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ISSUED: April 8, 1985

MINUTES
OF THE COMBINED MEETING OF ACRS SUBCOMMITTEES ON
EXTREME EXTERNAL PHENOMENA AND DIABLO CANYON
MARCH 21, 1985
CULVER CITY, CA

The combined Subcommittees on Extreme External Phenomena and Diablo Canyon met at the Pacifica Hotel in Culver City, California on March 21, 1985 to review the status of the NRC Staff's program on seismic design margins and Pacific Gas and Electric's (PG&E) program plan for the long term seismic reevaluation of the seismicity at the Diablo Canyon site.

Notice of the meeting was published in the Federal Register on March 4, 1985 (Attachment A). The schedule of items covered in the meeting is in Attachment B. A list of handouts, kept with the office copy of minutes, is included in Attachment C. The meeting was entirely open to the public. There were no written or oral statements received or presented from members of the public at the meeting. E. Igne was the cognizant staff member for the meeting.

Principal Attendees

ACRS

C. Siess, Chairman, Diablo Canyon
D. Okrent, Chairman, Extreme External Phenomena
P. Shewmon, Member
H. Etherington, Member
D. Ward, Member
R. Axtmann, Member
M. Carbon, Member
P. Pomeroy, Consultant
R. Scavuzzo, Consultant
B. Page, Consultant
G. Thompson, Consultant
M. Trifunac, Consultant
E. Luco, Consultant
J. Maxwell, Consultant

50-275
50-323

DESIGNATED ORIGINAL

Certified By BJR

NRC

J. Knight
J. Richardson
S. Brocoum
L. Reiter

NRC Consultants

R. Kennedy
R. Budnitz
P. Amico
J. Reed
C. Cornell
M. Shinozuka
W. Hall

PG&E

D. Brand
W. White
L. Cluff
J. Garrick
D. Hamilton
L. White
J. Frazier
D. Bligh
W. Tseng
R. McGuire

C. Siess, Chairman of this combined meeting, convened the meeting at 8:30 a.m.

J. Knight, NRR, presented a brief introduction on the history and status of the seismic margins program with respect to plant licensing. He stated that this program was initaited by the ACRS in 1977 when questions of improper use of deconvolution of the ground motion methodologies arose on the North Anna Plant. In addition, the possibility of earthquakes being larger than the SEE value prompted this study. J. Knight noted that regulations did not require the plant to be designed beyond the SSE, but that, in the common interest of both the industry and regulatory body, seismic risk assessment, as part of the PRA program, was initiated in some plants. At the present time about 16 plants have been assessed for seismic margins.

D. Okrent asked whether, if PRA studies show a potentially adverse result, the utility is obligated to notify the NRC. J. Knight replied

that lawyers may need to provide the answers, but he ventured to say that if the plant is designed to the SSE value and met all applicable codes the utility has no further obligations and does not have to report potentially adverse effects.

In reply to a question, R. Kennedy stated that faults such as cracks in components as piping and pressure vessels are accounted for in the PRA studies, but that gross undiscovered design and construction errors are not considered.

J. Knight mentioned three other activities that have a bearing on the seismic margins program. They are 1) the Seismic Qualification Utility Group that has been gathering data on performance of electrical equipment, 2) the eastern U.S. Seismicity Program at LLNL that provides a basis for a new look of eastern plants and 3) the NRC Piping Review Committee's comprehensive study including the work on seismic design in piping systems.

J. Richardson, RES, presented a brief overview of the seismic margins research program. He discussed the elements accounted for in the seismic design margins study. The program elements include seismic input obtained from the Eastern U.S. Seismicity Program, methods development and validation program which LLNL is performing and the fragility and response program where component fragilities, piping capacities and reliability data base information will be obtained. With this information seismic design margins studies will be performed and quantified. He stated that EPRI's program in this area will be closely coordinated with the NRC's program. The budget for NRC's program is about $5-8 million per year. EPRI's budget for their program will be about $4-5 million per year.

J. Richardson stated that cooperation with foreign countries, especially with the FRG and Japan, to obtain validation data is being vigorously

pursued because funds to develop our own test facilities do not exist. It was suggested by a member of the subcommittee that New Zealand should be contacted to see if they could provide some useful information to our program.

In reply to a question, J. Richardson stated that "yes" there was a large difference in the results of the analysis and experiment performed at HDR. A more realistic analysis that accounted for system non-linearities, i.e., geometric gaps between pipe and hangers, resulted in a more favorable comparison.

