

[ATTACHMENT 6]

U.S. NUCLEAR REGULATORY COMMISSION,
Washington, D.C., January 5, 1976.

Docket Nos. 50-275 and 50-323

ROGER BOYD,
Acting Director, Division of Reactor Licensing.

DIABLO CANYON

We strongly recommend that immediate meetings be held with upper management to initiate actions to promptly develop a firm basis for making a decision on Diablo Canyon. Our preliminary thoughts are provided in the enclosure.

R. C. DEYOUNG,
Assistant Director for Light Water Reactors Group 1,
Division of Reactor Licensing.

Enclosure: Diablo Canyon Geology—Seismology.

DIABLO CANYON GEOLOGY-SEISMOLOGY

I. GEOLOGY-SEISMOLOGY SITUATION

Based on USGS draft report, Renner Hofmann's assessments to date, as discussed with Dennis Allison, and the meeting of December 30, 1975, between the staff and USGS, we understand the geology-seismology situation is as follows:

1. USGS believes that the 1927 event might have occurred on the Hosgri Fault so we should place a magnitude 7.0 to 7.5 earthquake on that fault. The published magnitude for the 1927 event are in that range. This would lead to a calculated peak acceleration much higher than 0.5g using standard methods.

The USGS position is suspect. Renner Hofmann of the staff has reviewed the felt effects of the 1927 event and they seem to be very good data. In all respects they demonstrate that the 1927 event was either much farther out to sea or was much smaller. Either way, the plant, which is adequately designed for 0.5g using standard techniques, could take the effects of this earthquake when it is moved in an appropriate manner.

We do not have a direct verification of the magnitude determination at this time. Renner Hofmann has reviewed the location data, which indicate that the 1927 event was or could be on the Hosgri Fault, and considers them to be of very poor quality, capable only of determining the location to be somewhere off the coast of Central California.

The USGS expressed a willingness to take another look at this aspect of the geological situation taking into account Renner Hofmann's and Carl Stepp's comments made at the meeting on December 30, 1975.

2. The USGS believes that the Hosgri Fault is more than 90 miles long and may even be coupled with the San Simeon Fault at the northern end of the Hosgri Fault. This is a somewhat incongruous statement because it appears that one must add the San Simeon fault length to the Hosgri Fault on the north, as well as a few miles on the south, in order to get a 90-mile length. Nevertheless, what we believe they are saying is that other interpretations than the applicant's can be placed on the geological evidence of fault length. Furthermore, with these other interpretations, the fault length is unknown, except that it is greater than 90 miles.

It is not at all clear where we are going here. This is a question we must deal with even if USGS is convinced of our position with respect to item 1 above. Unfortunately, we do not have a specific earthquake recommendation from USGS based on fault length to deal with.

Renner Hofmann is looking at the seismic profiles but the USGS opinion (that another interpretation is possible) will probably hold water. Perhaps the fault length could be limited to 90 miles or a little more with additional field work. A fault length of up to 120 miles would give a 0.5g peak acceleration, assuming mostly strike slip motion and a rupture length of one half the fault length. We feel that these are reasonable assumptions for this site, but the USGS may well disagree.

3. USGS believes that the standard methods of calculating a peak acceleration and scaling a spectrum to it are not appropriate this close to large earthquakes. While they do not know what would be appropriate, they clearly invite us to find a better way.

Renner Hofmann is working on two approaches which can shed some light on the subject and may indicate that the plant could take a large earthquake on the Hosgri Fault. One approach is to place the magnitude 8.3 San Francisco earthquake on the Hosgri Fault and use the felt effects to estimate the peak accelerations. The second involves calculations of peak acceleration based on the fact that only the energy released in about four miles of fault length will contribute to the peak acceleration at a distance of four miles from the fault. This type of reasoning could possibly provide a rationale for reconciling the differences of opinion with which we are dealing.

4. The quality of the USGS recommendation, *as far as we can tell at this time*, is poor.

(a) Their specific recommendation to place a magnitude 7.0 to 7.5 earthquake on the Hosgri Fault is based on an idea which we consider not valid. However, USGS has agreed to consider this matter further in light of our comments to them.

(b) Their recommendation does not deal with a magnitude based on fault length, which must be dealt with. Indeed, they do not say that item a above is a worse case or design case, but neither do they say that there might be a worse case. We need something better than this to work with.

(c) It seems that we are dealing with the opinion of one of four people and we are not sure which ones. For example, one of these persons (Holly Wagner) is highly respected but we do not even know what he thinks, much less what a consensus of top geologists would be. As another example, Hanks, a Cal Tech professor and part-time USGS employee, published an article stating that the 1927 earthquake was not on the Hosgri Fault, but we have no indication of whether or not this was given any weight. This is not an adequate base for a decision as important as this and is, in our opinion, not the best USGS can give us.

(d) Holly Wagner is the highly respected geologist making the geological interpretations, yet we have been unable to discuss the matter with him. All we have gotten is secondhand word that good people have reviewed it and this is what they said, without meaningful discussion of the technical reasons.

