UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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In the Matter of	)	
	)	
PACIFIC GAS AND ELECTRIC COMPANY	)	Docket Nos. 50-275 OL
	)	50-323 OL
(Diablo Canyon Nuclear Power Plant, Units 1 and 2)	)	
	)	

PETITION FOR REVIEW
OF ALAB-763

Governor George Deukmejian hereby petitions the Nuclear Regulatory Commission (NRC) to review the decision of the Atomic Safety and Licensing Appeal Board (Appeal Board) in ALAB-763 concerning the adequacy of design quality assurance (QA) at the Diablo Canyon Nuclear Power Plant.

I.

THE APPEAL BOARD HAS CREATED AN ERRONEOUS STANDARD FOR DESIGN QUALITY ASSURANCE TO OVERCOME THE UNCONTRADICTED EVIDENCE THAT DIABLO CANYON FAILS TO MEET THE STANDARD ESTABLISHED BY THE REGULATIONS AND SOUGHT BY THIS COMMISSION

In 1981, faced with the mounting evidence of an unprecedented failure of Pacific Gas and Electric Company (PG&E) to meet NRC quality assurance requirements and to design Diablo Canyon in conformance with its licensing criteria, the commission established an Independent Design Verification Program (IDVP) to provide the assurance of quality missing from the design. The standard for this effort was stated in March 1982 in SECY-82-89: The IDVP was to demonstrate that

> "there is reasonable assurance that the overall . . . design is in conformance with the application . . . ." (PG&E Exh. 156, p. 2; see also PG&E Exh. 157, p. 7.)

The Appeal Board initially adopted the same standard in the proceeding on the reopened record:

"Normally, an effectively functioning design quality assurance program

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> ensures that the design of a nuclear power plant is in conformance with the design criteria and commitments set forth in an applicant's PSAR and FSAR. In the case of Diablo Canyon, however, this confidence has been seriously eroded . . . . [T]here is now substantial uncertainty whether any particular structure, system or component was designed in accordance with stated criteria and commitments.
>
> "In these circumstances, the Commission mandated the IDVP to provide after-the-fact assurance that the Diablo Canyon design conformed to the various design criteria . . . ." (Order of August 16, 1983 (unpublished), at 4-6 (fn. omitted).)

In the course of the hearing before the Appeal Board it became clear that Diablo Canyon does not meet that standard. Indeed, witnesses from the applicant, the IDVP, and the NRC staff all agreed that it was "virtually certain" that there remain in the design of both units errors that cause the design to fail to meet the licensing criteria. (Tr. D1177, D1543; see also Tr. D2264-65.) The problem facing the board was the fact that neither the IDVP nor PG&E itself examined more than a sample of the design (a process explicitly authorized by the commission, to which no party objects) and found numerous design errors resulting in violations of the licensing criteria -- an outcome apparently not expected.

Faced with this fact, the Appeal Board cast off from the established regulatory standard and landed on a more hospitable test, one of unbridled discretion: The verification program was merely to give "adequate confidence" that there remain no undetected violations of licensing criteria that would be "safety-significant." The regulations define "adequate confidence" as the assurance that comes from a program meeting the eighteen criteria of Appendix B to 10 C.F.R. part 50 (Appendix B). The board's use of the phrase, stripped of its context, leaves the board free to define "adequate" on an ad hoc basis, inviting the suspicion that they are matching the definition to an applicant's performance. And without any citation of authority, the board announces that there are licensing criteria for safety-related structures, systems, and components that are not significant to

safety and that may be violated without jeopardizing one's right to a license. (Slip Opn., pp. 31-32, fn. 68.)

Beyond the absence of any authority that some safety-related licensing criteria may be ignored, there is simply no basis for any conclusion about the safety-significance of the errors that were detected -- much less about the errors that remain undetected. The assessment of safety significance of a deviation from licensing criteria is, according to the evidence, complex and difficult -- so difficult, in fact, that the IDVP shied away from any such assessment of them and expressly disclaimed any opinion on whether the errors it detected were safety-significant.[1/] (Tr. D1555, D1557; PG&E Exh. 90, p. 6.4-1.) Yet ALAB-763 relies on opinions about the safety-significance of unknown errors. This left the IDVP in the awkward position of testifying that it had no opinion on the safety significance of the errors it had detected[2/] but did have an opinion on the safety significance of the errors sure to exist in unknown numbers in unknown locations, involving unknown components, violating unknown licensing conditions.

