

RECORDS MANAGEMENT ROOM

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION



BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)

PACIFIC GAS AND ELECTRIC COMPANY)

Units 1 and 2)

Diablo Canyon Site)

) Docket No. 50-275-OL
) Docket No. 50-323-OL

REPLIES OF PACIFIC GAS AND ELECTRIC COMPANY
TO INTERVENORS' INTERROGATORIES
DATED SEPTEMBER 27, 1978

October 17, 1978

7811010039

G

Interrogatory No. 1:

For each of the contentions relating to the adequacy of the seismic design of the Diablo Canyon Nuclear Power Plant, identify each witness the Applicant intends to call in the licensing hearing.

Reply:

Witnesses testifying on the contentions relating to the adequacy of the seismic design of the Diablo Canyon Nuclear Power Plant were identified in a letter filed with the Board on August 28, 1978, along with the areas of expertise to which they will address their testimony. The outlines of the testimony have developed further since that date and the following additional names should be added to the witness list:

<u>Name</u>	<u>Affiliation</u>	<u>Area of Testimony</u>
John A. McLaughlin	PGandE	Structural
Oscar A. Rocha	PGandE	Structural
M. E. Lee	PGandE	Structural
T. N. Crawford	PGandE	Electrical
R. M. Laverty	PGandE	Mechanical
Robert Lawson	Harding-Lawson	Structural
T. Udaka	Harding-Lawson	Structural
David Williams	URS	Structural

As we have done in the past licensing hearings, we will divide our testimony into sections; each section of testimony will be sponsored by one or two principal authors. During the hearing, a summary on each section will be given by one of the authors of written testimony. We will make additional witnesses available on

Reply to Interrogatory No. 1 continued:

a panel at the time of cross-examination on each section of testimony to assure that we can provide both general and specialized information on each subject.

The list of titles of testimony sections and authors is shown below. We have also attached to this answer, as requested in Interrogatory No. 2 (d) and (e), a summary of the educational background and professional employment for each witness named on our original witness list as well as for those added in this answer.

<u>Title of Testimony</u>	<u>Authors</u>
Establishment of Seismic Events for Which Plant is Designed	R. V. Bettinger J. B. Hoch
Characteristics of Faults	R. Jahns D. Hamilton
Characteristics of Earthquakes	S. Smith
Characteristics of Ground Motion at Site	J. A. Blume
Establishment of the Ability of the Plant to Withstand the Design Seismic Events	J. B. Hoch
Containment Structure	V. J. Ghio L. Malik
Auxiliary Building	V. J. Ghio L. Malik
Intake Structure	V. J. Ghio D. Lang
Turbine Building	V. J. Ghio D. Lang
Outdoor Tanks	V. J. Ghio D. Jhaveri
Buried Tanks & Piping Systems	J. A. McLaughlin R. T. Lawson

Reply to Interrogatory No. 1 continued:

<u>Title of Testimony</u>	<u>Authors</u>
Introduction & Evaluation of Plant System	H. J. Gormly
Systems & Functions Required	W. C. Gangloff
Reactor & Reactor Coolant System	T. Esselman
Auxiliary Mechanical Equipment	T. Esselman P. G. Antiochos
Other Class I Piping Systems	T. Esselman R. E. Bacher
Electrical Equipment & Instrumentation	T. Esselman R. A. Young

Interrogatory No. 2:

For each and every person identified in response to interrogatory number (1) above, identify the following:

- a) the substance of the facts and opinions to which the witness is expected to testify;
- b) the grounds for each opinion;
- c) all documents, and portions thereof, to which each expert will refer or upon which he will rely in the licensing hearing. If reference is made to the SER or FSAR and any amendments thereof, identify the specific section upon which each witness will rely;
- d) each witnesses' educational background;
- e) any professional employment or other work experience relating to the area of expertise upon which each witness will rely;
- f) all articles, books, scientific papers or abstracts, studies, analysis authored by the witnesses and relating to the area of expertise upon which each witness will rely.

Reply:

As described in Reply to Interrogatory No. 1, the witnesses are divided into three categories: (1) Those presenting direct testimony; (2) those available on panels for cross-examination of the direct testimony; and (3) those who may be used for rebuttal and will be available for answers to "detail" questions, specifics of which may not be fully known to direct testimony or panel witnesses. As testimony is due to be in the hands of all parties on November 15, 1978, none of it has been written as of the date of these answers. The opinions and supporting facts of the listed witnesses are however, available in the FSAR, amendments thereto and testimony before the ACRS full and subcommittees. As the testimony has not been written, it is impossible to identify with specificity sections of the FSAR, abstracts, analysis, etc., relied upon. That information will be provided as available pursuant to the applicable rules of discovery. Direct testimony supplied on November 15 will contain detailed bibliographies or references.

Interrogatory No. 3 (a) :

Does the Applicant know what a three dimensional soil structure interaction analysis is?

Reply:

Yes.

Interrogatory No. 3 (b) :

Describe a three dimensional soil structure interaction analysis.

Reply:

A three dimensional soil structure interaction analysis is a procedure that evaluates the effect of earth motions of various types and directions on a foundation, and the effect of the response of the foundation on the surrounding soil. The motions are considered in three dimensions. Models, idealizations, and assumptions can be used according to the importance of the various aspects in the overall results. The significance of these assumptions vary over a wide range in various applications ranging from design to research.

Interrogatory No. 3 (c) :

Has the Applicant or any of its consultants performed a three dimensional soil structure interaction analysis on the Diablo Canyon Nuclear Power Plant?

Reply:

Yes.

Interrogatory No. 3 (d) :

If so, please describe the results of that analysis and identify all documents that contain the results of such analysis.

Reply:

Results are described in Sections 3.7 and 3.8 of the T312, in Chapters 3 and 4 and Appendix D of the report titled "Seismic

Reply to Interrogatory No. 3 (d) continued:

Evaluation for Postulated 7.5 M Hosgri Earthquake."

Interrogatory No. 3 (e):

If the Applicant has not performed such analysis, state why they have not.

Reply:

Not applicable.

Interrogatory No. 3 (f):

To the Applicant's knowledge, has the Staff or any of its consultants performed a three dimensional soil structure interaction analysis on the Diablo Canyon Nuclear Power Plant?

Reply:

No.

Interrogatory No. 3 (g):

If so, has the Applicant had the opportunity to review the results of that analysis? If the Applicant has reviewed the results of such analysis, summarize those results. Identify any documents that contain the results of such analysis.

Reply:

Not applicable.

Interrogatory No. 3 (h):

Has the Applicant ever discussed with the Staff the need to perform a three dimensional soil structure interaction analysis on the Diablo Canyon Nuclear Power Plant? If so, please summarize those discussions. Identify any rules or memorandum relating to such discussions.

Reply:

Yes. A meeting with Staff February 4, 1977 covered the methods of analysis, including the use of fixed base models in accordance with the NRC Standard Review Plan. The Staff has

Reply to Interrogatory No. 3 (h) continued:

concluded with the fixed base analysis. This conclusion is stated in SER Supplement No. 7, Sec. 3.8.5.3(4).

Interrogatory No. 3 (i):

Is the Applicant aware of any person who has performed or has allegedly performed a three dimensional soil structure interaction analysis on the Diablo Canyon Nuclear Power Plant? If so, please identify each person.

Reply:

No, other than Applicant and its consultants.

Interrogatory No. 4:

Identify all documents upon which the Applicant will rely for estimating peak parameters of a 7.5 magnitude earthquake at short distances. If the SER or FSAR is cited, please provide the section number.

Reply:

Seismic Evaluation for Postulated 7.5 M Hosgri Earthquake - Chapter 3, and references contained therein.

Interrogatory No. 5:

Identify all documents upon which the Applicant will rely to support the reduction of the peak acceleration as measured in the free field to an "effective acceleration." If the SER or FSAR is cited, please provide the section number.

Reply:

Same as reply to Interrogatory No. 4.

Interrogatory No. 6:

Identify all documents upon which the Applicant will rely to support use of a tau effect to reduce by varying amounts the design response spectra for those structures of the Diablo Canyon Nuclear Power Plant having foundations extending over large areas. If the SER or FSAR is cited, please provide the section number.

Reply:

Same as reply to Interrogatory No. 4.

Interrogatory No. 7:

Identify all documents upon which the Applicant will rely for the selection of peak acceleration, velocity, duration and displacement parameters that describe the safe shutdown earthquake for the Diablo Canyon Nuclear Power Plant. If the SER or FSAR is cited, please provide the section number.

Reply:

Chapters 2 and 3, FSAR, and Chapters 2 and 3 of Seismic Evaluation for Postulated 7.5 M Hosgri Earthquake.

Interrogatory No. 8:

Identify any documents, including notes, letters and memorandum, that describe, summarize or report any meetings between Staff consultant, Dr. Nathan Newmark, and Applicant employees or consultants during the course of reanalysis. Reference is made to the meeting of March 13, 1978, as well as any other meeting.

Reply:

Criteria for reanalysis were set February 2, 1977. There were no meetings subsequent to that date with Dr. Newmark other than the meeting on March 15, 1978. Applicant does not have any documents regarding that meeting other than the notice of same which has already been produced.

Interrogatory No. 9:

Identify all documents, notes, memorandum and reports relating to, or reporting on, or issuing from the Diablo Canyon Seismic Research Program (SRP). See Attachment 1.

