

## NUCLEAR SYSTEMS SAFETY PROGRAM

81-SS-152

September 17, 1981

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Division of Engineering Technology  
Office of Nuclear Regulatory Research  
U.S. Nuclear Regulatory Commission  
Washington, D. C. 20555

SUBJECT: Monthly Management Letter No. 4, Progress for the  
Month of August 1981, NRC FIN A0362, SONGS-1 AFWS  
Project, Seismic Safety Margins Research Program

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

Dear Chuck:

The model comparison of the reactor building with Bechtel led to several items for further resolution. The key item was how the NSSS model was attached to the reactor building. Bechtel is revising their analysis to reflect the assumption of the NSSS model being rigidly attached to the reactor building. It was delayed due to the work they have to perform on continued operation petition. The model comparison has caused a significant delay on meeting the schedule (8/14/81) of computing the response of the containment sphere/reactor building. Bechtel/SCE is convinced that the best way to compare the model of the reactor building is to run a fixed-base analysis. We are actively pursuing this effort. The total YTD/Mo. cost is \$317K/98K. The accomplishments of the month of August are highlighted as follows:

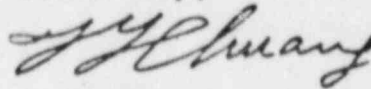
1. Seismic Input: Generation of the time histories for all three spectra has been completed. The checking process uncovered some deficiencies in one set of time histories for the average between the SONGS Unit 1 and Units 2 and 3 design spectra requiring the regeneration of this set. The sorting of the earthquake data base has been completed. Progress is continuing on the development of ground motion models.

2. SSI: The impedance and scattering matrices for the partial spherical foundation of the containment sphere/reactor building were refined with additional calculations at selected frequency intervals. SSI aspects of the additional SONGS-1 structures are proceeding. The development of soil properties and their variations for the range of acceleration levels is nearing completion.
3. Major Structural Response:
  - o Sphere Enclosure Building, Containment Sphere and Reactor Building - Eigenvalue extraction of the sphere enclosure building was completed. The completed model of the containment sphere and reactor building was incorporated into our SMACS type analysis and preliminary results generated for sensitivity studies. Stresses were calculated throughout the reactor building and transmitted to the fragility project for their use.
  - o Turbine Building - Eigenvalue extraction of the north turbine extension was completed. Models of the turbine pedestal, east and west feedwater platforms, and the south turbine extension are ready for eigenvalue extraction.
  - o Fuel Storage Building - This model is nearing completion awaiting additional information from SCE.
4. Subsystem Response: The following dynamic piping models have been coded and debugged:
  - o Auxiliary steam supply line piping between steam generators and containment.
  - o Discharge piping between containment (C-3C) and steam generator (E-1B).
  - o Discharge piping between containment (C-3A) and steam generator (E-1A).
  - o Piping between condensate storage tank and AFW pumps.
5. Fragilities: Preliminary seismic capacities for a majority of the seismic induced failure modes of the control-administration building, north turbine extension, west feedwater platform, diesel generator building, and sphere enclosure building were determined. When best estimate seismic loads and load distributions become available for these structures, acceleration levels associated with failure will be computed and further refinement of the capacities of critical failure modes will be made. The process of selection of available fragility data for AFW components is continuing.

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6. Systems Analysis: The development of the SONGS-1 AFWS fault tree is continuing. The modification of Zion-1 AFWS fault tree is completed. The probabilistic culling of Zion-1 AFWS fault tree and preparation for running SEISIM code for SONGS-1 has been initiated.
7. SMACS/Design Comparison: A sensitivity study was performed to determine the variation in mean response of the reactor building and containment sphere as a function of the number of earthquake input motions. Thirty earthquakes were found sufficient to define smooth mean and mean plus one standard deviation for the points selected.

Sincerely,



T.Y. Chuang, Project Manager  
SONGS-1 AFWS Project  
Seismic Safety Margins  
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TYC/sa

Addresses for Memorandum dated \_\_\_\_\_

AUG 26 1951

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