

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of)

PACIFIC GAS AND ELECTRIC COMPANY)

Units 1 and 2)

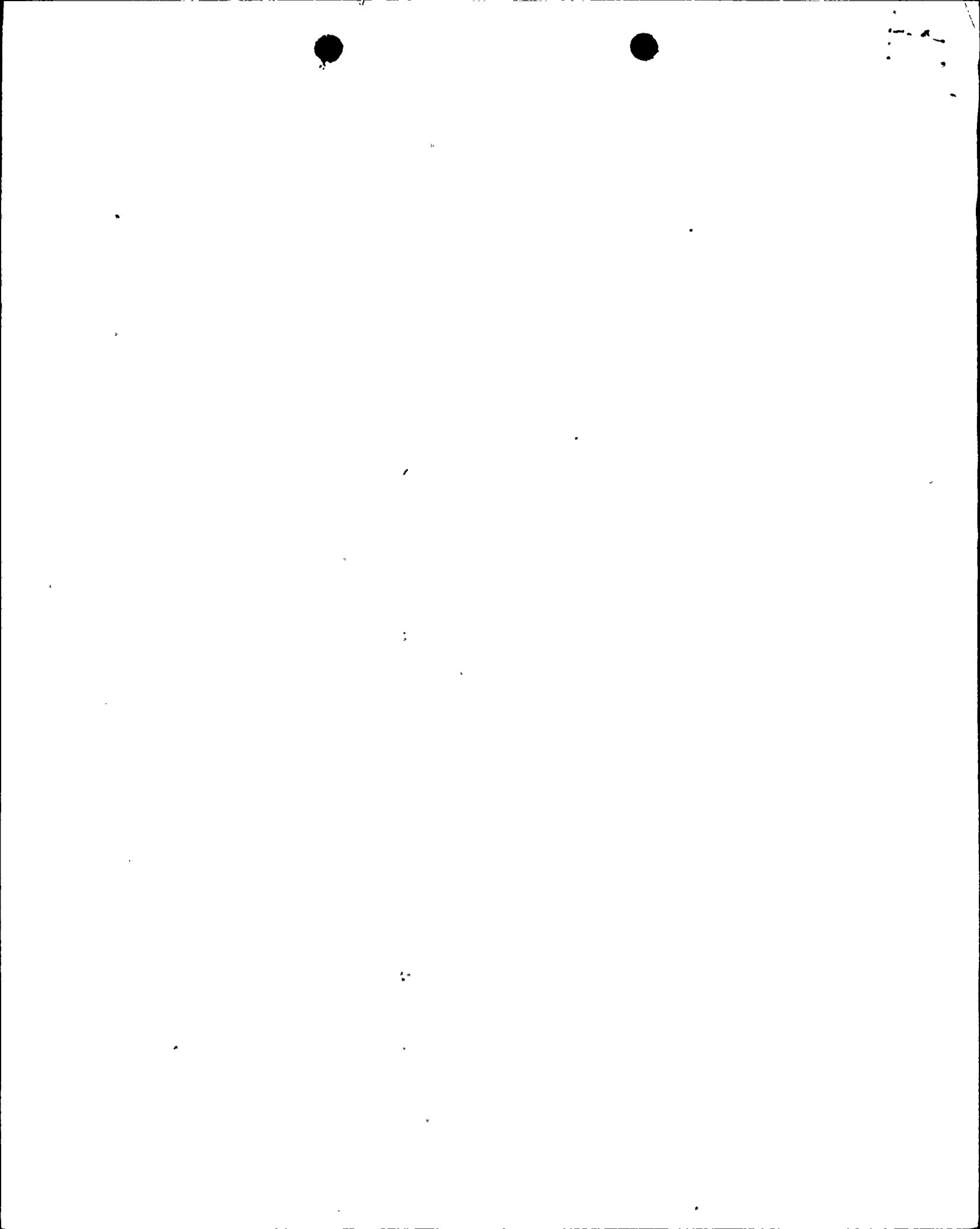
Diablo Canyon Site)

Dockets 50-275-OL
50-323-OL

RESPONSE OF PACIFIC GAS AND ELECTRIC COMPANY
TO SCENIC SHORELINE PRESERVATION CONFERENCE,
INC. MOTION PERTAINING TO TITANIUM TUBING

PGandE submits that the motion filed by Scenic Shoreline Preservation Conference, Inc. requesting a stay in removing the copper tubing from the condensers and substituting titanium tubes should be denied.

1. The Conference motion is completely lacking the stringent showing required by Atomic Safety and Licensing Appeal Boards in support of requests for stays. As pointed out in such Appeal Board decisions as Southern California Edison Company (San Onofre Nuclear Generating Station), Units 2 and 3, ALAB 199, RAI 74-4 478 (April 29, 1974), Northern Indiana Public Service Co. (Bailly Generating Station, Nuclear-1), ALAB 192, RAI 74-4 420 (April 15, 1974), and Wisconsin Electric Power Company (Point Beach Nuclear Plant, Unit 2), ALAB 58 (June 20, 1972), the showing required for a stay is that set out in Virginia Petroleum Jobbers Assoc. v. FPC, 259 F. 2d 921 (D.C.Cir. 1958) and confirmed in such later cases as A Quaker Action Group et al. v. Walter J. Hickel, 421 F. 2d 1111 (D.C. Cir. 1969). This showing is set forth in paragraphs a., b., c., and d. below. An examination of



these four elements reveals that Conference has not and can not make the showing required to support a request for a stay.

- a. Has the petitioner made a strong showing that it is likely to prevail on the merits of its motion?

The Conference motion was unsupported by any affidavits or other evidence. Thus, Conference has made no showing at all. On the other hand, an examination of the accompanying affidavits submitted by PGandE and material cited therein supports a finding that titanium is a non-toxic, non-corrosive material and that its use will have no adverse effects on the environment. Thus, Conference is unlikely to prevail on the merits of its motion.

- b. Has the petitioner shown that without such relief it will be irreparably injured?

