

NUCLEAR REGULATORY COMMISSION

ORIGINAL

In the Matter of:

*Discussion of May 18, 1967 Memo + Service Recommendation  
Plan for Diablo Canyon*

~~DISCUSSION OF CONGRESSIONAL TESTIMONY~~

*OPEN*

~~CLOSED MEETING - EXEMPTIONS 5, 9 & 10~~

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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

DISCUSSION OF MAY 18, 1967 MEMO AND  
SEISMIC REVERIFICATION PLAN FOR DIABLO CANYON

PUBLIC MEETING

Nuclear Regulatory Commission  
Room 1130  
1717 H Street, N.W.  
Washington, D.C.

Tuesday, November 10, 1981

The Commission met, pursuant to notice at

1:44 p.m.

BEFORE:

NUNZIO PALLADINO, Chairman of the Commission  
VICTOR GILINSKY, Commissioner  
PETER BRADFORD, Commissioner  
JOHN AHEARNE, Commissioner  
THOMAS ROBERTS, Commissioner

STAFF PRESENT:

S. CHILK, Secretary  
L. BICKWIT, General Counsel  
W. DIRKS  
H. DENTON  
R. FALKENBERRY  
R. DE YOUNG  
F. REMICK  
R. JACKSON  
J. DEVINE  
R. TADESCO

## P R O C E E D I N G S

(1:44 p.m.)

1  
2  
3 CHAIRMAN PALLADINO: The meeting will please come  
4 to order.

5 The subject of today's meeting is discussion of  
6 the May 18th, 1967 memo and seismic reverification plan for  
7 Diablo Canyon. The discussion of the May 18th, 1967 memo  
8 will be an open meeting, and the rest of the meeting then  
9 will be closed for Commission discussion.

10 Now, at this time I understand the staff is  
11 prepared to discuss the May 18th, 1967 memo, and I suggest  
12 we proceed.

13 MR. DIRKS: We have several staff people here, Mr.  
14 Chairman. We have Dr. Jackson from NOOR who is prepared to  
15 talk about the subject. We have Mr. James Devine from the  
16 U.S. Geological Survey who is sitting in the area there who  
17 is also prepared to review the seismic followup on the  
18 site. And we have from the NRR staff Mr. Bob Tadesco who  
19 could discuss some of the historical aspects of this memo.

20 Would you like to proceed first with the  
21 substantive part of the issue with Dr. Jackson, and then we  
22 can follow up with Mr. Tadesco?

23 CHAIRMAN PALLADINO: Is the historical background  
24 necessary to understand the substance?

25 MR. DIRKS: I think it would be important to get

1 into the substance of the issue first, and then we could  
2 follow it up with questions.

3 DR. JACKSON: Since being made aware of the need  
4 to discuss this memo a short time ago, we have gone back and  
5 primarily talked to the U.S. Geological Survey as to their  
6 recollection of what transpired at the time just before the  
7 memo was written and shortly thereafter. And basically Mr.  
8 Devine can discuss that.

9 From the staff's point of view and geoscientists'  
10 point of view we have looked back, and there were a number  
11 of episodes of mapping, geologic mappings. It boils down to  
12 about three phases of geologic mapping: those that were  
13 done on the seacliff exposures prior to the site being  
14 located there; extensive trenching across the plant area;  
15 and the actual mapping of the excavation for the plant  
16 structures.

17 And our perception is and understanding of the  
18 memos is basically the way a geologist would approach the  
19 problem: as you look at all of the available information  
20 that you have that you make a determination on that, and you  
21 would then pursue or not pursue depending on your best  
22 judgment the need for further trenching and further  
23 excavations.

24 It is our best understanding in looking back at  
25 this and from what we know of the site since that time that

1 basically there was confidence by the geologists, the review  
2 geologists at the U.S.G.S. and geologists who have reviewed  
3 that plan since then that these faults were old in terms of  
4 the criteria that were being proposed at the time, and there  
5 was no further need for specific additional trenching of  
6 that feature in particular.

7           It turns out that during the excavation of the  
8 plant structures the fault that is in question was  
9 apparently intersected in the plant structure and mapping  
10 program. After mapping Unit 1 excavation, two minor faults  
11 in the northern part of the excavation were interpreted to  
12 be part of this fault zone, and therefore, the fault was  
13 interpreted to die out as it approached the site from the  
14 seacliff exposure.

15           Our best understanding is that the faulting  
16 occurred somewhere between 15 million years ago and 80 to  
17 120,000 years ago, and the best estimate is that the actual  
18 movement on these faults took place in what is called the  
19 Pliocene or Lower Pleistocene time, which is more than a  
20 million years ago.

