UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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

AFFIDAVIT OF HOWARD B. FRIEND

STATE OF CALIFORNIA)
) ss.
CITY AND COUNTY OF)
SAN FRANCISCO)

Howard B. Friend, being duly sworn, deposes and says:

1. Initial problems discovered in the annulus area of Unit 1 of the Diablo Canyon Plant resulted in two efforts commencing in the September-October 1981 period:

a. An effort to correct the initially identified errors.

b. An effort to evaluate a sampling of other areas to determine if similar problems existed elsewhere.

2. The NRC Order and Letter dated November 19, 1981 formalized requirements for an independent verification program to be conducted on a sampling basis. This developed into the present Teledyne Engineering Services (TES)/Robert L. Cloud Associates (RLCA)/Roger F. Reedy (RFR) organization for Phase I (fuel load and low power test) with Stone and Webster Engineering Corporation (SWEC) added for Phase II (above 5% of rated power), with their extensive programs well underway.

3. The Independent Design Verification Program (IDVP) issued its first interim technical report in May which recommended expansion of the original sampling program in nine areas. While the IDVP at that time had only identified a few errors which required corrective action, the program had identified several unresolved items and concerns from which its additional sampling program was developed. These nine areas were scheduled to be completed by September, 1982.

4. Right from the beginning, back in September of 1981, PGandE had its own internal program to determine the extent of the concern. That effort has been reinforced by Bechtel and the program is now known as the PGandE/Bechtel Internal Technical Program, which has been performing work to:

a. Develop data and information for the IDVP.

b. Respond to IDVP open items and findings and implement corrective action.

c. Continue the review of engineering, particularly seismic design, to assure adequacy of the analysis and design, and to expedite the whole program.

5. In the structural area, this internal program first concentrated on developing the Blume Internal Review (BIR) to perform an in-depth review of the seismic work originally done by URS/Blume. Later, the Diablo Canyon project added technical expertise and manpower to monitor the Blume program and to perform additional evaluations and analyses. A large effort has been implemented to address the Blume findings and to further evaluate other internal findings to determine their significance and, if necessary, to develop corrective action. A large number of engineers has reviewed piping, both in response to the IDVP and in keeping with the Internal Technical Program to verify piping.

6. The findings thus far from the IDVP and the PGandE Internal Technical Program have been extensively reported. In the opinion of the PGandE/Bechtel experts, nothing discovered thus far would prevent a system, structure or component from performing its intended safety function in the event of a postulated Hosgri Earthquake. This opinion is based on the extensive studies and reviews performed by the Project's structural group and on a "Margin to Safety" analysis done by Westinghouse for the annulus piping. It remains the PGandE/Bechtel judgment that, if the sampling approach for piping and structures were continued the results would show that, while some areas of

the design may not totally meet the licensing commitments, nothing would be found that would prevent plant components from performing their intended safety functions in the postulated Hosgri event. However, the findings to date from both the IDVP and the Internal Technical Program have identified discrepancies in some portions of the seismic design. These findings have been noted and reported by both the IDVP and the Internal Technical Program through the semi-monthly reporting procedure.

7. The evaluation as to the cause of these discrepancies has not yet been completed, but it appears that the reasons involve the particular nature of seismic design and the somewhat unique development of this project. It has had many changes in the seismic criteria, spans a long period of time during which seismic technology has changed and developed, and was in some cases done or redone under very difficult conditions.

8. As discrepancies have been found in the seismic design area, both the IDVP and the Internal Technical Program have probed deeper into earlier engineering and design, and much more of the design has been reviewed than was originally planned. This gradual expansion of both the IDVP sample and the Internal Technical Program has now prompted the Project to formulate a more decisive corrective action program including a complete review of certain major areas of the plant's seismic design.

9. This corrective action program is viewed as being entirely within the scope of the existing verification program and the Internal Technical Program. The review has been expanded to a large extent in response to the initial findings of the IDVP. The Internal Technical Program has always had the responsibility for response and corrective action. The IDVP will verify the PGandE/Bechtel review and corrective action. This all fits entirely within existing programs.

10. The verification effort is definitely not being started over again at Diablo Canyon. It is intended that a complete review be done in certain areas of the seismic design, but obviously, it is not intended that engineering analyses and designs that are found to be satisfactory be redone. This complete review of all major structures includes the:

Containment Structure

Auxiliary Building (including fuel handling building)

Turbine Building

Intake Structure

11. Extensive structural verification and re-analysis has already been completed in the containment annulus, the Auxiliary Building, and the Intake Structure. The results will be submitted to the IDVP for verification. The URS/Blume organization will continue to be a major participant in this effort. However, the Project will be performing the bulk of the work with its own Project structural staff. Presently, approximately

40 engineers and analysts are working in the URS/Blume organization and over 100 engineers, analysts and designers are working on the Project structural staff.

12. In the piping area, it is planned that all large bore safety related piping design throughout the plant be verified. This involves a complete walkdown of the plant's large bore piping systems (per I.E. Bulletin 79-14 requirements), which is essentially complete, and an updating of the piping drawings to show the correct as-built piping configuration. This information will be fed into the piping analysis effort which will check the modeling, dimensions, valve orientation, use of proper spectra, etc. If appropriate, the pipe computer model for seismic, thermal and dead load will be rerun. All pipe supports will be checked and modifications will be made, if required. The small bore piping systems will be reviewed and complete reanalysis performed wherever required.

13. The corrective action program outlined above offers some significant advantages to the overall effort, not only to perform the necessary verification, but also to expedite the review and approval process. Overall, it is believed that the corrective action program is fully responsive to the requirements of the Commission Order and the findings and recommendations of the IDVP. It is believed that this is the

most efficient and effective way to further assure the safety of the plant and to move it toward successful commercial operation.

Dated: August 13, 1982

Howard B. Friend

Howard B. Friend

Subscribed and sworn to before
me this 13th day of August, 1982

Nancy J. Lemaster

Nancy J. Lemaster
Notary Public in and for the
City and County of San Francisco,
State of California.
My Commission expires April 14, 1986.

August 13, 1982

PROFESSIONAL QUALIFICATIONS OF HOWARD B. FRIEND

My name is Howard B. Friend. I am the Project Completion Manager for the Diablo Canyon integrated project organization consisting of the Pacific Gas & Electric Company and the Bechtel Power Corporation employees. I am a registered professional engineer in the State of California. I hold a BS degree in Mechanical Engineering from Heald Engineering College.

I have been with Bechtel for 30 years. I have been assigned to the Diablo Canyon Project since March 1982. Prior to that, I was on temporary assignment at the Houston Office of Bechtel Power Corporation as the Project Manager of the South Texas Project for Houston Lighting and Power responsible for the take over of engineering, procurement, construction management and related services.

Prior to that, I was assigned as the Manager of Division Engineering responsible for directing all engineering of the San Francisco Power Division including the design of both nuclear and fossil fueled power plants. My department was responsible for more than 22 major power plant design projects.

I also served as Engineering Manager for various nuclear power facility projects including Peach Bottom, Limerick Generating Station, Susquehanna Steam Electric Station, Skagit Unit No. 1, Pilgrim Station Unit No. 2 and Arkansas Power Station.

Prior to these assignments, I was Project Engineer for both Peach Bottom 2 & 3 and Limerick. I have also been responsible for the development of the Bechtel standard containment design and earlier in my career, was Project Engineer for the experimental HTGR Project, Peach Bottom Unit No. 1.

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