PGandE's evidence is that the use of titanium will have no adverse effects. In the highly unlikely event that some adverse effects flowed from the choice of titanium tubing PGandE is already committed by this Board's decision in the NEPA phase of the proceeding to take prompt remedial action to eliminate or significantly reduce the harmful effects. In the Matter of Pacific Gas and Electric Company, (Diablo Canyon Nuclear Power Plant, Unit No. 2) Initial Decision (NEPA), LBP-74-60, RAI-74-8 277 (August 2, 1974) p. 311. In addition, if there are adverse effects in Diablo Cove from chlorine in the station effluent PGandE is obligated to modify the station or procedures to eliminate the adverse effects. (IBID.) Finally, the plant is subject to the jurisdiction of various other public agencies than the NRC, including the Environmental Protection Agency, the Regional Water Quality Control



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Board - Central Coast Region, and the California Department of Fish and Game, which will be monitoring the effects of the plant and can be expected to take action if adverse effects appear in violation of their various permit requirements. Thus, Conference can make no showing of irreparable injury.

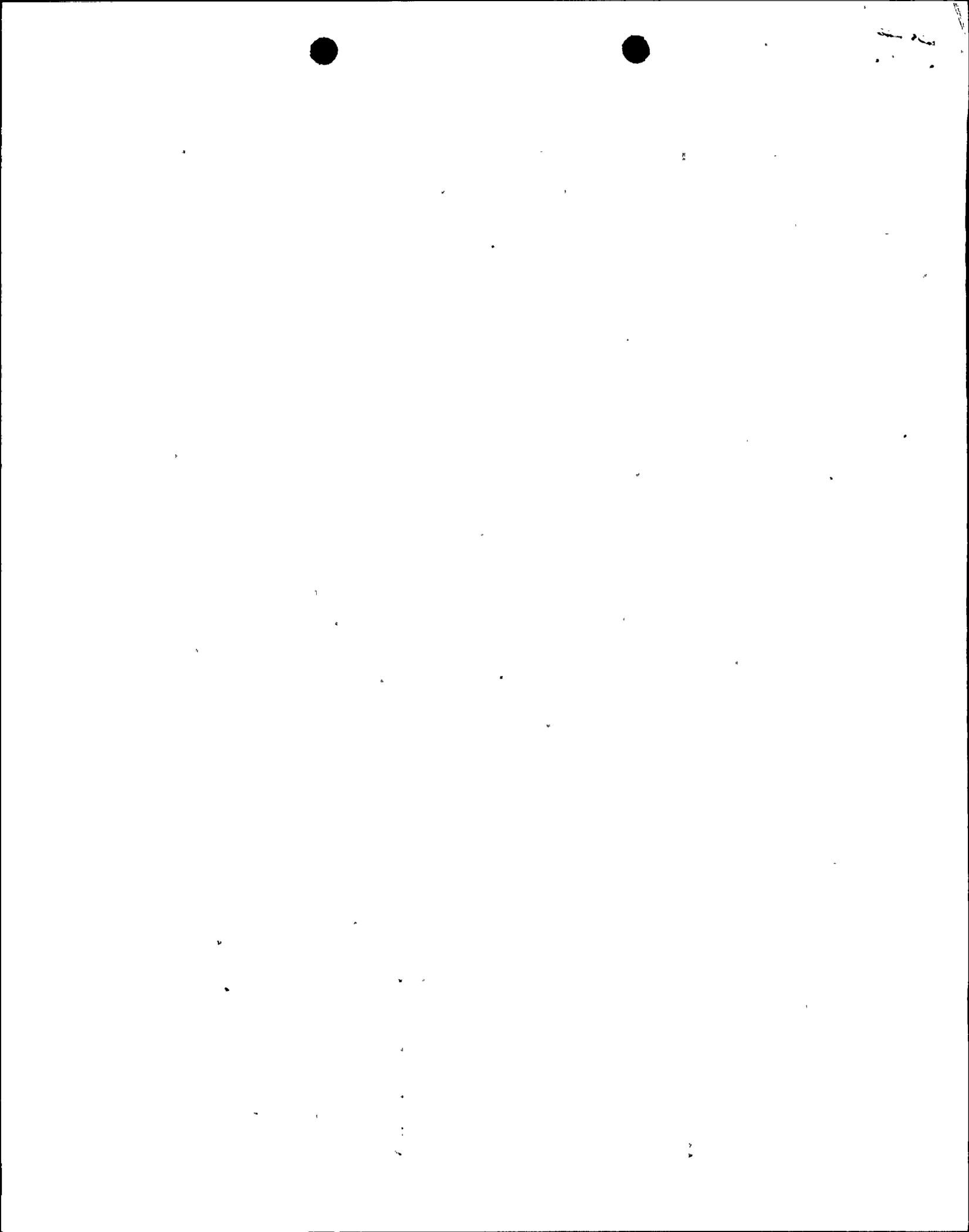
c. Would the issuance of a stay substantially harm other parties interested in the proceeding?

Indeed it would! Mr. Lindblad's affidavit indicates that a stay in the retubing work would delay the fuel loading date. Mr. Perry's affidavit indicates the excess fuel costs that would be incurred by PGandE in that event. These charges would substantially harm PGandE and its ratepayers.

d. Where lies the public interest?

Clearly, the public interest lies in permitting PGandE to continue its work to avoid further delay in completion of the Units. As outlined in Mr. Perry's affidavit, each unit at Diablo Canyon will produce each month an amount of energy equivalent to that produced from about one million barrels of oil. Thus, prompt completion of the Units will save this amount of oil each month. This supports the official policy announced by the President of the United States of reducing consumption of oil thus lessening the country's dependence on foreign sources of oil.

2. PGandE has received a positive certification under § 401 of the Federal Water Pollution Control Act Amendments of 1972 P. L. 92-500, 86 Stat. 816 (Letter from Richard L. Black, counsel for NRC Staff, to Elizabeth S. Bowers, Esq. dated February 5, 1975, which



indicates copies were served on all parties). In accordance with § 511(c) (2) of the Federal Water Quality Act Amendments of 1972 and Interim Policy Statement § 5(c) the Commission and therefore this Board is not authorized

" . . . to review any effluent limitation or other requirement established pursuant to this Act or the adequacy of any certification under section 401 of this Act; or . . . to impose . . . any effluent limitation other than any such limitation established pursuant to this Act." (§ 511(c) (2))

In other words, as pointed out in the NRC Staff Brief dated January 23, 1975

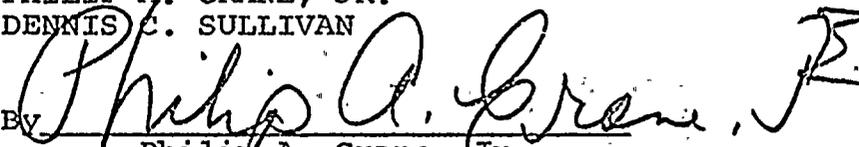
" . . . a positive FWPCA § 401 certification would be dispositive on the question of compliance with applicable limitations or other requirements promulgated or imposed pursuant to the FWPCA and the Board would have no responsibility to consider alternative cooling systems as they relate to water quality. This, of course, does not mean that the Board is precluded from considering such alternatives in regard to other impacts, e.g., aesthetics and land use." (Staff brief, p. 6)

In short, since the motion deals with matters of water quality and since PGandE has received a positive certification under § 401 of the Federal Water Pollution Control Act Amendments of 1972, the motion should be denied.