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1. The Appeal Board concedes that assessments about safety-significance "as a general proposition" require formal analysis. But in this case, the board is prepared to say that the identified non-seismic errors are "of minor safety signficance." (Slip Opn., p. 42, fn. 82.) According to the testimony, formal analysis is required because the unobvious interactions of errors among complex systems can create unforseen safety hazards. (Tr. D1555, D1557, ff. D2313 at 10-11.) The board offers no explanation how, from an examination of the obvious safety implications of the known errors, it can determine that no analysis of their unobvious implications is required.

2. The staff and applicant were less cautious about offering opinions on the safety-significance of the known errors. PG&E performed what it called a study of them (consisting mainly of the statement that, in the opinion of its engineers, each had no safety significance (see PG&E Exh. 92)); the staff did no more than cite and agree with that study. In assessing the staff opinion, it is useful to note that, in the view of the staff, none of the known errors -- not the mirror image error, not the incorrect spectra, not the erroneous calculation of masses, none of the errors -- constituted a safety-significant error. (Tr. D2696-99.) Of course, nobody did a study of the safety signficance of the unknown errors.

(Tr. D1554, D1557-59; PG&E Exh. 90, p. 6.2.5-2.)

To justify their novel standard,the Appeal Board compares its notion of "adequate confidence" to a straw-man standard of error-free design. (Slip Opn., p. 32, fn. 68.) Noting that no power plant is error-free, the board leaps to the conclusion that errors -- including errors violating licensing criteria -- simply don't count; to hold otherwise, the board implies, would require "'perfection'" of applicants. (Ibid.) Because the Governor raised the issue of remaining errors violating licensing criteria, he "apparently would accept only a zero error rate." (Id., p. 33, fn. 70.)

Nowhere does the Appeal Board acknowledge that the Governor did, indeed, propose an alternative standard for the verification program, one that does not require "'perfection,'" nor an error-free design, nor certainty of full compliance with licensing criteria. In his proposed findings, the Governor noted that the commission's regulations provide a "reasonable assurance" of safety not by making errors impossible but by providing a process, a properly functioning QA program, that ensures that the probability of such errors is acceptably low. Thus, a verification program can retrofit safety in either of two ways: (1) by showing, on the basis of scientifically valid samples, that the plant (or a given portion of it) is free of errors violating licensing criteria[3/] or (2) by giving the design the same level of scrutiny it would have received under a legally sufficient QA program. (Governor's Proposed Findings & Conclusions, p. 9.)

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3. Even this part of the standard does not require "'perfection.'" The point here is to provide an applicant that is highly confident of the adequacy of its design, or a portion of it (such as a given system or the work of a given design group), a way to avoid the 100 percent review of the design. For that portion of the design not qualified by sampling, a full review would be sufficient, irrespective of the number of the errors uncovered and corrected, since that review would provide the same level of assurance an adequate QA program would have provided in the first place.

Diablo Canyon meets neither alternative of the Governor's proposed standard. It fails to qualify under part 1 mainly because the samples drawn contained numerous errors causing violations of licensing criteria -- demonstrating precisely the opposite of what was sought to be shown. And the program did not try to meet part 2. Under an adequate QA program the entire design would be subjected to review by a second engineer or designer plus approval of all design work by a supervisor -- in addition to the inspections and audits required by Appendix B. (Tr. D401.) Neither the IDVP nor PG&E's internal technical program ("ITP") reviewed the entire design -- an omission that produced "puzzlement" even on the part of the Appeal Board.

In rejecting a review of 100 percent of the design, the Appeal Board confuses two distinct concepts: 100 percent confidence that the design is error-free and 100 percent coverage of the review. (Slip Opn., p. 33, fn. 70.) It is true, as the board observes, that even a 100 percent review does not provide absolute certainty that the design is error-free. (Slip Opn., p. 44, fn. 86.) But the regulations do require that 100 percent of the design be covered by the QA program. Although 100 percent confidence in the design is impossible, 100 percent coverage by the QA program is possible and necessary to yield a higher confidence in the design than a quality assurance program that checks only a fraction of the design. This higher confidence is the minimum level of confidence implicit in Appendix B.

This confusion was compounded by another: the failure to distinguish between the design process and the design product. According to the board, the important question is not what proportion of the design was verified but whether the verification program "was sufficient to test thoroughly the design process." (Slip Opn., p. 41, fn. 80.) QA programs are intended to assure the adequacy of both the design process and the product of that

process -- the design itself. (Appendix B, Criterion III.) By focusing on the design process, the board effectively abandons any hope that the verification program will provide the same assurance as a proper QA program.

