



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

October 22, 1984

OFFICE OF THE
COMMISSIONER

MEMORANDUM FOR: Files

FROM: *JA* John Austin, Technical Assistant
Patricia Davis, Legal Assistant
Office of Commissioner Assestine

SUBJECT: MEETING ABOUT SAN ONOFRE 1

On October 19, 1984, Pat Davis and John Austin of Commissioner Assestine's office met with Ken Baskin, Don Craven and Dave Piggott representing Southern California Edison Company (SCE) to discuss the seismic design capability of San Onofre 1. SCE indicated that in the May-June 1982 timeframe questions were raised by NRC staff about the capability of San Onofre 1 to withstand the original seismic design basis (0.5g) for the unit. The staff concerns arose from the preliminary results of a reanalysis of the plant using an assumed 0.67g acceleration. The staff evidently felt that the calculated stresses from the 0.67g value were so high that the ability of the plant to withstand a 0.5g acceleration was drawn into question.

SCE attempted a "generic" approach to resolving staff's concerns. The approach consisted of looking at similar industrial facilities, designed in the same timeframe, which have experienced the effects of significant earthquakes. SCE and its consultants found that such facilities could withstand substantial accelerations even though earthquakes were not explicitly considered in the design.

SCE also performed an analysis on San Onofre 1 as-built, and as modified since 1982. SCE and its consultants analyzed, with a 0.5g input, about 1/3 of the large piping runs, all of the small piping runs, and most (about 90 percent) of the safety equipment. The large pipes analyzed were selected to be those 10 pipe runs which had been previously (i.e. 1982) determined to be the highest stressed pipes, and 3 other large pipe runs. The methods used were the same techniques that the NRC staff had approved in February 1984 for use in the 0.67g reanalysis, and are more sophisticated than those used in 1982. SCE found that all calculated stresses were within allowable limits.

The SCE position is that the ECCS and other necessary safety systems can withstand the effects of a 0.5g acceleration. The salt water in-take structure is qualified for at least that value also. SCE is not aware of any residual NRC staff concern about the capability of San Onofre 1 to withstand the effects of a 0.5g acceleration. SCE believes that the NRC staff will document its conclusions about the status of the seismic resistance of San Onofre 1 sometime during the week of October 22.

SAN ONOFRE UNIT 1
STATUS 10/29/84

INFORMATION DUE

REFERENCE

- | | | |
|----|--|---|
| 1. | COMPLETION OF RETURN TO SERVICE PLAN | LTR, CRUTCHFIELD |
| | A. CERTIFICATION PLAN COMPLETE | TO BASKIN 10/19/84 |
| | B. DETERMINATION FAILURES IN NON-UPGRADED
SYSTEMS WILL NOT PREVENT HOT
STANDBY | |
| | C. CONFIRMATION OF MASONRY WALL AS-BUILT
CONFIGURATION (RECEIVED 10/29/84) | |
| | D. CONFIRMATION OF ANALYSIS QA/QC FOR 0.67G
UPGRADES | |
| | E. DETERMINISTIC BASIS FOR RESTART
(IN 10/17/84 SCE LTR.) | |
| 2. | REPORT DESCRIPTION OF 0.5G EVALUATION | TELECONS GRIMES
TO BASKIN 10/24
AND 10/25/84 |
| 3. | TDI - EVALUATION OF CRANKSHAFT CRACKING
(<u>REPORT RECEIVED 10/29/84</u> - COMPLETENESS
NOT YET VERIFIED) | LTR, CRUTCHFIELD
TO BASKIN 9/18/84
AND MTG 10/22/84 |
| 4. | REACTOR TRIP BREAKER TEST RESULTS
EVALUATION TO REGION V | GENERIC LTR 83-28 |
| 5. | ENVIRONMENTAL QUALIFICATION
JCO ADDITIONAL INFORMATION | AUDIT REVIEW 10/02
THRU 10/04/84 AND
MTG. 10/26/84 |

INFORMATION DUE

REFERENCE

- | | |
|--|--|
| 6.* MASONRY WALLS - SUPPORTING INFORMATION | MTG. 09/05/84 |
| 7.* RESUBMIT "OVERPRESSURE MITIGATION SYSTEM"
PROPOSED TECH SPECS | TELECON MCKENNA
TO RAINSBERRY
07/17/84 |
| 8.* REVISION TO LIMITING OVERTIME TECH SPEC | LTR. PAULSON TO
BASKIN 09/05/84 |
| 9.* SEP INTEGRATED ASSESSMENT -
ADDITIONAL INFORMATION AND UPDATE | MTG. 07/10/84 |
| 10.* APPENDIX J TECH SPEC REVIEW
SUPPORTING INFORMATION | TELECON MCKENNA TO
RAINSBERRY 06/29/84 |
| 11.* ENVIRONMENTAL QUALIFICATION REVIEW -
SUPPORTING INFORMATION | LTR. CRUTCHFIELD TO
BASKIN 05/09/84 |
| 12.* ORGANIZATION TECH SPEC -
SUPPORTING INFORMATION | LTR. PAULSON TO
BASKIN 09/07/84 |

