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Robert L. Mittl General Manager
Nuclear Assurance and Regulation

March 27, 1985

Director of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
7920 Norfolk Avenue
Bethesda, Maryland 20814

Attention: Mr. Albert Schwencer, Chief
Licensing Branch 2
Division of Licensing

Gentlemen:

REQUEST FOR ADDITIONAL INFORMATION
TMI ITEM II.K.3.28
HOPE CREEK GENERATING STATION
DOCKET NO. 50-354

As requested in a letter from A. Schwencer to R. L. Mittl, dated January 25, 1985, attached is the additional information on TMI Action Item II.K.3.28, Qualification of Accumulators on Automatic Depressurization System Valves.

Should you have any questions in this regard, please contact us.

Very truly yours,

Attachment

C D. H. Wagner
USNRC Licensing Project Manager (w/attach.)

A. R. Blough
USNRC Senior Resident Inspector (w/attach.)

REQUEST FOR ADDITIONAL INFORMATION
Hope Creek Generating Station

MULTI-PLANT ACTION F-55 OR TMI II.K.3.28
VERIFY QUALIFICATION OF ACCUMULATOR ON ADS VALVES

Question 1) Based on the requirements of NUREG-0737 Item II.K.3.28, it is necessary to demonstrate that the ADS valves, accumulators, and associated equipment and instrumentation meet the requirements specified in the plant FSAR and are capable of performing their functions during and following exposure to hostile environments, taking no credit for non-safety-related equipment or instrumentation. Additionally, air (or nitrogen) leakage through the valves must be accounted for to assure that enough inventory of compressed gas is available to cycle the ADS valves. If this cannot be demonstrated, it must be shown that the accumulator design is still acceptable. Since this system is a part of the emergency core cooling system, it must still perform its function for the long-term period of 100 days following an accident.

You are requested to address in detail (a) how you meet this long-term capability requirement of 100 days following an accident or (b) the justification as to why a shorter time frame is sufficient long-term capability for your plant, or (c) provide a commitment and schedule for upgrading to the 100 day long-term capability requirement.

Response 1) The design of the Hope Creek Generating Station is such that the ADS will be available for 100 days following an accident. During the time immediately following an accident, gas is available to actuate each ADS valve from its own local accumulator. At approximately 20 minutes into an accident period, the ADS accumulators are reconnected to the primary containment instrument gas system, described in Section 9.3.6 of the HCGS FSAR, which assures the availability of the compressed gas for 100 day operation. Controls, instrumentation, valves and equipment required for operation of the ADS, are environmentally and seismically qualified for their function and location in the plant. See the following FSAR sections for further information:

3.9 - Seismic qualification

3.10 - Seismic qualification

3.11 - Environmental qualification

5.2 - Main steam safety-relief valves

6.3 - Emergency core cooling systems (including ADS in Section 6.3.2.2.2)

7.3 - Engineered safety feature systems controls (including ADS in Section 7.3.1.1.1.2)

9.3.6 - Primary containment instrument gas system

Question 2) Define the number of times the ADS pneumatically controlled valve is capable of cycling using only the accumulator inventory at atmospheric pressure and at a specified percent (i.e., 70%) of drywell pressure, and the length of time these accumulators are capable of performing their function following an accident.

Response 2) The Hope Creek SRV accumulators are capable of providing the following number of SRV actuations prior to draining below the pressure required to operate the SRV's:

a) 64 cycles at 0 psig drywell pressure

b) 17 cycles at 43.8 psig, 70% of drywell design pressure

With pneumatic system makeup capability equal to or greater than 1 SCFH per SRV, to account for SRV actuator leakage, cycling of the SRV's is not limited by the pneumatic system. Should the makeup air system fail, each accumulator is capable of providing at least one SRV operation up to 1.2 hour following the loss of the makeup system, with less than or equal to 1 SCFH pneumatic leakage.

Question 3) Describe the ADS accumulator system design and operation (e.g., trains, air supply, capacity, alarms and instrumentation and their location, etc.)