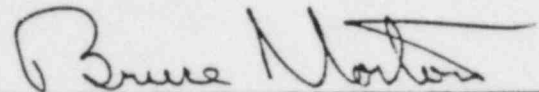
Reply:

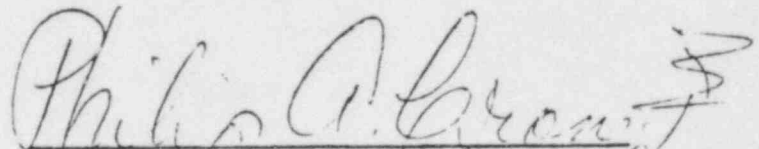
Documents responsive to this Interrogatory will be available in Room 767, 215 Market Street, San Francisco, commencing October 20, 1978. As there are numerous documents covering a time period from early 1977 to the date of the request it will take the Applicant

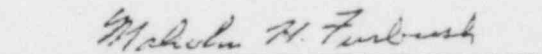
Reply to Interrogatory No. 9 continued:

somewhat longer to provide an index, but it is anticipated that the index will be available on October 27, 1978 and will be furnished to Intervenors.

We declare under penalty of perjury the foregoing Replies To Interrogatories are true and correct to the best of our information, knowledge, and belief.


Bruce Norton


Philip A. Crane, Jr.


Malcolm H. Furbush

Dated: October 17, 1978

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of

PACIFIC GAS AND ELECTRIC COMPANY

(Diablo Canyon Nuclear Power
Plant, Units No. 1 and 2)

)
) Docket Nos. 50-275 O.L.
) 50-323 O.L.
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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Panos G. Antiochos

Title or Position: Mechanical Engineer

Degrees: B.S. in Mechanical and Electrical Engineering, National
Technical University, Athens, Greece (1964)
M.S., University of California, 1969

Professional Experience: Registered Professional Engineer (Mechanical)
State of California. Employed at PGandE since 1969.
1969-1974 - Systems Engineer, Diablo Canyon
1975-1978 - Involved with seismic qualifications of
mechanical equipment for Diablo Canyon.

The first five years of my involvement with Diablo Canyon I spent as Systems Engineer in the area of Turbine-Generator and associated systems, and the Circulating Water System. I also have been Responsible Engineer for two safety-related systems: Emergency Diesel Engine-Generators and Auxiliary Saltwater System. Major areas of technical involvement for the above are: Heat Transfer, Fluid Flow, Stress Analysis.

The last four years I have spent almost exclusively in the seismic qualification of mechanical equipment for Diablo Canyon. I have performed dynamic analyses of various components (pumps, heat exchangers, tanks, valves, etc.), using a verified computer code (STRU DL) and in accordance with applicable USNRC Regulatory Guides as well as ASME III, IEEE-344, AISC and AWS codes.

I have specified seismic test procedures and have participated in in-place as well as shaker-table testing of vital Diablo Canyon equipment and components.

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Richard E. Bacher

Title or Position: Senior Mechanical Engineer

Degrees: B.S., Mechanical Engineering, 1968 (San Jose State
College)

Professional Experience: Employed at PGandE since 1968. I have
been performing and supervising work in piping design
in the Department of Mechanical and Nuclear Engineering.
At the present time, I am a Senior Mechanical Engineer
and supervise four engineers on a regular basis in
addition to defining and reviewing the work of several
consulting firms. The work of my group consists of
dynamic piping analysis, dead load analysis and code
compliance work. These tasks include stress analysis
of pipe and pipe supports for nuclear and other power
plant designs.

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Richard V. Bettinger

Title or Position: Chief Civil Engineer

Degrees: B.S. in Civil Engineering, University of California 1947.

Professional Experience: Employed at PGandE since 1947. 1963 -
Supervising Civil Engineer for Civil-Structural Design.
1971-1973 - Chief Civil Engineer.

Major projects in which he has participated include Cresta
Powerhouse; San Mateo 230 kv Tower Line Crossing; Pit No. 4
Powerhouse; Units 5, 6 & 7, Pittsburg Power Plant; all of
the Geysers Power Plant Units; Units 3 & 4, Morro Bay Power
Plant; Units 6 & 7, Contra Costa Power Plant; Unit No. 3,
Potrero Power Plant; Units 6 & 7, Moss Landing Power Plant;
and Units 1 - 2, Diablo Canyon Nuclear Power Plant.

Mr. Bettinger is chairman of the American Nuclear Society
Committee ANS-2 on site evaluation. He is a member of the
American Society of Civil Engineers Task Committee on Nuclear
Standards and served as a member of the joint American Con-
crete Institute--American Society of Mechanical Engineers
Code Committee which produced Division 2 of Section III of the
ASME Code for Concrete for Nuclear Service.

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: James C. Carroll

Title or Position: Supervising Engineer,
Department of Steam Generation

Degrees: Bachelor of Science Degree in Chemical Engineering
1952, University of California, Berkeley. Completed
graduate level courses relating to nuclear power technology.

Professional Experience: Continuously employed since 1952 in the
Company's Department of Steam Generation. Assigned to the
startup of Vallecitos boiling water reactor in 1957.
Subsequent experience has involved the startup of the
Dresden Nuclear Power Station of Commonwealth Edison and
startup of PGandE's Humboldt Bay nuclear unit. Participation
in PGandE's Bodega Bay, Mendocino, Diablo Canyon and
Stanislaus projects. Member American Nuclear Society and
have been actively involved in the Society's standard
writing activities relating to nuclear power plant
operations. Member and past chairman of Edison Electric
Institute Nuclear Power Plant Design & Operations Task
Force, presently called Nuclear Power Subcommittee.

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Thomas N. Crawford

Title or Position: Mechanical Engineer

Degrees: Bachelor of Science, Mechanical Engineering, University of California
1971, 1 year post graduate work, University of California

Professional Experience: Continuously employed by company since 1971, starting
as a Designer in the Design Drafting Department and transferring
to Mechanical and Nuclear Engineering in 1973. Worked on Diablo
Canyon Nuclear Power Plant since 1971 doing design, specification, and
testing of instrumentation systems and components. Registered
Mechanical Engineer, State of California. Registered Control Systems
Engineer, State of California. Member, Instrument Society of America.

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Bryan A. Dettman

Title or Position: Security Supervisor

Degrees: B.A. Police Administration, Sacramento State University, Sacramento, CA
M.A. Public Administration, Golden Gate University, San Francisco, CA

Professional Experience:

1. Walnut Creek Calif. Police Dept. - 1967-71 - Patrolman, Detective, Sergeant, Investigative Division Commander.
2. Bay Area Rapid Transit District Police - 1971-75 - Police Lieutenant, Bureau Commander.
3. PG&E - Nuclear Plant Security - 1975 to present.
Humboldt Bay Power Plant and Diablo Canyon Power Plant Security Supervisor.
4. 1974 - Bechtel Corp. - Consultant on Airport Security - Honolulu International Airport.

NOTE: As part of No. 3 above, have visited and observed security programs at the following nuclear plants:

1. Browns Ferry
2. Zion
3. Donald C. Cook
4. Seabrook
5. Rancho Seco
6. San Onofre

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: James T. Doudiet

Title or Position: Treasurer

Degrees: City College of San Francisco, A.A. 1965

University of California (Berkeley), B.S. Mechanical
Engineering, 1967

University of California (Berkeley), M.B.A. Finance 1969

Professional Experience: 1966-67 - Pacific Gas and Electric Company;
Engineering Trainee, Steam Generation;
Economics & Statistics (part-time)

1969 - Financial Analyst

1971 - Manager of Financial Planning and Analysis

1974 (Jan.) - Assistant Treasurer and Manager of Financial
Planning and Analysis

1976 (Jan.) - Treasurer

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Vincent J. Chio

Title or Position: Senior Civil Engineer

Degrees: Bachelor of Science, University of California 1959 - Continuing
Education courses and professional conferences related to structural
analysis, design and project management.

Professional Experience: Continuously employed since 1959 in the Company's
Engineering Department with increasing levels of responsibility for
structural design of Fossil and Nuclear fueled power plants. Involved
with structural design coordination, supervision, and review for the
Diablo Canyon Nuclear Power Plant structures since 1970. Registered
Civil Engineer, California. Member American Society of Civil Engineers.

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: John M. Gisclon

Title or Position: Senior Power Production Engineer

Degrees: B.S. - Mechanical Engineering, University of Nevada,
1961.

Professional Experience: Registered Nuclear Engineer -
California Diablo Canyon Plant Staff - Power Production/
Senior Power Production Engineer - Pacific Gas and
Electric Company, 8 years. Plant Systems Engineer
Westinghouse Electric Corporation, Naval Reactors
Facility, 16 months. Power Production Engineer on
Humboldt Bay Power Plant Staff, Pacific Gas and Electric
Company, 2 years.

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: H. James Gormly

Title or Position: Supervising Mechanical Engineer

Degrees: B. A. Physics, San Francisco State (1960)

M.S. Mechanical Engineering, San Jose State (1966)

Professional Experience: Registered Mechanical & Nuclear
Engineer, California. Employed with PGandE 23 years.
Senior Mechanical Engineer, 1968-1976. Supervising
Mechanical Engineer, 1977. For the past five years,
I have been the Chief Mechanical and Nuclear Engineer
assigned to the Diablo Canyon Project.

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Stanley A. Hanusiak

Title or Position: Civil Engineer

Degrees: Graduated from Cracow Technical University in Poland with BSCE (1953)
and MSCE (1955) majoring in Structures. Continuing education courses
and professional conferences related to structural mechanics, dynamic
and seismic analysis, design of nuclear power structures.

Professional Experience: _____

Twenty-five years of structural engineering experience including 16 years
of experience related to steam and nuclear power plant design with

Pacific Gas and Electric Company. Also:

One year with Kaiser Engineers in Oakland, California.
(design of cement plant structures).