* NOT REQUIRED FOR RESTART EVALUATION

A FEW REQUESTS FOR ADDITIONAL INFORMATION ARE CURRENTLY BEING PREPARED IN CONJUNCTION WITH OTHER ONGOING REVIEWS WHICH SHOULD NOT AFFECT RESTART.

SAN ONOFRE UNIT 1
STATUS 11/6/84

INFORMATION REQUESTED

SUBMITTAL

- | | |
|---|--|
| 1. COMPLETION OF RETURN TO SERVICE PLAN | |
| A. CERTIFICATION PLAN COMPLETE | LETTER DATED 11/3/84 |
| B. DETERMINATION FAILURES IN NON-
UPGRADED SYSTEMS WILL NOT PREVENT
HOT STANDBY | LETTER DATED 11/3/84 |
| C. CONFIRMATION OF MASONRY WALL
AS-BUILT CONFIGURATION | LETTER DATED 10/27/84 |
| D. CONFIRMATION OF ANALYSIS QA/QC
FOR 0.67g UPGRADES | LETTER DATED 11/3/84 |
| E. DETERMINISTIC BASIS FOR RESTART | LETTER DATED 10/17/84 |
| 2. REPORT DESCRIPTION OF 0.5g EVALUATION | LETTER DATED 11/3/84 |
| 3. TDI - EVALUATION OF CRANKSHAFT CRACKING | LETTER DATED 10/26/84 |
| 4. REACTOR TRIP BREAKER TEST RESULTS
TO REGION V | RTB TESTS AND INSPEC-
TIONS ARE COMPLETE;
RESIDENT INSPECTOR
REVIEW IS COMPLETE |
| 5. ENVIRONMENTAL QUALIFICATION - JCO's | LETTER DATED 11/3/84 |

SAN ONOFRE UNIT 1
ITEMS REQUIRING COMPLETION OF LICENSEE ACTIONS
PRIOR TO MODE 2 ENTRY
REGION V ISSUES

- 1) OPERATOR TRAINING ON DESIGN CHANGES
- 2) CALIBRATION OF STACK MONITORS
- 3) OPERATIONAL RADIATIONAL MONITORING SYSTEM (ORMS)
SATURATION/DOWNSCALE FAILURES - PROCEDURES
- 4) CALCULATIONAL TECHNIQUES FOR CORRECTING MAIN STEAM
LINE MONITOR READING FOR SHIELDING
- 5) INCORPORATION OF PLANT VENT MONITOR CONVERSION FACTOR
CHANGES WITH VENT FAN CHANGES

AUDIT REVIEW OF RETURN TO SERVICE PROGRAM
FOR HOT STANDBY SYSTEMS 7/26-8/1/84

° CRITERIA (NRC LETTER DATED 9/20/82 AND 2/8/84)

- EVALUATION OF RETURN TO SERVICE CRITERIA
- SEP GUIDELINES FOR SEISMIC EVALUATION CRITERIA
- PEAK SHIFTING OF INPUT FLOOR RESPONSE SPECTRA - AS RECOMMENDED BY PVRC
- DAMPING RECOMMENDED BY PVRC
- STRESS LIMITS FOR PIPING FUNCTIONAL CAPABILITY

2.0Sy FOR CARBON STEEL

2.2Sy FOR STAINLESS STEEL

- SHORT TERM ANCHOR BOLT ALLOWABLES AS REQUIRED BY IEB 79-02

WEDGE TYPE }
SHELL TYPE } 0.5 ULTIMATE AS SPECIFIED BY MANUFACTURER

° SYSTEMS REVIEWED

- FIVE PIPING SYSTEMS AUDITED AND INSPECTED (AF-02, CV-11, MS-01, RC-102/CV-100/CV-101, AND RC-115)
- ASSOCIATED SUPPORTS AUDITED AND INSPECTED (136 TOTAL)
- THREE MECHANICAL EQUIPMENT ITEMS INSPECTED (AXU, FEEDWATER TURBINE DRIVEN PUMP G-10, SEAL WATER Hx E-34, CHANGING PUMP G-8A&B)

