

8/19/76

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION  
BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of )  
PACIFIC GAS AND ELECTRIC COMPANY )  
(Diablo Canyon Nuclear Power Plant, )  
Units 1 and 2) )

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Docket Nos. 50-275-OL  
50-323-OL

SCENIC SHORELINE RESPONSE TO NRC  
STAFF INTERROGATORIES PROPOUNDED

JUNE 21, 1976

Interrogatory No. 1

1. Diablo Canyon as Point of Discharge
  - A. State whether the discussion in Chapter 3 of the FES Addendum adequately answers your contention as to whether the mouth of Diablo Canyon is the point of discharge of thermal effluents. If the answer to the above question is no, answer the following questions:
  - B. State in what respect the FES Addendum is deficient.
  - C. List the names, addresses and credentials of all witnesses upon which you will rely at hearing. Briefly summarize their testimony.
  - D. List any documents upon which you will rely to prove your contention.



Response to Interrogatory No. 1

1.A. No.

1.B. The physical and analytical model studies have not produced any clear basis for applicant's assurance of limited impact. The FES relies on determining severe impact once it occurs rather than anticipating damage.

1.C. We have not yet decided what witnesses we will use for this contention.

1.D. We have not yet determined which documents we might use to prove this contention.

Interrogatory No. 2

2. Modeling of Heat Transfer

A. State the basis for your contention that the FES Addendum inadequately models heat transfer from Diablo Cove and the Pacific Ocean to the atmosphere.

B. List all documents upon which you will rely at hearing.

C. List the names, addresses and credentials of all witnesses upon which you will rely at the hearing, giving a brief summary of their testimony on this subject.

D. State whether you or your witness agree with the following statement. If not, specifically list your reasons for disagreement and the factual or theoretical bases for this disagreement.

Heat transfer to the atmosphere can be important in the far field but is insignificant in the near field where entrainment of cooler water predominates. Far field effects can be of importance when the



discharge is into a small water body, but was not considered for the Diablo Canyon discharge since the far field is the Pacific Ocean. For these reasons, the Addendum, which contains estimates of plume size determined from the applicant's near field physical model, does not specifically mention heat transfer to the atmosphere.

Response to Interrogatory No. 2

2.A. and 2.D. The statement set out in 2.D. asserts that transfer of heat to the atmosphere is "insignificant" in the near field because entrainment of cooler water predominates. The meaning of "insignificant" in the context of the statement is unclear. Does the word refer to total heat transferred, effects on the atmosphere or something else?

2.B. We have not yet determined what documents we will use at the hearing to support this contention.

2.C. We have not yet determined which experts we will have testify at the hearing on this contention.

Interrogatory No. 3

3. Quantitative Data on Turbidity

A. Explain what "quantitative data on turbidity" means.

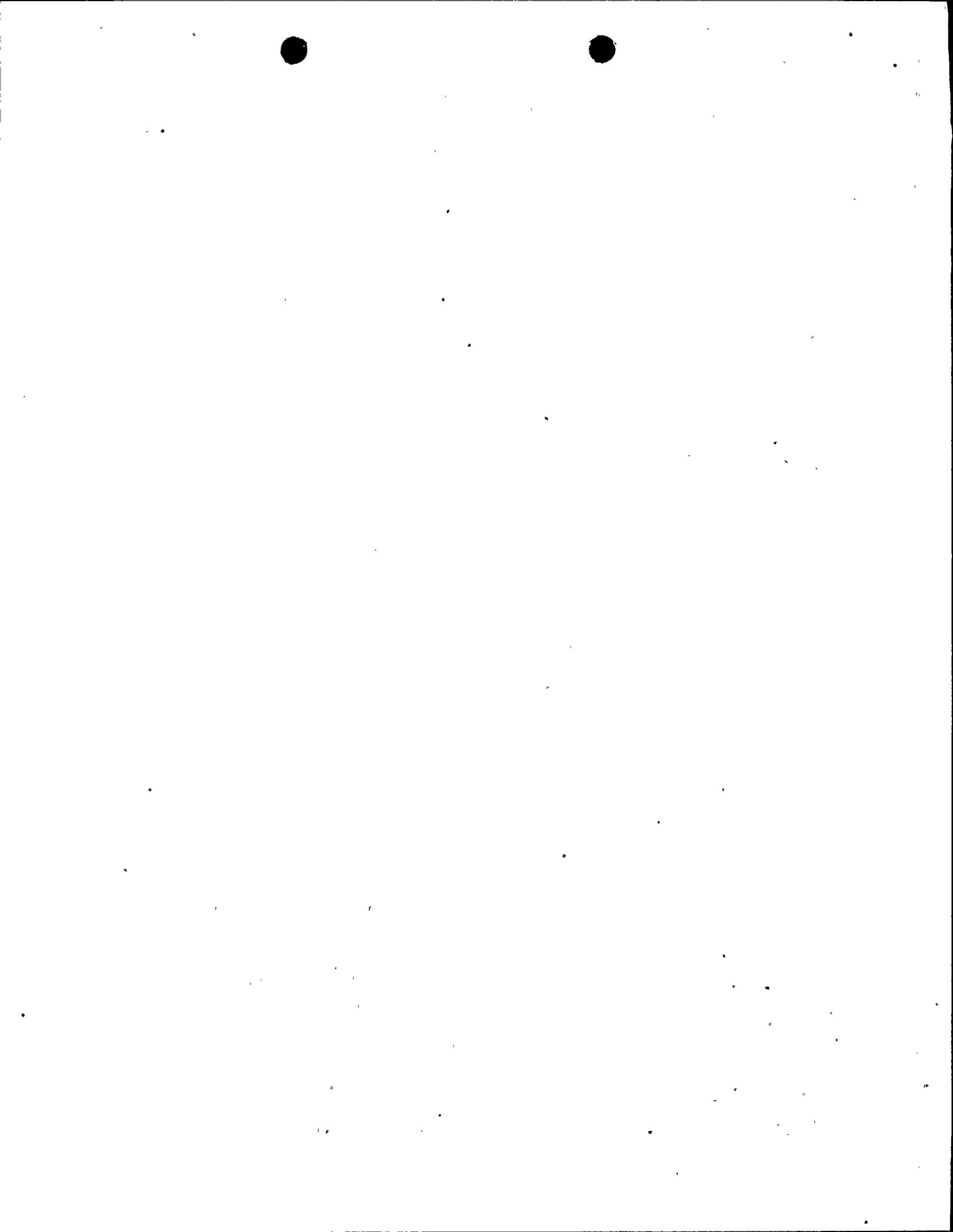
B. State which quantitative data on turbidity is referred to by the contention.

C. Explain how plant operation will affect turbidity.

D. List the areas and/or biota you believe will be affected by turbidity.

E. Explain how the FES and/or FES Addendum are insufficient in their consideration of turbidity.

F. List the names, qualifications and addresses of any witnesses you plan to present at hearing. Briefly



summarize their testimony.

G.. List all documents or reports upon which you will rely to prove your contention.

Response to Interrogatory No. 3

3.A. and 3.B. "Quantitative data on turbidity" means how much the light passing through a given length of water column is attenuated by particles in suspension.

3.C. The jet discharge would keep more particles in suspension than would be in suspension without the discharge, and thus would increase turbidity.

3:D. Any organisms that require light will be adversely affected if turbidity is increased. Also, sediments carried by the turbidity will drop elsewhere, burying organisms and in other ways impairing their functions.

3.E. No data on the amount of turbidity or its effects were given in section 4.3 of the FES Addendum. Statements such as "a fine layer of silt"; "no area of heavy sedimentation was found"; "adverse impacts...were minimal" are insufficient. The FES should include the data which supports these statements.

3.F. We have not yet determined what witnesses we will present at the hearing in support of this contention.

3.G. We have not yet determined what documents we will introduce in support of this contention.

Interrogatory No. 4

4. Quantitative Data on Sublethal Thermal Effects



- A. What species will experience sublethal effects?
- B. What endpoint of sublethality is referred to?
- C. Thermal effects of what degree are inferred (i.e., within what isotherm above ambient)?
- D. Considering the thermal data presented in the FES Addendum, what additional quantitative data are you referring to in your contention on sublethal thermal effects?
- E. List the names, credentials and addresses of all witnesses you will rely upon to prove your contention, giving a brief summary of the testimony of each on this subject.
- F. List all documents, texts and reports upon which you will rely at hearing to prove your contention.

