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SUBJECT: Responds to NRC Generic Ltr 88-14, "Instrument Air Supply Sys Problems Affecting Safety-Related Equipment."

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Iowa Electric Light and Power Company

February 21, 1989

NG-89-0347

Dr. Thomas E. Murley, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Subject: Duane Arnold Energy Center
Docket No: 50-331
Op. License No: DPR-49
Response to NRC Generic Letter 88-14,
"Instrument Air Supply System Problems
Affecting Safety-Related Equipment
File: A-101b, A-107a

Dear Dr. Murley:

NRC Generic Letter 88-14 requires that licensees review NUREG 1275, Volume 2, "Operating Experience Feedback Report - Air Systems Problems" and perform a design and operations verification of the instrument air system. In addition, information is to be provided on programs for maintaining proper instrument air quality. The attachment to this letter provides the requested information.

Should you have any additional concerns on this matter, please contact this office.

A046
1/1

This letter is true and accurate to the best of my knowledge and belief.

IOWA ELECTRIC LIGHT AND POWER COMPANY

By _____
DANIEL L. MINECK
Manager, Nuclear Division

Subscribed and sworn to before me on
this 21st day of February, 1989.

_____
Notary Public in and for the State of Iowa

DLM/PMB/pjv+

Attachment: Iowa Electric Response to NRC Generic Letter 88-14, Instrument Air Supply System Problems Affecting Safety-Related Equipment

cc: L. Liu
L. Root
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Iowa Electric Response to NRC Generic Letter 88-14:
Instrument Air Supply System Problems Affecting Safety-Related Equipment.

NRC Generic Letter 88-14 requests that all nuclear power plant licensees verify the design, operation, and maintenance of the instrument air supply system as well as the pertinent emergency procedures and personnel training. Each licensee is also to submit information on its program for maintaining proper instrument air quality.

Iowa Electric has closely monitored the development of information on problems with instrument air systems and their effects on safety-related equipment. Over the past several years, we have taken action to ensure an adequate instrument air supply and improve the air quality of the system.

In 1986, a large capacity, heatless air dryer was installed in the instrument air system to eliminate moisture accumulation. IE currently plans to install a second, similar dryer as a back-up by September 1989.

In 1987, three new oil-free air compressors were installed at the DAEC. The capacity of these compressors meets all current demands and will permit future expansion of the Instrument and Service Air Systems.

Preparation of a comprehensive program to further improve and maintain the reliability and quality of the instrument air system has been initiated. This plan is responsive to both INPO Significant Operating Experience Report 88-01 and NRC Generic Letter 88-14. This response provides the information requested in Generic Letter 88-14.

NRC Generic Letter 88-14, Item 1

Verification by test that actual instrument air quality is consistent with the manufacturer's recommendations for individual components served.

Iowa Electric Response to Item 1

We have identified the manufacturers' recommendations for instrument air quality for safety-related components. The recommendations for air quality include dewpoint, cleanliness (particulate size), and the effects of air supply oil content on internal component operation.

Preliminary air quality testing using portable sampling equipment was performed during the cycle 9/10 refuel outage at various locations throughout the plant. Initial test results found small quantities of particulate contaminants, primarily silica gel which resulted from failure of the after filter in a previous air dryer. Subsequent blowdowns, however, of instrument air headers and lines have demonstrated the effectiveness of the blowdown process to remove this particulate matter. No moisture was observed in the various drain lines used as blowdown points. These drain lines were off of main headers and branch lines and from accumulators throughout the plant.

We are developing a procedure which will require the quarterly blowdown of the instrument air system by purging air through specified drain points. Results of the blowdown tests will be trended to monitor the adequacy of the blowdown procedure in removing any remaining particulates.

A new surveillance program will require monthly tests of the instrument air quality at various instrument air headers downstream of the air dryers. This program will verify that the air quality (dewpoint, particulate and oil content) is consistent with manufacturer recommendations.

Both testing programs will be implemented no later than July 1, 1989. The results of these testing programs will be used in determining any future revisions to test frequency.

The Duane Arnold Energy Center has made a significant effort to ensure a high quality instrument air supply. Three new oil-free air compressors were installed and placed in operation in 1987. A new air dryer was installed in 1986 which uses an after filter rated to remove particulates as small as 0.7 microns. Dew point of the instrument air downstream of the dryers was recently verified to be as low as minus 52 degrees Fahrenheit, the minimum reading on our portable dew point monitor. This value surpasses all vendor and ANSI Standard dew point requirements.