° CONCLUSION

- CRITERIA USED MET REQUIREMENTS
- SUPPORTS OF PIPING AND EQUIPMENT PROPERLY INSTALLED
- SEISMIC FUNCTIONAL CAPABILITY REASONABLY DEMONSTRATED

SAN ONOFRE 1
SEISMIC DESIGN BASIS

CP 3/64 (SER 11/1/63)

PROBABLE LARGEST GROUND ACCELERATION - 0.17g

MAXIMUM GROUND ACCELERATION - 0.40g

0.25g + WORKING STRESS - CODE

0.5g + COMBINED STRESS - FUNCTION

OL 3/67 (SER 10/12/66)

DISTINGUISH CATEGORY A AND B

CATEGORY A - REFERS TO CP BASIS

CATEGORY B - 0.2g STATIC

AUDIT REVIEW OF ACCIDENT MITIGATION SYSTEMS
PERFORMED ON 11/14-15/84

° CRITERIA

- SAME AS FOR HOT STANDBY SYSTEMS
- FSAR DESIGN BASIS GROUND MOTION, I.E., 0.5g HOUSNER SPECTRUM
- AWWA CRITERIA FOR CAST IRON PIPING

° SYSTEMS

- FOUR PIPING SYSTEMS AUDITED (AC-05, MW-05, AC-23, AND SW-06)
- SUPPORTS AUDITED (69 TOTAL)

