

July 27, 1981

Docket No. 50-206
LS05-81-07-084

MEMORANDUM FOR: William T. Russell, Chief
Systematic Evaluation Program Branch, DL

FROM: Robert A. Hermann, Section Leader
Systematic Evaluation Program Branch, DL

Kenneth S. Herring
Systematic Evaluation Program Branch, DL

SUBJECT: TRIP REPORT: JUNE 1-3, 1981 MEETINGS WITH SOUTHERN
CALIFORNIA EDISON REGARDING SAN ONOFRE UNIT 1 SEP
SEISMIC REEVALUATION AND SSMRP AUXILIARY FEEDWATER
SYSTEM SEISMIC ANALYSIS



On June 1 through June 3, 1981, several meetings were held among representatives of the NRC and its consultants (LLNL and its subcontractors), and Southern California Edison (SCE) and its consultant (Bechtel) to obtain details regarding the San Onofre Unit 1 (SONGS 1) auxiliary feedwater (AFW) system related structures, systems, equipment, and components. This information is required for the NRC sponsored Seismic Safety Margins Research Program (SSMRP) seismic analyses of the SONGS 1 AFW system. In addition, a separate meeting between SCE and the NRC was held on June 1, 1981, to discuss the SCE seismic reanalysis scope and schedule under the Systematic Evaluation Program (SEP). Significant items discussed at these meetings are described below.

SONGS 1 SSMRP AFW SYSTEM SEISMIC ANALYSIS

June 1, 1981, was spent at the SONGS 1 site conducting a detailed walk-down of the SONGS 1 AFW system related structures, systems, equipment, and components. This walk-down served to familiarize the NRC consultants, LLNL and its subcontractors, with the SONGS 1 AFW system to aid in their development of models and fault trees for the SSMRP seismic analysis. June 2 and 3, 1981 was spent at the Bechtel and SCE offices in meetings among NRC, LLNL and its subcontractors, SCE and Bechtel discussing details of the SONGS 1 AFW system related structures, systems, equipment, and components. As a result of the site visit and meetings, the list of additional information (Enclosure 1) was developed. This information is required by LLNL, in addition to that already provided by SCE, to perform the SSMRP seismic analysis of the SONGS 1 AFW system.

The information request contained in Enclosure 1 was provided to SCE at the June 3, 1981 meeting. Based upon discussions at this meeting, SCE agreed to provide LLNL with the requested information according to the schedule indicated in Enclosure 1.

*SEO1
S/ll*

DSU USE EX(08)

*Add: Gary Staley - 1 cy
Eileen McKenna - 1 cy
Gusharnas - 1 cy*

AUG 5 1981

OFFICE						
SURNAME	8107300126 810727					
DATE	PDR ADOCK 05000206					
	P	PDR				

Points at which LLNL and SCE structural seismic analysis results would be compared were determined by the NRC and LLNL after the June 1 and 2 meetings (Enclosure 2). This was presented to SCE at the June 3 meeting. In addition, comparisons required to demonstrate the adequacy of the LLNL structural models were also discussed. Such comparisons are required for the verification of the adequacy of the LLNL structural models and large portions of their computer code, SMACS. This will also aid in the NRC verification of the Bechtel structural models and large portions of their computer code.

After much discussion among the representatives of the NRC, SCE, Bechtel, and LLNL and its subcontractors, the following conclusions regarding structural model verification were drawn:

- 1) For the Reactor and Diesel Generator Buildings, LLNL will perform seismic analyses using their models incorporating the same soil springs, and input time histories representing the ground spectra as were used by SCE in its previous analyses of these structures and the current analysis being performed to generate floor response spectra for the Reactor Building. Results of the analyses will be reviewed for appropriate agreement.
- 2) Given the complexity of the soil representation for the Turbine, Fuel Storage, and Auxiliary and Control Buildings, SCE will provide the frequencies, mode shapes and model masses resulting from analyses of their models for the fixed-base analyses of their models for appropriate agreement.

