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Testimony of
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Before the Subcommittee on Energy and the Environment
Committee on the Interior and Insular Affairs
U. S. House of Representatives

March 8, 1983

INTRODUCTION

On February 9, 1983 this Committee extended an invitation to Pacific Gas and Electric Company ("PGandE") to present testimony at a hearing to be held on March 8, 1983 concerning the licensing procedures which have been adopted by the Nuclear Regulatory Commission ("NRC") for restoration of authority to load fuel and conduct low power testing at the Diablo Canyon Nuclear Power Plant. The Committee indicated that the hearing would focus on concerns that the NRC would allow fuel loading prior to an adequate overall assessment of the plant's safety. The Committee specifically identified these concerns in a January 11, 1983 letter from Chairman Udall to Chairman Palladino of the NRC.

The following testimony will outline the events leading to the suspension of our low power testing license and the imposition of an independent design verification program for Diablo Canyon; describe the procedure approved by the NRC for restoration of authority to load fuel and conduct low-power testing; and respond to the concerns expressed by Chairman Udall in his January 11, 1983 letter.



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However, before proceeding with a discussion of these matters, PGandE wishes to assure this Committee that it is dedicated to designing, constructing, and operating the Diablo Canyon Nuclear Power Plant to the high standards of the NRC. PGandE will not seek restoration of our low power testing license until we are convinced that the plant meets applicable NRC licensing requirements and is safe to operate. PGandE believes that the current extensive and unprecedented efforts to verify the design and construction of Diablo Canyon are unparalleled in the history of the nuclear industry. PGandE is confident that the design verification program for Diablo Canyon together with the carefully considered procedures adopted by the NRC for the restoration of the low power license, more than adequately assures the protection of the public health and safety as required by the Atomic Energy Act.'

HISTORICAL BACKGROUND

On September 28, 1981, just prior to the commencement of fuel loading activities for Unit 1 of the Diablo Canyon Nuclear Power Plant, PGandE notified NRC's Region V office that it had discovered a potential problem in the seismic analysis of the annulus structure of the Unit 1 containment building. PGandE immediately commenced an investigation into the matter and notified the NRC that it would not proceed to load fuel until the problem had been resolved to the NRC's satisfaction.

The License Suspension and Verification Program

Following an extensive investigation by the NRC into the nature, extent and causes associated with the diagram error, the NRC on November 19, 1981, issued an Order (CLI-81-30) which suspended PGandE's authority to load fuel and conduct tests at power levels of up to 5% of rated power at the Diablo Canyon facility. The Order also mandated an independent review of seismic analyses and design activities performed by PGandE and its contractors prior to 1978 and QA activities which related to that work as a condition for restoring the suspended authority to load fuel and conduct low power testing. Efforts related to these requirements ultimately become known as Phase I of the overall verification program.

At the same time, the NRC Staff issued a letter to PGandE requiring that it conduct additional investigations before a full power license would be issued. Specifically, the Staff letter mandated an independent design verification program for all post 1978 seismic design and associated QA activities as well as non-seismic design and associated QA activities performed by PGandE and its contractors for safety related structures, systems, and components. Efforts related to these requirements became known as Phase II.

Independent companies and Program Plans to implement both Phase I and Phase II were proposed to the NRC and approved by the Commission in March and December 1982, respectively. The independent design verification program, frequently referred to as the IDVP, is under the overall program management of Teledyne Engineering Services

("Teledyne"). Associated with and reporting to Teledyne in this independent review effort are Robert L. Cloud Associates ("Cloud"), which is performing a detailed seismic review of the plant and selected systems, R. F. Reedy, Incorporated ("Reedy"), which is conducting an extensive review of the quality assurance programs and procedures employed by PGandE and its service related contractors, and Stone and Webster Engineering Corporation ("Stone and Webster"), which is conducting the Phase II non-seismic design review and the construction quality assurance (CQA) review.

To date the Teledyne, Stone and Webster, Cloud and Reedy organizations, which have had the equivalent of more than 100 professionals working on this project, have expended over 150,000 man-hours in carrying out their verification responsibilities. Approximately 30,000 drawings along with 5,000 documents composed of 500,000 individual sheets of design information have been transmitted to the IDVP. An estimated 40,000 attributes of systems, criteria, design, input data and analyses have been reviewed and evaluated by the IDVP.

