

ENCLOSURE

DIABLO CANYON POWER PLANT LONG TERM SEISMIC PROGRAM
QUARTERLY PROGRESS REPORT NO. 5

PACIFIC GAS AND ELECTRIC COMPANY

January 1987

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QUARTERLY PROGRESS REPORT NO. 5

1. INTRODUCTION

This is the fifth quarterly progress report for the Diablo Canyon Power Plant (DCPP) Long Term Seismic Program (LTSP). This report describes activities during the period August 1 through October 31, 1986.

During this reporting period, Phase III efforts continued in all program elements: Geology/Seismology/Geophysics, Ground Motions, Seismic Hazards Analysis, Soil/Structure Interaction, Fragilities, and Probabilistic Risk Assessment. Also during this period, the following meetings and workshops were held:

- | | |
|---------------------|--|
| August 7, 1986 | PGandE Consulting Board meeting |
| August 15-16, 1986 | NRC/PGandE Geologic Field Trip with U.S. Geological Survey (USGS), California Division of Mines and Geology (CDMG), University of Nevada, Reno (UNR), and others. The agenda and list of attendees are attached. |
| August 19-21, 1986 | NRC/PGandE Workshop on Probabilistic Risk Assessment. A plant visit related to PRA was held August 19. The agenda for the August 20-21 workshop and list of attendees for August 20 are attached. |
| October 21-22, 1986 | NRC/PGandE Workshop with USGS, CDMG, UNR, and others on Geology/Seismology/Geophysics. The agenda and list of attendees are attached. |
| October 23-24, 1986 | NRC/PGandE Workshop on Earthquake Ground Motions and Soil/Structure Interaction. The agenda and list of attendees are attached. |

During the next reporting period, the following meetings and workshops are planned:

- | | |
|----------------------|---|
| December 10-12, 1986 | NRC/PGandE Workshop on Soil/Structure Interaction |
| February 1987 | NRC/PGandE Workshop on Probabilistic Risk Assessment. |

2. GEOLOGY/SEISMOLOGY/GEOPHYSICS

2.1 Geology and Geophysics

2.1.1 Field Geologic Studies, San Simeon Area

Field geologic studies in the San Simeon area were continued and largely completed during the reporting period. The studies were

organized in four major categories: (1) mapping and detailed subsurface (trenching) exploration of the San Simeon fault in the area between Oak Knoll Creek and San Simeon Bay; (2) mapping and sampling of sea floor outcrops along the southeasterly projection of the San Simeon fault zone, in San Simeon Bay and off San Simeon Point; (3) mapping marine terrace surfaces developed across the traces of the San Simeon fault near San Simeon Bay, using surface mapping techniques supplemented by subsurface control (auger drilling and seismic refraction profiling); and (4) age dating studies using techniques of absolute age dating of samples from marine and fluvial terrace deposits and sag pond deposits (carbon 14, amino acid, u-series, thermoluminescence), soil chronosequence, uplift rate, and correlation.

Results to date from this work have clearly established that the San Simeon fault exhibits right lateral strike slip movement with recurrent slip events during Holocene time. The rate of slip has not yet been established precisely but is constrained to be in the range of 1-10 mm/yr.

Preliminary results of this work were reviewed at the NRC/PGandE workshop on October 21 and 22, 1986.

2.1.2 Acquisition of Vertical and Oblique Aerial Photos

The program of acquiring new aerial photographic coverage, reported as Item 2.1.1 of the previous Progress Report, was supplemented with another flight line of 1:36,000 scale stereo aerial photography extending between Nipomo and Point Buchon. Additionally, a program of acquiring low-altitude, large-scale oblique photos of the sea cliff between Point San Luis and Pismo Beach, using a helicopter-based photographic system, was completed.

2.1.3 Field Geologic Studies, Avila-Pismo Beach Area

Field geologic studies in the Avila-Pismo Beach area were initiated during the reporting period. The studies were divided among the following activities: (1) mapping of the marine terrace sequence and sea cliff between Avila and Pismo Beach, including the coastline intercepts of the San Miguelito, Pismo, and Wilmar Avenue faults; (2) detailed mapping and logging of the coastline exposure of the Wilmar Avenue fault zone near Pismo Beach; and (3) mapping and sampling of sea floor outcrops in San Luis Obispo Bay, adjacent to the onshore area being studied.

