November 21, 1996

Mr. Mark Smith
LaSalle County Station
Commonwealth Edison
2601 North 21st Road
Marseilles, IL 61341

SUBJECT: REQUEST FOR A TECHNICAL REVIEW OF A DRAFT INFORMATION NOTICE ON INCORRECT EFFECTIVE DIAPHRAGM AREA VALUES USED IN PNEUMATIC ACTUATOR CALCULATIONS - LASALLE COUNTY STATION, UNITS 1 & 2

Dear Mr. Smith:

The U.S. Nuclear Regulatory Commission (NRC) is planning to issue an information notice on the potential failure of safety-related air-operated valves because of the use of incorrect pneumatic actuator effective diaphragm area values supplied in vendor literature. We ask that you review the enclosed draft of that information notice to ensure the technical information is accurate. Your cooperation in this matter is appreciated. Please return any comments you may have as soon as possible. A copy of this request and your response will be placed in the Public Document Room for review by the public. Your response should be mailed to:

U.S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
ATTN: David Skeen, PECB
MAIL STOP: O11E4
Washington, DC 20555-0001

Please address any questions you may have on this matter to David Skeen of my staff. Mr. Skeen may be reached by phone (301) 415-1174 or you may fax comments to (301) 415-2279. If no comments are received by close of business November 25, 1996, we will assume the technical information in the notice is correct.

Sincerely,

[Original signed by]
Alfred E. Chaffee, Chief
Events Assessment and Generic
Communications Branch
Division of Reactor Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-373 and 50-374

Enclosure: Draft Information Notice

cc w/enclosure:
See next page

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cc:

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LaSalle County Courthouse
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UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
WASHINGTON, D.C. 20555-0001

November xx, 1996

NRC INFORMATION NOTICE 96-XX: INCORRECT EFFECTIVE DIAPHRAGM AREA VALUES IN VENDOR MANUAL RESULT IN POTENTIAL FAILURE OF PNEUMATIC DIAPHRAGM ACTUATORS

Addressees

All holders of operating licenses or construction permits for nuclear power reactors.

Purpose

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice to alert addressees to the fact that some vendors have published incorrect values for effective diaphragm area for some spring-type pneumatic diaphragm actuators and that use of these incorrect values may result in safety-related air-operated valves not fully closing under design basis conditions. It is expected that recipients will review the information for applicability to their facilities and consider actions, as appropriate, to avoid similar problems. However, suggestions contained in this information notice are not NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances

On October 4, 1996, Commonwealth Edison, licensee for the LaSalle County Station, issued a Part 21 notification pursuant to 10 CFR Part 21, Sections 21.1(b), 21.3a(3), and 21.3d(4). The notification identified the defect as incorrect values for the effective diaphragm areas, as published by the original and current valve vendors, for certain models of pneumatic actuators.

The original valve vendor, Black, Sivalls, and Bryson (BS&B), was later purchased by WKM Valve Division of ACF Industries, then by Muesco, and by Anchor/Darling Valve Company. The affected model of actuator is the Model 70-13 pneumatic diaphragm actuator, sizes 35, 70, 140, and 280. The size refers to the published diaphragm area in square inches. The affected actuators are either direct acting (spring to open or close, depending on the application) or reverse acting (normally spring to close) spring return actuators.

The Part 21 notification included an attachment providing a Nuclear Plant Reliability Data System (NPRDS) listing of valves of the applicable model number by plant; however, the listing may not include all of the applicable valves and may include valves that are not safety related or that are not required to isolate as are the primary containment isolation

valves at the LaSalle County Station. Some of the valves listed are not diaphragm actuated valves and the identification of some items is incomplete. The present manufacturer, Anchor/Darling Valve Company, was unable to compile a complete listing of the actuator applications because purchase order records from the original vendor are unavailable.

Discussion

The licensee found discrepancies in the bench set values of the actuators during the LaSalle County Station refueling outage that took place from February through April 1996. The published bench set and the actual bench set values, indicated from testing by the plant mechanics, were inconsistent. "Bench set" refers to the amount of preload and final compression force placed on the actuator spring so that the applied spring force on loss of air will achieve the required travel of the valve stem. Bench set adjustments are made by applying air pressure to the actuator in accordance with the manufacturer's published values and adjusting the spring compressive force by means of an adjusting nut to achieve the desired relationship between air pressure and valve stem travel. When performing bench set testing, incomplete valve stroke is typically indicative of a stiffer-than-expected spring. However, testing by the licensee indicated that the springs were within manufacturer's tolerances and additional testing with a known spring force, a known air supply pressure, and a known load indicated that the actual effective diaphragm area, which relates to the force opposing the spring as well as to the compression of the spring for proper preloading, was less than the published values.

Anchor/Darling Valve Company was contacted by the licensee and performed a series of tests to determine the actual effective diaphragm area. These tests indicated that the actual diaphragm areas of the various sizes of the Model 70-13 actuators were approximately 90 percent of the published values. Further testing by the licensee uncovered a contributing problem that further reduced the effective diaphragm area. The diaphragm case consists of two halves bolted together. Generally one half is deeper than the other. It was discovered that reverse-acting actuators assembled with a deep upper half caused unintended stretching of the diaphragm within the casing.

The licensee determined that the primary containment isolation valves would have closed at the design-basis-accident containment pressure of 40 pounds per square inch; however, many of the valves may not have been properly set up to close against the normally higher system pressure under other accident conditions. That is, the valves may not have closed under the highest expected differential pressure of the contained system fluid. Further details of the concern are in Licensee Event Report 50-373/96-011, dated October 28, 1996 (Accession No. 9611010277).

The licensee determined which valves at the LaSalle County Station were affected and was able to properly adjust the actuators to account for the discrepancies between the published values for the diaphragm area and the actual diaphragm area by (1) adjusting the bench set on the spring to achieve full travel of the valve and (2) reversing the diaphragm casings so that the deeper part of the casing was installed on the bottom with the shallower part of the casing installed on top to prevent the diaphragm from stretching.

The licensee has not identified similar problems on actuators made by other manufacturers, but licensees should be aware of the concern when testing and making adjustments to the bench set of pneumatic actuators. The proper setup of these actuators is especially important when the attached valve is used for isolation in a safety-related application. Licensees may wish to review their valves and actuators for applicability of this information.

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact one of the technical contacts listed below or the appropriate Office of Nuclear Reactor Regulation (NRR) project manager.

Thomas T. Martin, Director
Division of Reactor Program Management
Office of Nuclear Reactor Regulation

Technical contacts: Patricia Campbell, NRR
(301) 415-1311
E-mail: plc@nrc.gov

David Skeen, NRR
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E-mail: dls@nrc.gov

Andrew Dunlop, RIII
(630) 829-9726
E-mail: axd7@nrc.gov

Attachment: List of Recently Issued NRC Information Notices