21           And basically that is a summary of what I have.

22           MR. DEVINE: My comments are more on the attitude  
23 of the people involved and the specifics. I personally have  
24 been involved in the site since July of '67, shortly after  
25 the meeting that these notes came from; so I have known Mr.

1 Murphy and Dr. Colter, who are both mentioned in the memo,  
2 personally and directly on this case since that time. I  
3 talked with Dr. Colter last week about this circumstance.  
4 So my comments come from both of those sources: my own  
5 personal experience and my recent conversation with Dr.  
6 Colter.

7           And his comments were and my belief is that the  
8 excavations, the trenching that was done as a result of  
9 earlier questions did indeed reflect minor faulting in the  
10 trenching, but no evidence of displacement in the upper  
11 layer which is the 80 to 120,000 layer.

12           That question was looked at extensively by Dr.  
13 Colter and Dr. Yerkes of the Geological Survey, and they  
14 both recalled the field trip vividly, and indicated to me  
15 that their opinions today are as they were at that time;  
16 that there was minor faulting. It was not capable faulting  
17 as there was no evidence of the upper layer being displaced;  
18 and they know nothing in the intervening years that would  
19 cause them to change that position.

20           As for any attitudes about what additional work  
21 should be done, there was a strong feeling on the part of  
22 the Survey at that time after having been through a few  
23 other cases where capable faulting was a major issue, they  
24 were highly sensitized to the question. And it was after  
25 considerable thought on their part that they agreed with Dr.

1 Johns that additional trenching was not necessary, as indeed  
2 it would reflect more of the same that they had already seen.

3 My own personal involvement came as a seismologist  
4 as a result of the g values that were discussed in the same  
5 memo. But I do know over the years of talking with Dr.  
6 Colter there was no hint that something more should have  
7 been done.

8 COMMISSIONER AHEARNE: Jim, it mentions in the  
9 memo "significant fault exposed at the seawall," and goes on  
10 to say, "In Dr. Johns' opinion this larger fault does not  
11 run through the site but probably passes to the northwest."

12 Is there any possibility that that fault line  
13 connects up with the Hosgri fault?

14 MR. DEVINE: I guess the possibility would not be  
15 zero, but the probability was certain to be quite low. As  
16 you know, there was extensive seismic profiling immediately  
17 offshore to try to hook up faulting with the Hosgri, and it  
18 would be my judgment that that would most likely have been  
19 found if it indeed really hooks up with the Hosgri; and  
20 there is no evidence that it has been found. So my guess is  
21 the probability would be very low that that could happen.

22 CHAIRMAN PALLADINO: Was there any documentation  
23 around that time that reflects the opinions you are giving  
24 now? Are you aware of any, Jim?

25 MR. DEVINE: Yes, sir. There was a letter written

1 by the Geological Survey that was enclosed in the SER at the  
2 time which states in writing our position on that.

3           CHAIRMAN PALLADINO: What gives a number of us  
4 problems is that after, well, reading a couple of sentences  
5 here from the memo, it says, "It was established that if the  
6 containment were relocated to move it off the small faults,  
7 it would probably lie on similar faults in the new  
8 location. Thus, Dr. Johns concludes that the present  
9 proposed location is adequate. They do not intend to do  
10 further trenching at the risk of uncovering geologic  
11 structures which could lead to additional speculation and  
12 possibly delay the project."

13           That is reason to raise a little bit a concern  
14 saying they just didn't want to find out what they were  
15 afraid they might find out.

16           MR. DENTON: Mr. Chairman, after the memo came to  
17 my attention we did look back at all of the information, and  
18 we contacted the people that were involved. For whatever  
19 the reasons that the company advanced that logic, I can find  
20 no indication that that influenced the decision of the staff  
21 and the Survey.

22           The decision is well-documented based on geologic  
23 information. It's been followed up two or three times.  
24 It's even been covered in one hearing. And it was a choice  
25 of words that must have reflected what was said at the



1 time. But as you well know, the Survey has long had a  
2 reputation for independence about that, and about that same  
3 time frame rejected one site in California where they were  
4 concerned. So I don't find any basis for thinking that  
5 staff's influence was influenced at all other than on the  
6 geologic difference.

7 CHAIRMAN PALLADINO: Do we have at hand -- you say  
8 the letter that you issued about that time is in the FSAR,  
9 or where did you say it was?