Two years at Pennsylvania Glass Sand Corporation, West Virginia.
(mineral processing facilities).

Five years at Ministry of Construction Materials in Poland.
(design of cement plant structures).

P.E. registered in California (Civil Engineer and Structural Engineer)
and West Virginia (Structural Engineer).

Member of ASCE.

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: John F. Helms

Title or Position: Manager, Financial Planning and Analysis

Degrees: University of Washington, B.A. Business Administration, 1953
University of California (Berkeley), M.B.A. 1960

Professional Experience: 1960-62 - IBM Corporation, Oakland, Sales Rep.

1962-66 - General Electric Company, San Jose, Financial
Management Training Program

1966-71 - Memorex Corporation, Santa Clara, Senior Systems Analyst

1961-76 - Pacific Gas and Electric Company, San Francisco,
Financial Analyst

1976 - Manager of Financial Planning and Analysis

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RESUME OF QUALIFICATIONS
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Name: Julius Erich Herbst

Title or Position: Engineer

Degrees: Ingenieur fuer Elektrotechnik

(Electrical Engineer)

Ingenieur-Schule Polytechnikum Giessen Germany (1950)

Professional Experience:

1950-59 Lahmeyer Frankfurt, Germany,

Surveying and Design of Transmission Lines

1959-61 Western Knapp Engineering Co.

San Francisco

Design of Or Beneficiation Plants

1961-Present PG&E

Design of Transmission and
Distribution Substations (7 years)

Design for Steam Power Plants (10 years)

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January 1977 - Project Engineer for the Diablo Canyon Project.
Present

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RESUME OF QUALIFICATIONS
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Name: Ross M. Lavery

Title or Position: Senior Mechanical Engineer

Degrees: Bachelor of Science Degree in Mechanical Engineering
from College of Engineering, University of California,
Berkeley 1954

Professional Experience: Continuously employed in the Company's
Mechanical and Nuclear Engineering Department since 1957.
Involved in the design of mechanical systems and compo-
nents for fossil and geothermal power plants. Presently
responsible for seeing that the design of mechanical
components and systems which are a part of or related
to the nuclear steam supply system meet all the require-
ments placed on them at the Diablo Canyon Project.
Member American Society of Mechanical Engineers.
Registered Professional Engineers in California in
both the fields of Mechanical Engineering and of
Nuclear Engineering.

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RESUME OF QUALIFICATIONS
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Name: Ming E. Lee

Title or Position: Civil Engineer

Degrees: AA Degree, Architectural Engineering Technology

City College of San Francisco 1961

BSCE, Heald Engineering College 1972

Professional Experience: All with Pacific Gas & Electric Company

1968-1970: Engg. Designer, Design Drafting Department-prepared design
calculations & drawings for power plant facilities.

1971-1972: Siting Department-performed site studies and prepared plant
layouts for prospective new sites.

1972-present: Civil Engineer, Civil Engineering Department

In Charge of:

- 1) The design of the circulating water system and plant utilities for Diablo Canyon Project.
- 2) The design of equipment foundations, underground piping systems and retention ponds of the waste treatment systems at ten power plants.

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RESUME OF QUALIFICATIONS
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Name: Chung M. Li

Title or Position: Civil Engineer

Degrees: Bachelor of Science degree - 1953, National Taiwan University, Taiwan, China

Master of Science degree - 1959, University of Tennessee, Tennessee

Professional Experience: _____

1968 - Present Pacific Gas and Electric Co., San Francisco, CA

Diablo Canyon Nuclear Power Plants

1966 - 1968 C. F. Braun, Alhambra, CA

Refinery

1964 - 1966 Bechtel Corporation, San Francisco, CA
Nuclear Power Plant (Tarapur, India project)

1959 - 1964 Rust Engineering Co., Birmingham, AL
Diversified industrial building (steel mills, chemical
plants, paper mills).

1958 - 1959 University of Tennessee
Part-time job while studying for M.S.; worked for Professor
Walker

1953 - 1957 Silos, harbor work, etc.
Taiwan, China

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BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)	
)	
PACIFIC GAS AND ELECTRIC COMPANY)	Docket Nos. 50-275 O.L.
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(Diablo Canyon Nuclear Power)	
Plant, Units No. 1 and 2))	

RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: John A. McLaughlin

Title or Position: Senior Civil Engineer

Degrees: Bachelor of Science Degree in Civil Engineering,
Healds Engineering College of San Francisco 1957

Professional Experience: Twenty-one years of engineering in Power
Plant Site development, yard utilities, and cooling
water design. My experience in nuclear power began in
1967 when I was assigned to the Diablo Canyon project
and have devoted essentially half my time to the project.
Since 1974, I have been involved in the nuclear standards
effort and am currently in four work groups under sub-
committee ANS-2, Site Evaluation, of the American Nuclear
Society Standards Committee. I am a member of the American
Society of Civil Engineers and am currently chairman of
the local ASCE Section's technical group on power and
energy.

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Alfred W. Medcalf

Title or Position: Senior Steam Generation Engineer

Degrees: B.E.E., University of Louisville, 1956

M.S., Physics, University of Louisville, 1961

Professional Experience:

1956-1959 - U.S. Navy, Gunnery Officer
and Instructor

1960-1964 - Pile Physicist, General Electric Company,
Richland, Washington

1964-1966 - Nuclear Physicist, USAEC, Berkeley, California

1966-1970 - Shift Supervisor, LPTR, University of California,
Livermore, California

1971-Present - Steam Generation Engineer, Electric Operations,
Pacific Gas and Electric Company

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Donald Nielsen

Title or Position: Senior Electrical Engineer

Degrees: B.S., U.C. Berkeley, Electrical Engineering

Professional Experience: _____

1. Substation Engineer - PGandE, San Joaquin Division
 2. Electrical Engineer - PGandE, General Office
 3. Senior Electrical Engineer - General Office
- _____

General Office experience was in the field of electrical design of metropolitan substations and thermal power plants, including nuclear and fossil fueled. Also had experience on distribution engineering in distribution equipment specifications and tests.

I am a registered electrical engineer in the State of California.

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Oscar A. Rocha

Title or Position: Civil Engineer

Degrees: BSCE, National University of Nicaragua; Registered Professional Engineer,
California; member of American Society of Civil Engineers; member of
American Concrete Institute Committee 307.

Professional Experience: Fifteen years of experience in the design of tanks,
stacks, ducts and utilities for Fossil and Nuclear Power Plants for
Pacific Gas and Electric Company.

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1970-Present - Power Plant Engineer at Diablo Canyon Power Plant

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Igor Sokoloff

Title or Position: Civil Engineer

Degrees: Bachelor of Science Degree, Heald Engineering College, 1968; continuing
education courses related to analysis and design of structures.

Professional Experience: Continuously employed since 1969 in the Company's
Engineering Department with responsibility for analysis and design of
Auxiliary Building of the Diablo Canyon Nuclear Power Plant. Registered
Civil and Nuclear Engineer, California; member of American Society of
Civil Engineers; American Nuclear Society.

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Steven E. Traisman

Title or Position: Mechanical Engineer

Degrees: B.S., Engineering Mechanics, University of Wisconsin, 1969
M.S., Engineering Mechanics, University of Wisconsin, 1969
M.S., Environmental Engineering, John Hopkins University, 1974

Professional Experience: Registered Professional Engineer - Calif., Wis.
1971-1974 - Instructor, U.S. Naval Nuclear Power School
1975-Present - Mechanical Engineer, PGandE. Involved in
fire protection for Humboldt Bay Power Plant #3 and Diablo
Canyon from 1976 to the present.

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Thomas G. de Uriarte

Title or Position: Senior Engineer

Degrees: B.S., Civil Engineering, U.C. Berkeley, 1967

Professional Civil Engineer

Professional Quality Engineer

Professional Experience: 1967-Present - PGandE

4-1/2 years - General Construction (3 years - Pittsburg

Power Plant #7)

7 years - Quality Assurance (Primarily related to

Diablo Canyon)

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Michael V. Williamson

Title or Position: Civil Engineer (Licensing Engineer for Diablo Canyon)

Degrees: B.S., 1970, California State University, Los Angeles,
Engineering

Professional Experience: 1970-Present - Registered Civil Engineer,
Pacific Gas and Electric Company
1970-1972 - Junior Engineering Designer working on
structural design for Diablo
1972-Present - Various assignments, including Mendocino
Nuclear Project, Stanislaus Nuclear Project
and Diablo Canyon. Diablo Canyon Engineer
since February 1977.

Titles and Chronology:

July 1970 - September 1972 - Junior Engineering Designer
September 1972 - October 1973 - Engineer
October 1973 - Present - Civil Engineer

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Russell F. Wischow

Title or Position: Director of Quality Assurance

Degrees: Ph.D. Vanderbilt University 1958

M.S. North Dakota State University 1952

B.S. North Dakota State University 1951

Professional Experience: 1976 - Present: PGandE Director, Quality Assurance
1970 - 1976: President, Nuclear Audit and Testing Co. and Vice President,
E. R. Johnson Assoc., Inc., Vienna, Virginia
1967 - 1970: Director, Division of Nuclear Material Safeguards,
U. S. Atomic Energy Commission
1965 - 1967: Assistant General Manager, Nuclear Fuel Services,
Rockville, Maryland and West Valley, New York
1963 - 1965: Supervisor, Nuclear Division, Martin Marietta Corp.,
Baltimore, Maryland
1961 - 1963: Senior Research Chemist, Callery Chemical Co., Callery, PA
1952 - 1961: Group Leader, Oak Ridge National Laboratory, Oak Ridge, TN
(Scholastic Leave of Absence 1956 - 1958)

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Robert Allyn Young

Title or Position: Electrical Engineer

Degrees: Bachelor Science, Electrical Engineering,
University of California 1961

Professional Experience: 5 1/2 years Industrial Control Manufac-
turing; 2 years Power Plant & Mining Facilities Design
(Bechtel Corp.); 9 1/2 years Design Engineering Diablo
Canyon (PGandE); Registered Professional Engineer
(California No. 7102) in 1969.

