



UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

December 24, 1974



Mrs. Sandra Silver
1315 Cecelia Court
San Luis Obispo, California 93401

In the Matter of
Pacific Gas and Electric Company
(Diablo Canyon Nuclear Power Plant,
Units Nos. 1 and 2)
Docket Nos. 50-275 O.L. & 50-323 O.L.

Dear Mrs. Silver:

Enclosed are the answers to the interrogatories which you submitted to the AEC Regulatory Staff on October 29, 1974, on behalf of the San Luis Obispo Mothers for Peace. You will note that the answer to interrogatory #20 is mainly contained in the attached computer print-out on the abnormal occurrence reports and a copy of the operating status reports for Zion Station, Units 1 and 2.

Sincerely,

Richard L. Black

Richard L. Black
Counsel for AEC Regulatory Staff

Enclosure

cc w/enclosure, w/o attachments:

Elizabeth S. Bowers, Esq.
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Atomic Safety and Licensing Board Panel
Docketing and Service Section

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UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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 Nos. 1 and 2))	

RESPONSE TO INTERROGATORIES

1. Identify by title, author, date, and agency, if applicable, all studies, reports, memoranda, correspondence, and other documents pertaining to the seismic environment of the Diablo Canyon Power Plant, Units 1 and 2.

A. Which are completed.

(1) "Marine Geology Between Cape San Martin and Pt. Sal South-Central California Offshore", by H. C. Wagner, August 1974, Pacific-Arctic Branch of Marine Geology, U. S. Geological Survey. A preliminary administrative report to the USAEC Division of Reactor Safety.

(2) "Transcript of the USAEC Advisory Committee on Reactor Safeguards in the Matter of Diablo Canyon (Units 1 & 2) Pacific Gas and Electric Company, Docket Nos. 50-275 and 50-323". Drs. Harry O. Monson and Herbert S. Isben were convenors, September 12, 1974.

(3) Memorandum "Summary of ACRS Subcommittee Meeting Held on September 12, 1974", by T. J. Hirons, AEC, September 27, 1974.

(4) Memorandum "Status of the Geology and Seismology Portion of the Diablo Canyon Operating License Safety Review", by E. G. Case, September 6, 1974, AEC.

(5) Memorandum "Summary of Meeting Held on July 5, 1974 Regarding Offshore Faults", by T. J. Hirons, AEC, July 11, 1974.

(6) Memorandum "Technical Review Personnel Attendance at the Diablo Canyon (Units 1 & 2) ACRS Subcommittee Meeting", by R. C. DeYoung, AEC, July 24, 1974.

(7) Letter and Attached Maps from Elmer H. Balz of the USGS to W. P. Gammill, AEC, July 22, 1974.

(8) Memorandum "Acceptance Review of Diablo Canyon Units 1 and 2 (FSAR), from W. P. Gammill to K. R. Goller, AEC, July 31, 1973.

(9) Memorandum "Summary of Site Visit and Meeting held on October 25, 1973 to Discuss Questions Related to the Geology and Seismology of the Area", by T. J. Hirons, AEC, October 31, 1973.

(10) Memorandum "Forthcoming Diablo Canyon Site Visit and Meeting with Pacific Gas and Electric Company" by T. J. Hirons to K. R. Goller, AEC, October 16, 1973.

(11) "Georeff Bibliographic Search Diablo Canyon Area Faulting and Seismology" by GEO-REF, American Geological Institute, 5205 Leesburg Pike, Falls Church, Virginia, 22041, requested by Carl Stepp, AEC, February 11, 1974. A 90-page computer printout.

(12) Memorandum "Forthcoming meeting with Pacific Gas and Electric Company -- Diablo Canyon" by T. J. Hirons to Olan D. Parr, AEC, April 17, 1974.

(13) Memorandum "Summary of Meeting Held to Discuss Recent Offshore Explorations of USGS and PG&E (for Diablo Canyon Units 1 & 2), by T. J. Hirons, January 11, 1974, AEC.