Respectfully submitted,

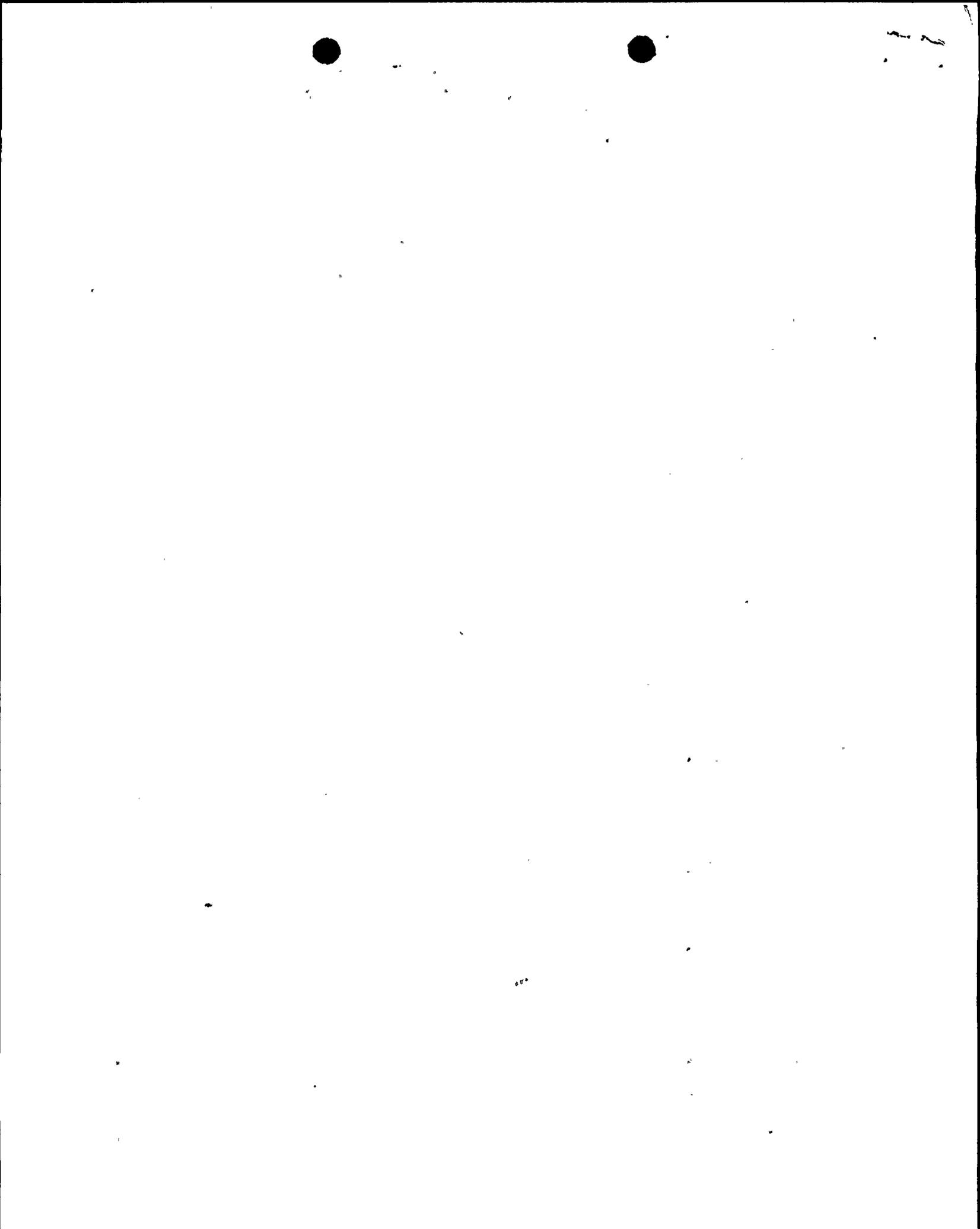
JOHN C. MORRISSEY
PHILIP A. CRANE, JR.
DENNIS C. SULLIVAN

By


Philip A. Crane, Jr.

Attorneys for
Pacific Gas and Electric Company
77 Beale Street
San Francisco, California 94106

Dated: June 20, 1975



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AFFIDAVIT OF CRAIG WALTON

My name is Craig Walton. I am the Water Quality Advisor for PGandE. I have a Ph.D degree in Water Chemistry and Zoology.

It is my opinion that the installation of titanium condenser tubes at the Diablo Canyon Power Plant will not result in any detrimental effects on the marine environment. The scientific literature shows that titanium has an extremely low corrosion rate and that the corrosion products that do form (primarily titanium dioxide) are inert or of low toxicity. The lack of concern over titanium toxicity is exemplified by a publication prepared for the then Atomic Energy Commission entitled "Toxicity of Power Plant Chemicals To Aquatic Life" (Wash-1249 June 1973) which contains no reference to titanium. The stated purpose of this report was to collect data on the effects on aquatic life forms of exposure to common chemicals. Similarly, a publication prepared at the request of EPA by the National Academy of Sciences and the National Academy of Engineering entitled "Water Quality Criteria 1972" contains no reference to the toxicity of titanium. Our Department of Engineering Research is currently running bioassay tests to confirm the low toxicity of titanium and its compounds.