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Norman L. Ziomek

Title or Position: Mechanical Engineer

Degrees: Bachelor of Mechanical Engineering, University of
Santa Clara 1960

Professional Experience: Continuously employed in the Company's
Mechanical and Nuclear Engineering Department since 1969.
Involved in systems and equipment engineering for Diablo
Canyon Power Plant mechanical systems. Prepared and
directed conceptual and final designs, engineering
calculations, specifications, and administered contracts
with equipment suppliers. Assistant to the project
engineer for planning, scheduling and coordinating
engineering and design for future nuclear generating
plants. Professional Mechanical Engineer, State of
California.

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Thomas C. Esselman

Title or Position: Manager, Support Structures Design,
Equipment Engineering for Westinghouse

Degrees: B.S. Case Western Reserve University, Mechanical Engineering
M.S. Case Western Reserve University, Mechanical Engineering
Ph.D. Case Western Reserve University, Mechanical Engineering

Professional Experience: In my current position, I am responsible
for the design and analysis of Class I component supports
to withstand postulated seismic and blowdown conditions.
My duties also include the design, analysis, and development
of criteria for equipment and piping supplied by Westinghouse
to assure its capability to withstand normal operating
conditions and abnormal conditions such as earthquake and
postulated pipe ruptures. During the past five years, I
have been involved with studies and analyses of the seismic
and blowdown qualification of Diablo Canyon. I have had
lead responsibility for the qualification of all equipment
supplied by Westinghouse, which includes piping, components,
and auxiliary and electrical equipment. I am a member of
the ASME and have served as a consultant to a task force
investigating ASME faulted condition limits. I have also
served with the ANSI-N45 Committee as a task force member
in the preparation of a methodology for assuring pump
operability.

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Wilmer C. Gangloff

Title or Position: Project Manager for Westinghouse

Degrees: B.S. in Physics, Ohio State University 1964

Professional Experience: During my employment with Westinghouse,
I have held positions of responsibility in the areas of
reliability analysis of control and protection systems
performance for various postulated normal and accident
conditions. I have also had lead responsibility for
reviewing conformance of safety and licensing standards
in the areas of control and electrical systems, core
designs, and postulated accidents. Prior to my current
position, I was one of those responsible for the devel-
opment of safety criteria and standards for Westinghouse
pressurized water reactor plants.

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Chi-Win Lin

Title or Position: Fellow Engineer for Westinghouse

Degrees: B.S., Civil Engineering, Taiwan Proc. Cheng-Kung University
1961
M.S., Engineering Mechanics & Sciences, University of Florida
1964
Ph.D., Engineering Mechanics & Sciences, Georgia Institute
of Technology 1966

Professional Experience: I joined Westinghouse Electric Corporation
in October 1969 as a senior engineer in the Auxiliary
Equipment group of the Pressurized Water Reactor Systems
Division. My responsibility was a lead engineer respon-
sible for the development of the methods and the analysis
of the auxiliary mechanical equipment. In February 1974,
I was promoted to Fellow Engineer and working for the
Structural Technology group in the same Division. I was
responsible for the development of the seismic methods
and criteria for systems and components, and was responsible
for the auxiliary mechanical equipment analysis for special
projects. On October 1, 1978, I was transferred to the
Plant Structural Engineering group and assumed the present
responsibility.

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Bruce A. Bolt

Title or Position: Professor of Seismology

Degrees: Ph.D. University of Sydney, Aust. 1959

D.Sc. University of Sydney, Aust. 1972

Professional Experience: Consulting Board for Earthquake Analysis,
Dept. of Water Resources 1967 to present; Veterans
Administration, Earthquake and Wind Forces Committee
1971-1975; California Seismic Safety Commission 1978
to present; Member Office of Emergency Services Advisory
Panel on Earthquake Prediction 1976- ; Chairman Panel
on Seismographic Networks, National Academy of Sciences
1978; Member National Academy of Engineering; Registered
Geologist and Geophysicist (California).

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RESUME OF QUALIFICATIONS
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Name: Dr. C. Allin Cornell

Title or Position: Consultant and Prof. of Civil Engineering
M.I.T., Cambridge, MA 02139

Degrees: A.B. Architecture, 1960, Stanford University
M.S. Civil Engineering, 1961, Stanford University
Ph.D. Civil Engineering, 1964, Stanford University

Professional Experience: Research, teaching and consulting in
earthquake engineering with special emphasis on proba-
bilistic approaches to seismic hazard definitions.
Dr. Cornell has acted as consultant on seismic design
criteria and risk analyses for several nuclear power
plants in the U.S., on air-craft crash risk analysis for
nuclear power plants, on seismic risk analysis and
ground motion for major dam projects, on wind-loading
design specifications for high buildings, on probabilistic
fire safety analysis; etc. The consulting services were
rendered to U.S. government agencies, to utilities, to
engineers/architects companies, and to special engineering
consultant firms.

The book by J.R. Benjamin and C.A. Cornell "Probability,
Statistics and Decision for Civil Engineers", McGraw-
Hill Book Co., New York 1970, can be regarded as the
standard text book in this field.

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Richard H. Jahns

Title or Position: Consultant (Prof. of Geology and Dean, School of Earth Sciences, Stanford University)

Degrees: B.S. Caltech, 1935; M.S. Northwestern, 1937;

Ph.D. Caltech, 1943. All degrees in Geology.

Professional Experience: Experience in petrology, mineralogy,
and economic, engineering, glacial, and structural
geology during past 42 years of work with U.S. Geological
Survey and at Caltech, Penn State, and Stanford. Much
of this experience was in California, including several
parts of the coastal region. Publications comprise
several monographs and more than 100 scientific papers.
Edited and contributed to "Geology of Southern California",
published in 1954 as Bulletin of 170 of California
Division of Mines.

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Dr. H. Bolton Seed

Title or Position: Professor of Civil Engineering, Geotechnical Engineering, Department of Civil Engineering, University of California, Berkeley

Degrees: B.S. Kings College, London University 1944

S.M. Harvard University 1947

Ph.D. Kings College, London University 1948

Professional Experience: Dr. H. Bolton Seed is a member of the faculty of the Department of Civil Engineering, University of California, Berkeley, since 1950 and has been engaged in research and instruction in soil mechanics, seismic ground motion, soil liquefaction under seismic excitation, soil-structure interaction analyses for seismic response, seismic design of large civil engineering structures, etc.

Dr. Seed has been Chairman of the Department of Civil Engineering, U.C. Berkeley, during 1965-1971.

Dr. Seed has acted as consultant on soil mechanics and seismic design problems to: U.S. Nuclear Regulatory Commission; Atomic Energy Organization of Iran; U.S. Army Corps of Engineers; U.S. Bureau of Reclamation; U.S. Department of the Interior; U.S. Geological Survey; U.S. Navy; U.S. National Aeronautics and Space Division; State

(contd)

Professional Experience: contd.

of California Department of Water Resources, Division of Highways, Division of Mines and Geology; Pacific Gas and Electric Company; Los Angeles Department of Water and Power, Oak Ridge National Laboratory; Westinghouse-Hanford Company, etc. Dr. Seed is further acting as special consultant of solid mechanics and seismic design problems to several Engineers/Architects and Consulting Engineers Companies.

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Robert T. Lawson

Title or Position: Executive Vice President

Degrees: B. S., Civil Engineering, University of Washington, 1948

Professional Experience: _____

1948-50 - Dames & Moore- Junior Engineer to Project Engineer

1950-52 - U.S. Marine Corps - Infantry Officer

1952-60 - Dames & Moore - Various levels of increasing
responsibility to Partner in the S.F. office

1960- Present - Harding-Lawson Associates Executive Vice-
President, consulting engineer

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: John Lysmer

Title or Position: Professor of Civil Engineering

Degrees: M.Sc., Technical University of Denmark, 1954
Ph.D., University of Michigan, 1963

Professional Experience: _____

1965-78 Professor of Civil Engineering
University of California, Berkeley, and
Consultant to numerous organizations in the areas
of soil dynamics and earthquake engineering.

1962-65 Research Assistant and Lecturer
University of Michigan

1961-62 Instructor and Research Engineer
University of Florida

1955-61 Civil Engineer
Ove Arup and Partners
London U.K. and Lagos, Nigeria

1954-55 Civil Engineer
Preben Schønning, Copenhagen, Denmark

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Stewart W. Smith

Title or Position: Professor and Chairman, Graduate Program in Geophysics
University of Washington, Seattle, WA 98195

Degrees:

1954 S.B. Geology and Geophysics, Massachusetts Institute of Technology

1957 M.S. Geophysics, California Institute of Technology

1961 Ph.D. Geophysics and Mathematics, California Inst. of Tech.

Professional Experience:

Geophysicist, Shell Oil Company 1954-1957

Assistant Prof. of Geophysics, Caltech 1961-1964

Associate Prof. of Geophysics, Caltech 1964-1970

Professor and Chairman, University of Washington 1970-present

Independent Consultant in seismology, 1966-present

Registered Professional Geophysicist, State of California

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Takekazu Udaka

Title or Position: Manager, Soil Dynamics and Earthquake Engineering

Degrees: Ph.D. Civil Engineering (Earthquake Engineering), U.C., Berkeley

M.S. Civil Engineering (Soil Mechanics), U.C., Berkeley

B.S. Civil Engineering (Soil Mechanics), Kyoto Univ., Japan

Professional Experience: Dr. Udaka has participated in the development
and application of analytical procedures for the seismic analysis
of soil deposits, earth structures, and soil-structure systems.