Results to date from this work suggest that the San Miguelito fault has not displaced terraces on the order of 100,000 years old, but such terraces appear to be displaced some 21 feet vertically across the Wilmar Avenue fault zone. The diver geology work suggests that these faults are not connected beneath San Luis Obispo Bay. Detailed studies of the terrace sequence and the faults are continuing.

Preliminary results from this work were reviewed at the NRC/PGandE workshop on October 21 and 22, 1986.

2.1.4 Acquisition and Interpretation of Geophysical Data

Acquisition and interpretation of marine geophysical data sets continued during the reporting period.

2- to 5-Second Seismic Program. Interpretation of the LTSP 2- to 5-second suite of CDP seismic reflection records (OPI-GSI; 1974 Western Geophysical; 1977 CGI) continued with development of structural contour maps of two horizons within the offshore Santa Maria Basin adjacent to the Hosgri fault. The two horizons are the top of the Monterey formation (Upper Miocene) and the Sisquoc unconformity (mid-Pliocene). Calibration of the seismic lines was achieved through correlation from the numerous logs of offshore wells now available. The region contoured as of the end of the reporting period extended from mid-Estero Bay to south of Point Arguello. This region will be further extended to the north and east, using new data recently purchased from Western Geophysical and Nekton Inc., respectively. The structural contour maps are being used in interpreting the pattern and history of deformation during the Neogene evolution of the offshore Santa Maria Basin and the Hosgri fault.

Shallow High-Resolution Seismic Program. Interpretation of the LTSP shallow high-resolution data set (Fairfield-MMS, pre-1980 analogue) continued, principally involving development of a structural contour map. The contoured horizon is estimated to be of Upper Pliocene or Plio-Pleistocene age. Other work included further study of the shallow structure and sea floor surface morphology along the trace of the Hosgri fault zone.

During this reporting period, detailed planning was completed for the acquisition of 380 miles of new shallow high-resolution seismic data. These data will be obtained during November and early December in the reach between Point Sal and Cape San Martin.

Reprocessing of Offshore 5-Second Seismic Data. The program of reprocessing offshore 5-second seismic data, described in Item 2.1.7 of the preceding Progress Report, was partially completed during the reporting period, with delivery of an initial set of reprocessed lines by the contractor. This program will be completed and the reprocessed data will be made available for revised structural interpretation of the Hosgri fault during the next reporting period.

Seisdata Services Inc. Onshore Seismic Data Acquisition Program. Processed records from the Seisdata Services Inc. onshore seismic program in the Santa Maria Valley region (identified in Item 2.1.8 of the preceding Progress Report) were received in 5- and 12-second

form and became available for interpretation. Two supplementary line extensions are scheduled for field acquisition during the next reporting period.

Deep Crustal Studies. During this reporting period, detailed planning was completed and a program of acquisition begun for a combined seismic reflection/seismic refraction program of deep crustal studies. This program, which involves participation by EDGE, the USGS, and others, will be completed during November.

2.2 Central Coast Seismic Network

A total of five high-gain seismic stations have been installed at locations along the coast, centered at the Diablo Canyon site. The locations and instruments are as follows, listed from north to south:

<u>Station</u>	<u>Location</u>	<u>Instruments</u>
LAR	Near Point Estero	3-Component
LDP	Davis Peak Microwave Tower	Vertical
LSW	Diablo Canyon Site	3-Component
LSH	Near Point San Luis	Vertical
LPS	Near Point Sal	Vertical

The data are transmitted by analog FM telemetry to the PGandE microwave tower at Davis Peak, from which they are multiplexed to the triggered digital recording center in San Francisco.

The contract for procurement of the remaining network equipment has been placed. Equipment deliveries will start in early 1987.

During the period August 1 to October 31, 1986, the network recorded regional and teleseismic events as well as explosions associated with the deep crustal survey. No local earthquakes were recorded during this period.