B. Which are in progress.

None known.

C. Which are projected for the future.

Letter from H. C. Wagner of the USGS re. Analysis of Amendment 19 to the Diablo Canyon FSAR Units 1 & 2, to the AEC.

2. Identify by title, author, date, and agency, if applicable, all studies, reports, memoranda, correspondence, and other documents pertaining to the adoption of the 0.40 g Double Design Earthquake criterion for Diablo Class I structures, systems, and components which are

A. Completed

Preliminary and Final Safety Analysis Reports for Units 1 & 2, Diablo Canyon Site as modified by 20 amendments, particularly Sections 2.5 and 3.7 by Pacific Gas and Electric Company. Various dates to November 1974.

B. In progress

None known.

C. Projected for the future

Contingent on results of 1.C above and further staff review.

3. Please set forth, and briefly explain, the major problems which the AEC feels are now either unresolved, not understood well enough, or otherwise outstanding and preventing the power ascension and subsequent routine operation of Diablo Units 1 and 2.

(1) Control Room Monitoring of Meteorological Parameters (Section 2.3.3).

- (2) Evaluation of Hydrology (Section 2.4).
- (3) Evaluation of Geology, Seismology, and Foundation Engineering (Section 2.5).
- (4) Final review of applicant's report on the effects of pipe rupture outside containment (Section 3.6).
- (5) Seismic qualification of safety related electrical equipment (Sections 3.10 and 7.8).
- (6) Documentation of justification for the use of results of 7-grid fuel assemblies to establish the acceptability of 8-grid assemblies (Section 4.2.1).
- (7) Documentation of the results of the single rod burst tests (Section 4.2.1).
- (8) Fuel rod surveillance program for the 17 x 17 fuel assemblies (Section 4.2.1).
- (9) Resolution of uncertainties in the thermal-hydraulic design (Section 4.4).
- (10) Documentation of results of subcompartment pressure calculations using the TMD Code (Section 6.2.1).
- (11) Commitment by applicant to remove power from the electrical system to lock certain motor-operated ECCS valves in their preferred safety positions (Sections 6.3.1 and 7.3.4).
- (12) Approval of the applicant's Emergency Core Cooling System (Sections 6.3.3 and 6.3.5).

(13) Resolution of staff concerns regarding physical and electrical separation in the solid state protection system (Sections 7.2.2.1 and 7.2.2.2).

(14) Resolution of staff concerns regarding physical separation in the process analog system (Section 7.2.3).

(15) Staff review of the applicant's position on ATWS (Anticipated Transients Without Scram) (Section 7.2.5).

(16) Additional documentation of the Engineered Safety Features Actuation System (Section 7.3.2).

(17) Documentation of the bypass and inoperable status indication with regard to safety related display information (Section 7.5).

(18) Environmental qualification of safety related electrical equipment (Section 7.8).

(19) Documentation of criteria for protection of Class IE cabling and equipment in hazardous and missile prone areas (Section 8.4).

(20) Resolution of the fuel cask tip problem (Section 9.2.3).

(21) Integrity of the main steam isolation valves in the event of a steam line break upstream of the valves (Section 10.3).

(22) Design modifications to protect the diesel generators from flooding in the turbine building (Section 10.4).

(23) Revisions to the reactor operation requalification program (Section 13.2).

(24) Design modifications to bring about a reduction of the doses in the event of a leakage in the residual heat removal system during the recirculation phase following a postulated LOCA (Section 15.1).

4. Please identify all plants in the United States which, for commercial power reactors, currently

A. Reprocess spent fuel

No plants currently reprocess spent fuel.

B. Accept spent fuel for interim storage.

(1) General Electric at Morris, Illinois.

(2) Nuclear Fuel Services at West Valley, New York.

(3) Allied-General Nuclear Services at Barnwell, S. C. has submitted an application for preoperational receipt of spent fuel but it does not currently accept spent fuel.