He is the author or co-author of the finite element computer
programs FLUSH, LUSH, TRIP and TRAVEL. Dr. Udaka specializes

in soil dynamics, especially in the analysis of soil-structure
interaction problems. Representative projects he has worked
on include: traveling wave seismic analysis of Fort Peck Dam,
Montana; soil-structure interaction analyses for Fast Flux
Testing Facility, Washington; soil-structure interaction analyses
for South Texas Nuclear Project; seismic stability analyses of
cooling ponds at X24-X25 Nuclear Plant Site, Mississippi; soil-
structure interaction studies for the General Electric Company
Standard Nuclear Plant; site-dependent response spectra study
for WPPSS-Hanford Nuclear Power Plant; pipeline displacement
study for Southwest Ocean Outfall Project, California (SWOOP);
soil-structure interaction studies of underground storage tanks
at Diablo Canyon Nuclear Power Plant, California; Seismic
Qualification Studies for underground pipeline using traveling
seismic waves at Diablo Canyon Nuclear Power Plant.

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RESUME OF QUALIFICATIONS
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Name: John A. Blume

Title or Position: President, URS/Blume 1971-present

Degrees: Stanford University, Ph.D. Structural/Earthquake
Engineering, 1967
Stanford University, Engineer, Structural Engineering,
1935
Stanford University, B.A. Civil Engineering, 1933

Professional Experience: _____

URS/John A. Blume & Associates, Engineers, San
Francisco, California, President and Director,
1971-present; John A. Blume & Associates, Engineers,
President, 1957-1971; John A. Blume, Structural
Engineer, Owner, 1945-1957

H. J. Brunnier, San Francisco, California, Engineer
in Charge of Design, 1940-1945

Standard Oil Company of California, San Francisco,
Engineer, 1936-1940

State of California, Division of Highways, Engineer,
1935-1936

U.S. Coast and Geodetic Survey, Seismological Division,
San Francisco, California, Research Engineer,
1934-1935

Stanford University, Stanford, California, Research
Assistant, 1933-1934

Dr. Blume participates in and directs special projects and research operations for the firm. He is an authority on earthquake engineering and structural dynamics and pioneered the development and application of new concepts of seismic design and analysis.

He has served for several years as principal consultant for studies of structural response to underground nuclear explosions for the U.S. Department of Energy Nevada Operations Office. He is also an active consultant on the earthquake aspects of nuclear power plant licensing, seismic criteria, and design for both the federal government and private industry. He is an advisor to the national Science Foundation on research policy and earthquake engineering.

Dr. Blume was Chairman of the Management Committee for the design of all structures and site work for the \$114-million Stanford Linear Accelerator Center. The John A. Blume Earthquake Engineering Center at Stanford University is named for him.

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Dilip P. Jhaveri

Title or Position: Vice President, URS/John A. Blume & Associates,
Engineers.

Degrees: University of Michigan, Ph.D. Civil Engineering, 1967
University of Michigan, M.S.E. Civil Engineering, 1963
Gujarat University, India, B.E. Civil Engineering, 1961

Professional Experience: _____

URS/John A. Blume & Associates, Engineers, San Francisco,
California, Vice President, 1977-present; Project
Engineer, 1969-present; Structural Dynamics Engineer,
1967-1969

University of Michigan, Department of Civil Engineering,
Research Associate, 1963-1966

N. N. Purandare, Consulting Engineer, Bombay, India,
Assistant Design Engineer, 1961-1962

Dr. Jhaveri has extensive experience in structural engineering, including computer-aided structural analyses, and soil-structure dynamics studies. Projects

have included seismic analyses of high-rise buildings, piping and equipment, buried structures, and other special structures. He has worked on several projects involving both linear and nonlinear dynamic analysis under earthquake loading.

Dr. Jhaveri has also been responsible in various capacities for seismic analyses of structures for nuclear power plants, including Kewaunee in Wisconsin, Indian Point Units 1 and 2 in New York, and Diablo Canyon in California. He has provided technical consultation on all analyses involving very high g-level seismic inputs for Diablo Canyon. He has also been in charge of a study to improve the seismic resistance capability of General Electric's BWR/6 Mark III standard plant and a generic review of the seismic design adequacy of the High-Temperature Gas-Cooled Reactor core and internals performed for the U.S. Nuclear Regulatory Commission.

He has been in charge of soil-structure interaction research conducted for the Electric Power Research Institute and for the Pacific Gas & Electric Company's Diablo Canyon Nuclear Power Plant. He has performed statistical analysis of ground motion records to observe the influence of local soil conditions and has been responsible for development of analytical techniques and computer programs for two- and three-dimensional static and dynamic analysis of high-rise structures.

Dr. Jhaferi has directed linear and nonlinear seismic analyses of buried radioactive waste tanks and other waste-processing facilities at the Savannah River Plant in South Carolina and the Hanford Atomic Reservation in Washington. He has also been in charge of analysis and seismic design of several high-rise buildings such as the One Embarcadero Center office building and the Hyatt Regency Hotel in San Francisco and the Bonaventure Hotel in Los Angeles.

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Lincoln Edgar Malik

Title or Position: Senior Engineer, URS/John A. Blume &
Associates, Engineers

Degrees: University of California, Berkeley, Ph.D. Civil
Engineering, 1976
Stanford University, Degree of Engineer, 1970
Stanford University, M.S. Civil Engineering, 1969
University of California, Berkeley, B.S. Civil Engineering,
1964

Professional Experience: _____

URS/John A. Blume & Associates, Engineers, San Francisco,
California, Senior Engineer, 1976-present

University of California, Berkeley, Department of Civil
Engineering, Research Assistant, 1971-1976

Sargent and Lundy Consulting Engineers, Chicago, Illinois,
Design Engineer, 1965-1968

Westenhoff and Novak Consulting Engineers, Chicago, Illinois,
Design Engineer, 1964

Dr. Malik has worked on concrete and steel design of conventional and nuclear power plants. He has been leader of the group responsible for designing the radiation waste building, service building, and turbine building of Quad Cities Nuclear Power Plant. He has participated in the design of several buildings of the Kincuid Power Plant and in the seismic analyses of structures and in licensing meetings before the U.S. Nuclear Regulatory Commission staff for the Diablo Canyon Nuclear Power Plant.

Dr. Malik has also done research on the response of the Olive View Medical Center in Los Angeles to the 1971 San Fernando earthquake, performing static and dynamic computer analyses, and has investigated the contribution of floor systems to the dynamic characteristics of buildings, while working as a research assistant at the University of California.

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: David Williams

Title or Position: Senior Research Engineer, URS/
John A. Blume & Associates, Engineers

Degrees: University of Canterbury, New Zealand, Ph.D. Structural/
Engineering, 1971
University of Canterbury, New Zealand, B.E. (Honors)
Civil Engineering, 1967

Professional Experience: _____

URS/John A. Blume & Associates, Engineers, San Francisco,
California, Senior Research Engineer, 1977-present
University of California, San Diego, Consultant Associate,
1976-1977

University of California, Berkeley, Department of Civil
Engineering and Earthquake Engineering Research
Center, Assistant Research Engineer, 1972-1976
Christchurch Technical Institute, New Zealand, Department
of Civil Engineering, Lecturer, 1970-1971
University of Canterbury, New Zealand, Department of
Structural Engineering, Teaching Assistant, 1968-1971

Dr. Williams has been responsible for management of a research effort to determine the effects of wind loading on high-rise buildings and to compare these with the effects of ground motion. This has involved both experimental and analytical considerations and their correlation. Response predictions based on both deterministic and nondeterministic analyses have been undertaken. He has also been responsible for evaluating the response of existing structures to postulated future earthquakes. His experience has included analysis and design of structural systems subjected to dynamic loads, including assessment of the reliability of fixed offshore platforms.

Dr. Williams has implemented the experimental phase of a comprehensive research project concerned with seismic response and design of modern highway bridges, a program sponsored by the U.S. Department of Transportation following the damaging San Fernando earthquake of 1971. This investigation has included a model study and detailed tests using a shaking table. In addition to feasibility studies, design, organization, and supervision of the experimental program from its conceptual stage, the project has included linear and nonlinear theoretical response prediction and its correlation with measured response. Dr. Williams has also conducted analytical and experimental research related to seismic-resistant design of masonry structural systems and has served as a consultant in this field.