Plainly the Appeal Board has adopted a lower standard for quality assurance at Diablo Canyon than it would require of any other plant. Indeed, it is instructive to consider the application of the Diablo standard to another plant. Suppose another utility came to the NRC saying that it proposed to omit a QA program for its design -- that its quality control would be such that the commission would have "substantial uncertainty whether any particular structure, system or component was designed in accordance with stated criteria and commitments." (Order of August 16, 1983 (unpublished), at 2.) Instead it would review the design after the fact -- but not the entire design, just a sample "sufficient to test thoroughly the design process." (Slip Opn., p. 41, fn. 80.) And that test would be judged not by whether there were errors in the sample examined; it would not turn on whether some of the discovered errors violated licensing criteria; it would not even be affected by whether there remained undetected errors violating licensing criteria. Instead, it would turn on whether the errors conceded to exist and to violate licensing criteria were deemed -- without formal analysis, indeed without even knowing what and where the errors were -- not to be "safety-significant." The commission would never license any other power plant on that basis. There certainly is nothing in the sorry history of Diablo Canyon to justify that standard here.

II.

THE POST-1981 QA PROGRAMS
STILL FAIL TO MEET APPENDIX B

Unlike the QA program in effect prior to license suspension, the Appeal Board's review of the QA program since November 1981 did not begin with any

finding of the program's adequacy or inadequacy. It is therefore properly evaluated in terms of the specific requirements of Appendix B. Remarkably, neither the staff nor the IDVP reached any conclusion on compliance with Appendix B, and the Appeal Board makes no finding on Appendix B.

The PG&E Program. Until August 1982 the Diablo Canyon QA program was solely the PG&E QA program. (Ff. Tr. D847, p. 10.) There is ample evidence of the deficiency of that program. The staff testified to continuing deficiencies in implementation through mid-1982. (Tr. D3024-26.) Documents produced from PG&E files revealed documentary gaps and contradictions indicating inadequacies in training, interface control, updating of license commitments, and, in fact, the failure to meet QA commitments. (Gov. Exh. 35, pp. 3-4; Gov. Exh. 36, pp. 3, 5-7.)[4/] The staff's witness on the QA program testified that, if those findings were true, then the program failed to meet Appendix B. (Tr. D2969-70.)

PG&E's principal defense to the deficiencies in its QA program was the claim that they didn't much matter because most of the design work (perhaps 95 percent) on the modifications was done after August 1982. (Tr. D3157-60.) There is no evidence what that 5 percent or so consisted of. The IDVP did not verify the pre-August 1982 program (see PG&E Exh. 133), and neither PG&E nor the IDVP nor the staff nor the Appeal Board found it necessary to identify the nature and quality of that work.

The DCP Program. Beginning in August 1982 the project was governed by

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4. Significantly, no member of the PG&E panel on the post-1981 quality assurance panel even knew of the existence of these documents. (Tr. D3155-56, D3198-99.) Once they had reviewed them, the witnesses sought to explain them away by saying that the authors had not reviewed the entire QA program which, they testified, was distributed among some twenty-odd manuals. (Tr. D3152.) Assuming that was true, and ignoring the implications of that fact for the likelihood that responsible employees could find out what the program required, it still leaves unexplained the findings of contradictions within the QA documents.

the QA program for the combined PG&E-Bechtel Diablo Canyon Project (DCP). (Ff. Tr. D847, pp. 10-11.) Once again, there is no evidence the program meets Appendix B.

The IDVP, which had reviewed the pre-1981 program against the requirements of Appendix B with devastating results, chose not to compare the post-1981 program with Appendix B[5/]; rather, the IDVP simply compared the QA program to PG&E's own requirements. (PG&E Exh. 90, pp. 4.2.1-2, 4.2.1-26.) Instead of evidence that PG&E complied with Appendix B, the record contains the IDVP's concession that the program was not timely implemented in strict accordance with Appendix B (Tr. D1699) and was not fully functioning in November 1982, when the design work was sufficiently far along to begin what came to be called the "Big Push" for construction of the modifications. (Tr. D1662-66.)

PG&E simply did not meet its burden of demonstrating that its post-1981 QA program met Appendix B. That fact provides the context in which the rest of the evidence on performance of the program must be judged. And the record is replete with evidence of QA deficiencies.

The IDVP review of the seismic redesign found numerous errors, including a substantial number of discrepancies between as-built drawings and design documents. (Ff. Tr. D2084, pp. 15-17, tables 5-1, 8-1.)[6/] A Bechtel audit likewise found deficiencies requiring corrective action throughout the program. (Gov. Exh. 33.) A PG&E audit showed that half of the DCP engineering manuals were out-of-date. (Gov. Exh. 42.) On cross-

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5. The IDVP justified the omission on the ground that it relied on NRC approval of the program. (PG&E Exh. 90, p. 4.2.1-26.) Yet the staff reviewed only the DCP QA commitment, not the actual program itself. (Tr. D2977-79.)