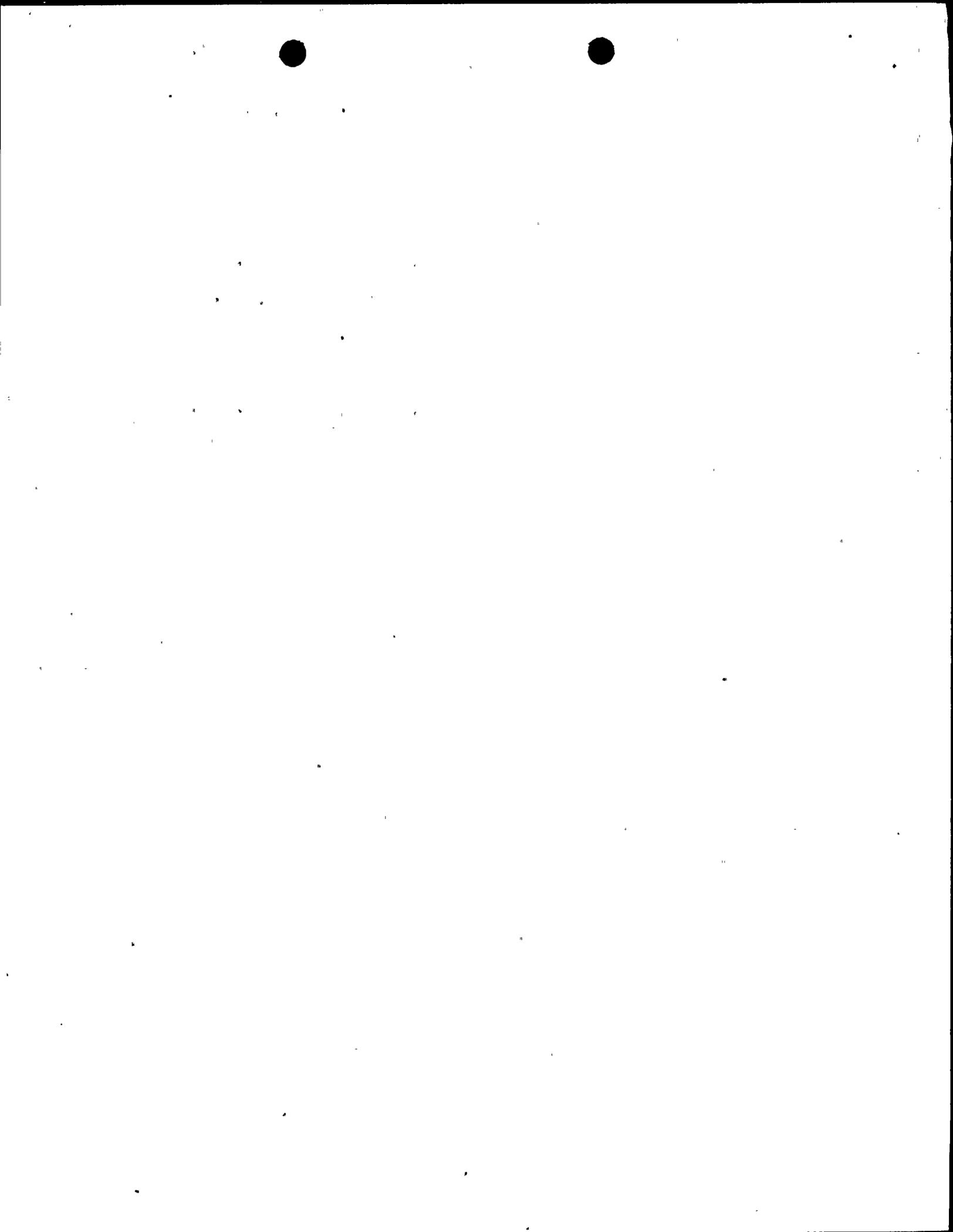
Response to Interrogatory No. 4

4.A. and 4.B. Any local species could suffer sublethal effects that could, for example, stunt its growth, reduce its reproductive capacity (fecundity or fertility), and/or adversely affect its ability to move, react to stimuli and/or recognize mates, predators or foods. These effects could indirectly cause the death of the affected organisms.

4.C. The degree of sublethal effects will vary from species to species.

4.D. Quantitative data on the sublethal effects of the thermal pollution data in the FES.

4.E. We have not yet determined what witnesses we will present to support this contention:



4.F. We have not yet determined what documents we will rely upon to support this contention.

Interrogatory No. 5

5. Prevailing Winds and Currents Causing Recirculation

A. State the basis for your contention that the FES Addendum does not adequately assess the extent of recirculation expected, citing those areas of the FES or Addendum you believe to be incorrect. Note especially page 3-10 of the FES Addendum.

B. Describe how recirculation could occur by either wind or current, stating the facts or information you would rely upon to support this theory at hearing on this subject.

C. List the names, the credentials and addresses of all witnesses upon which you will rely at hearing, briefly summarizing their testimony.

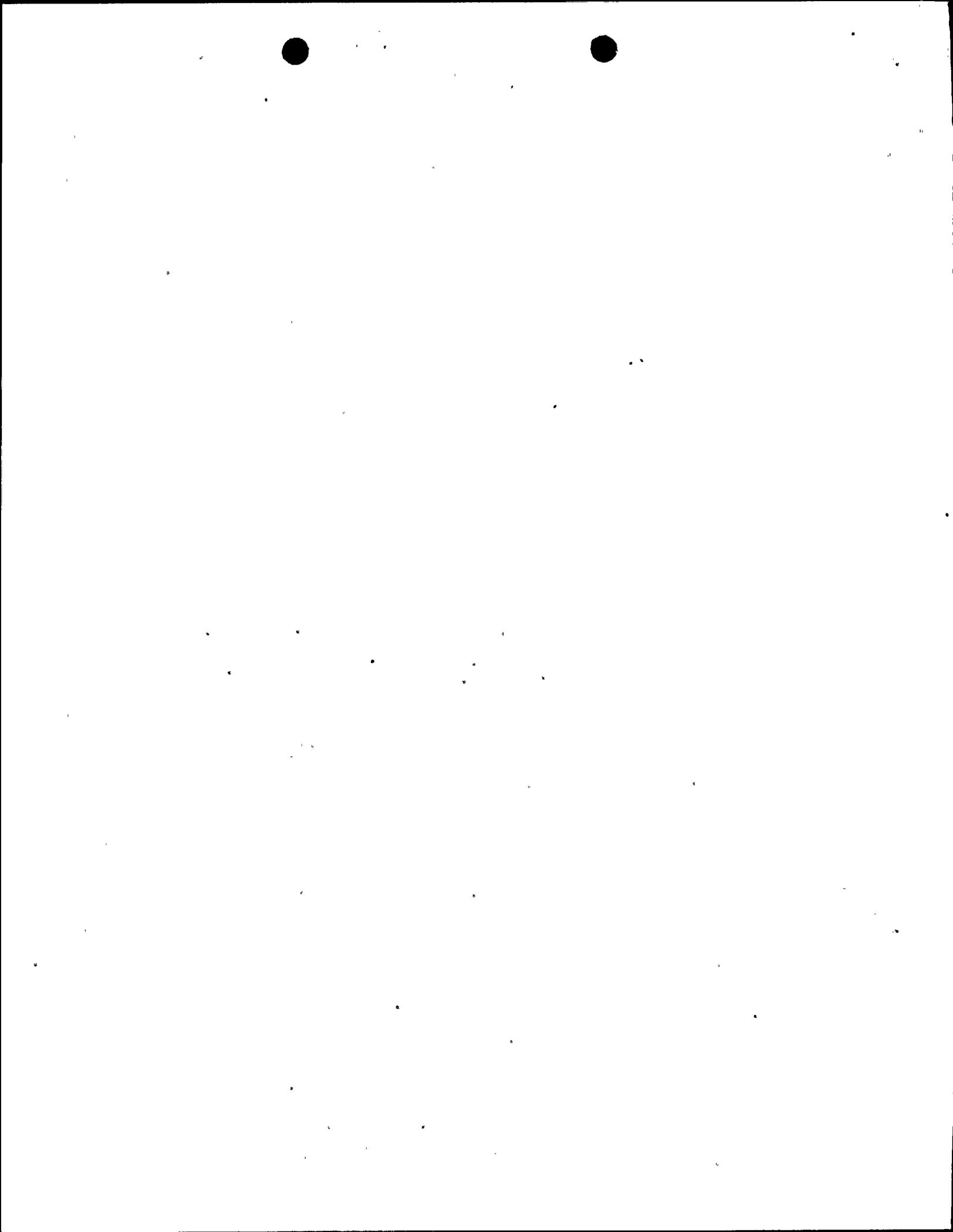
D. List all documents you plan to use to prove your contention.