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Ahmad F. Kabir

Title or Position: Senior Engineer, URS/John A. Blume
and Associates, Engineers

Degrees: University of California, Berkeley, Ph.D. Structural
Engineering, 1976
University of Waterloo, Canada, M.A.Sc. Structural
Engineering, 1970
University of Engineering and Technology, Bangladesh,
B.Sc. Civil Engineering, 1966

Professional Experience: _____

URS/John A. Blume & Associates, Engineers, San Francisco,
Senior Engineer, 1976-present

University of California, Berkeley, Department of Civil
Engineering, Research Assistant, 1971-1976

University of Waterloo, Ontario, Canada, Department of
Civil Engineering, Teaching Assistant, 1968-1970

University of Engineering and Technology, Dacca, Bangladesh,
Department of Civil Engineering, Lecturer, 1968

Government of Pakistan, Department of Telegraph and
Telephones, Dacca, Bangladesh, Consultant, 1967-1968

Omarsons, Ltd., Dacca, Bangladesh, Assistant Engineer, 1967

Dr. Kabir has worked on numerous structural design and analysis projects, including the prestressed concrete folded-plate roof of the multipurpose arena of Hong Kong University, the aerial superstructure of the Metropolitan Atlanta Rapid Transit Authority, a ramp bridge at the Taiwan airport, the Djakarta sports pavillion in Indonesia, and the San Jose Auditorium. He has also participated in the design of an offshore platform, industrial buildings, and several box girder bridges. He has worked on seismic studies for the Diablo Canyon Nuclear Power Plant and participated at licensing meetings before the U.S. Nuclear Regulatory Commission staff. Other assignments include work on soil-structure interaction studies for the Electric Power Research Institute.

Dr. Kabir has done research on the behavior of various types of reinforced concrete structures subjected to creep, shrinkage, temperature changes, and other time-dependent effects while at the University of California, Berkeley.

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Andrew B. Cunningham

Title or Position: Senior Engineering Geologist, URS/
John A. Blume and Associates, Engineers.

Degrees: University of California, Berkeley, M.A. Geological
Sciences, 1955
University of California, Berkeley, B.A. Geological
Sciences, 1951

Professional Experience: _____

URS/John A. Blume & Associates, Engineers, San Francisco,
California, Senior Engineering Geologist, 1967-present
Harding Associates, Soil Mechanics Engineers, San Rafael,
California, Engineering Geologist, 1963-1967
State of California, Department of Water Resources, Engineer-
ing Geologist, 1960-1963
Southern Pacific Company, Western United States,
Geologist, 1956-1960
Bear Creek Mining Company, Utah, Geologist, 1955-1956
University of California, Berkeley, Teaching and
Research Assistant, 1954-1955
Anaconda Copper Mining Company, Death Valley, California
Mine Engineer, 1951-1953

Mr. Cunningham is responsible for geologic and seismologic investigations and evaluations. He has carried out studies for high-rise buildings, hospitals, industrial plants, nuclear facilities, and other structures at a variety of sites, including desert and offshore sites. He is experienced in all phases of surface and subsurface geologic investigations and in such geophysical techniques as gravity, magnetic, and seismic measurements. He has investigated canal and tunnel alignments and dam sites for the California aqueduct system and has performed investigations to determine dynamic soil properties at the sites of large commercial buildings such as One Embarcadero Center in San Francisco and high-rise buildings in Iran. He is also an experienced mine engineer and mineral exploration geologist. Mr. Cunningham has conducted geologic and seismic evaluation studies for nuclear waste treatment plants, waste storage sites, and other nuclear installations throughout the United States and in various parts of the world. He has been in charge of geologic mapping, geophysical exploration, and other studies necessary to establish seismic criteria for the Fast Flux Test Facility at Hanford, Washington. He has carried out seismic and geologic studies at the Diablo Canyon Nuclear Power Plant site in California; the proposed Verplanck Nuclear Power Plant site in New York; and the U.S.

Department of Energy Savannah River Plant, South Carolina, and the Oak Ridge and Hanford reservations.

Mr. Cunningham has made numerous presentations before both state and federal government organizations, including the Advisory Committee on Reactor Safeguards, and has participated in reviewing more than 20 preliminary safety analysis reports for nuclear power plants for the Division of Reactor Licensing of the U.S. Atomic Energy Commission (succeeded by the Nuclear Regulatory Commission).

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: B. (Chuck) Chakravartula

Title or Position: PIPEDS Marketing and Technical Representative
for URS/John A. Blume & Associates

Degrees: University of California, Berkeley: M.D.A. Business
Administration, 1973. University of California,
Berkeley: M.S. Civil Engineering, 1970. Indian
Institute of Technology, Madras, India: B. Tech.
Civil Engineering, 1968

Professional Experience: URS/John A. Blume & Associates, Engineers,

San Francisco, California, PIPEDS Marketing and

Technical Representative, 1977-present

EDS Nuclear, San Francisco, California, Senior Lead

Engineer, 1973-1977

University of California, Berkeley, Teaching Fellow, 1971-1973

University of California, Berkeley, Department of Civil
Engineering, Graduate Research Assistant, 1968-1971

Mr. Chakravartula has extensive experience in piping
analysis of nuclear power plants in technical and
administrative capacities, including budgeting, planning
and evaluating alternative projects, quality assurance

B. (Chuck) Chakravartula

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and documentation, computer programming applications, and client liaison.

As Marketing and Technical Representative of the PIPESD piping analysis program (pipe structural and dynamic analysis), Mr. Chakravartula has been responsible for supervising all program development and coordinating worldwide program marketing efforts. His duties have included revising the program for code compliance, conducting technical seminars, documenting and maintaining quality assurance for program revision, and client liaison. Mr. Chakravartula has also been involved in the Hanger Design Review for Diablo Canyon Nuclear Power Plant, using PIPESD to determine the adequacy of the hanger under the Hosgri Spectra loads.

Mr. Chakravartula has participated in stress analysis of piping systems of nuclear power plants for Duke Power Company, with responsibilities in administration and supervision of the engineering staff, production schedule, and cost control data. He has performed analysis in compliance with the provisions of ASME Boiler and Pressure Vessel Code for McGuire Nuclear Station, Units 1 and 2; Catawba Nuclear Power Plant, Unit 1; and Oconee Nuclear Power Plant, Unit 1. The

work has involved fatigue evaluation and stress reports for class 1 components, stress evaluation of class 2 and 3 components, and postulation of break locations for high energy piping.

In addition, he has conducted analysis in accordance with ANSI B31.1 for the Tennessee Valley Authority at Sequoyah Nuclear Power Plant, Units 1 and 2, Watts Bar Power Plant, Units 1 and 2, involving analysis of pipe rupture, pipe whip, jet impingement, and development of jet impingement screening criteria. The project has also involved development and implementation of alternative analysis criteria for small diameter piping.

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Debabrata Ray

Title or Position: Senior Engineer, URS/Blume & Associates

Degrees: University of California, Berkeley: Ph.D. Structural
Engineering, 1974. Bengal Engineering College,
India: M.E. Civil Engineering, 1967. Bengal
Engineering College, India: B.E. Civil Engineering,
1964.

Professional Experience: URS/John A. Blume & Associates, Engineers,
San Francisco, California, Project Engineer, 1976-present;
Senior Engineer, 1975
University of California, Berkeley, Structural Engineering
and Structural Mechanics Division, Assistant
Research Engineer, 1974-1975; Research Assistant
and Teaching Assistant, 1969-1974
Chemical and Metallurgical Design Company, Ltd., New
Delhi, India, Structural Design Engineer, 1968
Metal Engineering and Treatment Company, Ltd., Calcutta,
India, Structural Design Engineer, 1967-1968
Bridge & Roof Company, Ltd., Calcutta, India, Structural
Designer, 1964-1965

Metal Engineering & Treatment Company, Ltd., Calcutta,
India, Structural Designer, 1964

Dr. Ray's experience with computer-aided engineering analysis has involved applications of numerical and computational methods. As Project Engineer for the PIPESD piping analysis program, he is responsible for developmental work, including incorporation of new features and capabilities and modification of the program. Dr. Ray is also responsible for conducting seminars in the United States and Europe on piping analysis and the American Society of Mechanical Engineers (ASME) code in relation to PIPESD. Most recently, Dr. Ray has been responsible for the development of the PIPESD/HEAT program, a thermal transient analyzer that determines temporal and spatial distribution of temperature in pipes for different fluid transient conditions and computes temperature gradients according to Section IV of the ASME Boiler and Pressure Vessel Code. The theory and computer code of PIPESD/HEAT has been solely developed by Dr. Ray. Both the PIPESD and PIPESD/HEAT programs are marketed worldwide through the Control Data Corporation.

Through his work on soil-structure interaction analysis for the Diablo Canyon Nuclear Power Plant near San Luis Obispo, California, Dr. Ray has provided testimony at public hearings of the Advisory Committee on Reactor Safety. His work has involved the generation of effective response spectra for translation, torsion, and tilting through a filtering concept for general wave-scattering phenomena arising from the shape, geometry, and rigidity of the foundations. He has been responsible for the three-dimensional finite-element seismic analysis of the Diablo Canyon intake structure including hydrodynamic effects.

Dr. Ray has been instrumental in writing the work plan for a soil-structure interaction study for the Electric Power Research Institute. He has also been responsible for the seismic analysis of nuclear-power-plant-related structures, including the Unit 1 Containment Building at the Indian Point Nuclear Power Plant in New York. Other projects have included analysis of buildings and their responses to the San Fernando, California, earthquake of February 1971; evaluation of existing structures to postulated future earthquake exposure; and dynamic analysis of equipment

and other structures. Dr. Ray has been involved with quasi-static and dynamic experimental investigation of earthquake resistance characteristics of inelastic beam-column subassemblages of multistoried steel frames for the Division of Structural Engineering and Structural Mechanics at the University of California, Berkeley. His earliest experience includes four years of work as a structural design engineer in India, during which time he worked on several projects, such as the Ni-Co sulphide refinery plant in Cuba and multicellular-shell-roof aircraft hangars.