10 MR. DENTON: Mr. Bob Tadesco.

11 MR. TADESCO: Mr. Chairman, Bob Tadesco of the  
12 staff.

13 Appended to our SER which issued in 1968 was a  
14 report from the Department of the Interior Geological  
15 Survey. That did indicate the report from the Geological  
16 Survey, acknowledging their evaluation of the exploratory  
17 trenches that they had examined in 1966.

18 CHAIRMAN PALLADINO: Are you saying then, and we  
19 would include in the record the fact that this statement did  
20 not influence the staff decisions on this plant, and that  
21 you relied on the USGS assessment as included in the SER as  
22 a basis for proceeding with this plant at this site?

23 Did I put words in your mouth?

24 MR. DENTON: Well, at that time I'm not sure the  
25 staff had any geologists on the staff, and we relied almost

1 completely on the Survey, and the Survey had had a lot of  
2 experience with the siting of power plants in California.  
3 And I have read the reports that were produced by the Survey  
4 both before and after that report, and I am confident that  
5 Dr. Colter was not influenced by whatever review was  
6 advocated at that meeting.

7           MR. DEVINE: I would like to put on the record  
8 that I asked Dr. Colter that directly, and he indicated that  
9 there was no way in influence as described in that  
10 sentence. The reason for asking for additional faulting was  
11 the strong belief that indeed similar structures as already  
12 discovered would be found, but no hint that you could find  
13 structures more severe than was already uncovered.

14           CHAIRMAN PALLADINO: This was a concern with  
15 regard to that site.

16           COMMISSIONER BRADFORD: That statement is directly  
17 contrary to what the memo itself says. I can understand  
18 that anybody's memory would be fuzzy back to '67. Mine  
19 certainly is. But I would be pretty hesitant to take  
20 someone's memory today over a record that was made at the  
21 time.

22           MR. DENTON: I don't think it's just that. It's  
23 also looking at the geological basis here. The area is  
24 faulted. There are a lot of faults in that area, and they  
25 are all old. It has been looked at when Unit 2 was dug, and

1 it is not as though -- as Bob Jackson said originally, there  
2 are the seawall exposures. There's the trenching that was  
3 done. That was the best trench reactor site at the time. I  
4 think there was over half a mile of trenching done. And  
5 then as they dug the foundations for the plant, they exposed  
6 other faults that were available, and all of those showed  
7 the same geologic structure and dates.

8 COMMISSIONER BRADFORD: The memo says, "It was  
9 suggested that the exposed fault of the seawall be traced by  
10 further trenching." Does anyone recall suggested by whom?  
11 Was that an AEC suggestion, a USGS suggestion?

12 MR. DENTON: Since we didn't have any expertise at  
13 the time, I don't know who would have brought that one out.

14 CHAIRMAN PALLADINO: What page are you reading  
15 from?

16 COMMISSIONER BRADFORD: It's the sentence right  
17 after the one you were reading from. Somebody at that  
18 meeting suggested that further trenching might be desirable.

19 CHAIRMAN PALLADINO: It's not clear from this.

20 DR. JACKSON: I would add a comment that from many  
21 meetings I have been involved in as a geologist I think  
22 trenching in this type of environment would always be asked  
23 for; in fact, as much as you can get, as often as you can  
24 get it. And this had an extensive amount of trenching for  
25 that time frame. In fact, I think there's been little more

1 done.

2           What a geologist does when he's looking at this  
3 kind of information is try to make a value decision as to  
4 what return you may get on that additional trenching.

5           COMMISSIONER BRADFORD: Okay. The part that  
6 troubles me, I think it's the part that troubled the  
7 Chairman as well when he came across the two sentences  
8 before, is the next sentence says, "The applicants said they  
9 did not believe that this was necessary."

10           Okay. Fair enough. That's the point that you're  
11 making. "And that further information of this type would  
12 only complicate a contested hearing."

13           Now, if you are so sure that all of the additional  
14 information would be favorable and would confirm that there  
15 was no faulting of concern, why would the public hearing be  
16 complicated? Why wouldn't the public hearing be simplified?

17           MR. DENTON: Bear in mind the applicant was saying  
18 that supposedly, not the staff; and I don't know why he said  
19 that. Our people wrote it down.

20           COMMISSIONER BRADFORD: The inference it invites  
21 is one that was suggested before which was that they didn't  
22 have reason to be a hundred percent confident that the  
23 result of further trenching would confirm what they have.

24           MR. DENTON: I guess I come back, I know of no  
25 more independent geological advice in the Survey in that

1 time frame.