IDENTIFICATION OF NRC CONCERNS

Two areas of concern to the NRC were identified during the June 1 and 2, 1981 site visit and meetings:

- 1) Adequacy of the fire hose connection provided as a back-up water supply to the AFW pumps, and
- 2) SCE's preliminary identification of substantial structural modifications required for masonry wall connections, the North and South Turbine Building Extensions, the East and West Feedwater Heater Platforms, and the Fuel Storage Building.

As a result of our November 24 and 25, 1980 site visit and walk-down, SCE committed to install a fire hose connection to the suction side of the AFW pumps to provide an alternate water supply should an earthquake disable normal supply paths. This connection has been provided, however, approximately 20 feet of the connection between the reinforced flexible hose and the fire hydrant consisted of a pipe laying laterally unsupported some 2 X 4 lumber resting on the ground. The connection of the pipe to the hydrant did not appear to provide for sufficient ductility to allow for large displacements

OFFICE ▶	.....	.....	.....	.....	.....	.....	.....
SURNAME ▶	.....	.....	.....	.....	.....	.....	.....
DATE ▶	.....	.....	.....	.....	.....	.....	.....

of the pipe. Based upon our comments, SCE agreed to either support the section of pipe or replace it with a fire hose. We agreed that either was appropriate. In addition, SCE pointed out an alternate fire hose AFW pump water supply path from the vicinity fire pump discharge to the AFW pumps. We encouraged the installation of this hose. These items should be followed up with SCE to verify that the appropriate actions have been taken in both areas.

The following structural modifications have been preliminary identified by SCE:

- 1) Addition of substantial lateral bracing from floor to ceiling in both the north-south and east-west directions for the North and South Turbine Building Extensions and the East and West Feedwater Heater Platforms to increase their lateral resistance to seismic motions. This is also required to prevent their impact with the Turbine Pedestal during a seismic event.
- 2) Increase of the connection capacities at the edges of masonry walls to provide sufficient resistance to out-of-plane seismic wall loads.
- 3) Replacement of the east masonry wall of the Fuel Storage Building with a 14 inch thick reinforced concrete wall and the addition of steel framing in the area of the building above the top of the spent fuel pool to the roof for lateral resistance to seismic motion. In addition, Roberts steel decking is to be added in the area of the structure above the top of the spent fuel pool for missile protection.

The structural members for the modifications discussed in 1 and 3 above have been layed-out and sized with a Bechtel stated 95% confidence in their adequacy, based upon preliminary Bechtel analyses. Their analyses are scheduled for completion in October 1981. In addition, the loads which the masonry wall connections must resist will be determined by August 1981. However, SCE stated that no modifications were planned for installation until after the completion of the SEP integrated safety assessment.

Based upon our inspection of the in-situ structures, we do not feel that such an installation schedule is appropriate. All such significant structural modifications should be implemented no later than January 1, 1983. Furthermore, certain of these modifications have a greater safety significance than the others and should be implemented within approximately 6 months in the following order of priority:

- 1) Addition of the North Turbine Building Extension bracing. Failure of this structure, induced by an earthquake, would impair the function of safety related systems, including the main steam lines and their isolation valves, the feedwater and AFW system lines, ECCS lines, and the power supply cables for the charging pumps, thereby eliminating paths

OFFICE ▶	.....	.....	.....	.....	.....	.....	.....
SURNAME ▶	.....	.....	.....	.....	.....	.....	.....
BATE ▶	.....	.....	.....	.....	.....	.....	.....

for providing water to the containment and the reactor. With loss of both the feedwater (main and auxiliary) and ECCS lines, and charging pumps, no means of decay heat removal would exist.

- 2) Addition of the West Feedwater Heater Platform bracing. Failure of this structure, induced by an earthquake, would impair the function of safety related systems, including the AFW pumps and instrument air compressors.
- 3) Strengthening of masonry wall connections. Failure of these walls, induced by an earthquake, would impair the function of safety related systems either attached to them or in their proximity.

In addition, SCE should provide a detailed basis for continued operation until the completion of all such significant structural modifications.