Response 3) As is typical for all of HCGS' SRVs, each ADS valve is provided with a local accumulator to provide a dedicated source of compressed gas for actuation. These accumulators have a capacity of 10 gallons and are located in the drywell. The ADS is shown schematically on FSAR Figure 5.1-3, Sheet 1. The Primary Containment Instrument Gas System (PCIGS), described in FSAR Section 9.3.6, provides the source of supply for the accumulators. During normal operation, the two PCIGS headers are interconnected to provide compressed gas to all PCIGS users. During a post-DBE period, the PCIGS headers are isolated from each other; one of the headers supplies three of the ADS valves, while the other header supplies the remaining two ADS valves. Each of the redundant PCIGS trains consists of a compressor, coolers, dryers, instrumentation and receiver tank as shown on FSAR Figure 9.3-11. The PCIGS compressor trains and receiver tanks are located at elevation 132 feet in the reactor building. Each receiver tank has a volume of 225 cubic feet and cycles between 90 and 105 psig. Pressure switches located on the receivers control the compressor cycling to maintain receiver pressure. High-high and low-low receiver pressure is annunciated in the main control room to alert the operator to problems at the receiver. Each compressor train has a nominal capacity of 20 scfm at the dryer outlet.

Question 4) Define the basis for the allowable leakage criteria for the ADS accumulator system (e.g., boundary conditions, environmental and seimic parameters, operator interface, margin, etc.).

Response 4) The allowable leakage criterion of 1 SCFH per SRV is to assure adequate accumulator capacity for 1 SRV actuation for a period of one hour, following an intermediate or small break, without recharging the accumulator. The accumulator has sufficient capacity to permit 1 SRV actuation against a drywell pressure of 43.8 psig, well above any drywell pressure produced by an intermediate sized break requiring ADS.

Question 5) What margin is in the allowable leakage criteria to account for possible increase in leakage in the ADS accumulator system resulting from effects of a harsh environment and/or a seismic event?

Response 5) General Electric's experience from previous environmental qualification and ongoing NUREG-0588 tests simulating harsh and seismic environments shows that for well beyond the assumed 1 hour period, SRV penumatic leakage will not exceed .5 SCFH. This assures that the leakage rate does not exceed 1 SCFH following an accident, with significant margin.

Question 6) A statement that test and/or analysis performed verified that a harsh environment and/or seismic event would not increase the leakage rate in the ADS accumulator system.

Response 6) The in progress NUREG-0588 SRV test shall verify that the SRV actuator pneumatic leakage will not exceed the allowable for up to 100 days in the DBE environment (LOCA + post-LOCA) following radiation, thermal, operational, vibrational and seismic (5 OBE and 1 SSE) aging.

Question 7) A statement that verifies that no credit was taken for non-safety-related equipment and instrumentation when establishing the allowable leakage criteria for the ADS accumulator system.

Response 7) When establishing the allowable leakage criteria for the ADS accumulator system, no credit for non-safety-related equipment was taken.

Question 8) Provide a concise description of the tests performed on the ADS accumulator system, and backup, and their frequency.

Response 8) The piping and valves associated with the ADS accumulator subsystem are periodically tested to ensure proper operation. The scope and frequency of testing is as described below:

The check valves in the ADS accumulator subsystem are tested in accordance with the requirements of ASME Section XI Subsection IWV, "Inservice Testing of Valves in Nuclear Power Plants." The check valves are exercised to the position required to fulfill their function in order to demonstrate their operational readiness. Tests are conducted to demonstrate that the check valves open on reversal of pressure differential as evidenced by disc movement when flow through the valve is initiated. Additionally, the valves are tested to demonstrate that the valve disc travels to the seat promptly on cessation or reversal of flow. Confirmation of disc movement is obtained through observation of appropriate pressure indictions in the system. The frequency of check valve testing is in accordance with Inservice Test Program Requirments.

A relief valve protects each ADS accumulator subsystem for overpressurization. Like the check valves mentioned above, the relief valves are periodically tested in accordance with the requirements of ASME Section XI Subsection IWV to demonstrate operational readiness. Tests are conducted to verify the relief valve setpoint. Tests are conducted such that all valves are tested every 5 years.

The piping in the ADS accumulator subsystem is ASME Class 3 and periodically pressure tested in accordance with the requirements of ASME Section XI Subsection IWD. Tests are conducted during each of the inspection intervals specified in Subsection IWA for the service lifetime of the plant.

Question 9) Provide a concise description of the surveillance performed, and how frequent, on alarms and instrumentation associated with the ADS accumulator system and backup system.

Response 9) Per the draft technical specifications attached with the response to Question 13, the following surveillance testing is performed:

a) At least once per 31 days, a channel functional test of the primary containment instrument gas system low-low pressure alarm is performed.

b) At least once per 18 months a channel calibration of the primary containment instrument gas system low-low pressure alarm is performed.