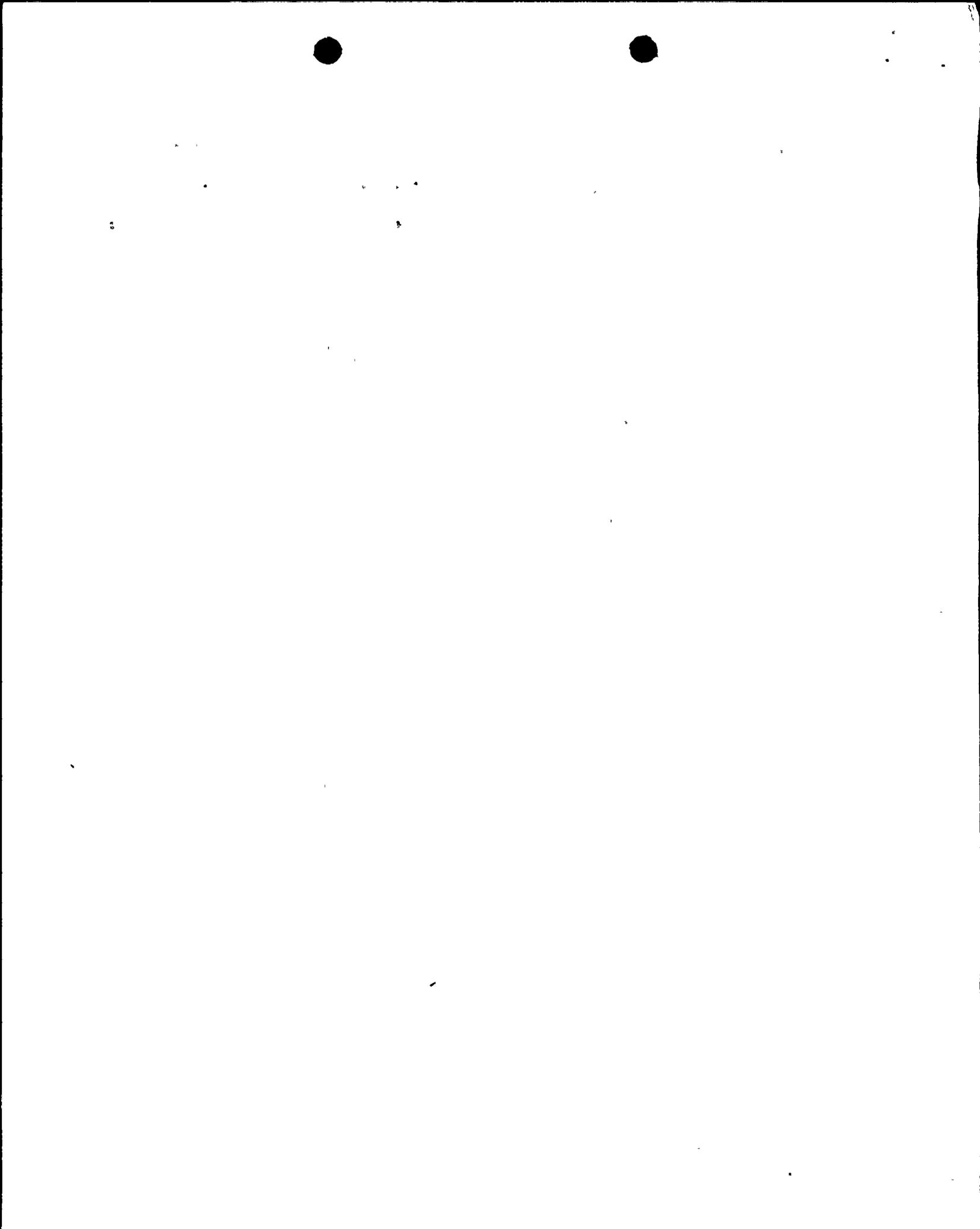
Titanium is the tenth most plentiful element, composing



approximately 0.6% of the earth's crust. Its natural concentration in seawater is approximately 1 part per billion. Of presently known materials titanium is among the most resistant to marine environments. It shows no measurable attack during atmospheric test exposure in marine environments.⁽¹⁾ In stagnant and flowing seawater, up to 30 feet per second, titanium and its alloys are generally reported to have "nil" corrosion rate. Various researchers have reported titanium corrosion rates in flowing seawater from 3×10^{-5} milspenetration per year (mpy) to 3×10^{-2} mpy,^(1,2,3) and one reference states that "the weight loss is so small that it was at the extreme limit of the analytical balance used in the experiment."⁽¹⁾ Titanium is also reported to be resistant to sulfide in all concentrations.⁽²⁾ This extremely low corrosion rate is due to a strongly adherent and protective TiO_2 passivation film which forms on the surface when the metal is exposed to oxygen in the environment.⁽⁴⁾ A titanium tube removed from the Morro Bay Power Plant condenser showed no corrosion damage and no measurable wall thinning after 4-1/2 years service in seawater.

Assuming the highest corrosion rate reported for titanium in seawater, 3×10^{-2} mpy, the concentration of titanium in the discharge from Diablo Canyon Unit 1 condenser would be less than 0.1 parts per billion. This concentration is much lower than any known concentration causing toxicity in marine organisms and significantly less than the natural seawater concentration of 1 part per billion.

On June 13, 1975 the California Regional Water Quality Control Board - Central Coast Region adopted a cease and desist order, a copy of which is attached. In my opinion PGandE can best comply



with this order by switching to titanium tubes in its condensers.

