UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

Docket Nos. 50-275
and 50-323

JUN 16, 1978

MEMORANDUM FOR: J. Carl Stepp, Chief, Geosciences Branch, DSE

FROM: R. McMullen, Geologist, Geosciences Branch, DSE
R. Hofmann, Section Leader, Geosciences Branch, DSE

SUBJECT: TRIP REPORT, MAY 3 AND 4, 1978 EXAMINATION OF FAULTS REPORTED BY THE CALIFORNIA DIVISION OF MINES AND GEOLOGY NEAR THE DIABLO CANYON NUCLEAR SITE

On May 4, 1978, a meeting and field reconaissance was held to evaluate geological anomalies near the Diablo Canyon Nuclear Power Plant site. Participants included representatives of the Pacific Gas and Electric Company (PG&E), its geological consultants, Earth Sciences Associates (ESA) and Dr. R. Jahns of Stanford University, the U. S. Geological Survey (USGS), the California Division of Mines and Geology (CDMG), Pecho Ranch, and the Nuclear Regulatory Commission (NRC). A list of participants is attached. The purpose of the meeting was to examine two exposures of a possible N20°W striking fault in the sea cliff, 14,000 and 14,500 feet north of the Diablo Canyon site which had been reported to the NRC by the CDMG (see memo to Gammill from Stepp, May 1, 1978).

CDMG's interest in the area was raised by apparently conflicting mapping. The 1922 fault map of California by H. Wood, shows a fault that extends across the peninsula from the Pismo area into Estero Bay. A 1946 revision of this map also shows the fault. As shown on these maps, the fault approximately coincides along a part of its trace with the San Miguelito fault zone. In subsequent mapping, Hall (1973) showed the San Miguelito fault zone terminating at a location which is about 2 miles east of the Diablo Canyon site, and south of Estero Bay. Field checking by ESA confirmed that the San Miguelito fault zone terminates where Hall had indicated (Diablo Canyon FSAR). CDMG considered it necessary to resolve the conflicting mapping. Investigations by CDMG appear to support the mapping of Hall (1973).

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During the investigation of a possible northern extension of the San Miguelito fault zone, CDMG geologists discovered severa. geological anomalies in the vicinity of Crowbar Canyon which they considered possibly suggestive of faulting, although they acknowledged that other causes were equally plausible. Crowbar Canyon is located 2 miles northwest of the Diablo Canyon site and trends northeast-southwest approximately perpendicular to a projection of the San Miguelito fault zone. Crowbar Canyon is incised into the coastal headlands and broadens out onto an old marine terrace which terminates seaward at an 80 foot sea cliff. The marine terrace is covered with fan material. A large landslide has been mapped west-northwest of Crowbar Canyon. Among the anomalies found were a topographic linear which constitutes Crowbar Canyon, a rapidly eroding headland several thousand feet west-northwest of Crowbar Canyon, a perched and apparently tilted alluvial fan that does not appear to be related to the present drainage or to a currently developing fan, and springs thought to be anomalous by the CDMG geologists. The two sea cliff features thought to be possible faulting mentioned above, were discovered when CDMG geologists examined the 80 foot sea cliff following up on their discovery of the headland anomalies. These two features were subsequently reported to the NRC. In response, we visited the site on May 4th. The bedrock exposed along the sea cliff in this area has been mapped as Obispo formation of Middle Miocene age (Hall, 1973). The eroded surface of the Obispo formation constitutes one of several marine terraces in the region. Stratification within the bedrock exposed at this location has an apparent dip toward the ocean.

The northernmost sea cliff feature was our primary concern because it was reported to apparently offset the overlying alluvium. The feature was determined during our field investigation to be a depression in rock filled with two soil units, the upper being an old fan deposit, and the lower a marine deposit. These soil units abut against bedrock on the shoreward side in such a way as to give the appearance of fault offset. The base of this contact was buried beneath recent alluvium on our arrival and the vertical contact gave the appearance of faulting of the alluvium. This interpretation had been made tentatively by CDMG geologists. During our visit, removal of the soil which covered the base of the feature revealed that the bedrock strata behind it is continuous and not faulted. Thus, we consider this feature to owe its existence entirely to mass wasting processes.

The southernmost feature was described as a minor N20°W striking vertical fault with little or no gouge but having horizontal slickensides and locally showing about one and one half inches of displacement.

We have concluded that this feature does not constitute a hazard to the site because it is minor, apparently discontinuous, and there is no evidence that it affects the overlying terrace surface or terrace deposits indicating an age of last movement greater than 80,000 to 120,000 years. There are many such fractures in the area, some of which have been intruded by Obispo tuff, indicating at least a Miocene age of last movement (Diablo Canyon FSAR). CDMG is continuing its investigation of the linearity of Crowbar Canyon, the apparently anomalous springs and tilted fan, the rapidly eroding headland, and the sea cliff. We will continue to keep informed of the results of that investigation, and will review its findings when it has been completed.

R. Hofmann, Section Leader
Geology & Seismology Section
Geosciences Branch

R. McMullen, Geologist
Geology & Seismology Section
Geosciences Branch

Enclosure:
Attendance List

cc w/enclosure:
H. Denton
R. Boyd
D. Muller
R. Denise
D. Vassallo
J. Tourtellotte
D. Davis
D. Goddard
J. Stolz
D. Allison
R. Hofmann
J. Hanchett (Region V)
R. McMullen
J. Devine, USGS
F. McKeown, USGS
P. Grew, Calif. Dept. of Conservation
J. Davis, CDMG

NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

MAY 1 1978

MEMORANDUM FOR: William P. Gammill, Assistant Director for Site Technology, DSE

FROM: J. Carl Stepp, Chief, Geosciences Branch, DSE

SUBJECT: FAULTING NORTH OF DIABLO CANYON REPORTED BY JAMES DAVIS (CDMG)

Dr. Davis (CDMG) called me to report on the California Division of Mines and Geology investigation of the northern extension of the San Miguelito fault zone. He reported the following:

1. Their work has shown the San Miguelito fault zone is not extended beyond the mapped position on the Hall map.
2. CDMG personnel found two faults in the sea cliff, 14,000 and 14,500 feet respectively north of the Diablo Canyon units. The faults trend north 20°W, are of unknown length, and the southernmost of them offsets the alluvium by an apparent 1 meter. The age of the offset is unknown. The alluvium appears to be an older alluvium, but its age is not yet determined. The southernmost of these two faults appears on the basis of the limited field investigation to juxtapose Obispo Formation against Monterey Formation. The sense of movement as indicated by slickensides, appears to be predominantly dip-slip. These faults are not aligned with any known major structure and are not related to the San Miguelito fault.

Dr. Davis has drafted a news release which states the following two points:

1. The CDMG has discovered fault offsets of undetermined age 14,000 feet and 14,500 feet north of the Diablo Canyon Nuclear Plant units.
2. CDMG has recommended to the NRC that we look into the matter.

Dr. Davis has not yet gotten approval of his Director to make the release. He expects that approval will be obtained before the end of today so that the release may be given tomorrow morning. He committed to telefax a copy of the release to us as soon as it has received Director approval.

J. Carl Stepp, Chief
Geosciences Branch
Division of Site Safety and
Environmental Analysis

cc: See next page

cc: H. Denton
R. Boyd
W. Gammill
D. Vassallo
J. Tourtellotte
D. Davis
D. Goddard
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J. Stolz
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R. Hofmann
D. McMullen
J. Hanchett
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Local PDR
PDR