Question 10) Provide a statement that confirms that the ADS accumulator system, backup system, and associated equipment and control circuitry, are seismically qualified.

Response 10) The ADS accumulator system, backup system, and associated equipment and control circuitry are seismically qualified. Seismic qualification is discussed in FSAR Sections 3.9 and 3.10.

Question 11) Provide a statement that confirms that the ADS accumulator system, backup system, and associated equipment and control circuitry are environmentally qualified for conditions associated with normal operation, maintenance, testing, and postulated accidents.

Response 11) The ADS accumulator system, backup system, and associated equipment and control circuitry located in a harsh environment are environmentally qualified for the conditions postulated to exist at their locations. The conditions that the equipment will experience and an overall discussion of environmental qualification may be found in FSAR Seaction 3.11.

Question 12) Provide a statement verifying that the ADS valves, accumulators, backup system, associated equipment and instrumentation are capable of performing their function during and following an accident situation while taking no credit for non-safety related equipment and instrumentation.

Response 12) The ADS valves, accumulators, backup system, associated equipment and instrumentation are capable of performing their function during and following an accident situation without relying on non-safety-related equipment and instrumentation. All components necessary for operability of the ADS are safety-related and are environmentally as well as seismically qualified, as discussed in Responses 11 and 10, respectively.

Question 13) Excerpts fron the plants technical specification verifying that they specify the following:

- ADS leak test frequency
- Allowable leakage rate
- Actions to be taken, in a specified time frame, should the leakage rate be exceeded.

Response 13) Though, there are no Technical Specification requirements for leak testing the ADS accumulator and backp system, the ADS accumulator check valves are included in the Inservice Test Program to be functionally tested and reverse flow check tested during shutdown if three months has elapsed since the last test.

HCGS Draft Technical Specification Section 3/4.5.1 ECCS-Operating, Surveillance Requirement 4.5.1d (attached) provides requirements for a channel functional test of the Primary Containment Instrument Gas System low-low pressure alarm system at least once per 31 days and a channel calibration at least once per 18 months.

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SURVEILLANCE REQUIREMENTS (Continued)

2. For the HPCI system, verifying that:

a) The system develops a flow of at least ~~(5000)~~ 5600 gpm against a test line pressure of [#] psig, ~~corresponding to a reactor vessel pressure of > 165 psig,~~ when steam ~~is being supplied to the turbine at~~ $\frac{75}{100}$ ≥ 15 psig.** ~~dome pressure is~~

B

b) The suction is automatically transferred from the condensate storage tank to the suppression chamber on a condensate storage tank water level - low signal and on a suppression chamber - water level high signal.

d. For the ADS:

1. At least once per 31 days, performing a CHANNEL FUNCTIONAL TEST of the ~~accumulator backup compressed~~ gas system low pressure alarm system. *primary containment instrument*

2. At least once per 18 months:

a) Performing a system functional test which includes simulated automatic actuation of the system throughout its emergency operating sequence, but excluding actual valve actuation.

b) Manually opening each ADS valve when the reactor steam dome pressure is greater than or equal to 100 psig(**) and observing that either:

1) The control valve or bypass valve position responds accordingly, or

2) There is a corresponding change in the measured steam flow.

Primary containment instrument

c) Performing a CHANNEL CALIBRATION of the ~~accumulator backup compressed~~ gas system low pressure alarm system and verifying an alarm setpoint of [#] + -[#] psig on decreasing pressure.

**The provisions of Specification 4.0.4 are not applicable provided the surveillance is performed within 12 hours after reactor steam pressure is adequate to perform the test.

Value to be determined during pre-op. testing.

Question 14) Provide a concise description of the design and operation of the backup system and confirm that it will meet the overall requirement of the ADS system following an accident.

Response 14) The primary containment instrument gas system (PCIGS) provides the backup to the ADS accumulators and is discussed in FSAR Section 9.3.6. During the post-accident period, the PCIGS will cycle to maintain the instrument gas receiver between 90 and 105 psig and has a nominal capacity of 20 scfm. The portions of the PCIGS that are required to supply the ADS accumulators are classified safety-related, seismic Category I, and are seismically and environmentally qualified. Power is provided by a Class 1E power supply with the Class 1E standby electrical supply as a backup. The capacity of the PCIGS is adequate to supply the ADS following an accident.