A question on withdrawing Reg. Guides 1.46 and 1.48 and implications thereof was brought up but ruled out of order by the Chairman. This matter will be reviewed at a later subcommittee meeting.

A question was asked as to why the Japanese piping design is "stiff" and why we are going from "stiff" to "flexible" piping systems design and that an integrated study should be performed in order to provide insights to the overall plant behavior under SSE and earthquakes more severe than the SSE. This study should provide a technical basis for using either "stiff" or "flexible" piping systems. The Staff will respond.

As a result of the ACRS letter to the EDO, dated April 4, 1984, the formation of the NRC Seismic Design Margins Group was initiated in order to quantify seismic design margins. Reporting to this Group is a panel called the Seismic Design Margins Expert Consultants. This panel has written an interim report that discusses progress accomplished to date in studying the issue of quantification of seismic design margins in nuclear plants. In particular, this report covers progress accomplished toward the establishment of screening guidelines that would be useful in studying how much seismic margins exist at a given nuclear power plant.

R. Budnitz, Chairman of the Expert Panel on Quantification of Seismic Design Margins, discussed the objectives of the panel charter. The dominant issue is a need to understand how much seismic design margins exist in a plant. He stated that seismic margins are defined as how much larger an earthquake must be (above to SSE) in order to compromise the safety of components, structures and equipment of a nuclear power plant. The seismic margins study applies specifically to eastern plants, whose design basis earthquake is in the range of 0.1 to 0.25g.

At this point in their study, Phase I, the goal is to develop screening guidelines that can be used at a plant not studied by a full-scope PRA. With these screening guidelines the expert panel believes that any items in a plant can be systematically studied to determine seismic margins defined in terms of earthquake size. These guidelines should provide a basis on which to focus resources for either doing more study, or in determining what items can be neglected. During Phase II, research programs are planned in order to fill in areas where technical basis are lacking, for example, operator behavior modeling, design and construction errors, and nonlinear structural behavior. Gaps of information exist in other areas such as BWR plants, and ice condenser containments. R. Budnitz stated that the interim screening guidelines will be applied to screen a couple of plants for a trial run.

The need to discuss with the NRC Staff potential research needs for the seismic margins program will be taken up at another subcommittee meeting.

R. Kennedy, SMA, presented a status of the expert panel's preliminary assessments of the seismic margin of a number of items of equipment, structures, and components of representative nuclear power plants as judged by the panel from available capacity data base. The sources of information were the results of seismic PRAs performed to date. He stated that there are seven published PRAs as well as six unpublished

PRAs. Data on how components, structures and equipment similar to that in nuclear power plants performed in historic earthquakes of up to 0.5g were also available. In addition, the Seismic Qualification Utility Group's (SQUG) and EPRI data was utilized. The panel focused on plants located in the eastern U.S. designed for 0.1 to 0.25g. As a measure of margin, the panel used the concept of high confidence, low probability failure (HCLPF) capacity. In PRA context, HCLPF was judged to represent about 95 percent confidence of not exceeding about 5 percent conditional probability failure. However, in the panel's judgment HCLPF tends to represent lower estimate on capacity for which it is extremely unlikely that failure will occur. The panel's general points are as follows:

° Median capacity is at least a factor of 2 greater
° Design capacity has built-in conservatisms
° Many components have inherent ruggedness due to nonseismic loads
° Capacity definition is generally below catastrophic collapse.

The panel in its preliminary report has presented HCLPF capacities for many nuclear power plant components, e.g., containments, NSSS supports, piping, valves, batteries and racks, active electrical equipment, dams and dikes, etc.

P. Amico, NRR consultant, discussed the systems aspect of the seismic design margins program. He stated that, basically, the screening criteria (use of HCLPF) that the expert panel have developed is based on the seismic PRA results of six out of the seven PRAs that were made publicly available; 6 PWRs and 1 BWR. The BWR PRA was considered but not utilized in the development of the screening criteria, and therefore the screening criteria are generally applicable only to PWRs. Sixteen dominant sequences of six PWR PRAs were reviewed. Of these sixteen, all would have been found under the initial screening concept. Of those, sixteen, 15 would have been properly assigned to plant damage states, leaving one not properly assigned a damage state. He stated that this

error would have overestimated the frequency of one serious PDS, but that core melt risk would be unaffected. Some possible effects, such as relay chatter, are not adequately treated in the PRAs upon which the conclusions were based.