3. GROUND MOTIONS

3.1 Empirical Ground Motion Investigations

During this reporting period, progress in the empirical ground motion investigations consisted of the following:

1. Representative acceleration time histories were selected for consideration and possible use in LTSP Soil/Structure Interaction analyses. These accelerograms were selected on the basis of their appropriateness to DCPD conditions.
2. Empirically derived ground motion relationships for horizontal acceleration response spectra were reviewed and evaluated for their applicability to DCPD conditions. On the basis of these

evaluations, attenuation relationships for horizontal acceleration response spectra for periods up to 2 seconds were selected and developed for consideration in LTSP Phase IIIA probabilistic seismic hazard analyses.

3. The development of attenuation relationships for use in LTSP Phase IIIB studies was initiated. These relationships will be based on detailed statistical analyses of currently available strong motion recordings.

Preliminary results of this work were reviewed at the NRC/PGandE workshop on October 23 and 24, 1986.

3.2 Numerical Modeling Program

The principal activity of the numerical ground motion modeling program was the calibration of the method against observed strong motion recordings. Particular emphasis was placed on evaluating the radiation of high-frequency ground motions from asperities on the fault surface.

In the course of the calibration study, a series of modifications were made to the simulation procedure. The calibration study was started with the empirical Green's function summation approach (Hadley and Helmberger, 1980), in which strong motion recordings of smaller events are summed to produce a simulation of a larger event. The first modification of this procedure was to calculate point source Green's functions and to convolve them with an empirical source function, following the procedure of Hadley, Helmberger and Orcutt (1982). The source function was selected from a strong motion recording very close to the source of a small event. This approach allows more exactness and flexibility in representing the Green's functions for any desired source depth and distance and any crustal structure model. This gave subfault Green's functions that were summed as before. The second modification was to use a series of empirical source functions representing a range of focal sphere locations instead of a single source function. This allows empirical representation of the variations in radiation around the focal sphere, instead of imposing the theoretical radiation pattern. This allows the motions at lower frequencies to be relatively coherent and exhibit nodes, while the motions at higher frequencies can be less coherent and not exhibit nodes.

Preliminary results of this work were reviewed at the NRC/PGandE workshop on October 23 and 24, 1986.

4. SEISMIC HAZARDS ANALYSIS

During this reporting period, the logic tree input for seismic hazards analysis was reviewed and updated for use in Phase IIIA. The Phase IIIA seismic hazard calculations will be performed during the next reporting period and will be reported in a future workshop.

5. SOIL/STRUCTURE INTERACTION

5.1 Program Modification

The SASSI computer program was upgraded to include plate elements for modeling foundation basemats to study the effects of foundation flexibility on Soil/Structure Interaction (SSI) responses. The modified program was tested to verify the program capabilities.

5.2 Development of Building Models

The 3-D containment and the auxiliary building models have been developed. For evaluation of the effect of basemat flexibility, a 3-D finite element model of the auxiliary building has also been generated. Efforts are continuing to develop a 3-D dynamic stick model of the turbine building.

The available recorded earthquake data in the various buildings are being analyzed to calibrate the dynamic properties of the 3-D SSI models.

5.3 Parametric Studies

In addition to the parametric studies reported in Quarterly Progress Report No. 4 (such as the effects of inertial interaction, kinematic interaction of inclined wave fields, foundation embedment, and structure-to-structure interaction, all performed on simplified containment and auxiliary building models), parametric studies were also performed to study the effect of basemat flexibility. These studies utilized a simplified 3-D finite element model of the auxiliary building and the SASSI computer program.

6. FRAGILITIES

6.1 Validation of Separation of Variables Approach

A series of time-history dynamic analyses were conducted on a simplified auxiliary building model by varying the structure and equipment dynamic properties using weighted Monte Carlo trials.

Initial comparisons of these time-history results and corresponding results predicted from the conventional separation of variables approach indicated quite similar results.

6.2 Reevaluation of Dominant Contributors

Critical examination of the structure and components that were identified in Phase II Probabilistic Risk Assessment (PRA) studies as the dominant contributors to seismic risk continued. Since the input ground motions and the plant-specific SSI responses have not yet been completed, the revised fragility estimates for this phase of the study are directed

towards capacity reevaluation only. Simplified nonlinear dynamic analysis of the turbine building is being performed to assess the variability associated with inelastic energy absorption capability of the building.