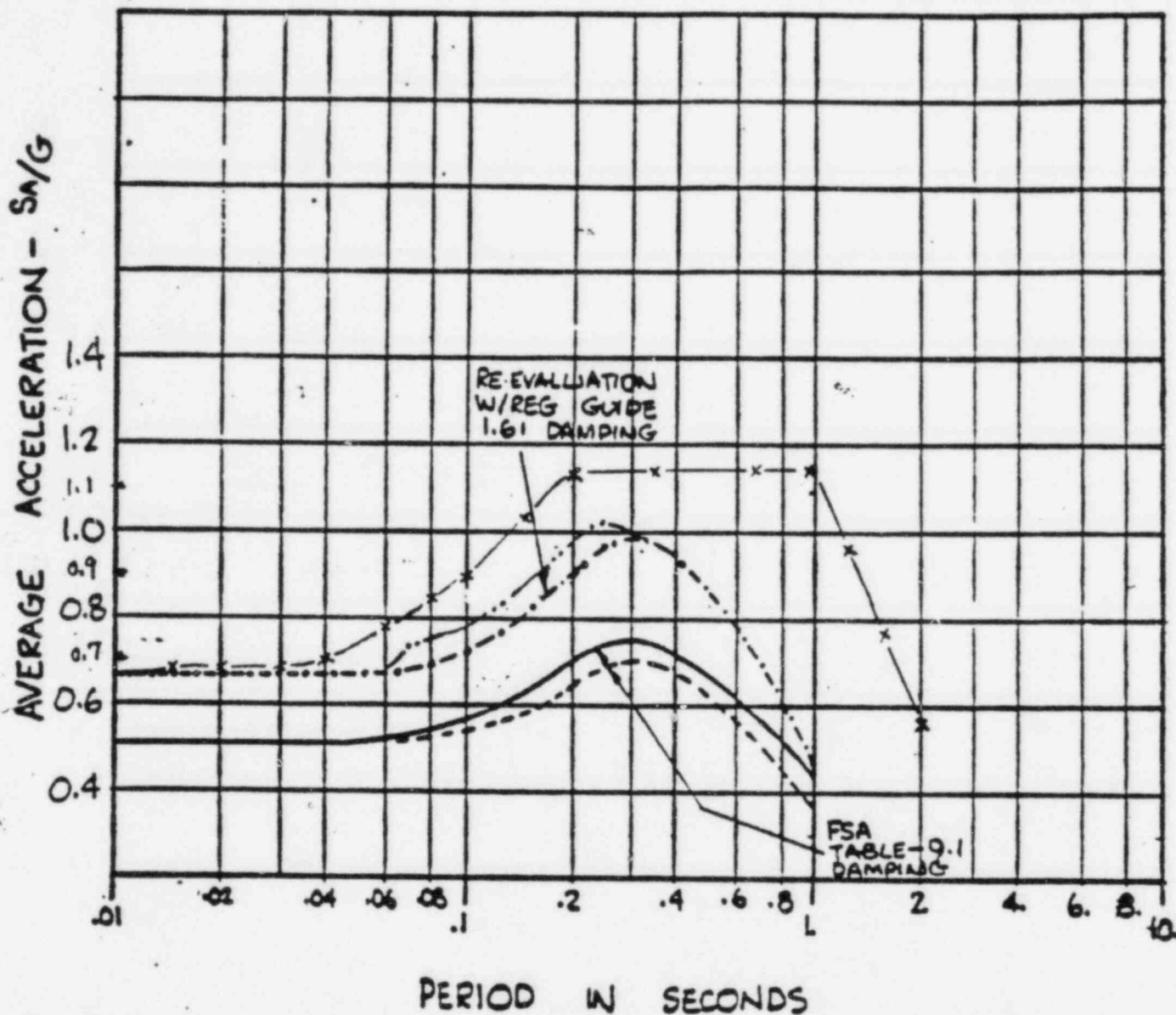
° COMPONENTS

- COMPONENT COOLING WATER PUMP G-15A, B, C
- RECIRCULATION HEAT EXCHANGER E-11
- REFUELING WATER STORAGE TANK

° CONCLUSIONS

- CRITERIA USED MET REQUIREMENTS
- SEISMIC FUNCTIONAL CAPABILITY REASONABLY DEMONSTRATED
- RWST AND CAST-IRON PIPE HAVE NO APPRECIABLE MARGIN AT 0.5g

FIGURE 2. CONCRETE STRUCTURES
RESPONSE SPECTRA



- .5g HOUSNER @ 5% DAMPING (RIGID CONCRETE FRAMES)
- - - .5g HOUSNER @ 7% DAMPING (CONCRETE SHEAR WALLS)
- · - · .67 HOUSNER @ 7% DAMPING (REINF. CONCRETE STRUCTURES)
- x - x - .67 Modified Newmark @ 7% Damping
- · · · · .67 Modified Housner @ 7% Damping

SAN ONOFRE UNIT 1 SEISMIC DESIGN

1967	DPR-13 - 0.25 _g CODE AND 0.5 _g FUNCTION
1976	MAJOR UPGRADES TO 0.67 _g
1978	START SEP
11/79 to 7/81	2,206 PETITIONS - 1560 CALIFORNIANS AND NADER
11/16/81	DIRECTOR'S DENIAL AND SER
2/27/82	SCHEDULED SHUTDOWN COMMENCES
5/20/82	SCE/NRC MTG. - DEMONSTRATE MEET 0.5 _g DESIGN BASIS
8/11/82	CONFIRMATORY ORDER - COMPLETE ALL 6/15/82 & 6/24/82 COMMITMENTS BEFORE RESTART
12/23/83	SCE PROPOSAL FOR HOT STANDBY SCOPE FOR RESTART
2/3/84	RESTART SER
8/30/84	SCE REQUEST FOR AUTHORIZATION TO RESTART

SONGS SEISMIC DESIGN STATUS

UPGRADES TO 0.67g COMPLETE BY RESTART

- ALL SAFETY-RELATED STRUCTURES
- REACTOR COOLANT SYSTEM TO ISOLATION VALVES, INCLUDING MAIN STEAM AND FEEDWATER LINES
- CONTROL ROD DRIVES
- AFWS AND CVCS
- ELECTRICAL DISTRIBUTION & INSTRUMENT AIR

NOT COMPLETE

- RHR AND PORTIONS OF SERVICE/COOLING WATER
- SAFETY INJECTION SYSTEM AND RECIRCULATION
- CONTAINMENT SPRAY
- SPENT FUEL POOL COOLING

STATUS AND SCHEDULE

- HOT STANDBY CAPABILITY COMPLETE BEFORE RESTART
- FINAL RESOLUTION OF SEISMIC IN SEP
- HOT FUNCTIONAL TEST IN OCTOBER - FOLLOWING INTAKE
STRUCTURE REPAIRS AND TDI INSPECTIONS
- PLANT CRITICALITY SCHEDULED FOR NOVEMBER