Equally important to the overall design verification of Diablo Canyon are PGandE's own efforts to assure that the plant design meets applicable license requirements. This program, known as the internal technical program ("ITP"), is a major expansion of the investigation which was established by PGandE immediately after the discovery of the diagram error. This extensive ITP is being undertaken jointly with the Bechtel Power Corporation and the U.R.S. Blume Corporation and is known as the Diablo Canyon Project ("Project"). The Project organization is a joint management team of PGandE and the Bechtel Power Corporation, with engineering and other technical services supplied by both the PGandE and

Bechtel organizations and by additional consulting organizations as necessary. Engaged full time on the internal technical program are more than 1,000 engineers and technical support people in the San Francisco Project Office and at the Diablo Canyon site.

Specifically, the ITP is performing additional design reviews to further assure the overall adequacy of plant design. Additionally, the ITP develops data and information in support of the IDVP, and responds to IDVP Phase I and Phase II findings. The ITP also implements design modifications or other corrective actions arising from the IDVP or ITP findings. For Phase I, the ITP is performing a comprehensive seismic design review of the plants' safety-related structures, systems, and components. In particular, the ITP is reviewing the seismic design of the containment structure, the auxiliary building, the fuel handling building, the turbine building; and the intake structure. The ITP also reviews the seismic characteristics of large and small bore piping and pipe supports; all safety related mechanical and electrical instrumentation, and control equipment; all Class I electrical raceways and HVAC supports; and safety-related instrumentation tubing and tubing supports. The results of all these reviews, re-analyses, and modifications are documented by the ITP and audited by the IDVP. This internal seismic design verification program is one of the most thorough verification of seismic design ever undertaken at a nuclear power plant.

In addition, PGandE also voluntarily agreed to have the IDVP perform a construction quality assurance ("CQA") review as an adjunct to the Phase II program to confirm the adequacy of construction at Diablo Canyon, even though PGandE was confident of the quality of the

construction efforts. PGandE agreed to this review to demonstrate that the plant was constructed according to its licensing requirements.

QUALITY ASSURANCE PROGRAM

In recognition of the importance of quality assurance as an integral part of the verification process, a comprehensive quality assurance program has been developed for the Diablo Canyon Project. This project program imposes rigorous management controls on the design, verification and procurement activities of the Project's ITP. This project quality assurance program meets NRC's 10CFR50 Appendix B requirements and has been approved by the NRC. The program was developed by and is being implemented using experience and resources provided by both Bechtel Power Corporation and PGandE.

The management controls provided through this project QA program include independent checks, reviews and surveillance of specific activities, as well as broader overviews and audits of the effectiveness of the program. For example, design analyses are independently checked by another designer who would have been qualified to originate that work. The overall designs of systems or structures are subjected to further design verification reviews. Additionally, key design documents are reviewed by Chief Engineers on the Bechtel Power Corporation staff and by PGandE's own Chief Engineers.

Quality assurance overviews and audits are planned and scheduled to assure that all areas of quality-related activities performed under the project QA program are audited. The Diablo Canyon Project has an independent quality assurance group that performs reviews, surveillance

and audits of quality-related activities. QA audits of the project are also performed by Bechtel Power Corporation's Division Quality Assurance Management Staff and by PGandE's Quality Assurance Department.

In addition, the NRC and the IDVP have conducted separate and independent reviews of the verification effort. The NRC Staff, in particular, has continuously been conducting its own reviews and evaluations of the Diablo Canyon verification work by independently evaluating the IDVP and by directly auditing the Project. Further, the Staff has conducted frequent technical as well as management level meetings with the Project and the IDVP, for the purpose of information exchange and for management review, so that the Staff is constantly aware of any potentially significant findings from the verification program.

VERIFICATION PROGRAM FINDINGS

The Phase I efforts related to seismic design are nearing completion. PGandE's efforts are being documented in its Phase I final report which has been and continues to be submitted to the NRC in installments since September 1, 1982. This report describes the seismic reanalysis, including scope, criteria, methodology, and analysis results for the various structures, systems and components that are involved in seismic-related activities. Any corrective action related to the Phase I seismic design review is implemented by the Diablo Canyon Project. Furthermore, these corrective actions are required to be verified by the IDVP and by the NRC.