II. RECOMMENDATION AT THIS TIME

Clearly we can benefit from further discussions with USGS at a lower level before they send their formal recommendation. However, in light of the serious nature of the decision we must make, the unknown quality of the USGS recommendation and the extra difficulty involved in reversing a USGS opinion after it is published, we recommend contacting top management at the Department of Interior and expressing our need for an immediate accelerated reevaluation of the geologic situation, including:

1. The independent opinions of several top USGS geologists not heretofore directly involved in the Diablo Canyon review.

2. A clear expression of the technical reasoning which can be discussed meaningfully with the staff.

In addition, we should immediately retain additional top geologists directly as consultants and initiate further independent review on our own. Depending on how quickly we take action, the results may or may not be completed in time to support the schedule for licensing.

III. POSSIBLE FUTURE OPTIONS

If we receive the USGS recommendation as it stands now, we will have three basic options, assuming that we will publish the SER Supplement and take a position instead of asking further questions and slipping the schedule. The basic options are:

1. Oppose the operating license. Leave the door open for further study, etc. Describe why.

We have a poor basis for this action at this time, other than general conservatism and "PG&E hasn't done enough to make everyone happy." Such arbitrary conservatism would not be an adequate basis in this case because of the large financial loss involved and the severe impact such action would have on the nuclear industry.

2. Favor the operating license. Require further study, etc. Describe why.

(a) If this is done on the basis of rejecting the USGS recommendation because it is poor, there would be difficulty justifying the action.

[ATTACHMENT 5]

U.S. NUCLEAR REGULATORY COMMISSION,
Washington, D.C., February 20, 1975.

Note To: A. Giambusso.

DIABLO CANYON—SEISMIC ISSUES

An ACRS Subcommittee meeting to review the Diablo Canyon OL application was conducted in San Luis Obispo on February 18 and 19, 1975. The Subcommittee consisted of Dr. Okrent (Chairman) and Dr. Bush. In addition, seven ACRS consultants were in attendance the first day of the meeting which was devoted almost in its entirety to the seismic issue. The specific matters discussed included geology, seismology, seismic design, seismic testing, and seismic scram. On the basis of my attendance at the meeting and side discussions with other staff members, USGS representatives, and applicant and Westinghouse participants, I came away with the following impressions:

1. The two main concerns which will determine the SSE "g" value are (a) the geological definition (extent) of the Hosgri fault zone, and (b) the seismic event that must be assumed to occur on the offshore fault. I believe that the USGS geologists (lead reviewer—F. McKeown) will maintain their currently indicated position. The "new" information described by the applicant and to be formally documented in the near future is not likely to convince the USGS to alter its current finding. I believe that the "new" information will convince the USGS that the 1927 Magnitude 7.3 earthquake occurred on a transverse fault and, therefore, need not be considered as capable of occurring on the Hosgri fault. I believe that the USGS seismologists (J. Devine—lead reviewer) would conclude that the appropriate "g" value for the site would be 0.5g if they could assume that the fault length were limited as the applicant contends and the 1927 event occurred on a transverse fault. However, if the fault length is determined on the basis of the current USGS geological interpretation, then the seismic event that must be assumed by the USGS seismologists, in order to be consistent with the methodology used for the San Onofre 2/3 evaluation, will result in a site "g" value similar to that determined for the San Onofre site (0.67g). It is my opinion that, unless specific guidance appropriate to this unique situation is provided to the USGS geologists and seismologists, they will proceed with their review basing it upon their standard methods and arrive at a site SSE "g" value well in excess of the 0.4g value approved for the CP and used for the design of the almost completed plant.

2. The as-built plant has significant margins in its design and it is capable of resisting seismic loads well in excess of those associated with the 0.4g seismic event assumed for design. The staff is presently convinced that the design is "good" for a 0.5g event. However, to convince the ACRS and others of this will require 3-6 months of applicant and staff effort. If an event in the order of 0.6g need be considered, it will be possible to show that many parts of the plant can safely resist such loads; however, many parts will need to be modified and very likely for some of these the modifications will not be practical. The evaluations to accomplish such a task, with the rigor that will be required, will entail years of applicant and staff effort.

3. The "tone" of the questions and comments from the ACRS Subcommittee members and the consultants indicated to me that they would find a 0.5g value acceptable and could be convinced that the as-built plant could adequately resist the increased loads associated with the event. However, they are not likely to be convinced unless a rather complete analysis is performed for a 0.5g event and the use of our currently approved seismic design criteria. To date no such analysis is available; the present positions of the applicant and the staff as to the ability of the plant to adequately resist a 0.5g event are based on qualitative assessments supported by a few typical calculations.