Response to Interrogatory No. 5

5.A. We find no documentation to provide a reasonable basis for the Staff's assertion at FES Addendum (a) 3, p. 3-10 that the proposed water testing (proposed at Addendum, p. 3-10) will not expose potential damage before it is done.

5.B. Given the Diablo Cove-South Cove geometry, recirculation could be caused by wind or coastal current.

5.C. We have not yet determined who are witnesses in support of this contention will be.



5.D. We have not yet determined what documents we will use to prove this contention.

Interrogatory No. 6

6. Entrainment and Impingement

A. State with particularity any FES or FES Addendum statements you disagree with on the subject of entrainment or impingement and reasons for your disagreement.

B. Name the species entrained or impinged with which you are concerned.

C. What is the population size and distribution of species for which entrainment effects are to be evaluated?

D. Considering the data presented in the Addendum, what additional information is available?

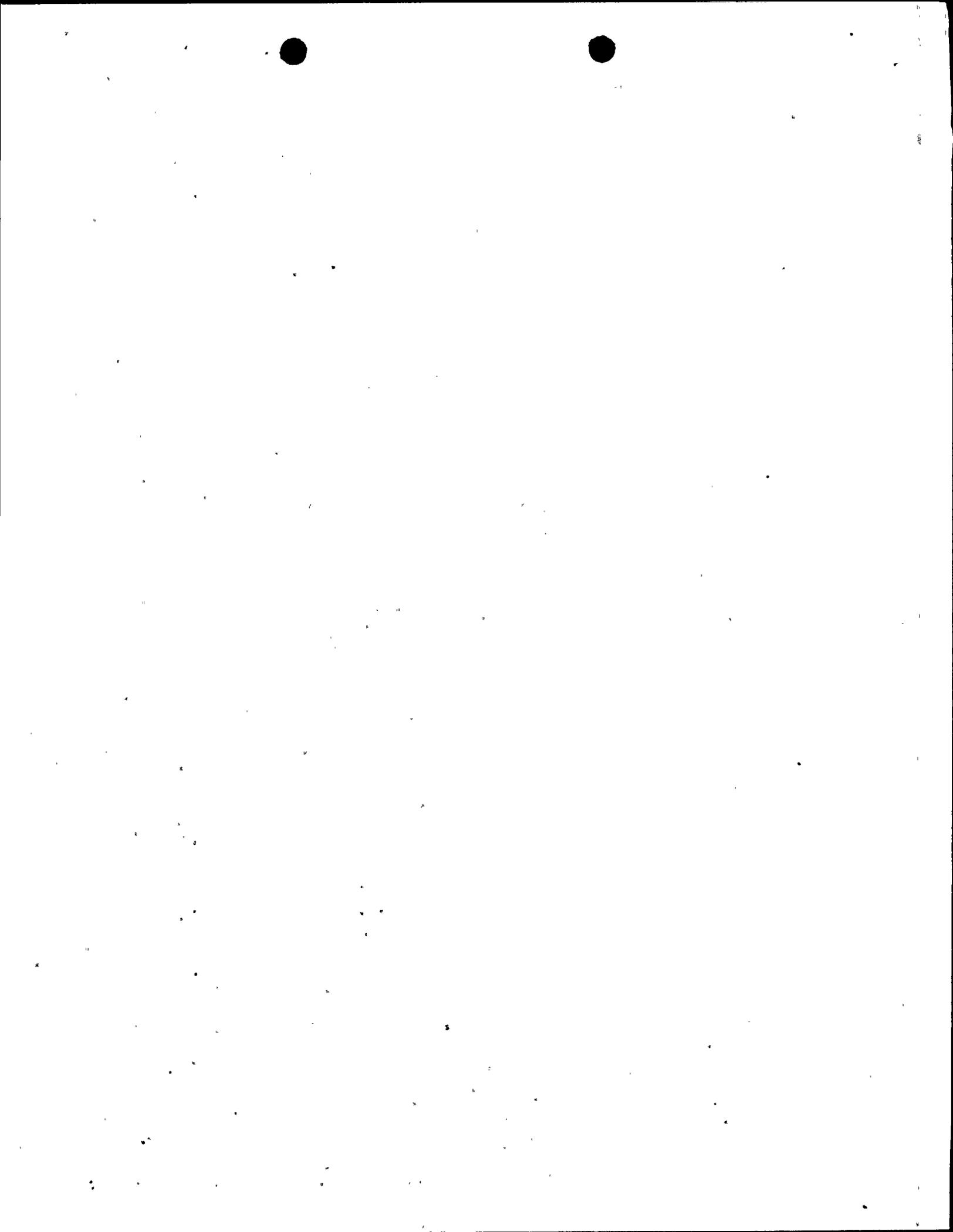
E. State whether your thermal contention relates to damage caused by entrainment only or to the thermal effects of heated water, or both.

F. State the names, credentials and addresses of all witnesses you expect to call at the hearing giving a brief summary of their testimony on this subject.

G. List all documents, reports and texts upon which you will rely to prove your contention.

Response to Interrogatory No. 6

6.A. The statement regarding insignificant mortality of abalone eggs appearing at FES Addendum Sec. 5.3.2 p. 5-5 should be supported by data. Furthermore, we see no indication that the abalone organisms generated by the eggs and larvae that survived impingement were held for a sufficient length of time



to analyze delayed mortality or sublethal damage. Such delayed mortality and sublethal damage were found in a study of a power plant on Long Island Sound by Carpenter, et al., in Marine Biology, 1975.

The statement that impingement will have a negligent impact on pelagic larval fish should be supported by data.

The study relating to fish impingement reported in the FES was conducted during 10 days of December only and therefore is not sufficient. The fish population near the Diablo Canyon site may be significantly higher in months other than December. Furthermore, fish migrations which typically occur for many species of marine fish could take place in months other than December. Many gravid females could be impinged and killed during such migrations. The higher fish populations and fish migration that could occur at Diablo in months other than December would result in higher impingement-caused fish kills than were recorded in the December data presented in the FES. Therefore, a full year's study should be made to accurately assess the adverse environmental impact of fish impingement during all months of the year.

6.B. and 6.C. We cannot name the species because the applicant has not yet done the relevant studies. For example, from what we know now, all species of plankton and nekton could potentially be impaired or entrained. The applicant bears the burden of proof to show which species will or will not be adversely impacted by impingement and entrainment.

6.D. None because the applicant did not conduct adequate studies. Instead, the applicant conducted only a minimal study



during ten days of one month of the year.

6.E. Our thermal contention refers to both entrainment and thermal effects damage.

6.F. We have not yet decided which witnesses we will call in support of this contention.

6.G. We have not yet decided what documents we will present to prove this contention.