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: David A. Lang

Title or Position: Project Manager for URS/Blume

Degrees: University of California, Berkeley, M.B.A. Business
Administration, 1978, in progress
University of California, Berkeley, M.S. Structural
Engineering/Dynamics, 1967
University of California, Berkeley, B.S. Civil Engineering,
1966

Professional Experience: _____
URS/John A. Blume & Associates, Engineers, San Francisco,
California, Project Manager, 1975-present; Senior
Engineer, 1971-1975; Engineer, 1967-1971

Mr. Lang has extensive experience in analysis and design of single and multistory public and commercial structures, steel and concrete frames, and shear-wall structures. He has been responsible for the design of all above-grade structures of the planned Yerba Buena Center Redevelopment Project in San Francisco and has served as structural project engineer for the modification and addition to the 40 x 80-Foot Wind Tunnel at Ames Research Center in

California. His design projects have included a number of research and administrative buildings for Syntex Corporation in Palo Alto, warehouse facilities for the U.S. Navy at the Port of Guam, hospital facilities at Mather Air Force Base in California, and a parking garage for the Bunker Hill complex in Los Angeles.

Mr. Lang has participated in the dynamic analysis of high-rise buildings in Las Vegas, Nevada, as part of the underground nuclear testing program for the United States Department of Energy, which involved monitoring tests and conducting subsequent surveys to ascertain damage to structures. He has performed dynamic seismic analyses of piping systems for various nuclear power plants, including the Dresden, Tsuruga, Diablo Canyon, and Oyster Creek plants. He has also analyzed piping systems and related structures for the nuclear Rocket Development Station in Nevada. He has served as project manager for the seismic evaluation of the Diablo Canyon Nuclear Power Plant and as project manager for the seismic analysis of reactor and evaporator buildings at the Savannah River Plant for E. I. du Pont de Nemours and Company.

Mr. Lang has also been involved in structural dynamics and analysis of waste treatment and storage facilities

at the Hanford Atomic Reservation in Washington for the Atlantic Richfield Hanford Company and Vitro Engineering. Mr. Lang has worked on the seismic analysis of a graphite stack for Douglas United Nuclear and a number of structures at Oak Ridge, Tennessee, for the Union Carbide Corporation and has participated in a study of the effects of Union Carbide Corporation and has participated in a study of the effects of the San Fernando earthquake on various high-rise structures in Los Angeles.

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Roger R. Villatuya

Title or Position: Senior Engineer, URS/John A. Blume & Associates,
Engineers

Degrees: Stanford University, M.S. Civil Engineering, 1967
University of the Philippines, B.S. Civil Engineering, 1964

Professional Experience: _____

URS/John A. Blume & Associates, Engineers, San Francisco,
California, Senior Engineer, 1969-present

John S. Bolles & Associates, Architects and Engineers,
San Francisco, California, Design Engineer, 1967-1969

DCCD Engineering Corporation, Consulting Engineers, Makati,
Rizal, Philippines, Design Engineer, 1964-1966

Philippine Prestressed Concrete Company, Marikina, Rizal,
Philippines, Design Engineer, 1964

Mr. Villatuya is responsible for the seismic analysis of
structures, equipment, and piping of nuclear plants,
high-rise buildings, and other complex structures.

For the Diablo Canyon Nuclear Power Plant, he has performed the dynamic seismic analysis of the containment structure (using the axisymmetric finite-element approach), the Auxiliary Building (including torsional modes of vibration), and the Turbine Building, and has performed the seismic analysis of piping systems.

Mr. Villatuya has also been responsible for the dynamic seismic analysis of the reactor building at the Duane Arnold Energy Center and several buildings at Indian Point Nuclear Power Plant and for the analysis of piping systems for static and seismic loads at the Savannah River Plant and the General Electric Test Reactor.

At the Hanford Reservation, Washington, he has made a dynamic seismic analysis of the Purex Process Facility Building, using elastic and nonlinear analyses procedures, and has made several seismic studies of underground waste storage tanks for dead, live, and thermal loads and earthquake ground motions. Mr. Villatuya has also studied damage effects of the 1971 San Fernando earthquake on office buildings in Southern California and has been involved in a statistical study of earthquake spectra.

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: RALPH T. YOKOYAMA

Title or Position: Principal Engineer, URS/Blume

Degrees: B.S., U.C. Berkeley, 1951

Registration: Civil Engineer, State of California

Structural Engineer, State of California

Professional Experience: 25 years experience in design, consultation,

seismic review and analysis of all types of structures including

highrise buildings, marine structures, and nuclear plants.

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Thomas C. Esselman

Title or Position: Manager, Support Structures Design,
Equipment Engineering for Westinghouse

Degrees: B.S. Case Western Reserve University, Mechanical Engineering
M.S. Case Western Reserve University, Mechanical Engineering
Ph.D. Case Western Reserve University, Mechanical Engineering

Professional Experience: In my current position, I am responsible
for the design and analysis of Class I component supports
to withstand postulated seismic and blowdown conditions.
My duties also include the design, analysis, and development
of criteria for equipment and piping supplied by Westinghouse
to assure its capability to withstand normal operating
conditions and abnormal conditions such as earthquake and
postulated pipe ruptures. During the past five years, I
have been involved with studies and analyses of the seismic
and blowdown qualification of Diablo Canyon. I have had
lead responsibility for the qualification of all equipment
supplied by Westinghouse, which includes piping, components,
and auxiliary and electrical equipment. I am a member of
the ASME and have served as a consultant to a task force
investigating ASME faulted condition limits. I have also
served with the ANSI-N45 Committee as a task force member
in the preparation of a methodology for assuring pump
operability.

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Chi-Win Lin

Title or Position: Fellow Engineer for Westinghouse

Degrees: B.S., Civil Engineering, Taiwan Proc. Cheng-Kung University
1961
M.S., Engineering Mechanics & Sciences, University of Florida
1964
Ph.D., Engineering Mechanics & Sciences, Georgia Institute
of Technology 1968

Professional Experience: I joined Westinghouse Electric Corporation
in October 1969 as a senior engineer in the Auxiliary
Equipment group of the Pressurized Water Reactor Systems
Division. My responsibility was a lead engineer respon-
sible for the development of the methods and the analysis
of the auxiliary mechanical equipment. In February 1974,
I was promoted to Fellow Engineer and working for the
Structural Technology group in the same Division. I was
responsible for the development of the seismic methods
and criteria for systems and components, and was responsible
for the auxiliary mechanical equipment analysis for special
projects. On October 1, 1978, I was transferred to the
Plant Structural Engineering group and assumed the present
responsibility.

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RESUME OF QUALIFICATIONS
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Name: Wilmer C. Gangloff

Title or Position: Project Manager for Westinghouse

Degrees: B.S. in Physics, Ohio State University 1964

Professional Experience: During my employment with Westinghouse,
I have held positions of responsibility in the areas of
reliability analysis of control and protection systems
performance for various postulated normal and accident
conditions. I have also had lead responsibility for
reviewing conformance of safety and licensing standards
in the areas of control and electrical systems, core
designs, and postulated accidents. Prior to my current
position, I was one of those responsible for the devel-
opment of safety criteria and standards for Westinghouse
pressurized water reactor plants.

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Bruce A. Bolt

Title or Position: Professor of Seismology

Degrees: Ph.D. University of Sydney, Aust. 1959

D.Sc. University of Sydney, Aust. 1972

Professional Experience: Consulting Board for Earthquake Analysis,
Dept. of Water Resources 1967 to present; Veterans
Administration, Earthquake and Wind Forces Committee
1971-1975; California Seismic Safety Commission 1978
to present; Member Office of Emergency Services Advisory
Panel on Earthquake Prediction 1976- ; Chairman Panel
on Seismographic Networks, National Academy of Sciences
1978; Member National Academy of Engineering; Registered
Geologist and Geophysicist (California).

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FOR SAFETY HEARINGS

Name: Dr. C. Allin Cornell

Title or Position: Consultant and Prof. of Civil Engineering
M.I.T., Cambridge, MA 02139

Degrees: A.B. Architecture, 1960, Stanford University
M.S. Civil Engineering, 1961, Stanford University
Ph.D. Civil Engineering, 1964, Stanford University

Professional Experience: Research, teaching and consulting in
earthquake engineering with special emphasis on proba-
bilistic approaches to seismic hazard definitions.
Dr. Cornell has acted as consultant on seismic design
criteria and risk analysis for several nuclear power
plants in the U.S., on air-craft crash risk analysis for
nuclear power plants, on seismic risk analysis and
ground motion for major dam projects, on wind-loading
design specifications for high buildings, on probabilistic
fire safety analysis; etc. The consulting services were
rendered to U.S. government agencies, to utilities, to
engineers/architects companies, and to special engineering
consultant firms.

The book by J.R. Benjamin and C.A. Cornell "Probability,
Statistics and Decision for Civil Engineers", McGraw-
Hill Book Co., New York 1970, can be regarded as the
standard text book in this field.

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Robert T. Lawson

Title or Position: Executive Vice President

Degrees: B. S., Civil Engineering, University of Washington, 1948

Professional Experience:

1948-50 - Dames & Moore- Junior Engineer to Project Engineer

1950-52 - U.S. Marine Corps - Infantry Officer

1952-60 - Dames & Moore - Various levels of increasing
responsibility to Partner in the S.F. office

1960- Present - Harding-Lawson Associates Executive Vice-
President, consulting engineer

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RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: John Lysmer

Title or Position: Professor of Civil Engineering

Degrees: M.Sc., Technical University of Denmark, 1954

Ph.D., University of Michigan, 1965

Professional Experience: _____

1965-78 Professor of Civil Engineering

University of California, Berkeley, and

Consultant to numerous organizations in the areas

of soil dynamics and earthquake engineering.