5. What would the AEC do, with respect to AEC-licensing of the Diablo facilities, if it were conclusively demonstrated that existing faults were not incapable of producing ground accelerations at the site in excess of 0.40 g?

If the present seismic design criteria for Diablo Canyon Units 1 and 2 were found to be inadequate to protect safety related structures and components from the postulated effects of the safe shutdown earthquake, i.e., 0.4g, the staff would require design modifications pursuant to the provisions of 10 CFR §50.109 to ensure that such structures and components would be able to perform their safety related functions during and subsequent to a seismic event.

6. Please set forth the basis for AEC's conclusion that short ground accelerations peaks, in excess of 0.40 g, would not cause failure of Class I systems and components.

Intervenors should specify the reference document from which this conclusion was taken. Our final evaluation of the adequacy of the seismic design for Diablo Canyon Units 1 and 2 will be contained in a supplement to the Safety Evaluation Report.

7. What possibility exists, in AEC's estimation, that peak accelerations in excess of 0.40 g might be experienced at Diablo due to seismic activity

A. On the San Andreas Fault

The staff has not yet completed their review of geology and seismology for the Diablo Canyon Plant. The results of our evaluation will be reported on in a supplement to the Safety Evaluation Report.

B. On the Hosgri Fault Zone

See answer to 7A above.

8. Describe the mechanical and/or mathematical model which lead to the AEC response to interrogatory no. 7.

Not applicable since the response to #7 will be documented in a supplement to the SER.

9. Noting that Highway 101 provides the only two useable exits from the City of San Luis Obispo, please set forth the AEC's basis for assuming evacuation of the city is possible in the case of a nuclear disaster at Diablo, during unfavorable wind conditions.

In its evaluation of the Diablo Canyon Emergency Plan the staff took cognizance of the Plan of the San Luis Obispo County Sheriff's Department which is responsible for evacuation of the general

public if necessary, and the provisions of the State of California Radiological Emergency Assistance Plan. Neither these plans of California authorities nor the Commission's findings with respect to the applicant's emergency plans, explicitly address the issue raised relating to the concerns for evacuation of the City of San Luis Obispo. The Staff has, however, taken note of the fact that this populated area is located some six miles beyond the boundary of the Low Population Zone surrounding the Diablo Canyon Plant. In the unlikely event of an occurrence approaching the most serious design basis accident, i.e., a loss-of-coolant accident, the staff Safety Evaluation Report has stated that the potential off-site doses at the Low Population Zone boundary are less than ten percent of the guideline values for siting purposes, i.e., 10 CFR Part 100. The staff considers that such doses are low enough that protective actions may not be warranted at this or any greater distance.

10. Please set forth the AEC's criteria for defining a successful population evacuation. Please quantitate.

The staff considers that a useful criterion for a successful evacuation of members of the general public in the wake of a radiological event would be that the combined risks to health and safety associated with the implementation of an evacuation should not exceed the combined risks associated with the radiological exposures that would be received if the evacuation were not carried out. The Environmental Protection Agency has made an extensive study of this subject. With respect to

evacuation risks, it has reported the results of this study in the document "Evacuation Risks - and Evaluation", June 1974 (EPA-520/6 - 74-002). As successor agency regarding responsibilities of the former Federal Radiation Council, EPA is expected to publish in the very near future their recommendations on Protective Action Guides for evacuation as a protective measure. In the interim, the AEC Regulatory Staff has considered that doses approximating 10% of 10 CFR Part 100 doses are suitable protective action guides.

11. What specific improvements in PWR design significantly differentiate PG&E's Units 1 and 2 from the model dispersion study tabulated at page 31 of TID-14844?

The Staff has never used the criteria in TID-14844 as bases for the siting of nuclear power plants. Our criteria for reactor siting are set down in 10 CFR Part 100, Reactor Site Criteria; these criteria include guidelines for the low population zone and population center distances. The distances given on page 31 of TID-14844 do not begin to take into account the dose reduction factors which can be achieved with current plant designs.