SEP SEISMIC REEVALUATION SCOPE AND SCHEDULE

A meeting was held on June 1, 1981, among representatives of SCE and the NRC, to discuss the scope and the schedule for the SONGS 1 SEP seismic reevaluation program being conducted by SCE. The NRC required minimum scope for this seismic reevaluation was previously defined in the April 24, 1981 10 CFR 50.54(f) letter from the NRC to SCE regarding SEP Topic III-6.

SCE stated that the current scope of their seismic reevaluations contained the structures, systems and components required to reach cold shut down using natural circulation and included:

- 1) Those portions of primary loop not included in their April 29, 1977 report on seismic reevaluation of SONGS 1;
- 2) Portions of the main steam and feedwater systems;
- 3) The RHR and the auxiliary cooling systems;
- 4) The CVCS for boration, including the RWST;
- 5) The salt water cooling system;
- 6) The service water system;
- 7) Portions of instrument air;
- 8) Completion of the work on electrical equipment anchorage; and
- 9) Application of the ANCO test program to strict supported cable trays to qualify site cable tray.

Excluded from their current program, but included within the scope defined in the April 24, 1981, NRC letter, are:

- 1) Engineered safeguards features;
- 2) The containment spray ring;
- 3) The low pressure safety injection system; and
- 4) The long term recirculation pumps.

OFFICE ▶							
SURNAME ▶							
DATE ▶							

SCE was informed that their current program was not considered complete and that it should conform to that outlined in the April 24, 1981, NRC letter. Based upon these significant differences, it was decided that the scope as well as the schedule would be discussed further at a later SCE/NRC meeting.

In addition, SCE proposed the use of "sampling" analyses in response to the August 4, 1980 10 CFR 50.54(f) letter from the NRC to SCE to meet the January 1, 1982 analyses completion deadline described therein. SCE was informed that such an approach would not be acceptable for the SONGS 1 reanalyses. SCE was also informed that the NRC staff has not yet completed the review of SCE April 29, 1977 report on seismic reevaluation of SONGS 1 and it will be included in the review under Topic III-6.

Robert A. Hermann, Section Leader
Systematic Evaluation Program Branch
Division of Licensing

Kenneth S. Herring
Systematic Evaluation Program Branch
Division of Licensing

Enclosure:
As stated

- cc w/enclosure:
- D. Eisenhut
- G. Lainas
- D. Crutchfield
- C. Berlinger
- S. Nowicki
- P. Y. Chen
- T. Cheng

OFFICE	SEPB <i>KSH</i>	SEPB <i>RH</i>	SEPB	SEPB <i>WR</i>	AD:SA:DL	
SURNAME	KHerring:b	RHermann	E.Kenna	WRussell	GLainas	
DATE	7/20/81	7/20/81	7/20/81	7/21/81	7/21/81	

cc

Charles R. Kocher, Assistant
General Counsel
James Beoletto, Esquire
Southern California Edison Company
Post Office Box 800
Rosemead, California 91770

Mr. R. Dietch, Vice President
Nuclear Engineering and Operations
Southern California Edison Company
2244 Walnut Grove Avenue
Post Office Box 800
Rosemead, California 91770

David R. Pigott
Chickering & Gregory
Three Embarcadero Center
Twenty-Third Floor
San Francisco, California 94111

Harry B. Stoehr
San Diego Gas & Electric Company
P. O. Box 1831
San Diego, California 92112

Resident Inspector/San Onofre NPS
c/o U. S. NRC
P. O. Box 4329
San Clemente, California 92672

Mission Viejo Branch Library
24851 Chrisanta Drive
Mission Viejo, California 92676

Mayor
City of San Clemente
San Clemente, California 92672

Chairman
Board of Supervisors
County of San Diego
San Diego, California 92101

California Department of Health
ATTN: Chief, Environmental
Radiation Control Unit
Radiological Health Section
714 P Street, Room 498
Sacramento, California 95814

U. S. Environmental Protection Agency
Region IX Office
ATTN: EIS COORDINATOR
215 Fremont Street
San Francisco, California 94111