Interrogatory No. 7

7. Species Losses and Regeneration of Significant Marine Breeding Areas

A. What species are referred to in your contention?

B. Does "significant" refer to species or areas?

C. What size "areas" are referred to and where are they located geographically?

D. Is the contention confined to only "breeding" areas (i.e., spawning areas) and not to nursery areas?

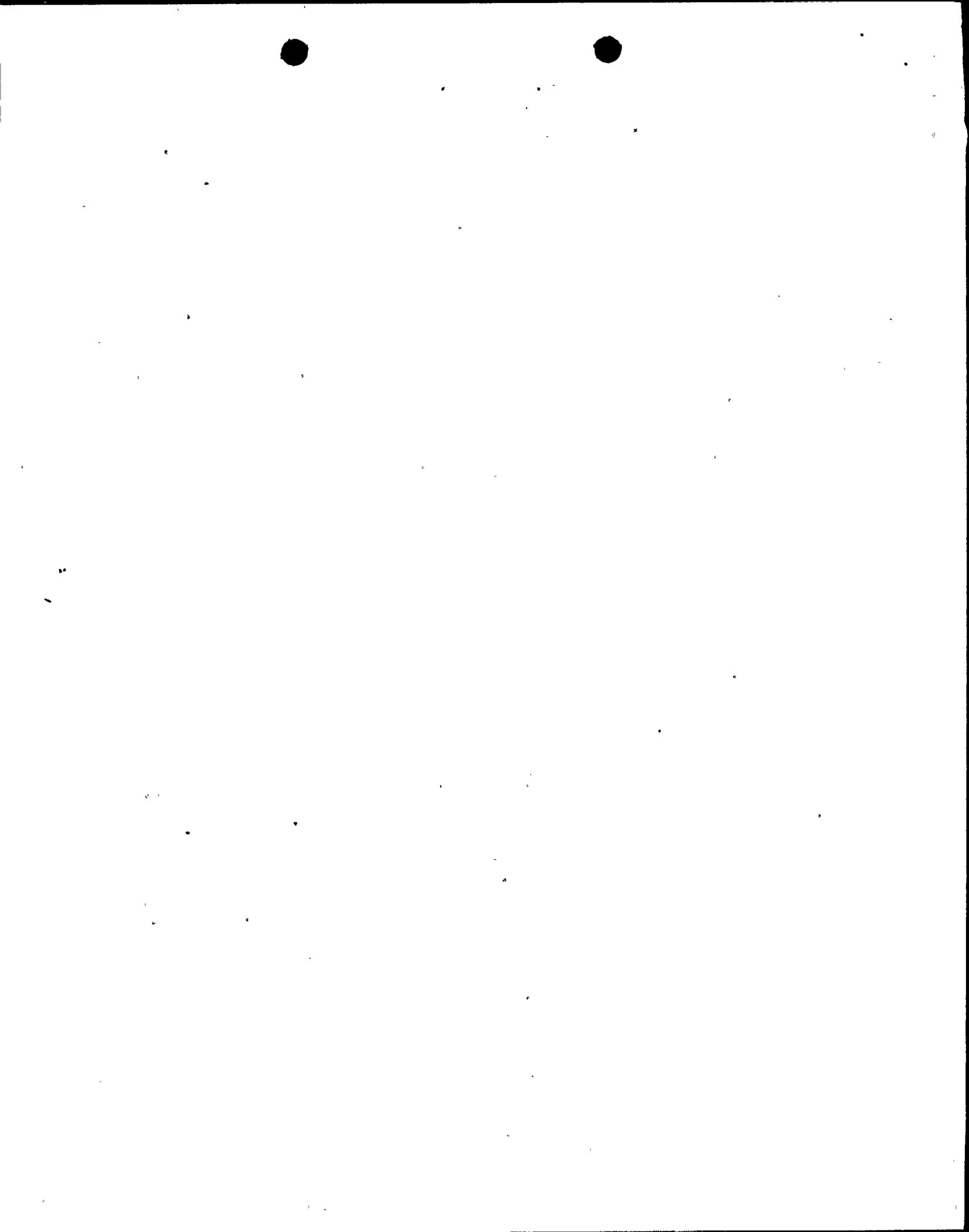
E. In the context of the question, what does "regeneration" mean?

F. List the names, credentials and addresses of all witnesses whom you will present at hearing, giving a brief summary of the testimony of each on each subject.

G. List all documents, reports and texts which you will use to prove your contention.

Response to Interrogatory No. 7

7.A. We cannot specify species because the FES and Addendum fail to make a prediction of sufficient scope and



depth regarding the nature of the expected thermal plume.

7.B. Significant refers to both losses of organisms and breeding areas.

7.C. Size and location cannot be identified until the staff treats the plume in a quantitative fashion.

7.D. The contention applies to both breeding and nursery areas.

7.E. We are unable to answer at this time.

7.F. We have not yet decided which witnesses we will present to support this contention.

7.G. We have not yet decided which documents we will use to support this contention.

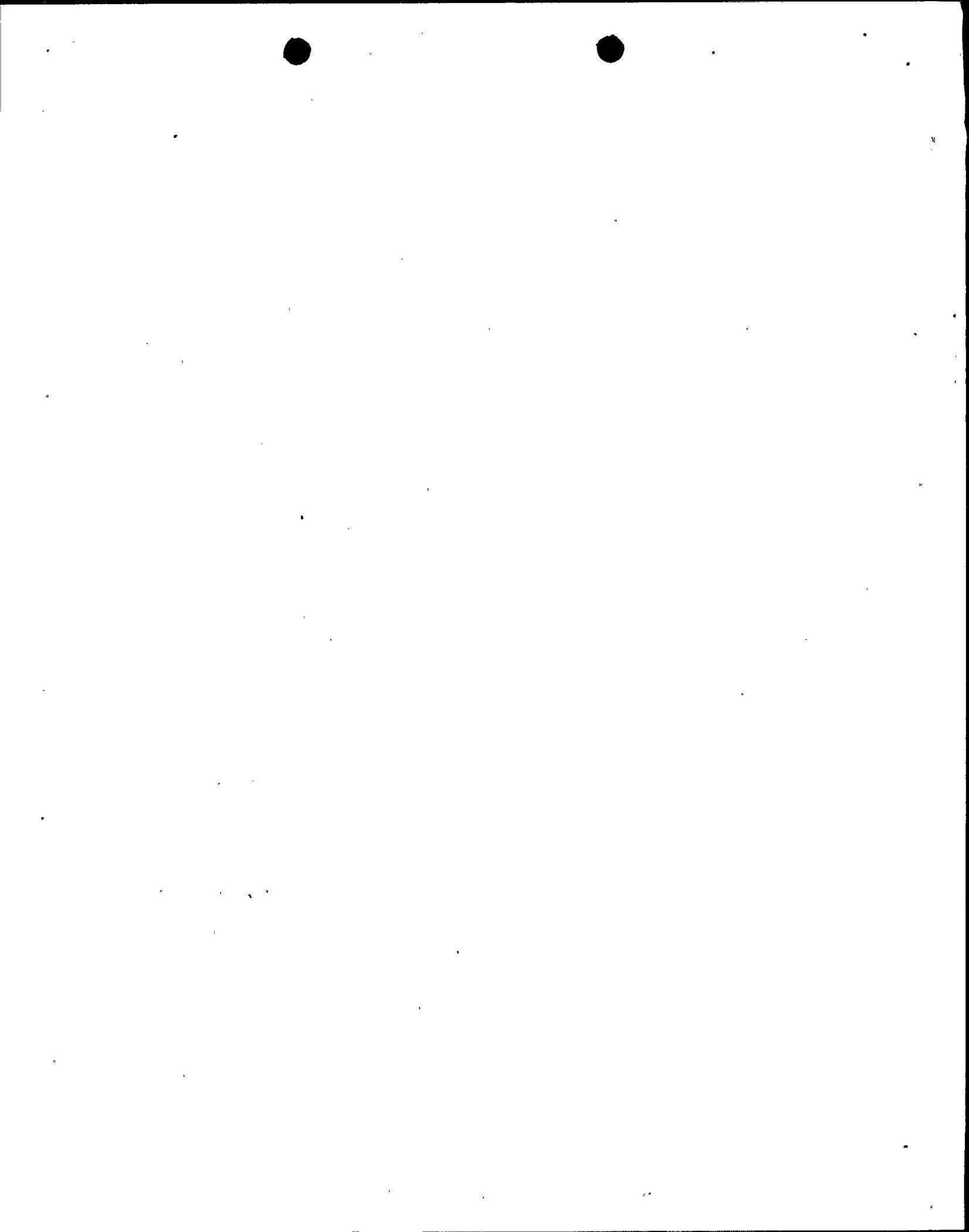
Interrogatory No. 8

8. 4 Degree Isotherm

A. State with particularity the statements in the FES Addendum which you disagree with and your reasons for disagreement. In view of the Staff's analysis of Applicant's thermal model, state why the FES Addendum's treatment of the subject is not sufficient, giving the factual basis for your views.

