the staff. This documentation should be maintained for a minimum of two years from the date of the licensee's/applicant's submittal.

This request is covered by the Office of Management and Budget Clearance Number 3150-0011, which expires December 31, 1989. Comments on burden and duplication may be directed to the Office of Management and Budget, Reports Management, Room 3208, New Executive Office Building, Washington, D.C. 20503.

Any questions regarding this letter should be directed to William LeFave, U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Washington, D.C. 20555, (301) 492-0862.

Sincerely,



Frank J. Miraglia, Jr.  
Associate Director for Projects  
Office of Nuclear Reactor Regulation