It was stated that the screening criteria will be used on two trial plants. In summary, he stated that, based on the expert panel screening guidelines concept which will be refined with additional research, a methodology for evaluating the seismic margins, and presumably a methodology for evaluating seismic risk, can simply be performed without an extensive PRA.

In summarizing this portion of the agenda, the Chairman stated that the next step is to get the final report from the expert panel on the quantification of seismic margin before we meet again -- maybe within the next year. In addition, the Chairman added that, personally, he likes the idea of the high confidence, low probability concept.

J. Knight, NRR, introduced the subject of the Diablo Canyon Long Term Seismic Program Plan. Before he proceeded with this matter, he stated that Unit 2 plans to load fuel in late April, go critical in late June and be in low-power operation in early July. Unit 1 is at full power, preparing to do a warranty run. He then introduced S. Brocoum, NRR Geology Section, and L. Reiter, NRR Seismology Section.

S. Brocoum presented a brief history of Diablo Canyon license seismic conditions initiated by the ACRS letter of July 14, 1978 suggesting that seismic reevaluation be performed in 10 years. The license condition approved by the Commissioners and endorsed by the ACRS sets forth specific program elements, as follows, as license conditions:

1. Geology and tectonics
2. Earthquake magnitude
3. Ground motion/soil structure interaction
4. Probability risk assessment/deterministic evaluation

He discussed the review schedule for the NRC Staff approval of the recently submitted Diablo Canyon program plan for the seismic condition. The Staff plans to formally approve PG&E's program plan by July 31, 1985, after the plan is submitted for ACRS consideration on July 1, 1985. He said, in response to a question, that PG&E's seismic reevaluation plan is very comprehensive and ambitious and that the time to complete it -- within three years -- was a Commission decision.

In response to a question, J. Knight stated that he will look into the resolution of Diablo Canyon use of high-strength bolts for safety-related components.

D. Brand, VP Engineering for PG&E, led off PG&E's presentation. He stated that in conformance with the license condition, they have developed a very comprehensive program which encompasses an integrated approach in in-depth studies in the areas of offshore and onshore geology, seismology, ground motion, soil structures interactions, seismic hazard, fragility analysis and probabilistic risk assessment. The program was submitted to the NRC Staff in January and presently is undergoing review. Four meetings with the Staff were made in the course of developing the program. He stated that L. Cluff, program manager for the long-term seismic program, would present an overview of the program related to geology tectonics and W. White, Bechtel Co., would handle the engineering aspects of the program.

L. Cluff, stated that the major goals of the Geology/Seismology Reevaluation Program are as follows:

° To update the map of the central and southern Santa Maria Basin and adjacent on-land area, with data relating to the subsurface dimention
° To update the map of the San Gregorio-Hosgri fault system, also with data relating to the subsurface dimension

° To improve understanding of the pattern and rate of tectonism in the region of Diablo Canyon
° To reevaluate the seismic capability of the Hosgri fault and any other faults found to be significant to the design earthquake for Diablo Canyon.

W. White next discussed the engineering portion of the program from the numerical modeling of ground motion through PRA. Ground motion will be performed by numerical modeling with the following elements:
° Estimate site-specific ground motion characteristics for conditions relevant to Diablo Canyon
° Evaluate the range of ground motion effects that are plausible and the associated probabilities
° Decompose the predicted ground motion into various components of incoming waves for soil-structures interaction analysis

Seismic hazard analysis will be an integration of geological and soil-structures interaction information. Some key features of the seismic hazard analysis are as follows:
° Known tectonic interpretations will be incorporated with special consideration given to those associated with central coastal California
° Provisions will be made to accommodate the information being generated on a continuing basis in other areas of the LTSP
° Analysis and assessments, some involving expert opinion, will be documented.

This analysis will provide ground motion (spectral ordinates and duration) at the base mat of the plant, that will account for the distribution of the maximum magnitude earthquake during the life of the plant.

Information from the seismic hazard analysis will be used to generate fragility curve acceleration capaciy on which a median acceleration capacity on the high confidence, low probability number will be obtained.