The Phase II efforts on non-seismic safety-related design matters are also nearing completion. Although this effort has identified some specific findings, PGandE's preliminary evaluation is that generic concerns are not being found.

It is PGandE's understanding that the construction quality assurance verification effort has been recently completed. About 250 aspects of construction activities were selected for quality verification. This review evaluated two of the major contractors' QA programs and sampled various structures, equipment and contractors' records for documentary evidence of adherence to approved procedures as well as physical evidence of compliance with design intent. The findings from this review were minor in nature and did not require any plant modifications. PGandE understands that these findings were resolved and closed out to the satisfaction of the IDVP. The results of this review confirm that the plant is constructed in accordance with its design documents and conforms to applicable quality requirements.

When the verification aspects of these programs are sufficiently complete and appropriate corrective actions for fuel loading are taken, PGandE believes that the NRC will be able to conclude with a high degree of assurance that no major deficiencies remain in the design of the plant. At that time, PGandE will ask the NRC for restoration of PGandE's authority to load fuel and conduct low-power testing.

THREE STEP LICENSING PROCESS

On December 8, 1982 the Nuclear Regulatory Commission approved a three-step licensing process for restoring PGandE's low power testing license and for full power operation. The three-step licensing approach provides an orderly process for completing the remaining work by PGandE, the IDVP and the NRC while at the same time providing a high degree of assurance that public health and safety will be protected.

Step one of the three-step process requires completion of prescribed requirements for restoration of the suspended authority for loading fuel and cold system testing. It should be noted that none of the activities authorized by step one involve actual fissioning of uranium or generation of radioactive fission products. Step two would require completion of the remaining requirements for initial criticality and low-power testing, and Step three would require the completion of the requirements for full-power operation. Since steps one and two are among the principal concerns of Chairman Udall's January 11, 1983 letter, the following discussion will focus on the particular requirements of these steps and their relationship to the overall verification program.

For step one, PGandE must complete prescribed Phase I verification activities, including all modifications necessary for the fuel load and cold system (non-critical) testing modes of operation. The IDVP must also complete prescribed activities for this step. In addition, the Phase II verification activities would have to be sufficiently completed to provide reasonable assurance that no major deficiencies remain

undetected. Restoration of the license to allow fuel load would come only after the IDVP, the NRC Staff, and the Commission itself had reviewed and concurred with the results of the verification activities.

The second step, which involves achieving initial criticality and conducting low power testing, requires that all remaining reports and modifications for these modes of operation be completed. Again, both the IDVP and the NRC must review and approve the results of these activities before authorization can be granted to proceed with this step.

Authority for each step would be granted only after the IDVP and the NRC had reviewed and concurred with the investigations and results those verification activities necessary to support each step.

The Commission's procedures specify in detail the requirements which must be met for each step. For example, before authority to load fuel is reinstated, PGandE must complete all activities prescribed in Step 1, as specified in the Commission's plan approved on December 8, 1982. Similarly, all activities prescribed in Step 2 must be completed before authority to conduct low power testing is reinstated. While PGandE has established a schedule for accomplishing each of these steps, this schedule does not control the process; rather the process requires completion of prescribed reviews and evaluations prior to restoration of PGandE's authority to implement each step. All modifications to safety-related structures, systems, and components required for any particular mode of operation of the facility will be completed prior to any anticipated operation in that mode, i.e., fuel load, initial criticality, and low power testing.

In essence, the procedure approved by the Commission for fuel loading and low power testing is entirely consistent with its November 19, 1981 Order. It merely adopts a two-step method for achieving the same result. This process is carefully delineated in the Commission's February 17, 1983, response to Chairman Udall where the requirements for fuel load and low power testing are set forth.

CONCERNS EXPRESSED IN JANUARY 11, 1983 LETTER

The process for license restoration discussed above responds to two of the concerns expressed in Chairman Udall's letter. Namely, that the NRC will permit fuel loading prior to completion by PGandE of its seismic and non-seismic reviews and any necessary corrective measures that would result from these review. The remaining concerns deal with the adequacy of the NRC review of: (1) the Brookhaven National Laboratory work (2) quality assurance results, and (3) all audits, analyses, and corrective actions since late 1981. PGandE's response to these additional concerns follows.

