

Lawrence Livermore National Laboratory

NUCLEAR SYSTEMS SAFETY PROGRAM

81-SS-7

January 18, 1982

Mr. R. M. Kenneally, Project Manager
Division of Engineering Technology
Office of Nuclear Regulatory Research
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

SUBJECT: Monthly Management Letter No. 8, Progress for the Month of
December 1981, NRC FIN A0362, SONGS-1 AFWS Project, Seismic
Safety Margins Research Program

REFERENCE: (1) "SSMRP Progress Report No. 11," P. D. Smith, et al.,
NUREG/CR-1120, Vol. 7, June 30, 1981.

Dear Roger:

A team of LLNL personnel met with SCE and Bechtel on December 21, 1981. The subject of this meeting was Piping Information and Piping Response Comparison. We concluded that the most efficient way to gather piping information is to visit the SONGS Unit 1. This visit took place on January 5, 1982. We also discussed piping response comparison. The following responses will be compared:

Piping components: resultant moments
Active valves: resultant accelerations
Piping supports: forces and/or moments
Equipment nozzles: nozzle loads (forces and moments)

Meeting minutes are in preparation. They will be sent to you when completed. The Total/YTD/Mo Cost is \$613K/\$202K/\$56K.

The accomplishments for the month of December are as follows:

1. Seismic Input:

With our consultant we have completed the regional zonation of the areas around SONGS Unit 1. In addition, we developed estimates for the largest earthquake that can occur on the various faults, and that can occur randomly. The process of finalizing the ranges for the parameters of the earthquake occurrence model for each of the faults is continuing. Some effort was required to plot the average spectra from the time histories generated for the SONGS-1, and SONGS-2 and 3 design spectra and the average of these two.

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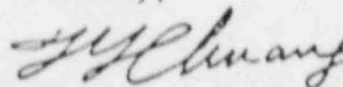
January 18, 1981

2. SSI:

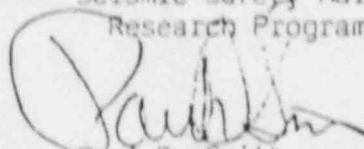
Sensitivity studies of the spatial discretization of the foundation impedance models of both the turbine pedestal and the column footings continued. Foundation models of Anchor Blocks No. 1 and 2 for the turbine building, and the fuel storage pool were constructed, and similar sensitivity studies were initiated. A modified version of computer code SSIN was received from Prof. H. L. Wong, USC. This version is capable of solving the SSI response problem for structures supported on multiple foundations.

3. Major Structure Response: Using the dynamic characteristics of the reactor building and containment sphere, we completed the two design comparison analyses. In each case, thirty sets of time history records defined the input motion. In one analysis, the SONGS Unit 1 design spectrum was the target spectra. In the second analysis, the average of the Unit 1 and Units 2 and 3 spectra was the target spectra. The results of these analyses were combined with those of a previous analysis that used the SONGS Units 2 and 3 design spectrum as a target spectra, and we compared them with Bechtel's design analysis and found that at the response points of interest, Bechtel's response spectrum enveloped the mean spectra of the Unit 1 comparison analyses. However, the mean spectrum of the Units 2 and 3 analysis exceeded the Bechtel spectra in the low frequency range. These results were sent to NRC in the monthly management letter for November, 1981. The models of both the turbine pedestal and the control administration building were completed and modal analyses also conducted.
4. Subsystem Response: The dynamic piping model for the piping between the containment penetrations (1-J-1 and 2-J-1), main steam stop valves, and intermediate anchor of the auxiliary steam line 69-3" has been coded. The selection of components for seismic response computation of two piping models has been completed.
5. Fragilities: The fault tree coordination for electrical and mechanical components has been initiated. This effort is to coordinate the fault tree, fragility parameter for the component and its location in the structure.
6. Systems Analysis: The analysis of fault trees for SONGS-1 is continuing.

Sincerely,



T. Y. Chuang, Project Leader
SONGS-1 AFWS Project
Seismic Safety Margins
Research Program



Paul D. Smith
Associate Program Leader
Seismic and Structural Safety

TYC/sa

cc: D. J. Guzy, NRC