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Washington Public Power Supply System
A JOINT OPERATING AGENCY

P. O. Box 968 3000 Geo. Washington Way Richland, Washington 99352 Phone (509) 375-5000

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PROPOSED RULE PR Misc Notice Reg Guide

Secretary Of The Commission
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Attention: Docketing & Service Branch

Subject: Comments On Safety/Relief Valve Position Monitors
As Proposed In Revision 2 To Regulatory Guide 1.97

Gentlemen:

The Washington Public Power Supply System has reviewed the requirements for Safety/Relief Valve Position Monitoring System (SRVPMS) as proposed in the subject Regulatory Guide. Based on this review, the attached recommendations are submitted for your consideration.

The Supply System finds that the requirements delineated for this system in U. S. NRC letter from Mr. D. B. Vassalo to All Pending Operating License Applicants, dated November 9, 1979, are adequate but in conflict with those of the Regulatory Guide requirements.

In our opinion, the SRVPMS should be designed to aid the operator in diagnosing a failure and taking appropriate corrective actions. The system should be reliable but need not be safety grade because other safety related parameters, such as, primary pressure, reactor vessel level, containment pressure, and containment water level, are available for mitigating the consequence of small break LOCA and/or a stuck open safety/relief valve.

Class 1E type requirements as specified in this Regulatory Guide for environmental and seismic qualification, power sources, and quality assurance are too strict, too expensive, unnecessary, will cause a freezing of technology for acoustic monitors and should be deleted.

Ack by card 4/24/80

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U. S. NRC has set a precedent for defining design requirements for diagnostic type systems by issuance of Regulatory Guide 1.133, Draft 2, Revision 1 and Regulatory Guide 1.45. Therefore, we recommend that these Regulatory Guides should be used as a guidance in setting requirements for SRVPMS and any reference to Class 1E type criteria should be deleted.

Very truly yours,

D. L. Renberger
Assistant Director, Technology

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Attachment

cc: Mr. A. S. Hintze, U. S. NRC

RECOMMENDED DESIGN CRITERIA

FOR:

SAFETY/RELIEF VALVE POSITION MONITORING SYSTEM

1.0 REFERENCES

1.1 NUREG-0578

1.2 U. S. NRC letter Mr. D. B. Vassalo to All Pending Operating License Applicants, "Discussion of Lessons Learned Short Term Requirements", dated November 9, 1979.

1.3 Regulatory Guide 1.133, Draft 2, Revision 1, "Loose Parts Detection Program for the Primary System of Light Water Cooled Reactors".

2.0 DISCUSSIONS

The purpose of relief and safety valves is to operate in conjunction with the reactivity control system to limit system overpressure during anticipated operational transients or accidents. Failure of relief and safety valves to close has been the cause of events that result in loss of coolant and depressurization of the reactor system. Early detection of this failure to close can provide the time required to avoid or mitigate damage to or malfunctions of primary system.

Generally, indirect indication of safety and relief valve is provided and can be misleading, as was the case at TMI-2. A positive indication of the position of these valves can aid the operator in diagnosing a failure and taking appropriate corrective actions. Thus, the consequences of a failure of these valves can be reduced if the operator can reliably determine that a valve has failed to close. The valve position indication system should be reliable and should supplement the information provided by safety related parameters, such as, primary pressure, reactor vessel level, containment pressure, and containment water level. These safety related parameters will be available in mitigating consequence of a stuck open valve even though a failure of the valve position monitoring system occurs.

Based on Reference 1.1, there have been five (5) known instances, out of about 230 actuations in about 200 reactor-years of service, of the failure of a relief valve in a PWR to properly close. In BWR's there have been about 53 inadvertent blowdowns due to improper operation of safety/relief valves located on the steam lines. In all instances, except for the one at TMI-2, the consequences were not significant and safety limits were not violated. These data indicate that a safety/relief valve opened due to an event or operational transient may fail to close even after the event or transient has subsided. Therefore, the valve position indication system should be designed to function for all events and transients that could

2.0 DISCUSSIONS (cont)

induce the opening of these valves. The events for which this system shall be designed to function are: Loss of Offsite Power, Small LOCA, and Safe Shutdown Earthquake.

The high radiation and thermal cycling environment to which most of the position indicating system is subjected could in time alter operating characteristics of this system. Therefore, provisions shall be incorporated into the system to permit channel check, channel functional test, and channel calibration.

3.0 DESIGN CRITERIA

The design criteria specified in Table 1, 2 and 3 of Regulatory Guide 1.97 are vague, incomplete, and unacceptable to the Supply System. The present criteria should be substituted by the following recommendations which were developed from Reference 1.2 and 1.3 and discussions of paragraph 2.0.

3.1 The SRVPMS should be designed to provide direct indication of valve position to the control room operator.

3.2 The valve position should be indicated in the control room. An alarm should be provided in the control room to indicate prolonged (time period greater than 30 seconds) opening of the valve.

3.3 Operability for Seismic Conditions: The SRVPMS should be capable of performing its function following all seismic (SSE and OBE) and hydrodynamic (for BWR only) events. The system should be shown to be adequate by analysis, test, or combined analysis and test.

3.4 Operability for Environmental Conditions: The system components should be designed to remain functional for the normal and LOCA environment to which they will be exposed. Components within the containment should be compatible with the 40-year design life of the reactor system. In those instances where a 40-year design life is not practical, a replacement program should be established for limited service life components. The environmental design of the system shall be shown to be adequate by analysis, test, or combined analysis and test.

NOTE: 40-year design life is recommended for in-containment components because a failed component inside the containment could not be repaired during power operation.

3.5 Power Source: The system shall be powered from a source which is available even after loss of offsite power, SSE and OBE. This power source should be separate from the power for the backup method (such as temperature, level, etc.), such that a single failure would not result in loss of all indications.

3.0 DESIGN CRITERIA (cont)

NOTE: By this criteria the use can be made of 1E bus or seismically qualified integral Battery Packs with enough capacity to last through the postulated event or transient.

3.6 Single Failure: For power source see Paragraph 3.5. Backup methods of determining valve positions should be available and discussed in the appropriate procedures as an aid to the operator for diagnosis and action.

3.7 Quality Assurance Level: The SRVPMS components should be of a quality that is consistent with minimum maintenance requirements and low-failure rates.

3.8 Display Type and Method: The SRVPMS should be continuously displayed by indicators.

3.9 Periodic Testing: Provisions shall be made for periodic on-line channel check and channel functional tests and for off-line channel calibration during periods of cold shutdown or refueling. Each channel of SRVPMS shall be demonstrated operable by a channel check performed at least once per 24 hours, a channel functional test performed at least once per 31 days, and a calibration test performed at least once per 18 months.