7. PROBABILISTIC RISK ASSESSMENT

Initiating event analysis and event sequence analysis are complete and are under review by PGandE. Data analysis, systems analysis, spatial interaction analysis, and plant damage state definition are in progress and are expected to be completed early in 1987. Human action analysis, seismic analysis, internal fire and flood analysis, other external events analysis, and quantification of results are scheduled to begin early in 1987 and to be completed by midyear.

Attachments

Diablo Canyon
Long Term Seismic Program
Geologic Field Trip
August 15 and 16, 1986

1. Assemble at PGandE Energy Center

Highway 101, just south of Avila Beach Turnoff

Friday - Assemble at 8:00 a.m.

Saturday - Assemble at 7:30 a.m.

2. Field Trip Friday - 8:30 a.m. - 7:00 p.m. Detailed Agenda by Slemmons

Saturday - 7:30 a.m. - 7:00 p.m. Detailed Agenda by PGandE

Transportation and box lunches provided for total of 24 persons.

3. Evening Session - 7:00 p.m. - 10:00 p.m.

PGandE Building

405 Higuera Street

San Luis Obispo

Friday - Geophysics

Saturday - Wrap up

NRC/PG&E DC LTSP

FIELD TRIP

ENERGY CENTER

Aug 14, 15, 1986

NAME

Lloyd S. CLUFF

Jim Crouch

Cruz Giese-Koch

Burt Stenstrom

Steve P. Nitchman

Eutizio T. VITTORI

George A. Thompson

Robert D. Brown

ROBERT H. SYDNOR

FRANK BICKWER

Dick Willingham

N. Timothy Hall

JACK BLANLEY

D.H. Hamilton

F.W. BRADY

Zhang, Xiaoyi

Barbara Matz

ING B. ALTERMAN

Kati Killeen

Kirk Swanson

Lili Mezger

William Lettis

Kathryn Hansen

Kevin Coppersmith

PG & E

Crouch, Bachmann & Assoc's Inc

U.S. NRC

~~Center for Neob. Diablo Can Project~~

Center for Neotectonics Studies

Center for Neotectonic studies (guest from ENEA)

Stanford Univ., Consultant to ACRS

U.S.G.S. Menlo Park, CA

CALIF. DIV. MINES & GEOLOGY

Earth Sciences Associates

Earth Sciences Assoc.

Earth Sciences Assoc.

PG & E

ESA

PG & E

associated with NRC

Center for Neotectonic Studies

NRC

assoc. with NRC

Center for Neotectonic Studies

Geomatrix

Geomatrix

Geomatrix

Geomatrix

PICKARD, LOWE AND GARRICK, INC.
DCPRA WORKSHOP
Newport Beach, California
August 20-21, 1986

AGENDA

WEDNESDAY, AUGUST 20

Introduction

Roy Fray, PGandE 8:30 a.m.

- The DCPRA as Part of the Long-Term Seismic Program
- The Project Team
- Today's Agenda

Overview

- | | | |
|--|------------------|------------|
| ● DCPRA Methodology | Dennis Bley, PLG | 9:15 a.m. |
| ● Seismic Analysis Methodology | Hal Perla, PLG | 10:00 a.m. |
| ● Break | | 10:30 a.m. |
| ● Phase II Approach and General Results | Dennis Bley, PLG | 11:15 a.m. |
| ● Phase III--Where We Stand, Where We Are Headed | | |

Lunch

Noon

Phase II Events

Don Wakefield, PLG 1:00 p.m.

- Internal Events
 - Preliminary Assumptions
 - ETC and MAXIMA Computer Codes
 - Contributors--Point Values, Recovery, Phase II Allowances for Sequence Uncertainty
 - Necessary Refinements for Phase III
- Break

3:00 p.m.

WEDNESDAY, AUGUST 20 (continued)

● Seismic Events

3:15 p.m.