B. Give the name, credentials and addresses of all witnesses you plan to present at the hearing to prove your contention, giving a brief summary of the testimony of each.

C. List the documents, texts and reports you will use at the hearing to prove your contention.



Response to Interrogatory No. 8

8.A. The FES Addendum indicates at p. 3-10 that for down-coast currents little can be said about the 4°F isotherm and that for upcoast currents the 4°F surface isotherm is expected to "cover an extensive area. The maximum extent could not be determined in the model, however, due to the limited extent of the thermistor array and the size of the model." Modeling with such vague and inexact results is inadequate.

We also adopt part 1 of the "Response of William P. Cornwell to Interrogatories filed by PG&E dated June 16, 1976" as part of our response to this interrogatory.

8.B. We have not yet determined which witnesses we will present to support this contention.

8.C. We have not yet determined what documents we will present in support of this contention.

Interrogatory No. 9

9. Procedures to Ensure Plume Will Not Exceed Predicted Values

A. State whether you agree that the procedures listed on page 3-11 of the FES addendum are sufficient to control the size of the predicted plume.

B. If the answer above is no, detail additional measures you propose to control plume size.

C. What is your definition of an acceptable plume size and what are your criteria for selection of that size?

D. State the names, addresses and credentials of your thermal plume witnesses, giving a brief description of the proposed testimony of each.



E. List all documents, reports and texts upon which you will rely to prove your thermal plume contention.

Response to Interrogatory No. 9

9.A. No.

9.B. We have yet to determine what additional measures we may propose to control plume size.

9.C. We have not yet determined whether any plume size would be acceptable and, if any size would be acceptable, what that size might be.

9.D. We have not yet determined who our thermal plume witnesses will be.

9.E. We have not yet determined what documents we will rely upon to prove our thermal plume contentions.

Interrogatory No. 10

10. Growth and Concentration of Bull Kelp, and Its Effect on Abalone Which Feed On It

A. As described in our Addendum, California Department of Fish and Game found that the sea otter has reduced the abalone population in Diablo Cove to at least 15% of the density they were at when the FES was issued and that the abundance of bull kelp has at least quadrupled. If you disagree with the above statement, state the facts behind your opinion.

B. If you agree with the above statement, explain why your contention is not moot.

C. List the names, addresses and credentials of all



witnesses you propose to present at the hearing, giving a brief summary of the testimony of each on this subject.

D. List all documents, reports and texts upon which you will rely at hearing to prove your contention.

Response to Interrogatory No. 10

10.A. We have not yet determined whether we can agree with the above statement.

10.B. Even if we determine that we can agree with the statement noted in 10.A., our contention would not be moot for the reasons noted by William P. Cornwell in his parts 2 and 3 of his "Response to Interrogatories filed by PG&E dated June 16, 1976" and his comments 11 and 12 in his "Response to Interrogatories filed by Staff dated June 21, 1976."

10.C. We have not yet decided which witnesses we will present regarding this contention.

10.D. We have not yet determined what documents we will present to support this contention.

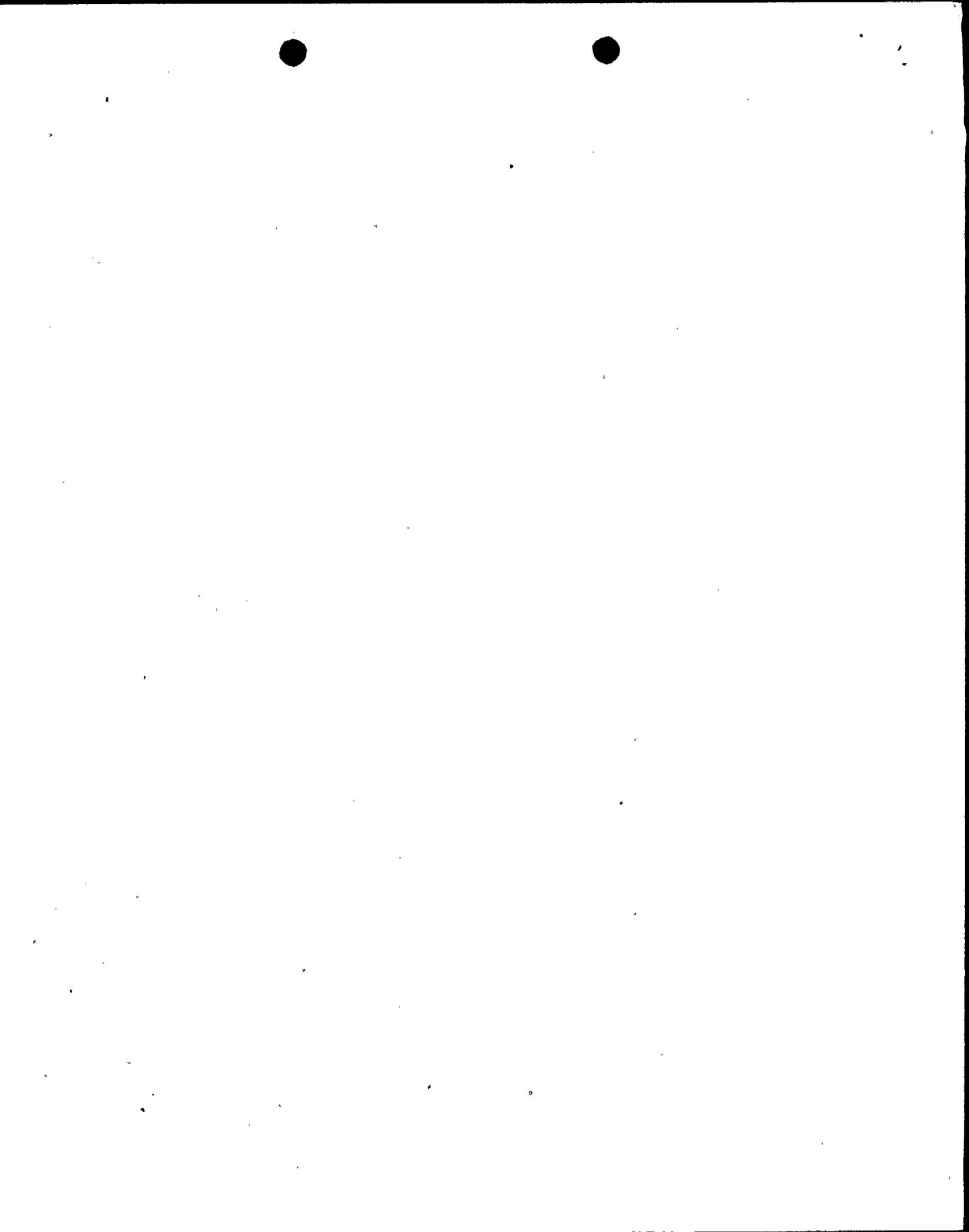
Interrogatory No. 11

11. Nuclear Fuel Shortages

A. State the basis for your contention that the Diablo Canyon Plant will experience fuel shortages.

B. List the evidence within your possession which indicates that there is or will be a nuclear fuel shortage for the Diablo Canyon Plant.

C. State the names, addresses, and qualifications of any witnesses you plan to present at hearing on uranium



availability. Give a short summary of the testimony of each.

D. Give the name of all articles, texts or reports you plan to offer as evidence at the hearing on the issue of fuel availability.

#### Response to Interrogatory No. 11

11.A., 11.B. and 11.D. We have not yet determined the exact basis and evidence, including documentary evidence, for this contention. However, we can state now that we will rely generally upon some of the numerous recent published reports predicting a general shortage of nuclear fuel for all nuclear plants well within the expected 40-year life of the Diablo Canyon plant. We reserve the right to supplement this interrogatory with any additional relevant information as we discover it.

11.C. We have not yet determined which witnesses we will call in support of this contention.