INFORMATION TO BE TRANSMITTED

Anticipated
Date for
SCE Transmittal

1. Modifications to Structures
 - 6/2/81 (a) Turbine Building - braced frames
 - 6/2/81 (b) Fuel Storage Building -
 - (i) fuel pool
 - (ii) new wall, East end
 - 10/1/81 (c) Masonry wall boundary information - connection details
2. Masonry Wall Property Study
 - 9/1/81 (a) Computech results - type of wall (8 different location in structures; fragility assessment if available (all letter reports and final report)
 - 7/1/81 (b) Equivalent linear properties @ DBE level
 - 6/3/81 (c) I&E bulletin response on masonry walls
3. NSSS Model
 - 6/2/81 (a) Letter of transmittal from W - received 6/2/81
 - 6/3/81 (b) Tape (should receive by 6/17/81)
 - 6/17/81 (c) Mass point locations - to be obtained from W through SCE; all masses
4. Soil Property Variations - raw test data if available
- 6/17/81
- 7/1/81
5. Filler Sand Properties - containment sphere & foundation, range of properties
- 7/1/81
6. Live and Dead Load Assumptions - all buildings
- 6/17/81
7. Amendment 52 + 2 Sets of Questions & Answers on Sphere Enclosure Building

Anticipated
Date for
SCE Transmittal

- | | |
|---------|--|
| 6/17/81 | 8. Soil Springs for Reactor Building spherical foundation |
| 10/1/81 | 9. Fixed-Base Modes - frequencies; mode shapes; modal mass |
| | (a) Administration - Control Building |
| | (b) Turbine Building - fixed base modes for each structure separately, i.e., north and south turbine extension, turbine pedestal, east and west feedwater platform. Also, time history analysis if necessary |
| | (c) Fuel Storage Building |
| 7/1/81 | 10. (a) Soil property information for reservoir |
| 6/17/81 | (b) Size of excavated area - layout, etc. |

PIPING SYSTEMSAnticipated
Date for
SCE Transmittal

- | | |
|------------------|---|
| 6/17/81 | 1. New AFWS drawings (P&ID) |
| 6/3/81 | 2. Information about loss of offsite power |
| 6/3/81 | 3. Maintenance information (maximum time plant can operate with auxiliary feedwater or diesel under repair) |
| 6/3/81 | 4. Fire protection report on AFW pumps (lube oil reservoir) |
| 6/17/81 | 5. Electrical layout |
| 7/1/81 | 6. Service water cooling to the AFW pump P&ID to point which can be traced from drawings |
| 6/17/81 | 7. P&ID's for five protection system |
| 6/17/81 | 8. Stress iso's for each piping model of AFWS |
| To be Determined | 9. Hanger details; valve information (configuration, weight, yoke length or simplified valve model) |
| 6/17/81 | 10. Piping specification - Suction and discharge |
| 6/17/81 | 11. Design and operating conditions in terms of temperature and pressure |
| 7/1/81 | 12. SW reservoir and fire system: Pipe material, configuration, etc. |
| 6/17/81 | 13. Insulation information for main steam and feedwater lines and auxiliary feedwater pump steam supply |

POSSIBLE STRUCTURAL RESPONSE QUANTITIES FOR SONGS-1

1. Containment sphere - forces at base - membrane stresses at intersection of sphere and foundation
2. Reactor building
 - . Foundation spectra
 - . Support points for NSSS - Response spectra - 4 support locations on operating deck
3. Turbine building
 - a. West Feedwater Heater Platform
 - . Forces & moments at top and bottom of columns
 - . Response spectra on operating deck (floor above AFW pumps)
 - . Response spectra on anchor block
 - b. North Turbine Building Extension
 - . Forces and moments at top and bottom of columns
 - . In-structure spectra at main feedwater location - E1. 30'0"
 - c. Turbine Pedestal
 - . Base shear and moments
4. Administration - Control Building
 - . Response spectra at control room
5. Fuel Storage Building
 - . Possibly AFW piping attachment or fuel pool