Brookhaven National Laboratory Work

Early in the NRC's investigation into the diagram error at Diablo Canyon, the Staff retained Brookhaven National Laboratory ("BNL") to conduct several independent reviews and analyses. The NRC has stated that these efforts are not intended as a substitute for the design and evaluation efforts now underway, nor is it a substitute for the

analytical effort being performed by the IDVP. As these evaluations are performed without regard to methods, procedures or criteria approved for Diablo Canyon, they provide additional insight as to the character of results obtained by use of current state-of-the-art techniques.

Major portions of the BNL work have already been completed. PGandE was informed at a meeting on February 15, 1983, that the remaining work would be completed within several weeks. These BNL analyses have received extensive review by PGandE, the IDVP, and the NRC. Others will similarly be reviewed as they become available. Accordingly, the results of these efforts will be available for PGandE, IDVP, and NRC consideration prior to any decision to restore the low power license. As stated by Chairman Palladino in his February 17, 1983 response, "The BNL analyses will be sufficiently completed and taken into consideration prior to any decision regarding restoration of the license."

Quality Assurance Matters

The next concern is that fuel loading will be permitted to occur before results are received from on-going audits of the design QA program. However, most of these QA audits of the verification efforts will in fact be completed prior to fuel loading and appropriate audit reports will be provided to the NRC. The IDVP Phase I design QA review activities have been completed and reports issued. The IDVP Phase II reviews are essentially complete with reports to be issued shortly. These QA audits include, as required by the Commission Order, IDVP audits of the QA programs and their implementation by PGandE and its

contractors. In addition, as discussed previously, the construction QA verification activity has been essentially completed. Other audits of QA programs include an IDVP QA audit of ongoing Project activities, PGandE internal QA audits of its contractors, and a PGandE QA audit of its own ongoing activities. Further audits are conducted by the Bechtel Power Corporation under both the project and PGandE Quality Programs. All necessary corrective actions identified in these ongoing audits will be implemented prior to fuel load.

NRC Review Activities

The final concern is that fuel loading will be authorized prior to an adequate NRC review of the various audits and corrective actions undertaken at Diablo Canyon since late 1981. The NRC is required to perform this review prior to fuel loading as specified in the Commission Order. The two-step licensing procedure for fuel load and low power testing will in no way inhibit this review. If anything, it provides for another stopping point in the review process.

It should be noted that the NRC has held or participated in numerous public meetings with PGandE, the IDVP, Brookhaven National Laboratory, and the Intervenor during which all aspects of the Diablo Canyon review effort have been exhaustively pursued and discussed. As a participant in these meetings, PGandE can attest to the thoroughness and diligence of the NRC review of Diablo Canyon.

Moreover, it should be noted that the Commission in its February 17 response has committed to take the "time necessary to assure (itself) and the public that there are no deficiencies that would prevent

safety-related structures, systems, and components from performing their intended safety functions."

In this connection, PGandE last week, informed the NRC that the completion schedule for the Design Verification Program was extended approximately 3 months as a result of unavoidable project delays and the need to accommodate some additional work required to resolve a previously noted IDVP concern (copy attached). This clearly demonstrates PGandE's commitment not to seek restoration of the low power license until it is convinced that the plant meets its licensing commitments and is safe to operate.

Conclusion

The licensing procedure approved by the Commission for fuel loading and low power testing provides for more than an adequate assessment of the plant's safety and is fully responsive to the concerns noted in Chairman Udall's January 11, 1983 letter.

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March 2, 1983

Mr. Darrell G. Eisenhut, Director
Division of Licensing
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Re: Docket No. 50-275, OL-DPR-76
Diablo Canyon Unit 1
Changes to Schedule for Fuel Loading,
Low Power Testing and Full Power Operation

Dear Mr. Eisenhut:

On December 2, 1982 PGandE provided estimated schedules for the submittal of a number of Project and IDVP reports necessary for support of the restoration of our license to load fuel, to perform low power testing and ultimately to achieve full power operation.

As a result of a recent evaluation, PGandE has found that estimated completion dates for some of the reports must be revised, to a schedule consistent with having Unit 1 ready for fuel load by June 30, 1983. The estimated submittal date for the various reports are shown on the attached update of our December 2 submittal.