In summary, as a result of developments during the past week, I continue to believe that, unless specific guidance, support and direction is provided promptly by the upper management levels at NRC and USGS to the "working" levels in the two organizations, positions that do not necessarily reflect the judgment of upper-level management will be formulated and documented to the extent that later modification will be difficult. Harold Denton and his people intended to have further discussions with their USGS counterparts during the evening of February 18 and perhaps on February 19. I suggest that upon his return, RL and TR meet at the appropriate level to discuss this critical situation and agree on a course of action to be followed.

R. C. DEYOUNG.

[ATTACHMENT 7]

A PROPOSED PROGRAM FOR DIABLO CANYON DISCUSSED AT AN INTERNAL STAFF
MEETING, JANUARY 12, 1976

PROGRAM TO ESTABLISH BASIS TO LICENSE DIABLO CANYON

BACKGROUND AND PROPOSED PROGRAM

Construction permits were issued for Diablo Canyon 1 & 2 in April 1968 and December 1970, respectively. Unit 1 is nearly completed; Unit 2 is a year or so behind. The SSE for the site was set by Dr. Newmark, the USGS, and the U.S. Coast & Geodetic Survey. The value selected was 0.4g and the plant has been constructed to that value. The OL applications for both units were docketed in October 1973. Our review was essentially completed by January 1975; at that time we recognized that on the basis of new evidence the SSE would be increased. The staff believed that the USGS would concur with a site "g" value of 0.5g and we had done sufficient work to convince us that the plant could safely withstand such an earthquake. On January 28, 1975, we were surprised by a USGS report that concluded that an acceleration of 0.5g was in its opinion inadequate for the site on the basis of present information.

At that time DRL recommended that two approaches be taken to resolve the issue. First, continue to acquire additional information to convince the USGS of the adequacy of a 0.5g SSE. Secondly, assume the USGS, at the reviewer level, would remain adamant and seek other means to confirm or modify its finding. The decision was made to pursue only the first paragraph. Today, we are essentially where we were last January except that the plant is almost ready for fuel loading. Once again we are faced with developing a program to establish a basis to permit a decision to be made on the licensing of Diablo Canyon. We believe it would be imprudent to once again pursue a single path based on acquiring additional information to convince the USGS review team (a relatively few individuals) to modify its current position. We again recommend a multi-faceted approach. The program we would propose to pursue is as follows:

1. Formally request that an independent review be conducted within USGS to confirm or modify the current USGS review team finding. This request might be made by Chairman Anders to the Secretary of the Interior and could, if legal considerations demand, be based on generic West Coast concerns rather than the Diablo Canyon issue alone.

2. Concurrently, form a team of consultants consisting of men of national stature in the fields of geology, seismology, and seismic design to evaluate the situation. This team might pursue various paths, including:

- (a) Assume a "great" earthquake could occur as the USGS review implies and demonstrate by logic, evidence, and judgment that the energy transfer to the site would be limited to within the design capabilities of the nuclear plant.

- (b) An independent evaluation of the evidence to arrive at a conclusion on the SSE that might be compared to those of the USGS review team and the panel of experts established by the licensee.

- (c) Assess the prospects for upgrading the plant design to higher SSE values by plastic analysis and/or structural modifications and testing.

3. Concurrently, form a task force to review the current status in an attempt to determine if a probabilistic basis can be established to license Unit 1 for an interim period of operation while the other reviews are being conducted.

4. Concurrently, inform the licensee of the course of action we are pursuing and require him to pursue similar and/or alternative courses so that our final decisions may be made on the basis of our evaluation of his efforts supplemented by our independent assessments.

IMMEDIATE ACTIONS

We are planning to take immediate actions to initiate some of the approaches indicated above. Specifically we plan to:

1. Meet with NRR management to obtain approval of the general approach or to obtain an approved revised program.

2. Meet tomorrow (at Chicago, Illinois) with Dr. Newmark to begin to formulate the team of consultants discussed in item 2 above, and the task force discussed in item 3 above. At the same meeting Dr. Newmark will make a presentation to us so that we may clearly understand the bases and limitations of his recent paper on seismic design margins and probabilities of structural and mechanical failures.

3. Meet here, later this week, with the licensee to advise him of the current status of review and of the program we intend to pursue to establish a basis for a decision.

In view of the seriousness of the problem, it is essential that strong Regulatory management be imposed immediately to "manage" the team of consultants and the probability task force. These managers should be the highest level managers that we can practically assign to the tasks.

ASSOCIATED CONSIDERATIONS

In developing a program to follow to resolve the Diablo Canyon problem, consideration should be given to:

1. The impact of our decisions on the nation's energy problems and programs. The impact of potential denial for operation of a plant approved for construction cannot be underestimated, especially where the basis for denial is in controversy.

2. The impact of our decisions on the moratorium before the California voters.

3. The impact of our decisions on the viability of continued operation of plants at other sites with altered seismological bases, such as San Onofre, Pilgrim, etc.

4. The impact of our decisions on the viability of continued operation of plants where it is uncertain that the capability exists to withstand altered design bases in areas other than seismic design, such as containment structural design, pipe whip inside containment, spurious valve failures, etc.