1962-65 Research Assistant and Lecturer
University of Michigan

1961-62 Instructor and Research Engineer
University of Florida

1955-61 Civil Engineer
Ove Arup and Partners
London U.K. and Lagos, Nigeria

1954-55 Civil Engineer
Preben Schønning, Copenhagen, Denmark

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)	
)	
PACIFIC GAS AND ELECTRIC COMPANY)	Docket Nos. 50-275 O.L.
)	50-323 O.L.
(Diablo Canyon Nuclear Power)	
Plant, Units No. 1 and 2))	

RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Richard H. Jahns

Title or Position: Consultant (Prof. of Geology and Dean, School of Earth Sciences, Stanford University)

Degrees: B.S. Caltech, 1935; M.S. Northwestern, 1937;

Ph.D. Caltech, 1943. All degrees in Geology.

Professional Experience: Experience in petrology, mineralogy,
and economic, engineering, glacial, and structural
geology during past 42 years of work with U.S. Geological
Survey and at Caltech, Penn State, and Stanford. Much
of this experience was in California, including several
parts of the coastal region. Publications comprise
several monographs and more than 100 scientific papers.
Edited and contributed to "Geology of Southern California",
published in 1954 as Bulletin of 170 of California
Division of Mines.

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NUCLEAR REGULATORY COMMISSION

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)	50-323 O.L.
(Diablo Canyon Nuclear Power)	
Plant, Units No. 1 and 2))	

RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Dr. H. Bolton Seed

Title or Position: Professor of Civil Engineering, Geotechnical Engineering, Department of Civil Engineering, University of California, Berkeley

Degrees: B.S. Kings College, London University 1944
S.M. Harvard University 1947

Ph.D. Kings College, London University 1948

Professional Experience: Dr. H. Bolton Seed is a member of the faculty of the Department of Civil Engineering, University of California, Berkeley, since 1950 and has been engaged in research and instruction in soil mechanics, seismic ground motion, soil liquefaction under seismic excitation, soil-structure interaction analyses for seismic response, seismic design of large civil engineering structures, etc. Dr. Seed has been Chairman of the Department of Civil Engineering, U.C. Berkeley, during 1965-1971.

Dr. Seed has acted as consultant on soil mechanics and seismic design problems to: U.S. Nuclear Regulatory Commission; Atomic Energy Organization of Iran; U.S. Army Corps of Engineers; U.S. Bureau of Reclamation; U.S. Department of the Interior; U.S. Geological Survey; U.S. Navy; U.S. National Aeronautics and Space Division; State

(contd)

Professional Experience: cont'd.

of California Department of Water Resources, Division of Highways, Division of Mines and Geology; Pacific Gas and Electric Company; Los Angeles Department of Water and Power, Oak Ridge National Laboratory; Westinghouse-Hanford Company, etc. Dr. Seed is further acting as special consultant of solid mechanics and seismic design problems to several Engineers/Architects and Consulting Engineers Companies.

UNITED STATES OF AMERICA
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In the Matter of

PACIFIC GAS AND ELECTRIC COMPANY

(Diablo Canyon Nuclear Power
Plant, Units No. 1 and 2)

)
) Docket Nos. 50-275 O.L.
) 50-323 O.L.
)
)
)

RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Stewart W. Smith

Title or Position: Professor and Chairman, Graduate Program in Geophysics
University of Washington, Seattle, WA 98195

Degrees:

1954 S.B. Geology and Geophysics, Massachusetts Institute of Technology

1957 M.S. Geophysics, California Institute of Technology

1961 Ph.D. Geophysics and Mathematics, California Inst. of Tech.

Professional Experience:

Geophysicist, Shell Oil Company 1954-1957

Assistant Prof. of Geophysics, Caltech 1961-1964

Associate Prof. of Geophysics, Caltech 1964-1970

Professor and Chairman, University of Washington 1970-present

Independent Consultant in seismology, 1966-present

Registered Professional Geophysicist, State of California

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In the Matter of)

PACIFIC GAS AND ELECTRIC COMPANY)

) Docket Nos. 50-275 O.L.

) 50-323 O.L.

(Diablo Canyon Nuclear Power)
Plant, Units No. 1 and 2))

RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: Takekazu Uda

Title or Position: Manager, Soil Dynamics and Earthquake Engineering

Degrees: Ph.D. Civil Engineering (Earthquake Engineering), U.C., Berkeley

M.S. Civil Engineering (Soil Mechanics), U.C., Berkeley

B.S. Civil Engineering (Soil Mechanics), Kyoto Univ., Japan

Professional Experience: Dr. Uda has participated in the development
and application of analytical procedures for the seismic analysis
of soil deposits, earth structures, and soil-structure systems.

He is the author or co-author of the finite element computer
programs FLUSH, LUSH, TRIP and TRAVEL. Dr. Uda specializes

in soil dynamics, especially in the analysis of soil-structure
interaction problems. Representative projects he has worked
on include: traveling wave seismic analysis of Fort Peck Dam,
Montana; soil-structure interaction analyses for Fast Flux
Testing Facility, Washington; soil-structure interaction analyses
for South Texas Nuclear Project; seismic stability analyses of
cooling ponds at X24-X25 Nuclear Plant Site, Mississippi; soil-
structure interaction studies for the General Electric Company
Standard Nuclear Plant; site-dependent response spectra study
for WPPSS-Hanford Nuclear Power Plant; pipeline displacement
study for Southwest Ocean Outfall Project, California (SWOOP);
soil-structure interaction studies of underground storage tanks
at Diablo Canyon Nuclear Power Plant, California; Seismic
Qualification Studies for underground pipeline using traveling
seismic waves at Diablo Canyon Nuclear Power Plant.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)
PACIFIC GAS AND ELECTRIC COMPANY) Docket Nos. 50-275 O.L.
(Diablo Canyon Nuclear Power) 50-323 O.L.
Plant, Units No. 1 and 2))

RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: C. RICHARD WILLINGHAM

Title or Position: Geophysicist, Earth Sciences Associates, Inc.

Degrees: 1966 B.A., University of California Riverside

1968 M.S., University of California Riverside

Professional Experience: _____

1966-68 Geophysicist, Texaco, Inc. Work involved determination of structure and evaluation of hydrocarbon potential of areas in Eastern Santa Barbara Channel in connection with offshore federal lease sales. Principal assignment was the interpretation of seismic reflection data, though work often involved acting as liaison between geologist and geophysicist and the correlation of geophysical and geological data.

1972 Geophysicist, U. S. Earthquake Mechanisms Laboratory. Employment involved the development of new techniques for detecting contemporary fault movements and the study of the mechanism of fault creep.

1968-78 Consulting geophysicist. Consulting assignments have involved acting as chief geophysical investigator in projects to determine the structural geology and hydrocarbon potential of major portions of the offshore California borderland.

1973-78 Geophysicist, Earth Sciences Associates, Inc. Work has included gravity, magnetic, and high resolution onshore and offshore seismic reflection studies to determine structure and seismic potential of nuclear power plant sites near Diablo Canyon, Humboldt Bay, and Collinsville, California.

1974-78 Assistant Professor of Geophysics and Astronomy, Santa Barbara City College, Santa Barbara, California.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)	
)	
PACIFIC GAS AND ELECTRIC COMPANY)	Docket Nos. 50-275 O.L.
)	50-323 O.L.
(Diablo Canyon Nuclear Power)	
Plant, Units No. 1 and 2))	

RESUME OF QUALIFICATIONS
FOR SAFETY HEARINGS

Name: DOUGLAS H. HAMILTON

Title or Position: Engineering geologist; Vice President and
Principal Geologist, Earth Sciences Associates, Inc.

Degrees: 1956 B.S., Stanford University

1962 M.S., Stanford University

Professional Experience: _____

1956 Geologist, Utah Construction Company.

1957-60 Air Intelligence Office, U. S. Navy.

1960 Geologist, Phillips Petroleum Corporation.

1961-69 Engineering Geologist, W. A. Wahler and Associates. Geologist for engi-
neering projects, especially dams, in California and Chile.

1969 Geologic research regarding faulting and landslides in the Central Andes
of Chile.

1969-78 Engineering Geologist, Earth Sciences Associates, Inc. Geologist for
engineering projects, especially siting studies and geologic hazard
assessments for power plants along the California coast. Work has
included a siting study for the California coastal region between Point
Conception and the Oregon border, and local and regional studies for
sites at Diablo Canyon, Moss Landing, Davenport, Collinsville, Point
Arena, and Humboldt Bay.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of)

PACIFIC GAS AND ELECTRIC COMPANY)

Units 1 and 2)

Diablo Canyon Site)

Docket Nos. 50-275-OL

50-323-OL

CERTIFICATE OF SERVICE

The foregoing document(x) of Pacific Gas and Electric Company has ~~been~~ been served today on the following by deposit in the United States mail, properly stamped and addressed:

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Washington, D. C. 20555

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Atomic Safety and Licensing
Board Panel
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Chairman
Atomic Safety and Licensing
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U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Secretary
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

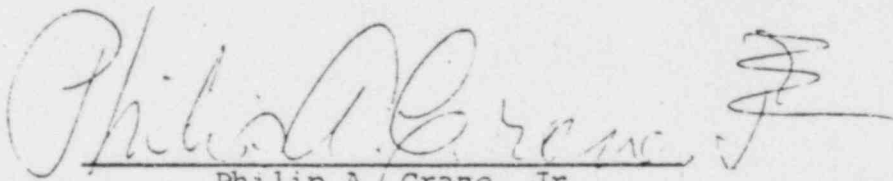
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Attorney
Pacific Gas and Electric Company

Date: October 17, 1978