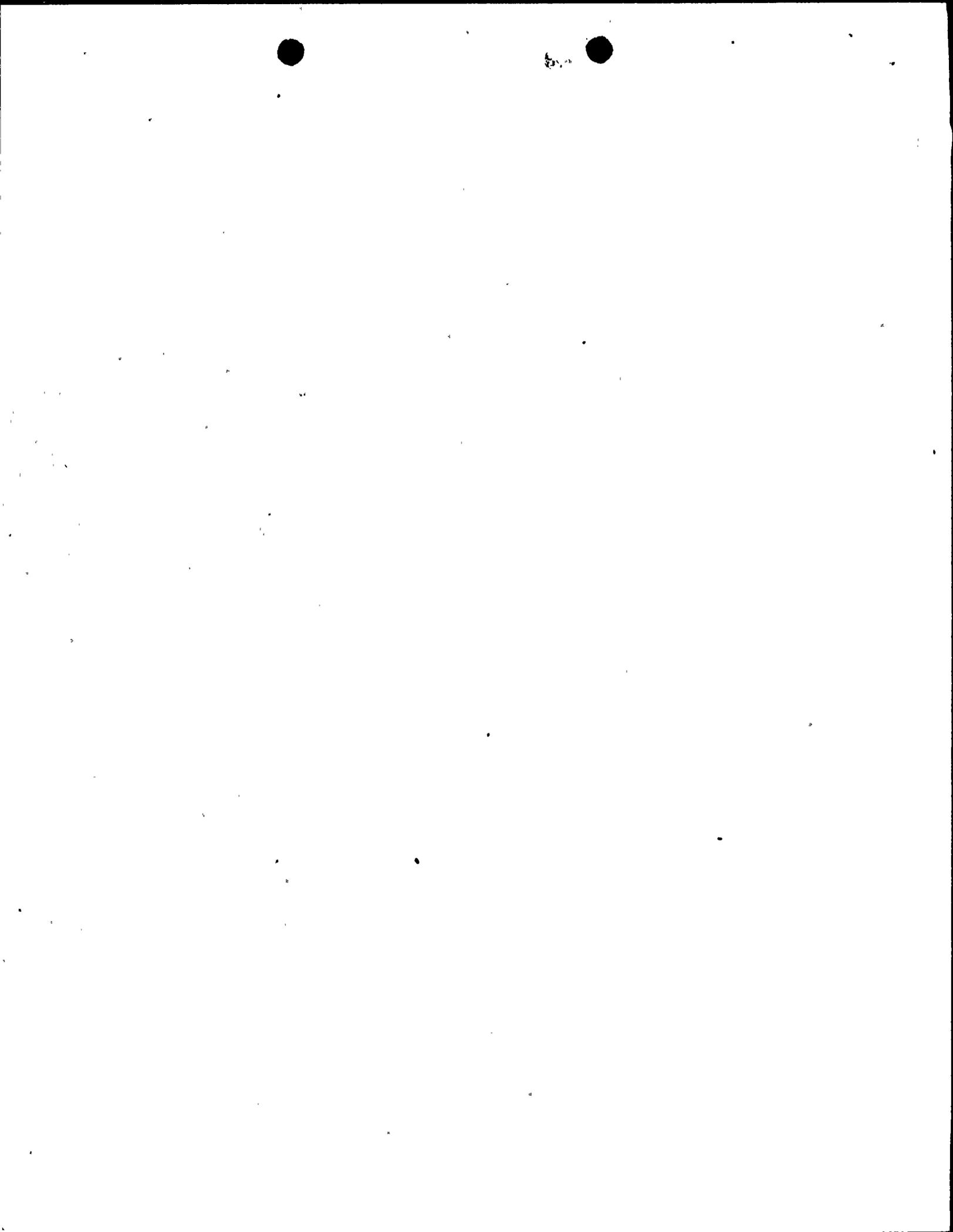
#### Interrogatory No. 12

##### 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.

E. List the names, addresses and credentials of all witnesses you plan to present on plant reliability at the hearing. Give a short summary of the testimony of each.

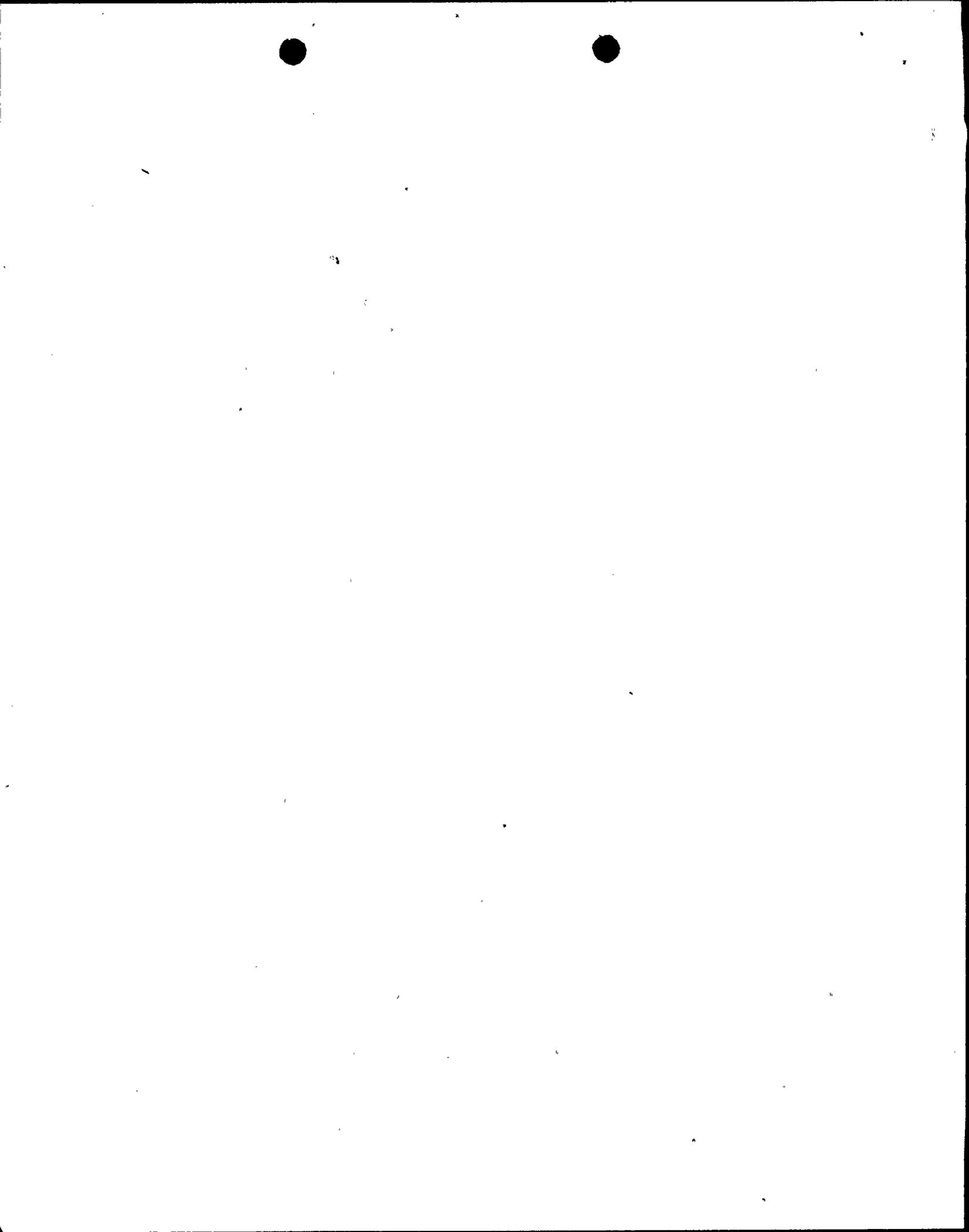
F. List all reports, documents or texts which you will present to support your contention on reliability at the hearing.

Response to Interrogatory No. 12.

12.A. Seismically induced plant malfunctions and earthquakes may cause lower reliability because of the inadequacy of the plant to withstand predicted credible ground accelerations at the site. We reserve the right to specify other possible causes of plant malfunctions and breakdowns which are relevant to this interrogatory as we determine them.

12.B. As to the cause we have specified, we cannot quantify seismic effects because no party has conducted a full evaluation of plant seismic design in relation to all ground accelerations up to and including the maximum credible ground acceleration. As to the effect of reliability on the NEPA cost-benefit balance, the increased likelihood of breakdowns and consequent lower reliability obviously will reduce the benefit of power generation and will increase costs.