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

Craig Walton

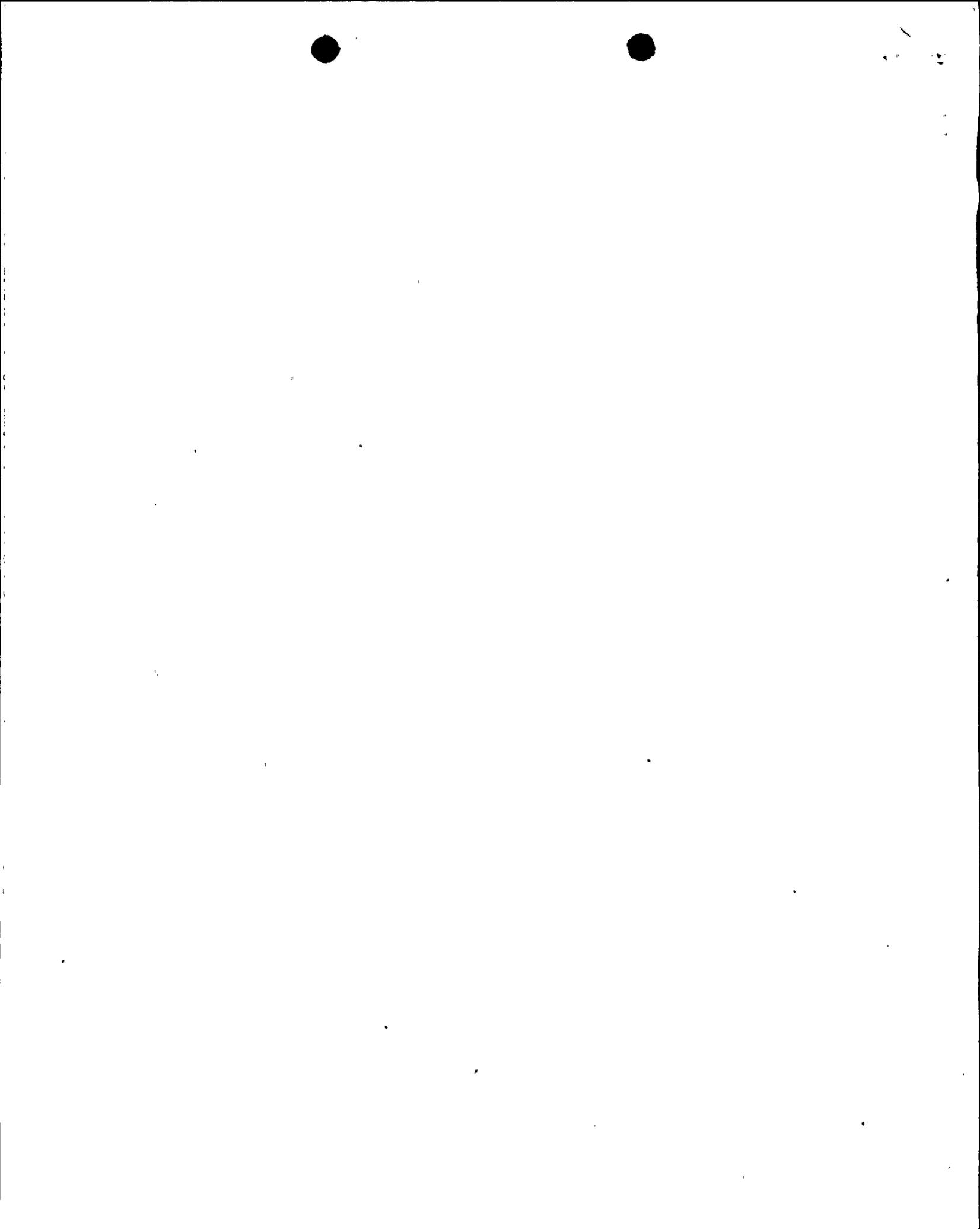
Craig Walton

Dated: June 20, 1975



BIBLIOGRAPHY .

1. Fink, F. W., and W. K. Boyd. The Corrosion of Metals in Marine Environments, DMIC Report 245, 1970, Defense Metals Information Center, Battelle Memorial Institute, Columbus, Ohio. "Titanium and Ti Alloys" pp. 50-57.
2. Cotton, J. B. and B. P. Downing. "Corrosion Resistance of Titanium and Seawater," Inst. Marine Engineers Trans., 69(8), 311-319 (1957).
3. Uhlig, H. H. Corrosion and Corrosion Control, 2nd Edition, John Wiley and Sons, New York.
4. Millaway, E. E. "Titanium: Its Corrosion Behavior and Passivation," Materials Protection, 4(1): 16-21, January 1965.



CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
CENTRAL COAST REGION

1122 LAUREL LANE
SAN LUIS OBISPO, CALIFORNIA 93401



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Discuss _____ Other Copy to _____
Action _____ Comment _____ File _____

June 17, 1975

Pacific Gas and Electric Company
77 Beale Street
San Francisco, California 94106

Gentlemen:

Enclosed is a copy of Cease and Desist Order No. 75-2, Order Requiring the Pacific Gas and Electric Company, Diablo Canyon Nuclear Power Plant, San Luis Obispo County, to Cease and Desist from Discharging Wastes Contrary to Requirements Prescribed by the California Regional Water Quality Control Board, Central Coast Region, which was adopted by this Board on June 13, 1975.

Your attention is directed to the specific actions and time schedule contained in this Order.

Very truly yours,

CALIFORNIA REGIONAL WATER QUALITY
CONTROL BOARD, CENTRAL COAST REGION

By *Kenneth R. Jones*
KENNETH R. JONES
Executive Officer

KRJ:MLS:ms

Enclosure

- cc: State Water Resources Control Board
- State Department of Health, Santa Barbara
- State Department of Fish and Game, Monterey
- San Luis Obispo County Health Department
- San Luis Obispo County Planning Department
- San Luis Obispo County Engineer
- U. S. Environmental Protection Agency