2 COMMISSIONER AHEARNE: Was any further trenching  
3 done?

4 MR. DENTON: Yes. Well, let me qualify that.  
5 Now, trenching is only one of several ways to understand the  
6 area, so every time they excavated for another plant -- they  
7 did Unit 1, they did Unit 2; I think they even trenched some  
8 more before Unit 2 was allowed -- so there was a lot of  
9 geologic work, all of which confirms the kind of  
10 understanding that Dr. Jackson and I said exists for that  
11 site.

12 COMMISSIONER AHEARNE: But as far as you know, was  
13 there any work done that flowed from these concerns raised?

14 MR. DENTON: Let me go back to the only historical  
15 memory, Bob Tadesco.

16 MR. TADESCO: It's hard to recollect back to that  
17 time, but they had a review of the memo in the report, so we  
18 had to file it. And it talked about the adequacy of the  
19 trenching plus the additional trenching done at Unit 2 in  
20 the report of the Survey. That is what we relied on.

21 COMMISSIONER AHEARNE: As far as the Survey knows,  
22 there was no additional work done.

23 MR. DEVINE: Not to my knowledge.

24 COMMISSIONER BRADFORD: Has there been a complete  
25 file search on our part or on the Survey's part with regard

1 to this?

2 MR. DENTON: I wouldn't say complete, but we have  
3 searched our files. Are you fishing for problems or do you  
4 think that there are some there? We have looked, we have  
5 talked to everyone involved, and we can't find any basis for  
6 thinking these faults are anything but old faults.

7 COMMISSIONER AHEARNE: But the difficulty is we  
8 have a memo. The memo reports a meeting, and obviously it  
9 is a meeting that occurred over 14 years ago; and so  
10 unfortunately, memories are going to be probably very poor  
11 sources of information. So you have to rely as best you can  
12 on whatever written information is available, and the  
13 written information indicates a concern about doing further  
14 exploration because it could delay the project and  
15 complicate a contested area.

16 Now, I have no way of knowing who raised those  
17 objections or concerns, but at least at the moment it sounds  
18 like whoever raised them was successful in the argument.

19 MR. DENTON: Well, I don't want to be defensive  
20 about this. When we got the memo called to our attention we  
21 relooked, and I think we have told you all that we can tell  
22 you today about this, other than going back and retrenching  
23 from start. We have sought out the people, and have them  
24 here, who have the best corporate and geologic memory of  
25 that site.

1           COMMISSIONER BRADFORD: But as far as you know, in  
2 fact the fault from the seawall never was trenched in the  
3 way suggested here; that is, followed to its end to see how  
4 close it came to the plant in what form?

5           DR. JACKSON: What I tried to indicate is our best  
6 understanding, that it was a feature picked up on the  
7 mapping of Unit 1 which was interpreted to be part of that  
8 fault extending toward the site.

9           I might add from a geologic point of view the  
10 seacliff is the best trench you could ever have as a natural  
11 exposure which has natural weathering and weathering  
12 properties that you don't have in a trench which is  
13 excavated. It is the best exposure you can have.

14          So being a geologist, you put a lot of faith in  
15 that particular trench. And I think one of the things I  
16 tried to mention before was that as you proceed, if this  
17 trench offset or in the seacliff you noticed geologic  
18 conditions which would leave you suspicious, you would have  
19 no choice but to trench and to follow it up further.

20          In this case it is my judgment that what was done  
21 they evaluated all of the evidence, and they would look, for  
22 instance, at air photographs of the so-called terrace units  
23 and see if there were any indications or possibilities that  
24 that fault could project in that direction and offset the  
25 other material and decide to trench or not to trench.

1           COMMISSIONER BRADFORD: I appreciate what you say,  
2 and I don't have any basis for doubting it other than this  
3 language in here about the extent to which further work  
4 might cause further problems.

5           Given the situation as you have described it, it  
6 sounds as though further work would only have increased the  
7 certainty for people. What is troubling me is that people  
8 seem to say if we learn more, it is going to weaken our  
9 case. That is the opposite of the situation you described.

10          DR. JACKSON: I understand. I've been interested  
11 in trenching for many years. Trenching was not really done  
12 routinely; in fact, it has evolved as a result of the  
13 nuclear power plant siting, the use of trenching to identify  
14 active faulting.

15          And I think what has happened, there was an  
16 evolution through time of the dependency on this  
17 methodology, and that stemmed from the U.S. Geological  
18 Survey and the support that the NRC or AEC at that time gave  
19 to that aspect of the study.

20          So I think it was -- my judgment would be that it  
21 was an evolving approach. There was an extensive amount  
22 done here and a judgment made by the geologists at that time  
23 that said that there's a certain amount beyond which you get  
24 diminishing returns.

