

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 Plant,) 50-323 O.L.
Units Nos. 1 and 2)

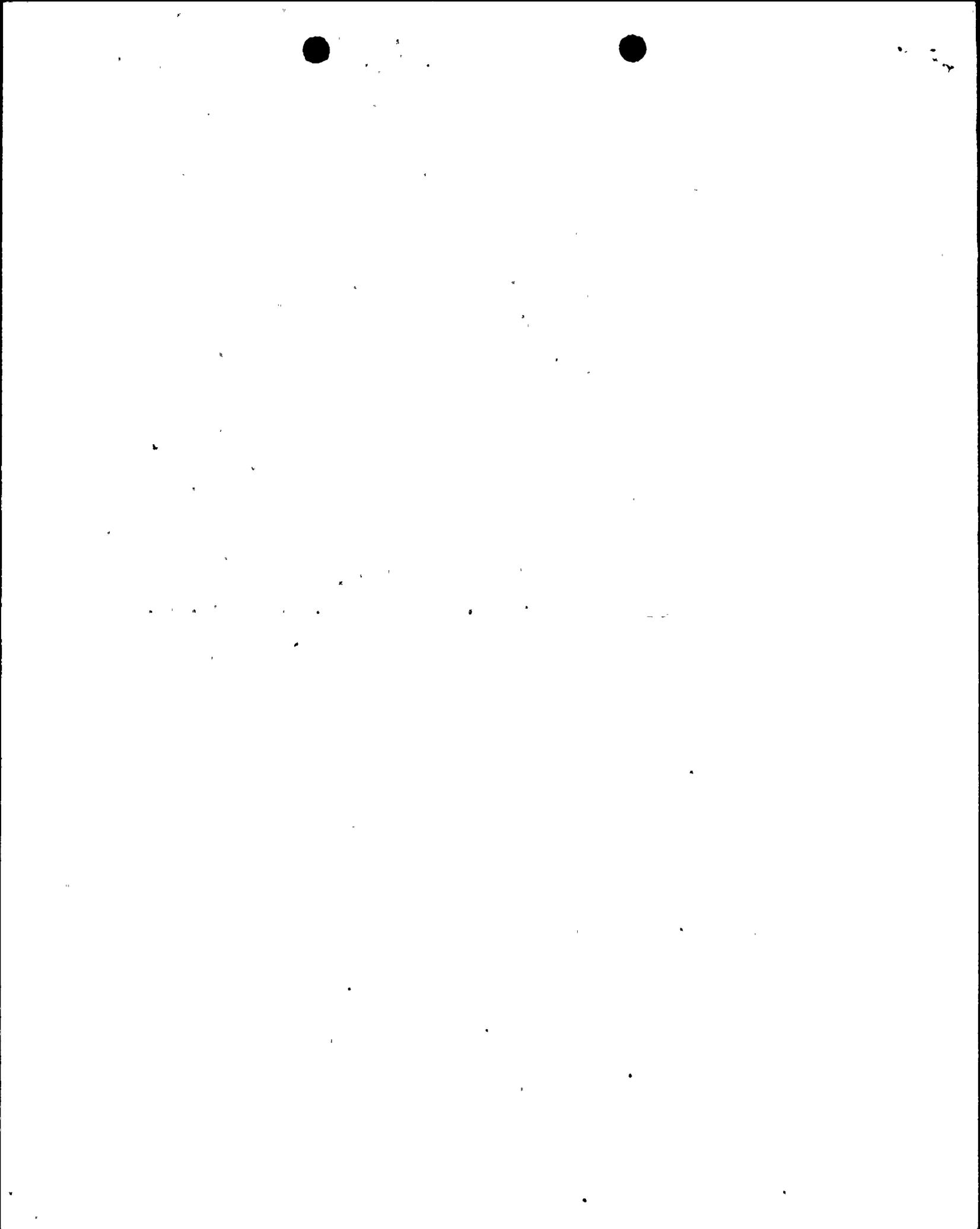
SUPPLEMENTARY RESPONSE OF SCENIC SHORELINE
AND JOHN J. FORSTER TO STAFF INTERROGATORY 12

PROPOUNDED JUNE 21, 1976

On June 21, 1976, the Staff of the Nuclear Regulatory Commission propounded virtually identical interrogatories to Intervenors Ecology Club and Scenic Shoreline Preservation Conference. These Intervenors responded to the Staff interrogatories in July and August respectively before any technical consultants had begun to work in their behalf.