The changes in the submittal dates are primarily a result of the structural analysis work requiring more time than originally estimated and increasing in scope. We have also experienced lower than expected production rates in the plant and an increase in modifications to the annulus steel.

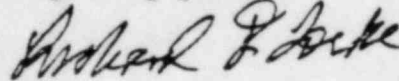
Mr. Darrell G. Eisenhut

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March 2, 1983

While we have generally revised the report submittal dates in support of Step 1 by about one month, we have adjusted all of the dates to be consistent with our physical progress of modifications to the plant. You will note the revised schedule also provides more time for NRC Staff review and Commission action.

Very truly yours,



for

Philip A. Crane, Jr.

PAC:LS
Attachment

cc (w/att.): Mr. R. H. Engelken
Mr. W. E. Cooper
Mr. G. W. Knighton
Service List

ESTIMATED SCHEDULE FOR COMPLETION OF ACTIVITIES REQUIRED
FOR FUEL LOADING, LOW POWER TESTING, AND FULL POWER OPERATION
MARCH 1, 1983

	ACTIVITY	PREVIOUS SCHEDULED COMPLETION DATE (a)	PRESENT SCHEDULED COMPLETION DATE
<u>Step I</u> Requirements for Restoration of the Low Power License	1. Project reports submitted: A. Final Report for Phase I B. Status Report for Phase II C. Supplement for As-built	02/15/83 02/15/83 03/15/83	03/15/83 03/11/83 06/10/83
(See Note 1)	2. IDVP reports submitted: A. Status Report for Phase I B. Status Report for Phase II C. Final Report for ITP QA Program D. Final Report for Construction QA E. Final Report for Non-Hosgri Spectra F. Final Report for PG&E/W Interface G. Final Report for Hosgri Spectra H. Supplement for As-built Verification (Modes 5 & 6)	03/01/83 03/01/83 03/01/83(b) 03/01/83(b) 03/01/83(b) 03/01/83 03/01/83 03/15/83	04/08/83 04/08/83 04/15/83 03/10/83 04/01/83 03/18/83 04/01/83 06/15/83
(See Note 2)	3. NRC Decision For Restoration of the Low Power License	03/31/83	06/30/83
<u>Step II</u> Requirements for Initial Criticality and Low Power Testing	1. Project reports submitted: A. Final Phase I Report Supplement B. Supplement for As-builts	04/01/83 04/30/83	05/15/83 06/10/83
(See Note 3)	2. IDVP reports submitted: A. Final Report for Phase I B. Status Report for Phase II C. Supplement for As-built Verification (Modes 2, 3, 4, 5 & 6)	04/15/83 04/15/83 04/30/83	06/15/83 05/06/83 06/30/83
	3. NRC Decision For Initial Criti- cality and Low Power Testing	05/15/83	07/15/83(c)
<u>Step III</u> Requirements for Issuance of a Full Power License	1. Project reports submitted: A. Phase II Report B. Supplement for As-built	05/15/83 06/15/83	05/15/83 06/15/83
	2. IDVP reports submitted: A. Final Report for Phase II B. Moved to Step 1 2.C C. Moved to Step 1 2.D D. Moved to Step 1 2.E E. Supplement for As-built Verification (Modes 1 through 6)	06/01/83 06/01/83 06/01/83 06/01/83 06/15/83	06/15/83 N/A N/A N/A 06/30/83
	3. NRC Decision For Issuance of a Full Power License	06/30/83	08/15/83(d)

(a) As provided in December 2, 1982 Submittal

(b) Dates previously shown in the December 2, 1982 submittal were for status reports.

(c) Latest Project need date is 08/15/83

(d) Latest Project need date is 09/30/83

NOTES

NOTE 1 Phase II status report will address that Phase II activities are sufficiently complete to provide reasonable assurance that no major deficiencies remain undetected.

Note 2 Items to be completed after fuel loading:

- o Civil structural final confirmatory load review (supported loads). Primarily Annulus and Class I platforms.
- o Turbine building modification design and construction.

Note 3 Items to be completed after RCS heatup and low power testing:

- o Turbine building modification design and construction.