Planned modifications of the air system, scheduled for completion in August 1989, include installation of a second new dryer and an inline dewpoint monitor.

The implementation of the improvements and procedures described above will ensure that the DAEC air quality is consistent with all air-operated components' manufacturers' quality requirements.

NRC Generic Letter 88-14, Item 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.

Iowa Electric Response to Item 2

We have reviewed the manufacturers' recommendations for maintenance on the safety-related components supplied by the Instrument Air System and have compared them with our Preventative Maintenance program. The comparison included maintenance activities, implementation of vendor recommendations and adequacy of root cause determination and trending of system performance.

Although the preventative maintenance program was determined to be adequate to ensure that the equipment will function as intended on a loss of instrument air, additional effort is planned to resolve identified deficiencies.

One area of weakness is in the establishment of justifiable period for rebuilding solenoid valves. This area is presently being evaluated. We are also evaluating other steps which might increase the operational reliability of the instrument air system and the components it supplies. Any recommendations resulting from these evaluations will be incorporated into the DAEC Preventative Maintenance program before the start of the Cycle 10/11 refuel outage.

We have verified the emergency procedures which would guide operators in the identification, control and recovery from partial and total loss-of-air events. The abnormal operating procedure which would be used in case of loss-of-instrument-air identifies probable annunciators, probable indications and expected automatic actions. This procedure is based on actual experience gained during transients involving partial and total loss-of-air. It is, however, being updated to include actions to be taken in case critical components do not fail in their required position. Operating and Annunciator Response Procedures are being updated to include operation of equipment presently being acquired and installed. All updates will be completed by December 1989.

A complete review of the DAEC training program determined that instruction on the air systems and events involving loss of instrument air is satisfactory. The training program, however, has been enhanced as recommended in INPO Significant Operating Experience Report 88-01 by emphasizing the importance of the instrument air system and consequences of its failure. Simulator training scenarios are being developed for use with our plant specific simulator currently scheduled for operation in January 1990. These scenarios will include loss-of-air transients in which plant response can be varied to simulate the failure of different components to move to their proper loss-of-air, fail-safe positions.

NRC Generic Letter 88-14, Item 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 analysis of current air operated component failure positions to verify that they are correct for assuring safety functions.

Iowa Electric Response to Item 3

The instrument air system was verified to be in accordance with its intended safety function. The following items were accomplished as part of the review.

1. Identification of safety-related components that are required to be "fail safe" upon loss of normal instrument air. We verified that these components were designed to fail in the required positions.

2. Identification of the safety-related components that must perform safety-related functions after an assumed loss of instrument air. These components have alternate air supplies in the form of accumulator and/or safety-related air/nitrogen supply. The following were verified for each accumulator.

   a. Capability of the stored air/nitrogen to supply the required number of safety functions.

   b. Capability of stored air/nitrogen volumes to perform as designed with permissible leakages for the duration of the loss of instrument air/nitrogen event.

   One exception to b) above exists with the accumulator for the reactor building-torus vacuum breaker isolation valve. Because these accumulators are not capable of meeting our self-imposed leakage criteria, the vacuum breaker isolation valves are also supplied by a safety-related standby air compressor. Consequently, these valves would still be capable of performing their intended safety function after a loss of the normal instrument air supply and, therefore, meet their original design intent.

   A testing program is in development that will provide further assurance that air-operated safety-related components will perform their safety-related function upon loss of their normal instrument air supply. These tests will verify the following:

      1) Safety-related components will fail in the required position.

      2) Leakage of check valves which provide isolation between the safety and non-safety-related supply of air/nitrogen does not exceed the permissible leakage.

The test program will be completed by the end of the Cycle 10/11 refueling outage.

NRC Generic Letter 88-14, Item 4

Discussion of program for maintaining proper instrument air quality.

Iowa Electric Response to Item 4

As discussed in our response to Item 1, Iowa Electric has taken action to ensure that the quality of the instrument air supply will be maintained. A second large capacity, heatless air dryer will be installed as a back-up. An inline dewpoint monitor will provide continuous indication of air supply moisture content and ensure any degradation in dryer performance is detected. The new surveillance program will measure the dewpoint, particulate and oil content of the air supply at various instrument air headers downstream at the air dryers. These actions will ensure that the manufacturers' recommendations for air quality are maintained.