In September, both Ecology Club and Scenic Shoreline as well as other Intervenors submitted affidavits in support of their answer to Staff and Applicant motions for summary disposition. These affidavits from Intervenors' technical consultants supplemented most of the responses to the Staff interrogatories of June 21. However, no affidavit supplemented Intervenors' response to Interrogatory No. 12, an interrogatory concerning plant reliability addressed to both Scenic Shoreline and Ecology Club, because the

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contention regarding that issue had been ruled out of the proceedings by the Board when the affidavits were submitted.

Subsequently, in a telephone conference call with all parties, the Board reinstated the plant reliability contention 2B. This supplementary response outlines Intervenors' present position on that plant reliability issue.

Interrogatory No. 12: Plant Reliability

A. State which plant malfunctions or breakdowns will cause a low reliability factor for Diablo and the factual basis for your assertion.

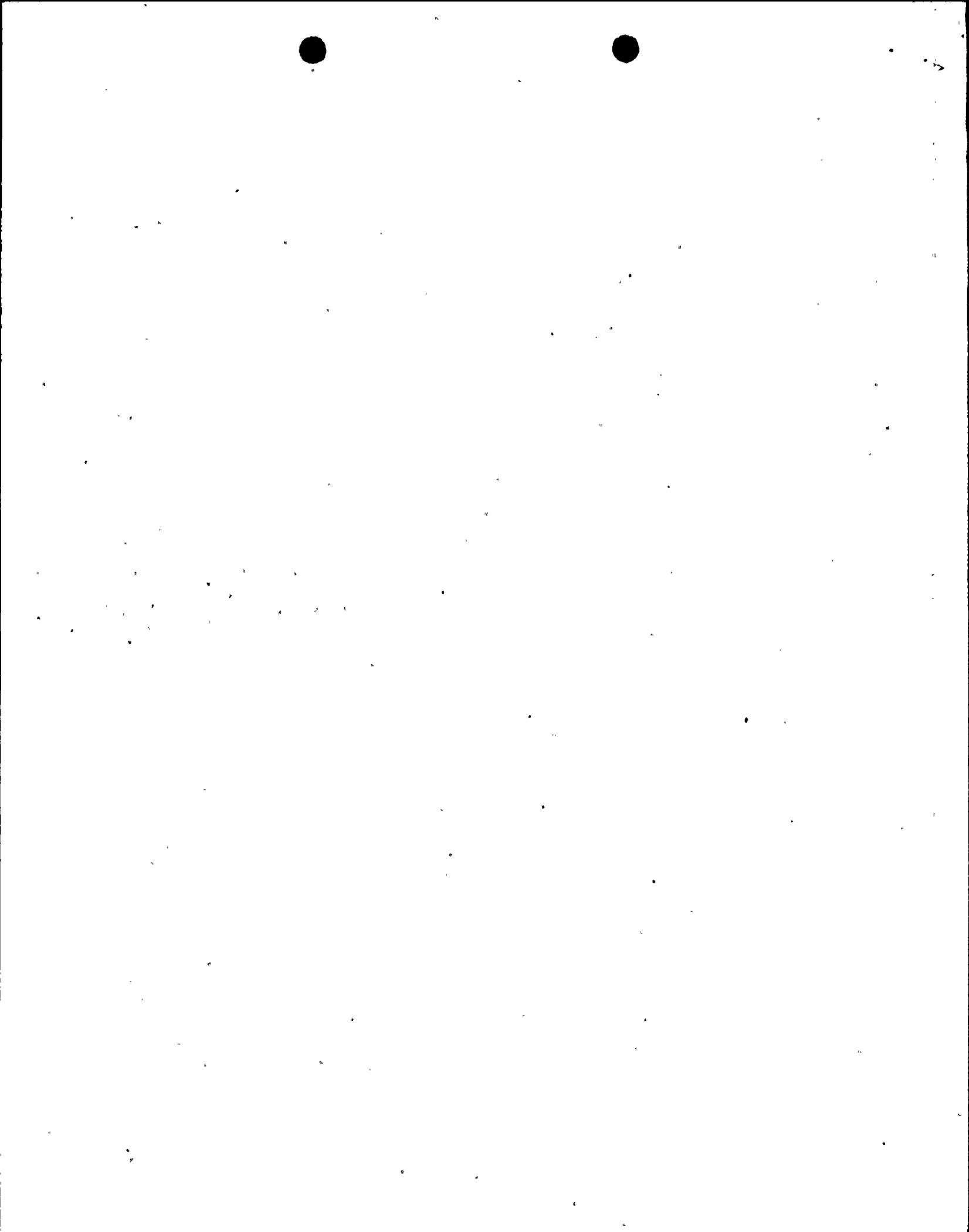
B. Quantify and state how reliability will effect the cost-benefit balance.