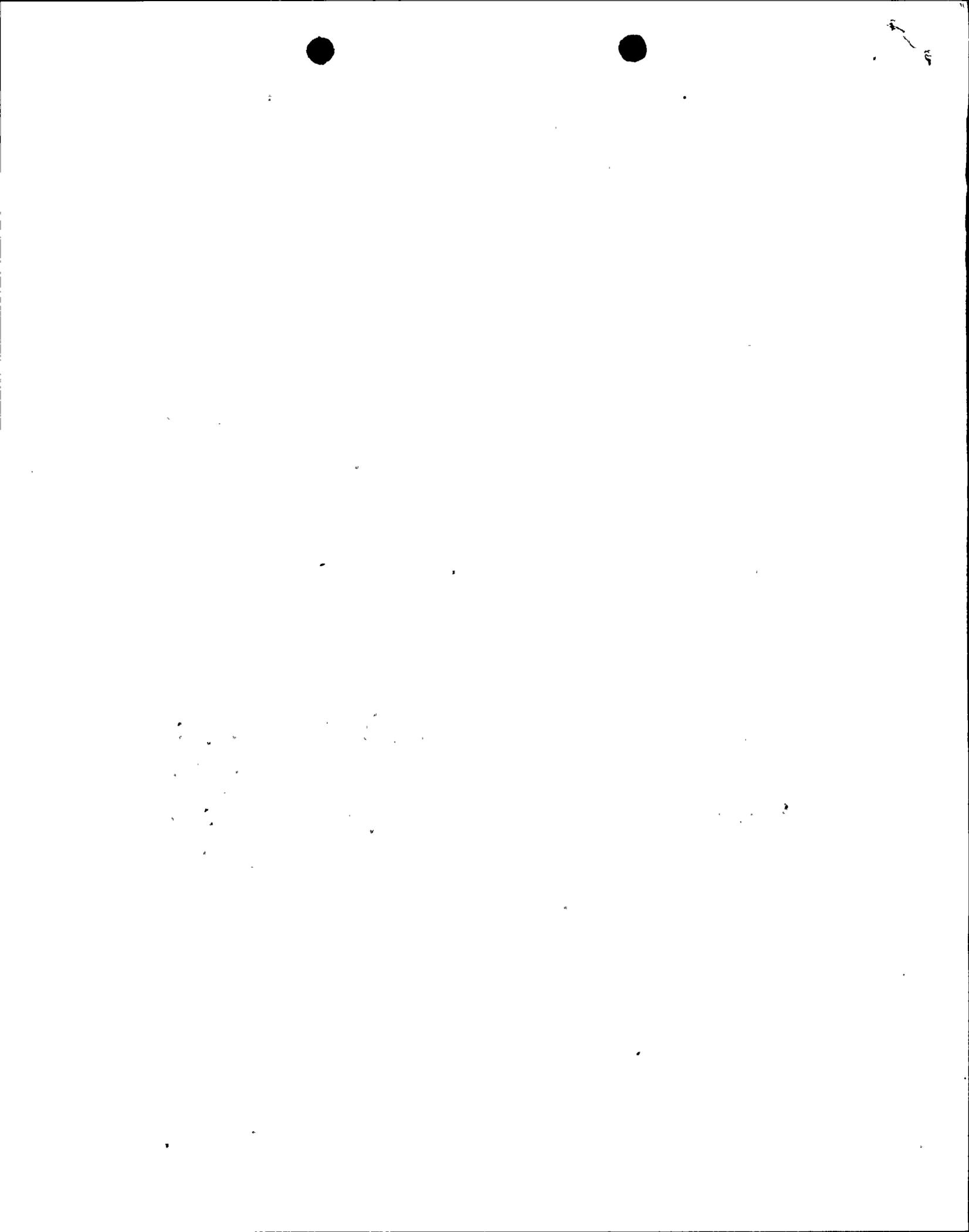
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COAST REGION

CEASE AND DESIST ORDER NO. 75-1

ORDER REQUIRING THE PACIFIC GAS AND ELECTRIC COMPANY, DIABLO CANYON NUCLEAR POWER PLANT, SAN LUIS OBISPO COUNTY, TO CEASE AND DESIST FROM DISCHARGING WASTES CONTRARY TO REQUIREMENTS PRESCRIBED BY THE CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD, CENTRAL COAST REGION.

The California Regional Water Quality Control Board, Central Coastal Region, finds:

1. On October 17, 1969, this Regional Board adopted Waste Discharge Requirements covering the Pacific Gas and Electric Company's discharge from its Diablo Canyon Nuclear Power Plant.
2. The discharge requirements provided, in part, as follows:
 - "3. The discharge shall be controlled to the degree necessary to prevent any noticeable change in the receiving waters. This shall include change in natural appearance resulting from discoloration, floating or suspended solids, grease, oil, oil slicks, and foam."
 - "5. The discharge shall be controlled to the extent that floating, suspended and settleable solids and toxic substances will not interfere with marine life, including fish, plant and bird life and the organisms upon which they depend."
3. On October 11, 1974, this Regional Board adopted NPDES Waste Discharge Requirements Order No. 74-41 for the Diablo Canyon Nuclear Power Plant and specifically provided, in part, as follows:
 - "A. Discharge Requirements
 1. Existing Waste Discharge Requirements adopted October 17, 1969, shall remain in effect.
 2. Pursuant to Section 13370 of the Porter Cologne Water Quality Control Act, the discharge shall comply with all applicable effluent limitations, national standards of performance, toxic and pretreatment effluent standards, ocean discharge criteria and all other final regulations established pursuant to Sections 301, 302, 303(d), 304, 306, 307, 316, and 405 of the Federal Water Pollution Control Act and amendments thereto.



- 3. The discharge shall not cause a violation of any applicable water quality standard for receiving waters adopted by the Board or the State Water Resources Control Board."
- 4. On Thursday, May 29, 1975, at 9:00 a.m. in the Veterans' Memorial Building, 801 Grand Avenue, San Luis Obispo, California; after due notice to the discharger and all other affected persons, a hearing panel of the Regional Board conducted a public hearing at which the discharger appeared and evidence was received concerning the discharge.
- 5. Upon the basis of the evidence received, the hearing panel recommended that the Board issue a cease and desist order against the discharger requiring that it comply forthwith with the aforesaid requirements.
- 6. The discharger has violated the requirements listed in 2. above and is considered to be in threatened recurring violation of requirements listed in 2. and 3. above.
- 7. The problems associated with the presence of foam as a result of the discharge are violations of waste discharge requirements which require development of a solution over a period of time. Therefore, order to comply forthwith is not appropriate. It is more appropriate that a time schedule for compliance be established which is consistent with the operation schedule of the plant.

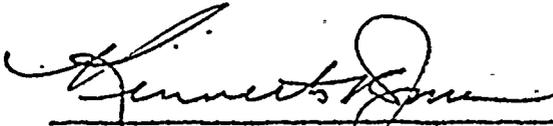
IT IS HEREBY ORDERED THAT

- 1. The Pacific Gas and Electric Company cease and desist forthwith from discharging wastes contrary to requirements listed in items 2. and 3. above.
- 2. Compliance with requirement No. 3 relating to presence of foam as a result of the discharge shall be according to the following schedule:

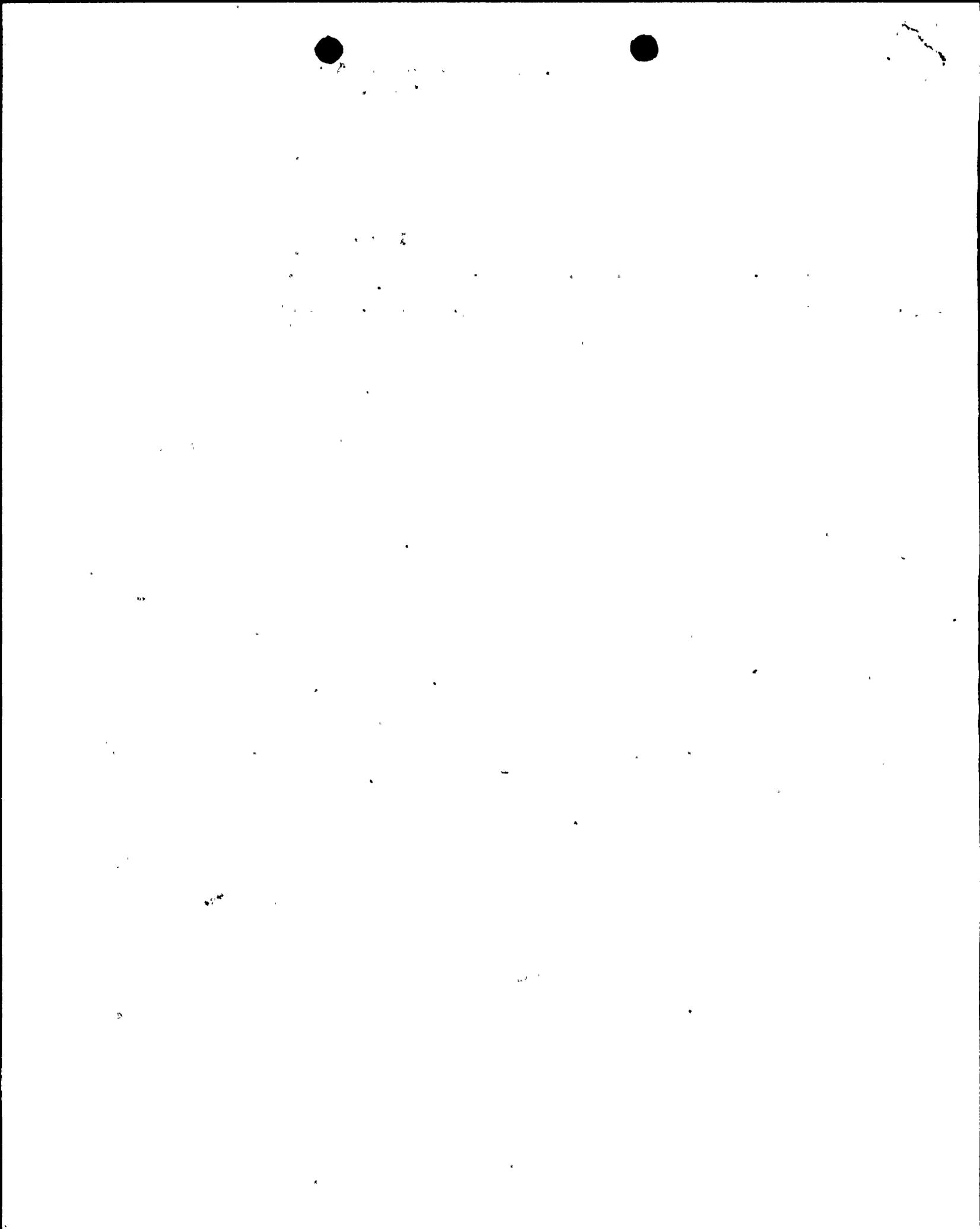
	<u>Complete</u>	<u>Report to Board</u>
Development of Control Concept	Dec. 31, 1975	Jan. 15, 1976

- 3. If, in the opinion of the Executive Officer, Pacific Gas & Electric Company fails to comply with this order, the Executive Officer is directed to request the Attorney General to take the appropriate enforcement action against the discharger, including injunction and civil monetary remedies, if appropriate.

I, KENNETH R. JONES, Executive Officer of the California Regional Water Quality Control Board, Central Coast Region, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Coast Region, on June 13, 1975.



 Executive Officer



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AFFIDAVIT OF WILLIAM J. LINDBLAD

My name is William J. Lindblad. I am PGandE's Project Engineer for Units 1 and 2 at its Diablo Canyon Site.

A principal reason for switching the condenser tubes from copper to titanium is to provide the condensers a leaktightness commensurate with current conditions. When the copper-nickel tubes were originally specified in 1967 they represented the economic choice because steam generator water chemistry could tolerate a nominal level of seawater leakage, and the cost of replacement energy during condenser maintenance was low. Since that time Westinghouse has changed its steam generator water chemistry requirements to a system with a minimal capacity for inleakage of seawater. Experience with titanium in operating plants shows a vast improvement in minimizing condenser seawater leakage over copper alloys. The hardness and corrosion resistance of titanium are the basic attributes that make it more leak resistant than copper-nickel. Even a thinner gauge titanium tube performs better in this regard than copper. In addition, replacement energy fuel costs during outages for condenser maintenance have escalated as a result of general increases in fossil fuel costs.



A second reason for the switch was to reduce by over 95% the amount of copper surface exposed to circulating seawater. This will assist PGandE in complying with the Cease and Desist Order issued by the California Regional Water Quality Control Board - Central Coast Region, adopted June 13, 1975, a copy of which is attached to the accompanying affidavit of Mr. Craig Walton.

By virtue of the fact that titanium is less toxic to marine organisms than copper, it is also less resistant to marine fouling growth. However, experience at other plants shows that marine fouling can be controlled with the condenser cleaning methods described in the PGandE Environmental Report and within applicable water discharge requirements.

While titanium metal is less conductive of heat than copper-nickel alloys, this is only one of the considerations in the overall heat transfer effectiveness of the condenser. We have compensated for this in part by specifying a thinner gauge tube. We conclude that on an overall basis, the condenser will perform adequately with titanium.

Titanium condenser tubes have been installed in PGandE power plants using once-through saltwater cooling for periods exceeding four years. No corrosion damage or measurable tube wall thinning has been observed, and the tubes have performed satisfactorily in all respects.

The retubing of the condenser for Unit 1 was started June 10, 1975 and is scheduled to be completed October 17, 1975. Between the latter date and the scheduled fuel loading date of January 24, 1976 a number of tests will have to be run on the various plant components.