6. Significantly, questions are now emerging from the staff about how the IDVP could have approved the DCP work in the face of such discrepancies. (See, e.g., Board Notification 84-082, p. 3.)

examination PG&E witnesses admitted that the DCP did not perform audits of the adequacy of design documents as required by Criterion XVIII of Appendix B. (Tr. D972-75, D976-78.)[7/]

It is useful see how PG&E dealt with the "design interface" problem -- the difficulty encountered in communications among design groups that led to the mirror-image error. As late as March 1983 the DCP engineering instructions establishing design interface controls consisted of a matrix assigning responsibility for each relevant combination of design groups -- an incomplete matrix with nearly every cell empty. (Gov. Exhs. 37-39.)

Once again the board dismisses these deficiencies with the familiar observation that nobody's perfect and the equally familiar refrain that the errors are not significant. (Slip Opn., pp. 92-93, 97-98.) That may be sufficient to rebut the citation of errors in a program that has, through other evidence, established its compliance with Appendix B. In the absence of such evidence, the board's claim is irrelevant and implies a shifting of the burden of proof from the applicant to the parties challenging the adequacy of its program.

III.

THERE REMAINS THE URGENT NEED TO COMPLETE THE VERIFICATION OF THE DIABLO CANYON DESIGN

The growing importance of verification programs throughout the nuclear industry to compensate for past QA deficiencies makes the standards for review of such programs of paramount importance to this commission. Just as

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7. The staff is now requiring that PG&E undertake such technical audits and has issued a peoposed violation citing the past failure to do so. (Board Notification 84-025, Tr. 104.) While PG&E has now agreed to perform such audits, it continues to maintain that Criterion XVIII does not require audits of the adequacy of the design. (See Feb. 7, 1984, letter from Schuyler (PG&E) to Eisenhut (NRC), PG&E letter no. DCL-84-046, p. 47.)

Diablo Canyon has focused attention on the problem of QA failures in the nuclear industry, the commission's handling of this case will establish the standard by which verification programs will be judged. The failure of this Appeal Board to hold Diablo Canyon to the same level of quality assurance that Appendix B requires creates a gaping hole in NRC regulation. ALAB-763 offers the licensee who violates the commission's regulations a lower standard for remedial action than the original licensing requirements.

Beyond the precedential implications of this decision, Diablo Canyon remains the subject of genuine doubt about the quality of its design. These doubts can only be resolved by completion of the work begun in 1981: a verification that demonstrates, with the same certainty Appendix B demands, that Diablo Canyon fully meets the safety requirements of the commission. Because PG&E has still not established that it has a QA program in compliance with Appendix B, only the IDVP can provide that verification.

A good deal of work has already been done. The errors discovered thus far have all been corrected. The commission may well have adequate confidence in the facility to permit operation while the still-missing assurance of safety is provided. But the desire to avoid undue delay in operation should not force the commission to ignore the remaining uncertainties and leave those doubts lingering for the next forty years.

Dated: April 26, 1984

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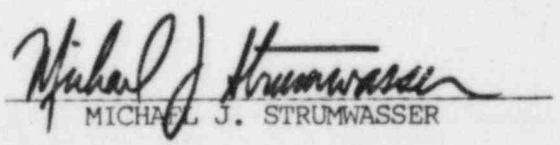
By 
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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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 1 and 2)		

NOTICE OF APPEARANCE

NOTICE IS HEREBY GIVEN, pursuant to 10 C.F.R. section 2.713, of the appearance of counsel as follows:

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CERTIFICATE OF SERVICE

I hereby certify that on this date I caused copies of the foregoing Petition for Review of ALAB-763 and Notice of Appearance served on the following by U.S. Mail, first class (except for those persons marked with an asterisk ("*"), to whom the envelope was posted Express Mail), postage prepaid.

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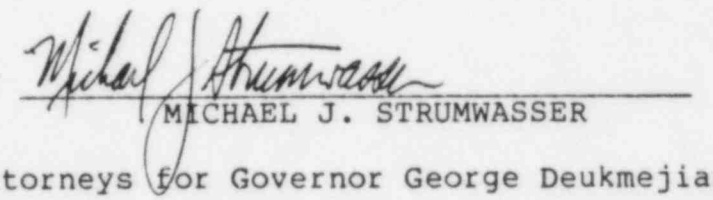
By 
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