C. Explain how scheduled downtime will cause a lower reliability factor. State with particularity what times you estimate the plant will be scheduled for downtime.

D. Explain what other factors you consider will create reduced operational efficiency of the Diablo Plant.

Response to Interrogatory No. 12:

A-D. Intervenors' position on plant reliability essentially involves the concept of plant capacity factor. Plant capacity factor, an important index of a reactor's usefulness and reliability, is found by dividing the number of kilowatt hours of electricity a generating plant actually produces over a given period of time by the number of kilowatt hours that plant would have produced during the same period of time if the plant had



operated full-time at its full designed capacity.

Seismically induced plant malfunctions may significantly reduce plant capacity. If a ground acceleration occurs which damages the Diablo plant, the generating station could be shut down literally for years while inspections and repairs take place. During these years, plant capacity would be reduced to zero.

But many malfunctions and breakdowns also can occur even in the absence of any earthquake or other disruptive natural phenomena. Historically, such malfunctions have had many causes and have reduced substantially the capacity factors of many nuclear plants. For example, two Westinghouse nuclear generating stations located in France and Italy (Sena and Selni reactors) were out of service for periods of longer than one year in the late 1960's due to extensive modifications required in malfunctioning reactor internal barrel structures. A third reactor built by Westinghouse located in Japan (Mihama) has been out of service for more than one year due to the requirement for replacing the steam generator tube bundles. In addition, problems in refueling and maintenance have forced outages for considerable periods, reducing plant capacity factors further.

Furthermore, scheduled downtime, as well as forced outages, reduces plant capacity. For example, if the Diablo Canyon nuclear generating plant is scheduled to be non-operative for six weeks each year, its yearly plant capacity factor will be reduced by about 12%. We expect that the Diablo Canyon plant will be scheduled for downtime at least six weeks each year for