12.C. Downtime will affect the cost-benefit balance by reducing the benefit of power generation and increasing the cost of maintenance and repairs. Intervenors are in the least favorable



position of any party to predict scheduled downtime and we can make no such predictions at this time.

12.D. We are not sure of the meaning of the term operating efficiency. But plant operations could be impaired or entirely interrupted by fuel shortages, accidents, including those caused by earthquakes, tsunamis and sabotage. We reserve the right to add other factors relevant to this interrogatory that might impair or curtail plant operations as we discover evidence of their existence.

12.E. We have not yet determined the identity of such witnesses.

12.F. We have not yet determined what documents we will introduce in support of this contention.

Interrogatory No. 13

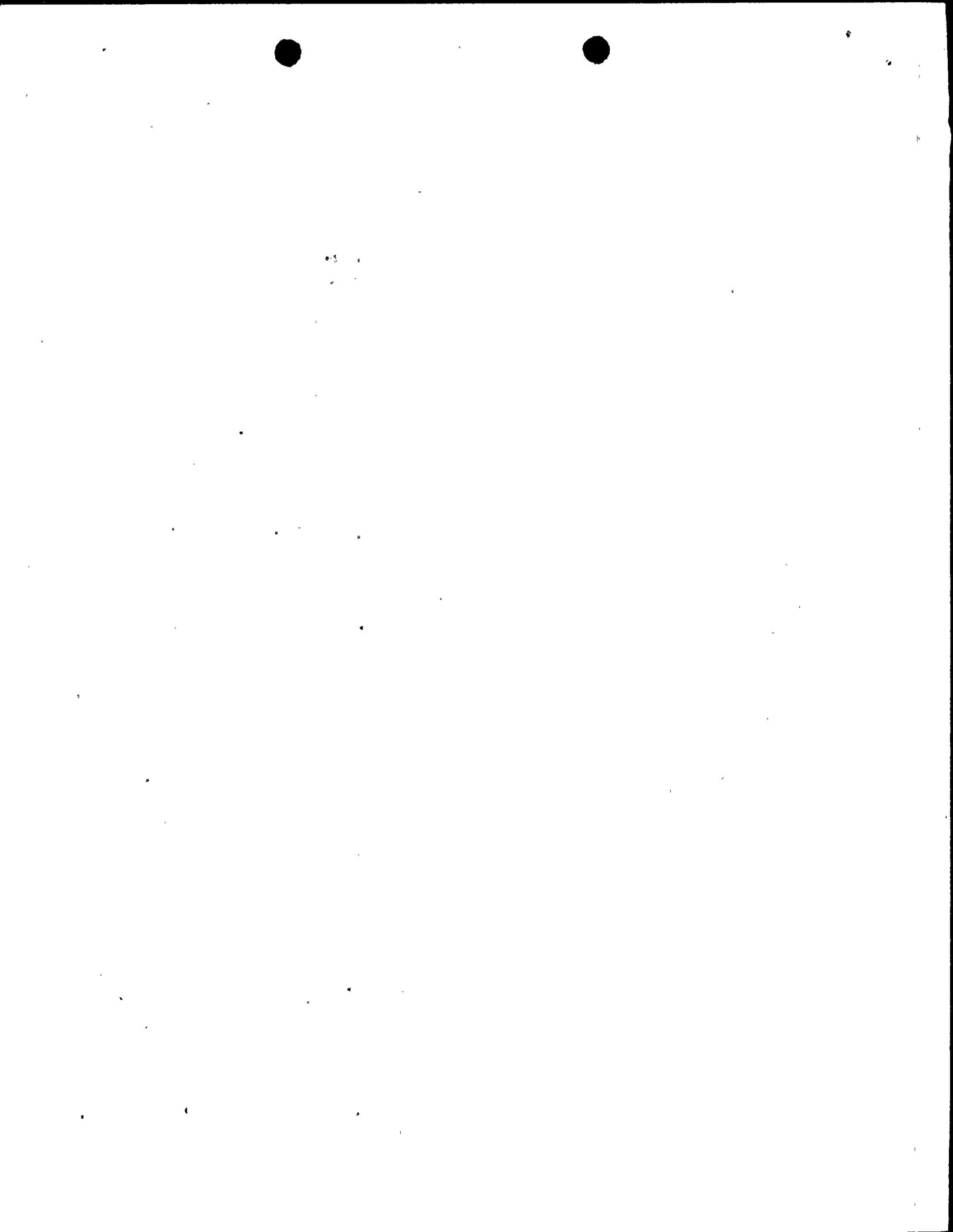
13. ECCS

A. Explain what you mean by "ECCS deficiencies causing added expenditures."

B. State whether you believe the plant complies with Appendix K to 10 C.F.R. Part 50. If not, name the areas in which the ECCS is deficient.

C. List the ECCS deficiencies which have added to the cost of the plant. Give your estimate for the cost of correction of each deficiency as well as the basis for your estimate of cost.

D. List the names, addresses, and credentials of all witnesses you plan to present at hearing on ECCS or Appendix K. Give a short summary of the testimony of each.



E. List all documents, reports, and texts which you will present at hearing to prove your contentions.

Response to Interrogatory No. 13

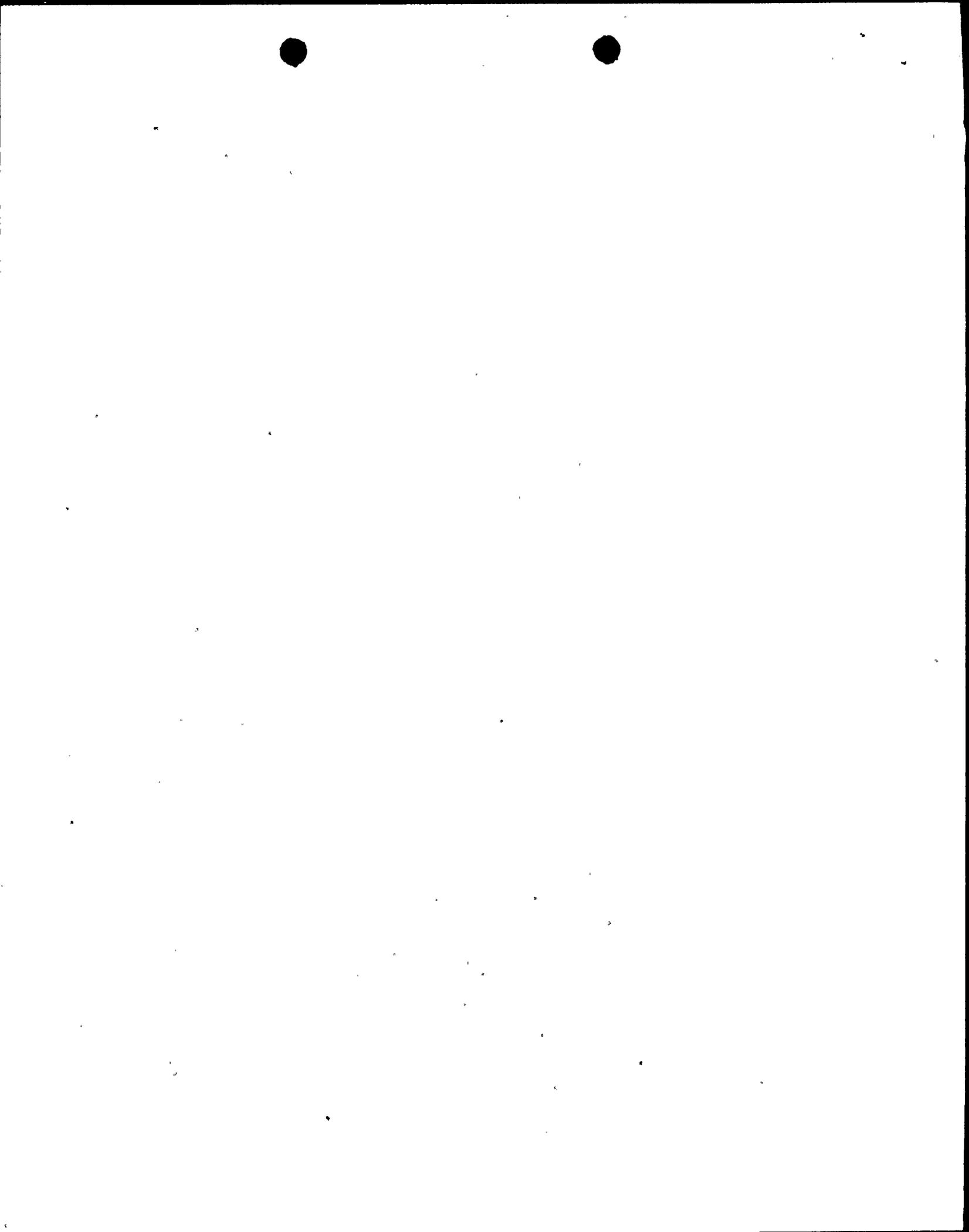
13.A. This phrase refers to an ECCS which, upon being found deficient in design or construction, requires additional work and retrofitting, and, therefore, added expenditure.