12. Is the AEC aware of any method by which the chief onsite emergency coordinator can obtain promptly off-site meteorological data immediately after a radioactive calamity?

Section 2.3.2 of the Diablo Canyon Safety Evaluation Report indicates several local areas in the vicinity of the Diablo Canyon site where meteorological data are available. In addition to these,

the San Luis Obispo County Airport makes frequent measurements of wind speed and direction. For additional details regarding emergency procedures following an accident, please refer to the Diablo Canyon Emergency Plan which was submitted by PG&E on March 25, 1974.

13. If answer to no. 12 is yes, please set forth such methods.

See response to #12.

14. If answer to no. 12 is no, please set forth basis for AEC's lack of concern.

Not applicable.

15. Set forth AEC's basis for postulating that a PWR pressure vessel rupture with subsequent release of radioactivity of catastrophic proportion is impossible, or of a probability so small as to be considered effectively impossible.

The subject of pressure vessel rupture was rejected by the Diablo Canyon Atomic Safety and Licensing Board (see Board's Order dated May 30, 1974 regarding Contention 1a from the petition of Forester and Valentine). The staff therefore feels that pressure vessel rupture is not appropriate as the subject of an interrogatory. However, see the staff's assessment of reactor vessel integrity found in Section 5.3 of the Diablo Canyon Safety Evaluation Report.

16. Please describe the danger to the public health and safety that would obtain if a vehicle, carrying several large emplacements of dynamite, were to accelerate into the most dangerous section of the spent fuel storage building, assuming that a large but reasonable number of spent fuel assemblies were cooling off in the pool.

The Staff considers intervenors question to be vague and without proper basis. How does the dynamite find its way into the vicinity of the spent fuel pool building, how is it accelerated into the pool, what kind of vehicle, what is a dangerous section of the pool, how does one account for a total breakdown in security which would allow the dynamite to find its way into the site, etc.?? The scenario which one has to propose for this event to take place appears to have an extremely low probability. With regard to potential effects on the spent fuel pool, the concrete and liner for the pool are Seismic Category I, and as such are designed to withstand the severe stresses which might be caused by an explosion as well as an earthquake.

17. Will the AEC provide MFP, without an order, with the PERT schedule for documents on Diablo Canyon Units 1 and 2, and will it continue to provide us with prompt updates of the schedule?

Intervenor presently receives copies of all correspondence regarding review schedules for the Diablo Canyon Plant. PERT schedules involving detailed review flow charts are internal documents which are not usually made available to the public.

18. Please set forth the expected completion dates for the geology, seismology, and hydrology portions of the Staff's Safety Evaluation.

We plan to publish an SER supplement on these items on January 10, 1975.

19. Will the AEC allow the onsite storage of fresh fuel assemblies before the seismology portion of the Safety Evaluation has been completed?

The requirements for preoperational storage of nuclear fuel are discussed in Section 21.1 of the Diablo Canyon Safety Evaluation Report. These requirements for preoperational storage as set forth in 10 CFR Part 140 do not set specific requirements regarding the status of the seismology portion of the safety review. However, with the recently announced delay in the fuel loading date for Diablo Canyon Unit 1 (now estimated to be October 1, 1975), the staff plans to have the seismology portion of the safety review completed well before this date.

20. According to FSAR Table 1.3-1, Zion Units 1 and/or 2 have been used for design comparison with Diablo Units 1 and/or 2. If this is true, then with respect Zion 1 and/or 2, commencing with fuel loading,

A. List any incidents or occurrences requiring Regulatory notification giving dates and descriptions.

Enclosed are copies of the operating status reports and also a computer listing of the abnormal occurrence reports for Zion 1 and 2. These reports list the incidents, dates, descriptions and duration of shutdowns. The nature and frequency of occurrences at Zion 1 and 2 did not necessitate any major design changes for the Diablo units.