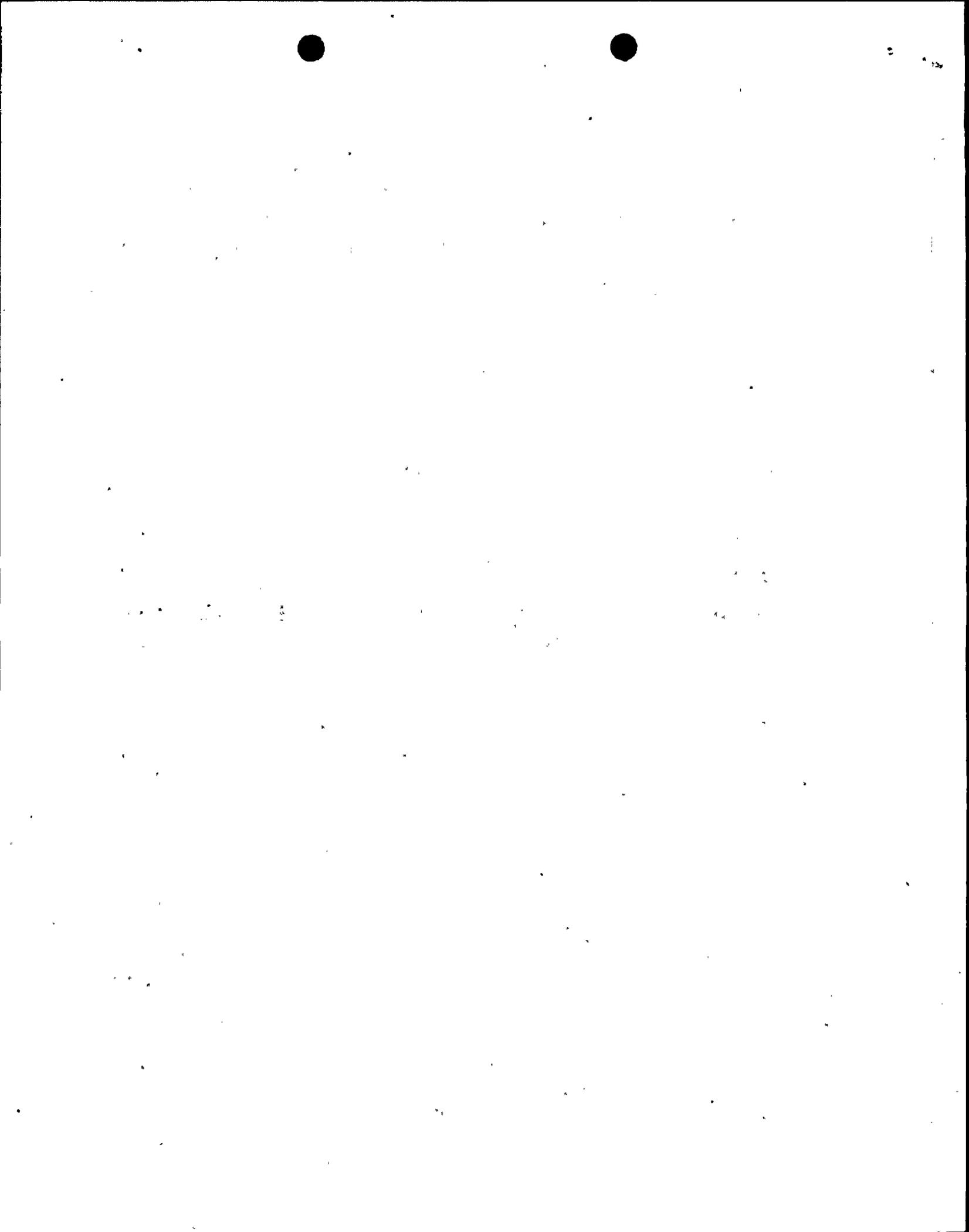


refueling. We have not yet ascertained other possible occasions for scheduled downtime and reserve the right to add other occasions for scheduled downtime as our technical review of the plant capacity issue progresses.

Plant reliability and capacity factor has a direct and important effect on the cost-benefit balance required by the National Environmental Policy Act. Plant capacity factor measures the benefit of actual electric power generation from a nuclear plant in relation to the theoretical capacity for generation from that plant. The Staff estimates in the Final Environmental Statement that the Diablo Canyon nuclear plant will run at an 80% capacity factor. (FES at p. 13-8) In sharp contrast, it is Intervenor's position that the Diablo Canyon plant will operate at about a 50% capacity factor during its first ten years of operations and at somewhat less than 50% during the last 20 years of its life. Thus Intervenor's claim that the Diablo Canyon plant will provide something less than 60% of the benefit of electrical power generation that the Staff predicts for it. This significant difference between Intervenor's and the Staff as to the major benefit claimed for Diablo Canyon, the generation of electric power, clearly affects the NEPA cost benefit balance.