- Assumptions

- Contributors--Point Values, Recovery, Phase II
Uncertainty Treatment, Sensitivity to Computational
Techniques

- Phase III Improvements

Phase III Plan

Hal Perla, PLG

4:00 p.m.

THURSDAY, AUGUST 21

Event Sequence Models

Don Wakefield, PLG

8:30 a.m.

● Initiating Events

● Event Sequence Diagrams and Frontline
Event Trees

● Phase II/Phase III Comparisons

Systems Analysis

Jim Lin, PLG

9:15 a.m.

● Dependency Matrices

● Support System Event Trees

● Systems Analyses--Format, Assumptions,
RISKMAN^{®3}

● Phase II/Phase III Comparisons

● Break

10:30 a.m.

Other Work

● Spatial Interactions

Mardy Kazarians, PLG 10:45 a.m.

● Data

Shobha Rao, PLG 11:00 a.m.

● Relay Chatter

Bruce Smith, PGandE 11:15 a.m.

✓ ● External Events

Hal Perla, PLG 11:30 a.m.

● Design and Construction Errors

● Documentation

Lunch

Noon

THURSDAY, AUGUST 21 (continued)

Seismic Fragility Analysis

Bob Kennedy, RPK

1:00 p.m.

- Methodology
- Phase II Results
- Planned Phase III Activities

Aug 20, 1986

NRC/PG&E DC-LTSP PRA WORKSHOP
PLG OFFICE NEWPORT BEACH, CA

Lloyd S. CLUFF PG&E

DENNIS C BLEY PLG

HAROLD F PERLA PLG

Jiun Yang BNL

NILESH C. CHOKSHI NRC

Bob Youngblood BNL

James Lin PLG

JOSEPH SOMSEL PG&E

FRANK GEE PG&E

MIKE MILLER PG+E

Don Wakefield PLG

Roy Fray PG+E

Ray Terry PG&E

Kazarian PLG

Rao PLG

BSG PLG

Robert Kennedy - RPK Int.

+ 2 LTS

DIABLO CANYON LONG TERM SEISMIC PROGRAM (LTSP)
GEOLOGY/SEISMOLOGY/GEOPHYSICS
NRC/PGandE WORKSHOP
CONFERENCE ROOM 2L, SECOND FLOOR OF
45 FREMONT STREET BUILDING
(BUILDING LOCATION IS DIRECTLY ACROSS STREET FROM 77 BEALE STREET)
SAN FRANCISCO

AGENDA (TENTATIVE)

TUESDAY, OCTOBER 21, 1986

- | | |
|------------------------|--|
| 8:00 a.m. - 8:30 a.m. | • Introduction <ul style="list-style-type: none">• NRC• PGandE |
| 8:30 a.m. - 2:30 p.m. | Characterization of Hosgri Fault Zone <ul style="list-style-type: none">• San Simeon Region• Offshore Region from Point Estero to Purisima Point• Discussion |
| 12:30 p.m. - 1:30 p.m. | Lunch |
| 1:30 p.m. - 3:00 p.m. | Characterization of Hosgri Fault Zone (Continued) |
| 3:00 p.m. - 5:00 p.m. | Characterization of San Luis/Pismo Region <ul style="list-style-type: none">• UNR Studies• PGandE Studies• Discussion |

WEDNESDAY, OCTOBER 22, 1986

- | | |
|------------------------|--|
| 8:00 a.m. - 12:30 p.m. | Characterization of San Luis/Pismo Region (Continued) |
| 12:30 p.m. - 1:30 p.m. | Lunch |
| 1:30 p.m. - 3:00 p.m. | Tectonic Framework <ul style="list-style-type: none">• Neogene Tectonic Model• Discussion |
| 3:00 p.m. - 5:00 p.m. | NRC Caucus and Discussion |

Attendees:

Frank W. Busby
 William R Lettis
 Kathryn Killeen
 N. Timothy Hall
 Rich Schweickert
 Karlana Matz
 D. Burton Slenmans
 D.A. BRAND
 George Thompson
 Lem Reiter
 GUS GIESE-KOCH
 ROBERT H. SYDNOR
 Earl W. Hart
 But Swan
 D.H. Hamilton
 Kirklyn Hanson
 Kevin Coppersmith
 C.R. ALLEN
 Robert Brown
 JAN D. RIETMAN
 Steve P. Nitchman
 Xiaoyi Zhang
 Dick McMillen
 William U. Savage
 Bimal Sarkar
 Roland W Madsen
 MARCIA TPL ALLEN

PG & E
 Geomatrix Consultants
 UNR
 Earth Sciences Assoc.
 UNR
 UNR
 Univ Nevada - Reno
 PG & E
 RCTG
 NRC
 NRC
 CALIF. DIV. MINES & GEOLOGY
 Calif Div. of Mines & Geol.
 Geomatrix Consultants
 Earth Sciences Assoc.
 Geomatrix Consultants.
 Geomatrix Consultants
 PG & E CONSULTANT
 U.S. Geological Survey
 PG & E CONSULTANT
 U.N.R.
 U.N.R.
 US NRC
 PG and E
 LTSP
 PG and E
 PG & E

NRC/PG&E Workshop

October 21, 1982

Attendees,

Page 2

Lloyd S. Elmer

Hans Schierling

Jean SAVY

PAUL SOMERVILLE

Walter Mornay

David P. Blumenthal

PG&E

NRC

LLNL

WOODWARD-CLYDE

USGS

USGS

DABLO CANYON LONG TERM SEISMIC PROGRAM
GEOLOGY/SEISMOLOGY/GEOPHYSICS NRC/PG&E WORKSHOP
OCTOBER 22, 1986

NAME OF ATTENDEE

AFFILIATION

- | | |
|-----------------------|-----------------------------|
| 1. Lloyd S. CLUFF | PG&E |
| 2. Hans Schierling | NRC |
| 3. Jan D. Rietman | Consultant to PG&E |
| 4. MARCIA McLAREN | PG&E |
| 5. Kathryn Killeen | UNR |
| 6. Burt Stemmans | UNR |
| 7. Rich Schweickert | UNR |
| 8. FRANK W. BRADY | PG&E |
| 9. George A. Thompson | ACRS |
| 10. ROBERT H. SYDNOR | CALIF. DIV. MINES & GEOLOGY |
| 11. Leon Reiter | NRC |
| 12. Gus Giese-Koch | NRC |
| 13. Burt Summ | Geomatrix Consultants |
| 14. Steve Nitchman | UNR |
| 15. Dick McMullen | USNRC |
| 16. Roland W. Madsen | PG&E |
| 17. Yi-Ben Tsai | PG&E |
| 18. Zhang, Xiaojie | U.N.R. |
| 19. Bob Brown | USGS |
| 20. Kevin Coppersmith | Geomatrix Consultants |
| 21. William Lettis | Geomatrix Consultants |
| 22. J. A. Harrison | Geomatrix Consultants |
| 23. C.R. ALLEN | PG&E CONSULTANTS |

DUBLO CANYON LONG TERM SEISMIC PROGRAM
GEOLOGY/SEISMOLOGY/GEOFYSICS NRC/PGandE WORKSHOP
OCTOBER 22, 1986

NAME OF ATTENDEE

AFFILIATION

24. PAUL SOMERVILLE

WOODWARD-CLYDE

25. N. Timothy Hall

Earth Sciences Assoc.

26. Barbara Matz

UNR

27. Earl Hart

Calif Div of Mines & Geol

28. Anne Zech

USGS.

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DIABLO CANYON LONG TERM SEISMIC PROGRAM (LTSP)

GROUND MOTIONS

NRC/PGandE WORKSHOP

17TH FLOOR CONFERENCE ROOMS

77 BEALE STREET BUILDING

SAN FRANCISCO

AGENDA (TENTATIVE)

GROUND MOTIONS

THURSDAY, OCTOBER 23, 1986 (ROOM 1753)