PRA will involve the following items:

° Assess the significance of conclusions drawn from seismic reevaluation studies
° Assess the significance of conclusions drawn from seismic reevaluation studies
° Accomplished by developing and interpreting probability curves for frequency occurrence of different plant damage states
° Methodology will allow backtracking to identify the major contributors

In response to a question, J. Garrick stated that the PRA analysis consists of three separate models. They are 1) Level I PRA, a quantification of core damage, 2) Level II PRA, a quantification of the release or source term and 3) Level IV PRA, a quantification of the sequences.

L. Cluff then stated that any questions regarding further details on the elements of the Diablo Canyon seismic reevaluation program will be handled by further questions by the subcommittee and response.

As a comment, B. Page, ACRS consultant, stated that his reaction to the geological aspect of the program is favorable and that he was impressed by its comprehensiveness and thoroughness. He further stated that the personnel involved are very competent. Other ACRS consultants voiced similar opinions. In response to a question regarding the characterization of the Hosgri fault, D. Hamilton stated that, based on current study, the focal mechanisms toward the south end of the Hosgri and in the area of the transverse ranges are dominantly a reverse thrust mechanism, although some have a component of a strike slip. The study

being proposed will assemble all the geological evidence so that choices will be narrowed, and effectively choose among the possibilities a focal mechanism of either a strike-slip or thrust fault. Information gathered by private oil companies for the exploration of oil in the region will be extensively studied. The earthquake focal mechanisms must be established in order that the magnitude of the SSE be accurately determined. (Presently Diablo Canyon is designed for a 7-7.5 magnitude earthquake.)

It was stated that human-actions analysis in the PRA studies will be accounted for if seismic effect is a critical issue with respect to risk. Water hammer effects will be included in the PRA studies. Regarding relay chatter fragility estimates, this matter is likely to be a more dominant contributor to risk at Diablo Canyon because the earthquake levels are higher than at most plants. This will be taken into account in the PRA studies.

The meeting was adjourned about 10:15 p.m.

Future ACRS Actions:

The NRC Staff plans to submit for ACRS comments, PG&E's Long-Range Seismic Reevaluation Program by July 1, 1985.

* * *

NOTE: A complete transcript of the meeting is on file at the NRC Public Document Room at 1717 H Street, N.W., Washington, DC or can be obtained at cost from Ace Federal Reporters, Inc., 444 North Capitol St., Washington, DC 20001, telephone (202) 347-3700

EFFECTIVE DATE: March 4, 1985.

FOR FURTHER INFORMATION CONTACT: Ada R. Kimsey, Office of the Clerk of the Board, Merit Systems Protection Board, (202) 653-7200.

SUPPLEMENTARY INFORMATION: With the publication of Volume 13, *Decisions of the United States Merit Systems Protection Board*, covering the period January through March 1983 (*see* 49 FR 49188), the Board ceased publication of its final orders and precedential interlocutory orders. Of the series of Board decisions volumes, Volume 12 (October through December 1982), as well as Volume 13, is in print. Both may be obtained from the Superintendent of Documents. The ordering information is: Volume 12: stock number 062-000-00017-1, $16; and Volume 13: stock number 062-000-00018-0, $11.

The Board continues to publish *The Digest*, a monthly summary and listing of opinions and orders, and "Federal Employee Appeals Decisions," quarterly microfiche with paper index of initial decisions issued in its 11 regional offices. Further, the Board has published a special microfiche edition of initial decisions resulting from the air traffic controller strike of 1981: "Federal Employee Appeals Decisions, Air Traffic Controller Cases."

Meanwhile, researchers may contact the following organizations which offer a variety of services regarding Board decisions:

Federal Merit Systems Reporter, Labor Relations Press, 1725 K St., NW., Washington, D.C. 20006, (202) 833-1122

FLITE (Federal Information Through Electronics),[1] HQUSAF/JAS, Denver, CO 80279-5000, (303) 370-7531, AUTOVON: 926-7531

The Hawkins Merit Systems Protection Board Service, Hawkins Publishing Co., Inc., Suite 220, 933 N. Kenmore St., Arlington, VA 22201, (703) 525-9090

Lexis, Mead Data Central, 1050 Connecticut Ave., NW., Suite 1090, Washington, D.C. 20036, (202) 785-3550

Merit Systems Protection Board Case Service, Information Handling Services, 1700 N. Moore St., Suite 2100, Arlington, VA 22209, (703) 524-9802

United States Merit Systems Protection Board Reporter, West Publishing Co., P.O. Box 64526, St. Paul, MN 55164-0526, 1-800-328-9352

Dated: February 26, 1985.

For the Board.