B. List all incidents or occurrences that cause (1) a shutdown, and (2) a scram, of Units 1 and/or 2.

See response to 20.A.

C. With respect to No. 20B, give duration of each listed shutdown.

See response to 20.A.

D. Explain the nature of each problem that caused each shutdown or scram referred to in no. 20B and explain how the Diablo design will decrease the frequency of occurrence of these problems.

See response to 20.A.

21. With respect to Diablo's 17x17 fuel array, please identify all reactors that you know of that

A. Have used a 17 x 17 array

None

B. That use a 17 x 17 array

None

C. That will use a 17 x 17 array.

(1) Two 17 x 17 arrays will be inserted in each of the Surry 1 and 2 reactors.

(2) Applications currently under OL review which plan to use Westinghouse 17 x 17 fuel:

1. Trojan

2. Diablo Canyon 1 and 2

3. Salem 1 and 2

4. Beaver Valley 1 and 2
5. Farley 1 and 2
6. Sequoya 1 and 2
7. North Anna 1 and 2

22. Give dates of operation for all entries, if any, in your response to interrogatory No. 21.

<u>Plant</u>	<u>Estimated Initial Fuel Load</u>
Surry 1	December 1974 (to load the 17 x 17 assemblies)
Surry 2	Spring of 1975 (to load the 17 x 17 assemblies)
Trojan	Late 1975
Diablo Canyon 1	October 1975
Salem 1	June 1976
Beaver Valley 1	October 1975
Farley 1	November 1975
Sequoyah 1	July 1976
North Anna 1	January 1977

Note: Fuel loading dates for Unit 2 of the above plants are too far in the future to be accurately estimated.

23. Please set forth all problems, of which the AEC is aware, which are, or might be, associated with the use of the 17 x 17 arrays cited in your response to interrogatory no. 21.

Specifically, see items 6 thru 9 of the response to interrogatory #3. For more details, see Section 4 of the SER for Diablo Canyon.

24. Please list causative errors or common mode failures which could, conceivably, lead to the existence of a critical geometry in the spent fuel pool.

The Diablo Canyon spent fuel pool is designed to accomodate fuel assemblies in a subcritical array such that a criticality factor of ≤ 0.9 is maintained, even with unborated water in the pool. The spent fuel racks are designed to prevent insertion of a spent fuel assembly in other than a prescribed location. The only opening physically large enough to accept an assembly is a fuel storage cell. The center-to-center fuel storage spacing and the physical arrangement of the racks thereby prevent any possibility of accidental criticality. The Staff does not envision any causative errors or common mode failures which would lead to a critical geometry in the spent fuel pool.

25. Please discuss the consequences of the existnece, in the spent-fuel pool, of a critical geometry.

In the very unlikely event of a critical geometry in the spent-fuel pool, a very low power level would result in the pool. The heat generated would be removed by the water in the pool by natural convection. In addition, the spent fuel pool cooling and cleanup system is designed to remove the heat generated by the spent fuel such that the water is maintained at or below 120°F. Radiation levels at the top of the spent fuel pool would be small fractions of the allowable values.

26. Is it necessary, in AEC's estimation, for P.G. and E. to perfect its rights in the Northern Evacuation Route from the plant site? Please explain and provide basis for answer.

The Diablo Canyon Emergency Plan includes a copy of a letter dated 1/17/74 confirming approval by the Field Ranch for use of the road from Montana De Oro Park to the northern boundary of the plant site as an emergency evacuation route if ever required. The Staff considers this expression of intent to be sufficient evidence that plant personnel would be permitted passage along this northern route if it were ever necessary during plant lifetime, and consequently, the Staff has accepted the plan with this statement.

27. Does 10 CFR or other AEC regulations contain retrofitting requirements for utilization facilities, in the event that a significant fault is discovered subsequent to establishment of Class I seismic criteria? Please respond in light of the recently-discovered Hosgri Fault Zone.

Yes. See Section 109 of 10 CFR Part 50 titled Backfitting.