CHRONOLOGY - SONGS 1 SEISMIC DESIGN

3/27/67	DPR-13: FSAR 9.4, 0.25g Code and 0.5g Function
1973	SCE initiates 0.67g re-evaluation
1976	Major upgrades to 0.67g - containment shield building, new diesels and various NSSS
1978	Initiate SEP - scope includes shutdown systems, mitigation systems and BOP
12/20/79	44 FR 75535 Notice
11/79 to 7/81	2.206 Petitions - 1560 Californians and Nader
4/28/80	SCE's JCO - seismic capability
8/4/80 & 4/24/81	NRC 50.54f - seismic capability
9/80-10/81	SCE submittals - seismic scope and criteria
11/16/81	2.206 Director's denial and SER: turbine building and FW heater mods complete by 1/1/83
12/81	Preliminary analysis results and SCE commitment to notify NRC when structural integrity cannot be demonstrated
2/27/82	Scheduled shutdown - steam generator inspection and seismic mods
5/6/82	Russell memo - analyses predict structural (systems) failures
5/20/82	SCE/NRC meeting - "licensees need(ed) to provide information that demonstrates that the facility meets its licensed design basis [0.5g] before . . . restart"
6/15/82 & 6/24/82	SCE program to upgrade essentially all safety-related systems and structures to 0.67g
8/11/82	Confirmatory Order - "maintain. . . shutdown condition until modifications . . . are completed and NRC approval is obtained for restart."
7/13/83	Clarification to OI - the issue involves a "judgment rather than complete reanalysis"
11/21/83	SCE response to 12/29/82 Russell memo
12/23/83	SCE proposal for restart scope and criteria
2/8/84 & 3/7/84	SER for restart scope - hot standby scope and criteria acceptable with exceptions
8/30/84	SCE request for authorization to restart

ENCLOSURE (1) TO APRIL 24, 1981 50.54f LETTER

SAFETY RELATED SYSTEMS, STRUCTURES AND COMPONENTS
SAN ONOFRE 1 PLANT

"The scope of review for the seismic re-evaluation program should include the systems, structures, and components (including emergency power supply and distribution, instrumentation, and actuation systems, with the following functions:

1. The reactor coolant pressure boundary as well as the core and vessel internals. This should also include those portions of the steam and feedwater system extending from and including the secondary side of the steam generator up to and including the outermost containment isolation valve and connected piping of 2-1/2 inch or larger nominal pipe size, up to and including the first valve that is either normally closed or is capable of automatic closure during all modes of normal reactor operation.
2. Systems or portions of systems that are required for safe shutdown as identified in the SEP safe shutdown review (SEP Topic VII-3). The system boundary includes those portions of the system required to perform the safety function and connected piping up to and including the first valve that is either normally closed or capable of automatic closure when the safety function is required.
3. Systems or portions of systems that are required to mitigate design basis events, i.e., accidents and transients (SEP Topics XV-1 to XV-24). The functions to be provided include emergency core cooling, post-accident containment heat removal, post-accident containment atmosphere cleanup, as well as support systems, such as cooling water, needed for proper functioning of these systems.
4. Systems and structures required for fuel storage (SEP Topic IX-1). Integrity of the spent fuel pool structure including the racks is needed. Failure of the liner plate due to the safe shutdown earthquake must not result in significant radiological releases, or in loss of ability to keep the fuel covered. Failure of cooling water systems or other systems connected to the pool should not permit draining of the fuel pool. Means to supply makeup to the pool as needed must be provided.
5. Structures that house the above equipment.

For the San Onofre 1 plant, the staff considers the following systems, and associated structures, and components should be addressed:"

Systems and Components

System	Status of Modifications	Spectra
a) Reactor Coolant System	Complete ✓	0.67g Housner
b) Portions of Main Steam System	* Complete	0.67g Housner (restart)
c) Portions of Main Feedwater System	* Complete	0.67g Housner (restart)
d) Portions of Systems directly connected to the RCS up to and including isolation valve	Complete	0.67g Housner (restart)
e) Control Rod Drive	Complete	0.67g Housner
f) Auxiliary Feedwater System	* Complete <i>new</i>	0.67g Housner
g) Residual Heat Removal	-----	-----
h) Portions of Chemical and Volume Control System	* Complete	0.67g Housner (restart)
i) Portions of Component Cooling Water System	-----	-----
j) Portions of Salt Water Cooling System	-----	-----
k) Portions of Service/Miscellaneous Water System	-----	-----
l) Portions of Instrument Air System	Nitrogen bottles provided for required components	0.67g Housner (restart)
m) Safety Injection System	-----	-----
n) Containment Spray System	-----	-----
o) ECCS Recirculation System	-----	-----
p) Spent fuel pool cooling	-----	-----
q) Electrical Distribution System	* Complete	0.67g Housner

* field inspection

Structures

Structure	Status of Modifications	Spectra
Containment	Complete ✓	0.67g Housner
Reactor Auxiliary Building	Complete ✓	0.67g Housner
Control/Administration Building	Complete ✓	0.67g Housner
Fuel Storage Building (including pool)	Complete ✓	0.67g Housner
Ventilation Equipment Building	Complete	0.67g Housner
Turbine Building	Complete ✓	0.67g Housner
Intake Structure	Modifications underway to resolve rebar corrosion	0.67g Housner
Sphere Enclosure Building	-----	0.67g SONGS 2/3
Diesel Generator Building	-----	0.67g SONGS 2/3

See USARMC drawings