Herbert E. Ellingwood,

Chairman.

[FR Doc. 85-5120 Filed 3-1-85; 8:45 am]

BILLING CODE 7400-01-M

[1] FLITE is available only to Federal agencies.

NUCLEAR REGULATORY COMMISSION

Advisory Committee on Reactor Safeguards Combined Extreme External Phenomena, Structural Engineering, and Diablo Canyon; Open Meetings

The ACRS Subcommittees on Extreme External Phenomena, Structural Engineering, and Diablo Canyon will hold a combined meeting on March 21 and 22, 1985, at the Pacifica Hotel, 6161 Centinela Avenue, Culver City, CA.

The entire meeting will be open to public attendance.

The agenda for the subject meeting shall be as follows:

Thursday, March 21, 1985—8:30 a.m. until the conclusion of business

Friday, March 22, 1985—8:30 a.m. until the conclusion of business

The Subcommittees will discuss the status of the NRC Staff seismic design margins programs and PG&E's program plan for a seismic reevaluation of Diablo Canyon.

Oral statements may be presented by members of the public with the concurrence of the Subcommittee Chairman; written statements will be accepted and made available to the Committee. Recordings will be permitted only during those portions of the meeting when a transcript is being kept, and questions may be asked only by members of the Subcommittee, its consultants, and Staff. Persons desiring to make oral statements should notify the ACRS staff member named below as far in advance as is practicable so that appropriate arrangements can be made.

During the initial portion of the meeting, the Subcommittee, along with any of its consultants who may be present, may exchange preliminary views regarding matters to be considered during the balance of the meeting.

The Subcommittee will then hear presentations by and hold discussions with representatives of the NRC Staff, its consultants, and other interested persons regarding this review.

Further information regarding topics to be discussed, whether the meeting has been cancelled or rescheduled, the Chairman's ruling on requests for the opportunity to present oral statements and the time allotted therefor can be obtained by a prepaid telephone call to the cognizant ACRS staff member, Mr. Elpidio R. Igne (telephone 202/634-1413) between 8:15 a.m. 5:00 p.m., e.s.t. Persons planning to attend this meeting are urged to contact the above named individual one or two days before the scheduled meeting to be advised of any changes in schedule, etc., which may have occurred.

Dated: February 26, 1985.

Morton W. Libarkin,

Assistant Executive Director for Project Review.

[FR Doc. 85-5194 Filed 3-1-85; 8:45 am]

BILLING CODE 7590-01-M

Advisory Committee on Reactor Safeguards Combined Subcommittees on GESSAR II, Reliability and Probabilistic Assessment and Safeguards and Security; Notice of Meetings

The ACRS Subcommittees on GESSAR II, Reliability and Probabilistic Assessment and Safeguards and Security will hold a combined meeting on March 27, 28 and 29, 1985, at the Sandia National Laboratory, Albuquerque, NM.

To the extent practical the meeting will be open to public attendance. However, portions of the meeting will be closed to discuss proprietary information relating to the GESSAR probabilistic risk assessment and plant security.

The agenda for subject meeting shall be as follows:

Wednesday, March 27, 1985—8:30 a.m. until the conclusion of business

Thursday, March 28, 1985—8:30 a.m. until the conclusion of business

Friday, March 29, 1985—8:30 a.m. until the conclusion of business

The Subcommittees will continue their review of GESSAR II for a Final Design Approval applicable to future plants, and review design features for protection against sabotage at commercial nuclear power reactors. The principal topics to be discussed are plant security and the GESSAR II and probabilistic risk assessment.

Oral statements may be presented by members of the public with the concurrence of the Subcommittee Chairman; written statements will be accepted and made available to the Committee. Recordings will be permitted only during those portions of the meeting when a transcript is being kept, and questions may be asked only by members of the Subcommittee, its consultants, and Staff. Persons desiring to make oral statements should notify

ATTACHMENT A

REVISED: Mar. 11, 1985

PROPOSED AGENDA ON MARCH 21-22, 1985
MEETING OF THE ACRS SUBCOMMITTEES ON
EXTREME EXTERNAL PHENOMENA,
AND DIABLO CANYON
LOS ANGELES, CA

