KANSAS GAS AND ELECTRIC COMPANY

GLENN L. KOESTER
VICE PRESIDENT - NUCLEAR

February 18, 1985

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

KMLNRC 85-060
Re: Docket No. STN 50-482
Subj: Main Steam and Feedwater Isolation Valves

Dear Mr. Denton:

During preoperational testing of the main feedwater isolation valves, it was determined that the valves would not perform exactly as described in the FSAR. Although the same testing was not performed on the main steam isolation valves (because of required plant conditions), the expected valve performance is the same as the feedwater valves because of the similarity of design.

Kansas Gas and Electric Company (KG&E) has evaluated the valve's failure to perform as described in the FSAR and has determined that the situation does not represent a significant deficiency or an unreviewed safety question. The probability of a main steam or feedwater isolation valve's failure to close when required due to the design problem discovered during testing is extremely small. Nevertheless, the valve's failure has already been assumed in accident analyses.

The attached report provides a description of the valves, the testing performed, the problem discovered during testing, and the basis for the above KG&E conclusion. This letter is provided to inform you of the deviation from an FSAR description and to request your concurrence that this situation should not delay issuance of the Wolf Creek Operating License.

Yours very truly,

for Glenn L. Koester
Vice President - Nuclear

GLK:dab

Attachment

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MAIN STEAM AND FEEDWATER ISOLATION VALVE DEVIATION FROM FSAR DESCRIPTION

A. Description of Valves

The main steam isolation valves are described in the FSAR Section 10.3.2.2 and depicted on Figure 10.3-1 (Sheet 2) as AB-HV-11, 14, 17, and 20. The feedwater isolation valves are described in Section 10.4.7.2.2 and depicted on Figure 10.4-6 (Sheet 2) as AE-FV-39, 40, 41, and 42. The steam and feedwater valves are nearly identical in design except for actuator and valve size (28-inch vs. 14-inch).

The valves are bidirectional, double disc, parallel slide gate valves. For normal valve opening and slow closing, hydraulic fluid is pumped by one of two actuators for each valve to the appropriate side of the valve operating piston. Stored energy for emergency closure is supplied by accumulators which contain high pressure gas to pressurize hydraulic fluid. A solenoid causes hydraulic fluid to be admitted to the top of the valve operating piston and allows the fluid below the piston to be dumped to a reservoir.

Two separate pneumatic/hydraulic power actuators are provided to act on each steam and feedwater isolation valve. Electric solenoids for each power actuator are supplied from separate Class IE electrical sources.

Automatic main steam and feedwater isolation valve closure actuation is described in FSAR Section 7.3.7. Section 7.3.7.2.e contains the following statement:

> "Note that each valve can be closed within the appropriate time limit by either actuator side, regardless of the status or operation of the other actuator side."

B. Preoperational Testing

Preoperational testing of the main steam and feedwater isolation valves is described in FSAR Sections 14.2.12.1.3, .4, and .5. Testing of the valves at Wolf Creek, including valve closure times and assurance that either actuator would fast close the valve, has been successful.

The valve control system includes provisions for performing an inservice 10-percent close test of each valve. In order to verify the FSAR statement quoted above, a preoperational test was performed on a feedwater isolation valve that included the following features:

1. The valve was placed in the 10-percent exercise mode using one of the power actuators,

2. a single failure was simulated by disabling the fast close override of the actuator that was in the exercise (or test) mode, and

3. a feedwater isolation signal was inserted to the other actuator.

Given the above conditions and, if the valve was in the opening phase of the 10-percent exercise cycle, the other actuator would not completely close the valve.

It has been determined that:

1. One actuator will fast close the valve if the other actuator simply fails to respond to the "fast close" signal and is not in the opening mode.
2. If one actuator is in the slow open (or close) mode and an emergency close situation occurs, the valve will go shut because of the control sequence interruption by the "fast close" signal.

In other words, it is necessary to have a single failure for the valve to fail to respond to an emergency signal.

The cause of the failure of the valve to perform as expected has been determined to be an interaction of the two actuators when the conditions described above exist. The actuators are independent except that they operate on a common valve piston. The actuator in the opening mode allows hydraulic fluid from the top of the operating piston to be drained to a reservoir. High pressure hydraulic fluid from the other actuator is admitted to the top of the piston when the "fast close" signal is provided. The valve starts to close but there is insufficient hydraulic fluid to close the valve and to allow for the draining through the other actuator.

C. Safety Analysis

The circumstances that would have to occur in order for the situation described above to be a problem are:

1. A main steam or feedwater isolation valve would have to be: a) in the opening phase of a 10-percent exercise cycle (this exercise is performed only on one valve at a time and is done quarterly during power operation), or b) in the last portion of a valve opening (this would normally be done prior to criticality during a plant startup).

2. an undetected failure would have to be present in the same actuator that was causing the opening, and

3. an accident would have to occur that generates either the steam line or feedwater isolation signal.

FSAR accident analyses that depend on steam line or feedwater isolation assume that one of the four valve fails to close. Since the conditions described above also require a specific single failure, no additional failures need be assumed and the scenario is an analyzed event.

Because of the low probability of occurrence (due to the short time frame of the valve opening and the likelihood of the accident) and the fact that the event has been analyzed to meet regulatory requirements, KG&E believes there is no safety impact.

The FSAR will be changed in the next revision.

D. Supplementary Measures

Despite the conclusions of the above analysis, KG&E, in concert with the architect/engineer, Bechtel, and the valve vendor, Anchor-Darling, is investigating possible design changes that would overcome the deficiency described above. If any change is to be made, it would be implemented and tested before the end of the first refueling outage.

In the interim, it should be noted that the valve control system provides for verification of the electronic control logic and for checking of the accumulator pressure in each actuator. Until the modification mentioned above has been installed and tested, administrative controls will be used to ensure that the logic and accumulators are operable before each quarterly 10-percent exercise cycle or normal valve opening. Administrative controls will prevent testing more than one valve at a time and prevent both sides of a specific actuator to be in a test mode simultaneously.