



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO A REQUEST FOR RELIEF REGARDING INSERVICE TESTING
OF AUTOMATIC DEPRESSURIZATION SYSTEM SAFETY/RELIEF VALVES AT
LIMERICK GENERATING STATION, UNITS 1 AND 2

DOCKET NOS. 50-352 AND 50-353

1.0 INTRODUCTION

The Code of Federal Regulations, 10 CFR 50.55a, requires that inservice testing (IST) of certain American Society of Mechanical Engineers (ASME) Code Class 1, 2 and 3 pumps and valves be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code and applicable addenda, except where relief has been requested and granted or proposed alternatives have been authorized by the Commission pursuant to 10 CFR 50.55a(f)(6)(i), (a)(3)(i), or (a)(3)(ii). In proposing alternatives or requesting relief, the applicant must demonstrate that: (1) conformance is impractical for its facility; (2) the proposed alternative provides an acceptable level of quality and safety; or (3) compliance would result in a hardship or unusual difficulty without a compensating increase in the level of quality and safety.

2.0 BACKGROUND

By letter dated April 1, 1996, PECO Energy Company (the licensee) submitted a request for relief 41-VRR-2, Revision 3, from certain ASME Code IST requirements pertaining to testing of the plant Automatic Depressurization System (ADS) safety/relief valves (S/RVs). The licensee supplemented this request with a letter dated December 5, 1996, which described the preventive maintenance program for the plant S/RVs. The plant IST program requires that the testing meet the requirements of the ASME Section XI Code, 1986 Edition, which references ASME OM-1-1981. Specifically, this request seeks relief from performing stroke and stroke-time testing to the safety-related position at least once every 3 months in accordance with paragraphs IWV-3412 and IWV-3413 of the Code. There are a total of 14 S/RVs in each of the Unit 1 and 2 main steam systems, and five of these per unit are ADS S/RVs as identified below.

Unit 1

PSV-41-1F013E, H, K, M and S

Unit 2

PSV-41-2F013E, H, K, M and S

These valves have both a safety mode and a relief mode of operation. The safety mode is the self-actuating function which is necessary to relieve system overpressure. The relief mode is accomplished by an automatic or manual control circuit that applies electric power to solenoids which provide control air to the pneumatic actuator piston. The safety mode is a Code Category C function. The relief mode is a Code Category B function and is the subject of this relief request.

3.0 BASIS FOR RELIEF

The licensee states that the Code Category B IST requirements to perform quarterly stroke and stroke-time testing have been linked to S/RV seat leakage degradation of the main and pilot stage disks. Pilot leakage degradation is not a concern for the ADS function itself, but could lead to S/RV setpoint drift, spurious actuation, and failure to reseal. The licensee states that such events have occurred at Limerick and other BWRs with similar S/RVs. If any of the S/RVs fail to reseal, a LOCA would result. The licensee states that the granting of this relief should reduce S/RV leakage and improve ADS S/RV reliability by reducing the potential for spurious S/RV actuation. The licensee also states that the current method of measuring stroke time (an indirect measurement by observing steam flow by acoustic monitoring) is of limited or no value for detecting valve degradation since the S/RVs are fast acting valves.

4.0 PROPOSED ALTERNATIVE TESTING

As an alternative to meeting the above Code-required stroke and stroke time IST requirements, the licensee proposes to perform the following testing:

- a. Division 1 and 3 ADS logic system functional testing as required by TS Sections 3.3.3 and 4.5.1.d.2.a which verifies the Emergency Core Cooling System (ECCS) logic for actuating the ADS, not including actual stroking of the instrument gas/accumulator solenoids.
- b. A test which verifies proper operation of the ADS solenoid valves, air operator, and pilot assembly each refueling cycle and each time maintenance is performed on the valves.
- c. An ADS leak test, also performed each refueling cycle and each time maintenance is performed on the ADS valve, which verifies that ADS instrument gas/accumulator leakage is low enough to ensure adequate pneumatic pressure for design-basis ADS S/RV operation.
- d. S/RV setpoint and leakage testing, performed on at least 50% of the S/RV pilot stages each refueling outage, which verifies the pilot setpoints and that leakage is within strict limits. The response time of the pilot valve assembly will also be measured while performing this testing.
- e. A new main disk exercise test, performed on at least two S/RVs per unit each refueling cycle and on all 14 S/RVs per unit within 7 operating cycles, which ensures that the main disks can freely open.

The licensee states that the testing described above will verify all of the critical ADS components and will measure the response time of the ADS S/RVs. The licensee also states that the requested relief would only change the frequency of verification that the pilot disk opening directly results in opening of the main disk. The licensee further states that the functioning of the main disk is extremely reliable based on both Limerick and industry performance history.

5.0 EVALUATION

The staff agrees that the testing proposed by the licensee is an acceptable alternative for testing the ADS S/RVs. The staff also agrees with the licensee that the available data indicate that the current stroking requirement for the main disk could result in seat leakage degradation which could lead to a spuriously opening valve and a LOCA. The licensee's proposed testing provides for verification of the important ADS S/RV components similar to the currently required testing except for the stroking of the main stage disks. The licensee proposes to verify the stroke of at least two of the plant S/RV main stages each refueling outage. The staff notes that the preventive maintenance schedule currently performed would ensure that the main stages are capable of operating by actually moving the disks at a frequency of approximately every six years (or three refueling cycles). If the licensee should determine that less frequent maintenance is necessary in the future (e.g., because the valve leakage improves), the time period between main disk stroke verifications could be extended. The staff agrees with the licensee that the industry data indicate that the main stage is very reliable for performing its safety function such that the proposed frequency of stroke testing is acceptable. The staff also agrees with the licensee that the proposed testing is acceptable for measuring the response time of the ADS S/RVs as an alternative to the current stroke-time testing method of measuring steam flow. Therefore, the staff finds that the requested relief from the requirements of paragraphs IWV-3412 and IWV-3413 of the 1986 Edition of the ASME Code, Section XI, for stroking and stroke-timing is acceptable.

After the licensee submitted the above discussed relief request, the staff became aware of a proposal which is currently being evaluated by the ASME Operations and Maintenance (OM) Code Working Group on Safety and Relief Valves which would modify the OM Code main disk stroking requirements for BWR S/RVs. This OM Code proposal is preliminary, but is consistent with the licensee's proposal.

6.0 CONCLUSION

Based on the above evaluation, the staff concludes that, in accordance with 10 CFR 50.55a(a)(3)(i), it is appropriate to grant the licensee's relief request 41-VRR-2, Revision 3. As described above, the staff has determined that the licensee has demonstrated that the proposed alternative would provide an acceptable level of quality and safety.

Principal Contributor: G. Hammer

Date: January 16, 1997