- 8:00 a.m. - 8:30 a.m. Introduction
- NRC
 - PGandE
- 8:30 a.m. - 12:30 p.m. Ground-Motions Input to Phase IIIA Studies
- Time Histories for Fragility Evaluation
 - Input to Soil/Structure Interaction (SSI)
 - Input to Seismic Hazard Analysis
 - Discussion
- 12:30 p.m. - 1:30 p.m. Lunch
- 1:30 p.m. - 5:00 p.m. Ground-Motions Input to Phase IIIB Studies -
Work in Progress
- Empirical
 - Numerical
 - Discussion

FRIDAY, OCTOBER 24, 1986 (ROOM 1752)

- 8:00 a.m. - 9:00 a.m. Additional Topics
- USGS - K. Campbell
 - Discussion
- 9:00 a.m. - 10:00 a.m. Instrumentation
- Additional Ground-Motions Instruments at Site
 - Discussion

SOIL/STRUCTURE INTERACTION

- 10:00 a.m. - 10:30 a.m. Introduction
- 10:30 a.m. - 12:30 p.m. ● Incorporation of Ground Motion Characteristics
in SSI Studies
- Discussion
- 12:30 p.m. - 1:30 p.m. Lunch
- 1:30 p.m. - 3:30 p.m. NRC Caucus and Discussion

DIABLO CANYON LONG TERM SEISMIC PROGRAM
GROUND MOTIONS NRC/PG&E WORKSHOP
OCTOBER 23, 1986

NAME OF ATTENDEE

AFFILIATION

1. Lloyd S. Claff	PG & E
2. FRANK W. BRADY	PG & E
3. Leon Reiter	NRC
4. Nilesh Chokshi	NRC
5. C J Costantino	BNL
6. PAUL SOMERVILLE	WOODWARD - CLYDE PG & E
7. GUS GIESE-KOCH	NRC
8. Ross Sadigh	*GEOMATRIX/PG & E.
9. JERRY FRAUER	SAIC/PG & E
10. Yei Aki	LLL consultant
11. RALPH J. ARCHULETA	LLL consultant
12. Lalliana Mualchin	Div. Mines & Geology.
13. Steve Day	LLL Consultant
14. Ben Tsai	PG and E
15. George Thompson	ACRS
16. Bimal Sarkar	LTSP / PG & E
17. FAIZ I. MAKDISI	GEOMATRIX/PG & E
18. John A. Egan	Geomatrix/PG & E
19. MARK MAYER	PG and E
20. Kevin Cyppersmith	Geomatrix / PG & E
22. Wen S. Tseng (see p 2)	Bchtel Western Power Corp / PG & E

DIABLO CANYON LONG TERM SEISMIC PROGRAM
GROUND MOTIONS NRC/PG and WORKSHOP
OCTOBER 23, 1986

NAME OF ATTENDEE

AFFILIATION

21. Jean SAVY

LLNL

22. Wen S. Tsang

Bentel Western Power Corp./PG&E

23. Don Helmberger

PG&E Consultants

24. D. A. BRAND

PG&E

25.

26.

27.

28.

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NAME OF ATTENDEE

AFFILIATION

- | | |
|------------------------|-------------------------------------|
| 1. Lloyd S. PLUFF | PG & E |
| 2. FRANK W. BRADY | PG & E |
| 3. Keri Alki | USC |
| 4. Gus Giese-Koch | US NRC |
| 5. Leon Reiter | US NRC |
| 6. NILESH CHOKSHI | US NRC |
| 7. C.J. COSTANTINO | BNL |
| 8. Ross Sadegh | Geomatics / PG&E |
| 9. Bimal Sarkar | LTSP / PG&E |
| 10. W.S. Tseng | Bechtel / PG&E |
| 11. PAUL SOMERVILLE | WOODWARD-CLYDE |
| 12. Don Helmbarger | PG & E consultant |
| 13. Lillian Mualchin | Div. Mines & Geology |
| 14. MARK MYER | PG&E |
| 15. RALPH J. ARCHULETA | LLL Consultant / U.C. Santa Barbara |
| 16. Steve Day | LLL consultant |
| 17. JERRY FRAZIER | SAIC - PG&E |
| 18. FAIR MAKDISI | GEOMATRIX - PG&E |
| 19. JOHN EGAN | GEOMATRIX / PG&E |
| 20. Ben Tsai | PG&E |

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