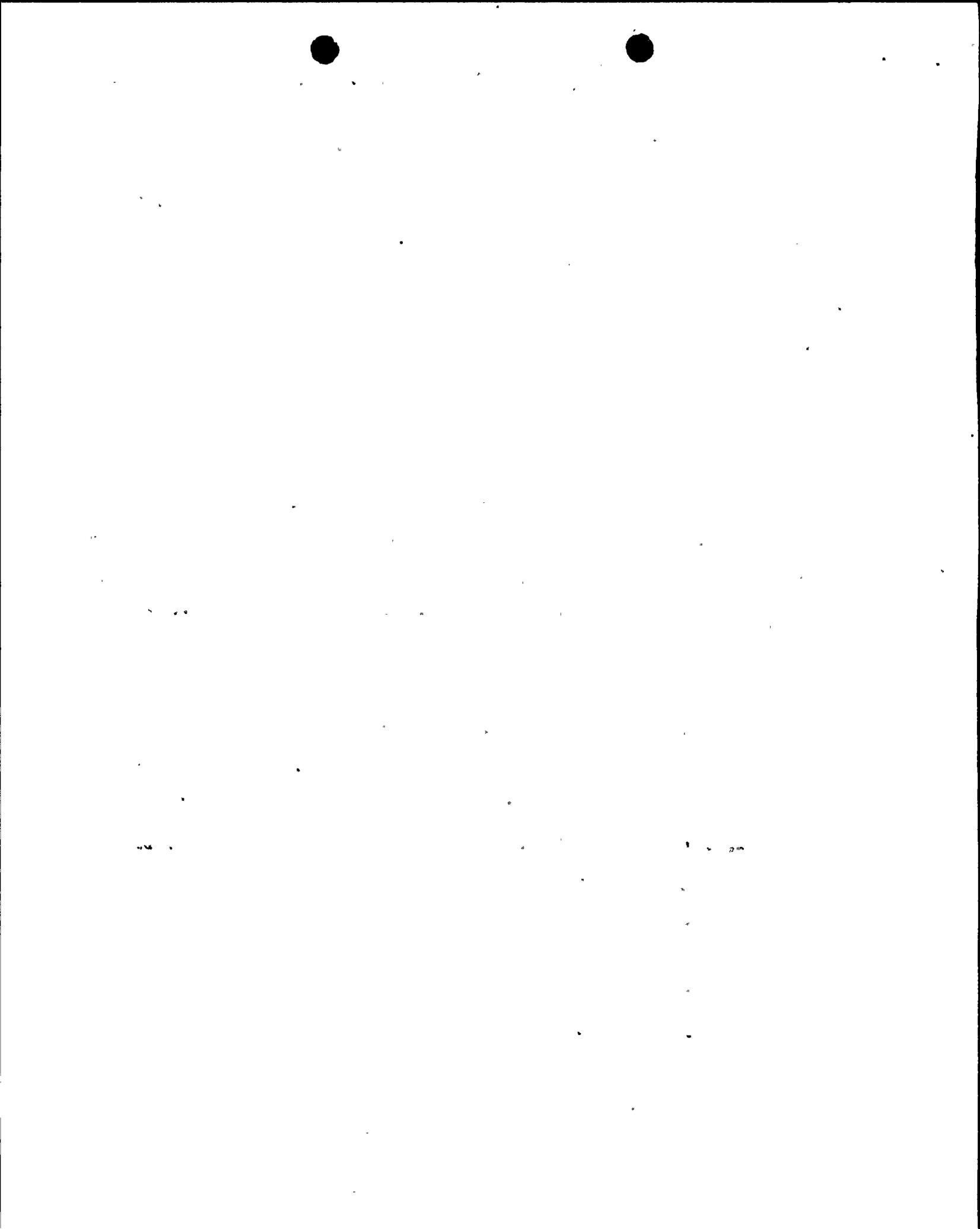
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An operable condenser is a necessary part of such tests. If the work of retubing the condensers were to be delayed, this would delay the fuel loading date. The extra fuel costs incurred by PGandE as a result of such a delay are outlined in the accompanying affidavit of H. R. Perry.

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


William J. Lindblad

Dated: June 20, 1975



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AFFIDAVIT OF H. R. PERRY

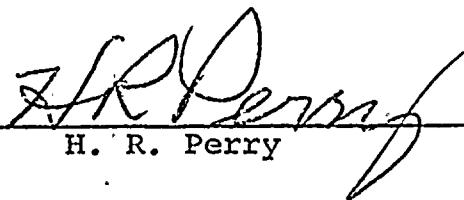
My name is H. R. Perry. I am Chief Planning Engineer for Pacific Gas and Electric Company. My principal responsibilities are to develop and recommend plans for expansion of the Company's electric generation and transmission facilities. In connection with my duties I keep informed on the relative costs of various types of fuels for electric power generation because knowledge of such costs has a direct influence on planning of system additions.

When completed it is estimated that Pacific Gas and Electric Company will have invested more than \$500 million in the generating, step-up and transmission facilities of Unit 1 at Diablo Canyon. This investment will provide the ability to generate energy from nuclear fuel at a much lower cost than the equivalent amount of energy from existing units using oil fuel. The estimated nuclear fuel expense, if the unit is operated at an average capacity factor of 80 percent, is \$43 million annually. At 80 percent capacity factor the annual energy output from Unit 1 is equivalent to roughly the amount of electricity generated from 12 million barrels of oil. Using a figure



of \$16 per barrel, 12 million barrels would cost \$192 million, as opposed to the annual cost of \$43 million for Unit 1's nuclear fuel. Thus, for each month the unit is delayed beyond the scheduled fuel loading date the Company will incur excess fuel costs of about \$12 million.

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



H. R. Perry

Dated: June 20, 1975



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Diablo Canyon Site)
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Docket Nos. 50-275-OL
50-323-OL

CERTIFICATE OF SERVICE

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

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C/o Ms. Raye Fleming
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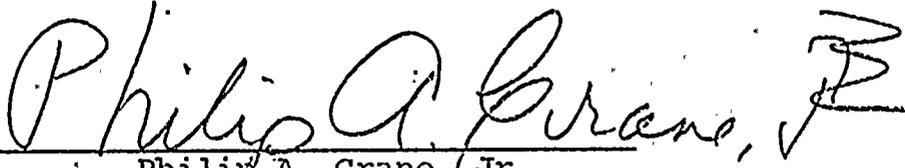
Secretary
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

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Andrew Skaff, Esq.
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Philip A. Crane, Jr.
Attorney
Pacific Gas and Electric Company

Dated: June 20, 1975

