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NUCLEAR PRODUCTION DEPARTMENT

April 13, 1982

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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
File 0260/0130/L-860.0/M-001.0
Safety Relief Valve, Revised
In-Plant Test Program
AECM-82/150

In response to concerns identified in the NRC letter to Mississippi Power & Light (MP&L), dated February 12, 1982, a limited scope test program for gathering safety relief valve (SRV) confirmatory data was proposed via MP&L letter AECM-82/79, dated March 15, 1982. Based on recent conversations with members of your staff, MP&L proposes the attached revised test program to address NRC concerns on this subject.

In addition to the previously proposed shakedown tests, the revised program provides for four single valve actuations (SVA) and four multiple valve actuations (MVA). The MVA testing will utilize a symmetric configuration of four valves. It is MP&L's contention this revised test program will provide sufficient information to confirm the adequacy and conservatism of the analytical models used in the Grand Gulf containment design. Furthermore, this testing allows for Grand Gulf a unique confirmation of design loads and structural response independent of earlier prototypical testing (Kuosheng Nuclear Power Station, August, 1981).

Test plans and procedures are currently being modified to reflect the test program as described in the attachment. The revised test plan will be available for your review by June 1, 1982.

If further information is required in this matter, please advise.

Yours truly,

L. F. Dale
Manager of Nuclear Services

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Attachment: Grand Gulf In-Plant Safety Relief Valve Test Program

cc: (See Next Page)
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GRAND GULF IN-PLANT SAFETY RELIEF VALVE TEST PROGRAM

A. Test Matrix

The proposed revised SRV test matrix will consist of single valve actuations (SVA) and multiple valve actuations (MVA), specifically:

Three shakedown tests
Four SVA'a
Four 4-valve MVA's

The shakedown tests are run to ensure that all instrumentation and the data acquisition system are functioning correctly with the optimum gain settings on signal amplifiers. It is probable that useful data will be collected during the second and third tests, and this will be included in the statistical sample with the SVA data.

Sufficient pressure sensors have been located within the region of maximum expected pressure for the single valve actuation tests. This will provide a good statistical basis for comparison to design. Sensors have been positioned to provide data on pressure combination effects from the multiple valve actuation tests as shown in the original test plan submitted for review to the NRC (Report Number MPL-01-008).

Upon completion of the four SVA's, the real time pressure data will be examined, and the 95-95 confidence level pressures calculated for each. If the calculated value is less than the acceptance criteria, then the test will be considered successful, and the MVA tests will be commenced. Should the calculated pressure exceed the acceptance criteria, a review of the structural response test data will be made to determine if additional tests would be warranted.

Following completion of the MVA tests, the 95-95 confidence level pressures will be determined. If the calculated value is less than the 4-valve acceptance criteria, this will complete the SRV testing. Should the calculated pressure values exceed the acceptance criteria, a review of the structural response test data will be made to determine if additional tests would be warranted.

All SVA's will be performed with the low-low set point valve, V-10, at azimuth 0°. For this reason, the structure-mounted accelerometers are placed at 0° azimuth to record the maximum vertical and radial accelerations, and at 90° or 270° azimuth to measure the maximum tangential accelerations. In general, structural accelerometers are mounted as biaxial pairs, measuring either vertical and radial (0° azimuth) or vertical and tangential (90°/270° azimuth) accelerations. In addition, accelerometers are mounted on the polar crane and hydrogen recombiner, and five sets of triaxial sensors are mounted on selected piping located within the containment to measure prototypical piping and equipment response.

The accelerometer locations have been chosen to correspond with the nodal points of the New Loads Adequacy Evaluation (NLAE) structural and piping models. Response spectra will be generated for comparison with the design spectra to confirm the adequacy of the structural design.

B. Test Acceptance Criteria

Test pressure and acceleration data from SVA's will be compared against the Grand Gulf design values for a single valve actuation. Test pressure data from the MVA's will be compared against values calculated for a 4-valve actuation using the Containment Load Report methodology. Vertical acceleration test data from the MVA actuations will be compared against the ADS (8-valve) case which represents the closest symmetric design condition.

Multiple valve acceptance criteria for the radial and tangential accelerometers have been developed using the single valve acceptance criteria. The single valve acceptance criteria will be used for the horizontal accelerations because of the timing differences of the bubbles entering the pool.

The experience at earlier test programs showed that manual actuation of the four valves can produce delays on the order of 80 milliseconds between the first and last valve actuation - approximately three water clearing pressure cycles. MP&L is investigating alternative methods for simultaneously actuating the four valves that will not impact the plant safety relief valve functions. However, even with simultaneous valve actuation, equal bubble arrival time is not expected to occur because of uncontrollable variables, such as valve opening time and different line losses. This is representative of actual discharge scenarios, even during normal operating transients expected for the plant.

C. Summary

Several generic Mark III containment issues have been resolved through earlier Mark III SRV testing conducted at the Kuosheng Nuclear Plant. These include pool thermal mixing and X-quencher condensation performance. This is noted in the NRC staff's review, as documented in Appendix C to Supplement No. 1 of the Grand Gulf Safety Evaluation Report (NUREG-0831), dated December, 1981. Based on the above, the proposed test program scope has been revised from a prototypical SRV test. The test matrix has been designed to provide measurement of Grand Gulf unique structural loads, acceleration responses and pool pressure time histories, thus permitting the confirmation of analytical models used in Grand Gulf's design.

With the testing and analysis proposed in this test program and the submittal of the Kuosheng final report, when available, no additional review and analysis of Kuosheng data is required for the confirmation and evaluation of design loads and structural response of Grand Gulf.