13.B. We do not believe the plant complies with Appendix K to 10 C.F.R. Part 50. While we cannot name specific areas of ECCS deficiency except for seismic design, we reserve the right to identify ECCS deficiencies relevant to this interrogatory in relation to Appendix K or any other appropriate regulatory standards as we discover evidence of such deficiencies.

13.C. We cannot list any such deficiencies except for seismic design deficiencies which have already caused considerable costs at least for extensive re-analysis of plant design conducted by the applicant. Furthermore, substantial and costly redesign and retrofitting to meet credible seismic hazards cannot be ruled out until the applicant completes its seismic re-evaluation and ACRS, Staff and intervenor experts can comment upon that re-evaluation. We reserve the right to identify other deficiencies and costs relevant to this interrogatory as we discover evidence of them.

13.D. We have not yet decided what witnesses we will present in support of this contention.

13.E. We have not yet determined what documents we will present in support of this contention.



Interrogatory No. 14

Are there any other contentions other than those listed above which you plan to litigate at the environmental hearing? If so, in regard to each, please state.

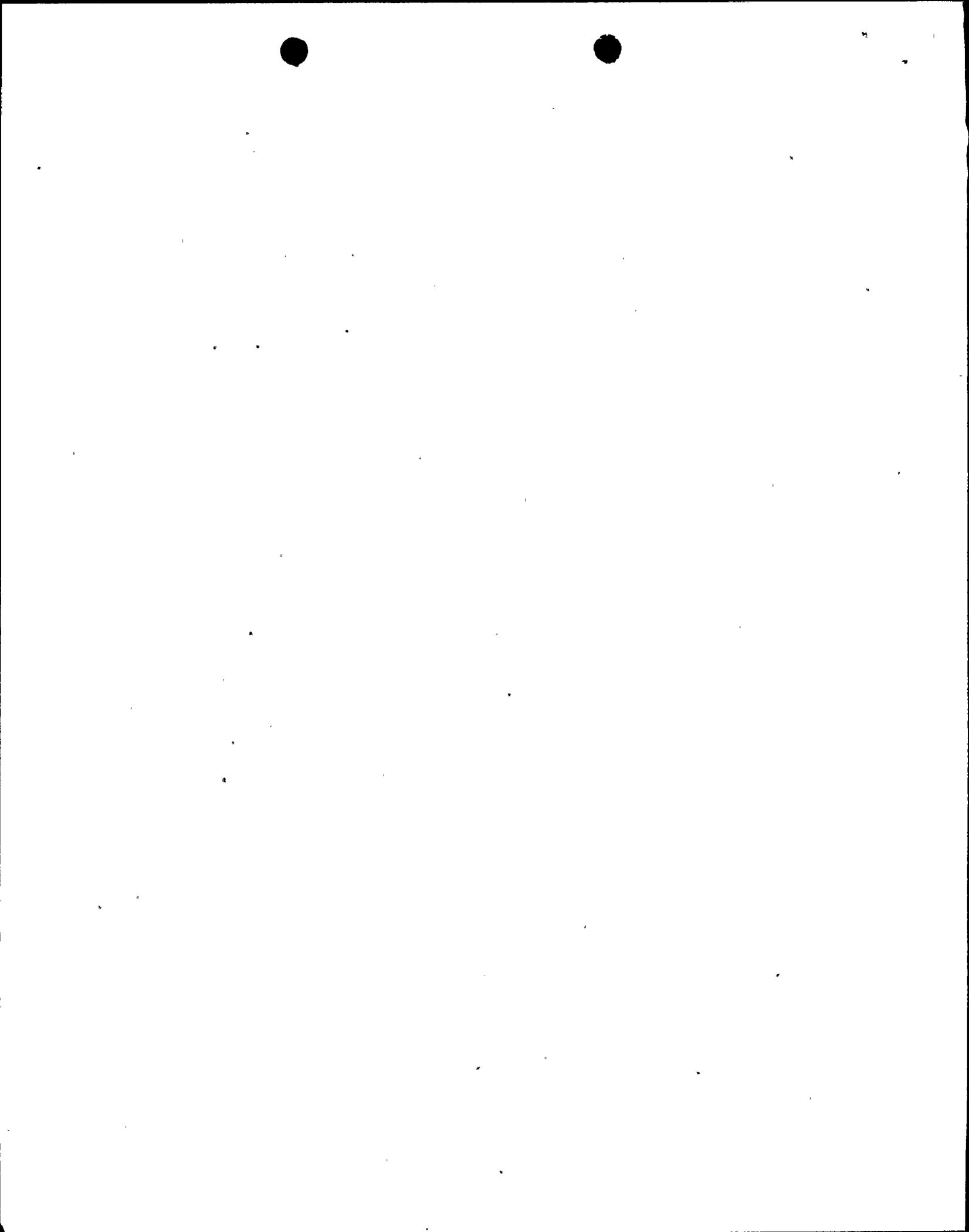
- A. The contention.
- B. The basis for your contention, including all quantitative data.
- C. The names, addresses and qualifications of any witnesses you plan to present. Please include a short summary of their testimony.
- D. The names of any documents, texts or records which you plan to present at hearing.

Response to Interrogatory No. 14

(1) Whether the Environmental Impact Statement adequately assesses all adverse environmental impacts that could occur from earthquake caused accidents, including Class 9 accidents, given the high potential seismicity of the site and the current seismic design and construction of the Diablo Canyon nuclear plant.

(2) Whether the Environmental Impact Statement adequately considers the adverse environmental impacts of transporting nuclear fuel to and from the plant, storing fuel at the plant, reprocessing the fuel used at the Diablo plant at reprocessing plants, and disposing of the fuel used at the Diablo Canyon plant, including, but not limited to, adverse environmental impacts produced by seismicity.

(3) Whether the Environmental Impact Statement adequately considers energy conservation and related reductions in energy



demand as well as alternative sources of energy supply both as alternatives to operation of the Diablo Canyon nuclear plant and as elements of the NEPA cost-benefit balance.

(4) Whether Pacific Gas and Electric Co. and the U.S. Nuclear Regulatory Commission are to collect epidemiologic data on human cancers, leukemias, infant mortalities and other somatic effects, and genetic effects of radioactive releases on the population within a 50-mile radius of the plant, during the operating lifetime of the plant and for a reasonable period of time thereafter.

14.B. The existence of the Hosgri-San Simeon fault which could produce a ground acceleration at the plant site of at least .75g forms the basis for the seismic aspects of the above contentions. We base the rest of these recently formulated contentions on general reading into problems relating to nuclear plants and general advice from expert consultants, but have not yet formed specific factual bases or obtained relevant quantitative data for them. We reserve the right to supplement the response to this interrogatory with relevant factual bases and quantitative data as we determine and discover them.

14.C. We have not yet determined what witnesses we will present in support of these contentions.

14.D. We have not yet determined what documents we will present in support of these contentions.

I declare under penalty of perjury that the foregoing Response to Interrogatories are true and correct to the best



of my knowledge, information and belief.

SCENIC SHORELINE PRESERVATION  
CONFERENCE

Dated: August 19, 1976

By:

  
James A. Geocaris