March 21, 1985

I. Presentation on NRC Seismic Design Margin Program

1. Executive Session (15 min) — 8:30 - 8:45 am

2. NRC Presentation

a. Introduction (5 min) Knight — 8:45 - 8:50 am

b. History and Status of NRC Actions on Seismic Margins Licensing Activities (15 min) Knight — 8:50 - 9:05 am

c. Summary of Ongoing NRC and Industry Seismic Design Margins Programs - (25 min) Richardson — 9:05 - 9:30 am

d. Discussion of Proposed Seismic Design Margins Program Plan

° Introduction - R. Budnitz — 9:30 - ~~10:00~~ 11:75 am

° Assessment of Fragility Data - R. Kennedy/J. Reed — 10:00 - ~~11:30~~ 11:25 2:10 am

° Assessment of Systems Analysis Paul Amico — ~~11:30~~ 2:10 - 2:50 - 12:30 pm

*** Lunch *** (1 hr) — 12:30 - 1:30 pm

° (Continued) — ~~1:30 - 2:00 pm~~

° Conclusions, Future Work and Schedule - R. Budnitz/J. Richardson — 2:50 ~~2:00~~ - ~~2:30~~ pm

3. Discussion (30 min) — ~~2:30~~ - ~~3:00~~ pm

4. Summary, Conclusions, and Future Actions - (15 min) — 3:50 ~~3:00~~ - ~~3:15~~ pm

*** Break *** (15 min) — = 3:50 ~~3:15~~ - 4:05 ~~3:30~~ pm

Ron Ballard VP, PG&E

II. Presentations on the Long Term Seismic Program Plan — Lloyd Cluff - Program Mgr.

1. Executive Session - D. Okrent/C. P. Siess - (15 min) — ~~8:30 - 3:45 pm~~

ATTACHMENT B

2. NRC Staff Introduction - Status Report on Diablo Canyon Licensing Effort and the Diablo Canyon Long Term Seismic Program Plan (30 min) 4:05 4:40 ~~3:45 - 4:15 pm~~

3. PG&E Briefing on Long Term Seismic Program Plan

   a. Summary of Objections, Organization and schedule - PG&E (30 min) 4:40 - 6:10 ~~4:15 - 4:45 pm~~

   *** Break *** (15 min) 4:45 - 5:00 pm

   b. Description of Program Plan Elements - PG&E - (4 hrs, continuation on 3/22/85) 5:00 - 6:30 pm

   *** Dinner *** (1 hr) 6:10 → 7:30 ~~6:30 - 7:30 pm~~

   b. (Continuation) ~~7:30 - 9:30 pm~~

March 22, 1985

3. b. (Continued from 3/21/85) ~~8:00 -~~

   (1) Geology 7:30 p

   (2) Earthquake Magnitude and Ground Motion Studies

   (3) Soil-Structure Interaction 9:34 p

   (4) Fragility Analysis

   (5) Seismic Hazard Analysis 10:10

   (6) Probabilistic Risk Assessment

   c. NRC Staff Comments

   d. General Discussion - D. Okrent/ C. P. Siess

4. Summary, Conclusions, Future ACRS Actions, and Adjournment - D. Okrent/C. P. Siess July 1 plan, July 8-11 full ACRS ~~10:00 am~~ ~ 10:30 p

B-2

Subcommittee Chairmen:

D. Okrent - Chairman, Extreme External Phenomena
C. P. Siess - Chairman, Diablo Canyon

ACRS Staff Contact :

E. Igne 202-634-1413

Location:

Pacifica Hotel - Culver City (Los Angeles) CA 213-649-1776

ATTACHMENT C
LIST OF ATTACHMENTS
COMBINED MEETING OF ACRS SUBCOMMITTEES ON
EXTREME EXTERNAL PHENOMENA AND DIABLO CANYON
MARCH 21, 1985
CULVER CITY, CA

Attendees Sign-In Sheets

1. Licensing Seismic Margin Actions, J. Knight, NRC

2. Seismic Design Margins Research Program, J. Richardson, RES

3. Expert Panel on Quantification of Seismic Design Margins, R. Budnitz
   Appendix: Draft Interim Report by the Expert Panel on Quantification of Seismic Design Margins, dtd 3/15/85

4. Assessment of Seismic Margin from Available Fragility Information, R. Kennedy

5. Seismic PRA Results, P. Amico

6. History of License Seismic Conditions (Diablo Canyon), S. Brocoum, NRC

7. Diablo Canyon Long Term Seismic Program, L. Cluff, PG&E

8. Ground Motion by Numerical Modeling, W. White, PG&E

ATTACHMENT C