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January 30, 1985

NUCLEAR LICENSING & SAFETY DEPARTMENT

U. S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Washington, D. C. 20555

Attention: Mr. Harold R. Denton, Director

Dear Mr. Denton:

SUBJECT: Grand Gulf Nuclear Station
Units 1 and 2
Docket Nos. 50-416 and 50-417
License No. NPF-29
File: 0260/L-860.0/M-001.0
ADS Accumulators and Air System
AECM-85/0030

Reference: 1. MP&L Letter AECM-83/0672 from L. F. Dale to H. R. Denton, dated October 24, 1983.

Mississippi Power & Light Company (MP&L) provided information concerning the Automatic Depressurization System (ADS) Accumulators and related air systems in an October 24, 1983 submittal (reference 1). In a December 6, 1984 telephone conversation with your staff, MP&L was requested to provide additional information in support of the NRC's review of MP&L's referenced submittal. To assist in your review of this additional information, the following system summary will provide useful background information for understanding the design and operation of GGNS's Automatic Depressurization System.

The ADS valves and their accumulators, receivers and associated components are a part of the Nuclear Boiler System which is safety related. Normal pneumatic supply to the receivers is from the plant Instrument Air System with pressure being increased to ADS service requirements by either of two full capacity booster compressors. The Unit 1 instrument air compressor normally supplies all Unit 1 instrument air requirements. The Instrument Air System, including the booster compressors, is not a safety related system except for penetrations to the Auxiliary Building, Containment and Drywell, isolation valves, piping between isolation valves, and piping from the containment isolation valve to the ADS air receiver tanks.

Each ADS valve is provided with two accumulators to assure operability following a loss of instrument air. Short term makeup to the accumulators is provided by four air receivers. Two air receivers supply the accumulators associated with the four ADS valves on steam lines A and C. These receivers also supply the accumulator for the low-low set valve (non-ADS valve). The two remaining receivers supply the accumulators for the four ADS valves on steam lines B and D. The ADS accumulators and receivers assure a post-accident pneumatic supply is available to the ADS valves for a period of time

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sufficient to re-establish the operability of the Instrument Air System or connect a temporary air supply for long term makeup.

Long term post-accident makeup to the ADS system will be provided by restoring the operability of the Instrument Air System, recognizing that either of two service air compressors or the Unit 2 instrument air compressor can be used to back up the Unit 1 instrument air compressor. A class 1E divisional source supplies power to the Unit 1 instrument air compressor. Following a loss of offsite power, the power to the compressor is initially shed, but can be restored.

In the unlikely event that instrument air cannot be restored, a temporary air supply will be connected into the safety related portion of the instrument air supply outside containment. This would involve connecting nitrogen bottles to a test connection located between Q1P53-F003 and the penetration.

Detailed responses to your request for additional information are provided as Attachment 1.

Yours truly,

L. F. Dale
Director

WKH/SHH:rg
Attachment

cc: Mr. J. B. Richard (w/a)
Mr. R. B. McGehee (w/a)
Mr. N. S. Reynolds (w/a)
Mr. G. B. Taylor (w/o)

Mr. Richard C. DeYoung, Director (w/a)
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QUALIFICATION OF ADS ACCUMULATOR SYSTEM
REQUEST FOR ADDITIONAL INFORMATION

1. Describe the location of the temporary air supply connection in terms of environment? (i.e. temperature, humidity and radiation)

RESPONSE

The long term ADS pneumatic supply makeup connection is located in the Auxiliary Building at approximate elevation 166'. This location was classified in MP&L's NUREG-0588 response as having a 5 day post accident environment of: temperature 80°F, pressure ± 1" water gauge and 50% relative humidity. The calculated radiation dose in this area due to direct shine through the penetrations is approximately 13 rem/hour, based on access 5 days following an accident.

MP&L recognizes that this dosage is relatively high and would be unacceptable for normal occupational exposure; however, this exposure level results from the highly conservative design basis accident source term, for which the probability of occurrence is extremely low. As discussed in the cover letter to this attachment, the test connection serves as an additional means for furnishing ADS air requirements.

2. Is the location of the temporary air supply connection within a seismic area?

RESPONSE

The Instrument Air System is not a safety related system and therefore, not seismicly qualified except for penetrations to the Auxiliary Building, Containment, and Drywell, isolation valves, piping between isolation valves and piping from the containment isolation valve to the ADS air receiver tanks. The temporary air supply connection is located within the seismic portion between the containment isolation valve (Q1P53F003-A) and the containment penetration. This connection is shown in FSAR Figure 9.3-1. The location of the connection is within the Auxiliary Building which is a seismic Category I structure.

3. Provide additional information clarifying the difference between the five day and seven day air supplies.

RESPONSE

Since the simulation of post-accident environment within the plant is unfeasible, the capacity of the ADS air supply following exposure to a harsh environment must be a calculated value rather than a measured value. The calculated system capacity must account for the fact that during exposure to harsh environment, the air within the receivers and accumulators is heated to approximately 300°F. As a result of the added heat, the pressure within the receivers and accumulators increases. In order to prevent system over-pressurization, the ADS air system was designed with pressure relief valves on the ADS accumulators and receivers. Following harsh environment exposure and subsequent heat up, the air system relief valves lift to relieve system pressure. Following pressure relief, the relief valves reseat leaving the system at a lower pressure than before exposure to harsh environment. In order to apply worst case conditions, the air within the ADS receivers and accumulators is now assumed to be cooled to 200°F (expected temperature five day post-accident). This cooling of the air results in the system pressure being further reduced. Beginning at this reduced system pressure, the ADS receiver and accumulator system is now calculated to have sufficient capacity to actuate each ADS valve twice and hold them open for five days. The assumed valve leakage rate for this calculation is 1 SCFH per valve as directed by the NSSS vendor.

The ADS receiver and accumulator system was designed to provide under normal plant conditions three actuations of each ADS valve over a minimum period of seven days. The adequacy of this system is demonstrated by field leakage testing under normal plant environmental conditions. With the containment and drywell at atmospheric pressure, the pressure decay rate in each of the two ADS air headers is monitored and an extrapolated seven day air pressure is determined. The leakage test is considered successful if the extrapolated air pressure is above 110 psig. Field tests have shown that with the ADS air system at 110 psig, each ADS valve can be actuated three times. Therefore, the difference between the five day and the seven day supply is that the five day supply is a calculated value following system exposure to harsh environment which is not simulated in the plant. The seven day air supply is a measured capacity and serves to demonstrate the adequacy of the system under normal plant conditions. The successful completion of the seven day leakage testing ensures that the assumed leakage rate of 1 SCFH per valve, which is also the basis for the calculated five day supply, is a valid assumption.

4. Is the 1 SCFH per valve leakage rate affected by harsh environment?

RESPONSE

The MSRV's were purchased with a maximum allowable actuator leakage rate of 0.2 SCFH per valve. Qualification testing (Dikkers Technical Report TAO-313-GH, Revision 1, included in NUREG 0588 Equipment Qualification Central Files) recorded a maximum actuator leakage rate of 0.053 SCFH per valve following radiation aging, thermal aging, mechanical aging, vacuum ambient and emergency ambient testing. Similar testing conducted by GE recorded less than 0.02 SCFH actuator leakage during thermal aging and thermal transient testing as well as after radiation aging, thermal aging, thermal transient, mechanical aging, external pressurization, dynamic aging and seismic tests. A thermal effects analysis completed by GE has also indicated that actuator leakage should not significantly increase during harsh environmental conditions. Therefore, MP&L believes that harsh environment has very little effect on the 1 SCFH per valve leakage rate.