25          I might make one comment from the complication



1 point of view. There's no doubt complication could mean  
2 many things. It may mean to me as a geologist that what you  
3 have is more trench logs, more arguments about age dates of  
4 the particular material, and complicated. It may be more  
5 certain in the end that it adds another element to the  
6 review; so complicated may not mean complicating the  
7 hearings in terms of the difficulty issue, but complicated  
8 in terms of the geologic aspect.

9 MR. DENTON: I would suggest that for a more  
10 further look you would have to go back and interview more  
11 parties than we have been able to since this came to our  
12 attention. We will try to figure out what was behind these  
13 statements and recreate that.

14 We tended to work internally. We have not gone  
15 back to the company. And we talked to the people who either  
16 worked for the AEC at the time or worked for the Survey at  
17 the time.

18 CHAIRMAN PALLADINO: Based on the SER or the  
19 letter contained from the USGS in the SER, do you believe  
20 that you proceeded in a proper and effective way with regard  
21 to these particular faults, and you were not influenced by  
22 the concern that further trenching should be avoided because  
23 it might give unanticipated problems?

24 MR. DENTON: I've never known the Survey to be  
25 influenced by any potential problems it might raise. They

1 give us their best scientific advice, and that has been my  
2 experience in working with them.

3 COMMISSIONER AHEARNE: Jim, do you have anything?

4 MR. DEVINE: Yes. If I could make one more  
5 comment, if I could, on that very point.

6 This site particularly I think the record shows  
7 that we have not in the Survey at any time been hesitant to  
8 reopen the case. As you know, the last five years has been  
9 largely, as a result of our involvement in the increase of  
10 the earthquake sites and so forth, I think it is important  
11 to recognize that we have never felt an obligation to do  
12 other than provide the best geologic advice and let the  
13 chips fall where they may. And I think our record is quite  
14 strong in this case for just that.

15 COMMISSIONER AHEARNE: So, Jim, I gather your  
16 conclusion is that this memo has not led you to be uneasy  
17 about the Geologic Survey's position.

18 MR. DEVINE: My feeling is the memo is a  
19 misstatement of our position as far as it implying that more  
20 data would cause more trouble. I think that is a  
21 misstatement from our attitude.

22 CHAIRMAN PALLADINO: Any other questions?

23 Well, that completes the first part of the meeting.

24 COMMISSIONER BRADFORD: Joe, excuse me for one  
25 thing. Perhaps I had just not been reading the memo closely

1 enough. I had not taken it to state a USGS position at all;  
2 that is, the part that the Chairman and I both quoted is  
3 attributed to -- I don't know if it's attributed to anybody  
4 -- to a Dr. Johns who is a consultant to the applicant.

5           What did you have in mind with regard to the USGS  
6 position?

7           MR. DEVINE: The last sentence of the letter says,  
8 "Dr. Colter agrees with the statement and findings made by  
9 Dr. Johns."

10           COMMISSIONER BRADFORD: I see. I took that to be  
11 with regard to the geology itself, not a policy issue.

12           MR. DEVINE: It is ambiguous, what it does mean.

13           COMMISSIONER BRADFORD: Your point is you would  
14 not have been endorsing the statement with regard to  
15 hearings.

16           MR. DEVINE: That's true.

17           CHAIRMAN PALLADINO: Any other comments or  
18 questions on this subject?

19           We will now proceed to further discussion of the  
20 seismic reverification plan for Diablo Canyon, and as the  
21 committee voted, this will be a closed meeting. So at this  
22 time we will take a recess while members of the public --

23           MR. DIRKS: Do you want to go into the proposed  
24 letter?

25           MR. BICKWIT: The Commission decided it wanted to

1 close the remaining portion of this discussion.

2           CHAIRMAN PALLADINO: Because there were a number  
3 of items that certainly related to frustration of purpose,  
4 and we want to be free to discuss it.

5           We will recess for a few minutes while visitors  
6 are allowed to leave.

7           (Whereupon, at 2:10 p.m., the open session of the  
8 meeting was adjourned.)

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NUCLEAR REGULATORY COMMISSION

This is to certify that the attached proceedings before the

the matter of: DISCUSION OF MAY 18, 1967 AND SEISMIC  
REVERIFICATION PLAN FOR DIABLO CANYON

Date of Proceeding: November 10, 1981

Docket Number: \_\_\_\_\_

Place of Proceeding: Washington, D. C.

were held as herein appears, and that this is the original transcript  
thereof for the file of the Commission.

Alfred H. Ward

Official Reporter (Typed)

Alfred H. Ward

Official Reporter (Signature)