As Intervenor's technical review of the matters covered by this Interrogatory is continuing, we reserve the right to supplement this response as that technical review progresses.

12.E. Intervenor's plan to present the following witnesses on plant reliability at the environmental hearings:



Mr. Dale Bridenbaugh
MHB Technical Associates
366 California Avenue, Suite 6
Palo Alto, California 94306

Mr. Charles Kamanoff
Council on Economic Priorities
84 Fifth Avenue
New York, New York 10011

Mr. Steven Moody
Council on Economic Priorities
250 Columbus Avenue
San Francisco, California

The Staff already has Mr. Bridenbaugh's lengthy credentials in his affidavit in support of Intervenors' Motion to Add New Contentions dated September 7, 1976.

Mr. Kamanoff received a B.A. in Applied Mathematics from Harvard University in 1968. In 1971 and 1972, he co-authored a 600 page study of the environmental performance of 15 investor-owned utilities which was published as the book Price of Power by the M.I.T. Press in 1972. From 1972 to 1974, Kamanoff was the Senior Quantitative Analyst of New York City's Environmental Protection Agency. Since 1974, he has worked as Energy Projects Director of the Council on Economic Priorities in New York. As Energy Projects Director, Mr. Kamanoff has directed several detailed comparative cost studies of alternative energy sources for agencies of various states. Currently, he is completing a lengthy study on operating reliability of nuclear and fossil fuel electrical plants. In addition to his duties at the Council, Mr. Kamanoff recently was appointed by Frank Zarb to the Federal Energy Administration's Energy Finance Advisory Committee.

Mr. Moody received his B.A. in Political Science from



the University of California at Berkeley in 1964, a Masters in Economics from the New School in 1968 and has done work toward his Ph.D. in Economics at Columbia University. From 1969 to 1972, Mr. Moody was Director of Operations for International Research and Marketing, the largest Japanese economic research firm operating in the United States. From 1972 to 1975 he was Director of Research at the Council for Economic Priorities in New York City. While holding that position, he initiated the nuclear plant reliability study now being completed by Mr. Kamanoff. Since the first of this year, Mr. Moody has been Director of the West Coast Office of the Council on Economic Priorities.

In his testimony Mr. Bridenbaugh will identify several specific and generic past causes of low plant reliability and capacity factor and will give reasons for expecting these causes to continue into the future. The testimony of Messrs. Kamanoff and Moody will consist of plant capacity factor figures from the past and predictions derived from the past figures of plant capacity factors in the future, including a prediction of the capacity factor for Diablo Canyon.

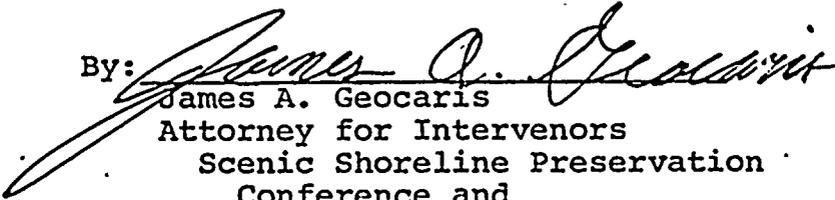
12.F. We have not yet determined all reports, documents or texts we will present to support our position on plant capacity at the environmental hearing. However, we will rely, at least in part, on information contained in the Nuclear Regulatory Commission's gray book series in order to derive our past plant capacity factor figures.



I declare under penalty of perjury that the foregoing supplementary Response to an Interrogatory is true and correct to the best of my knowledge, information and belief.

Dated: October 15, 1976

By:


James A. Geocaris
Attorney for Intervenors
Scenic Shoreline Preservation
Conference and
John J. Forster

