REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 8705260374 DOC. DATE: 87/05/18 NOTARIZED: NO DOCKET #
FACIL: 50-275 Diablo Canyon Nuclear Power Plant, Unit 1, Pacific Ga 05000275
50-323 Diablo Canyon Nuclear Power Plant, Unit 2, Pacific Ga 05000323
AUTH. NAME AUTHOR AFFILIATION
SHIFFER, J. D. Pacific Gas & Electric Co.
RECIP. NAME RECIPIENT AFFILIATION
Document Control Branch (Document Control Desk)

SUBJECT: Summarizes technical developments of long term seismic program re topics that occurred subsequent to previous geology, seismology, geophysics workshop in Oct 1986.

DISTRIBUTION CODE: A001D COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 6
TITLE: OR Submittal: General Distribution

NOTES:

	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL
	PD5 LA	1	0	PD5 PD	5	5
	SCHIERLING, H	1	1	TRAMMELL, C	1	1
INTERNAL:	ACRS	6	6	ARM/DAF/LFMB	1	0
	NRR/DEST/ADE	1	1	NRR/DEST/ADS	1	1
	NRR/DOEA/TSB	1	1	NRR/PMAS/ILRB	1	1
	OGC/HDS2	1	0	REG FILE 01:	1	1
EXTERNAL:	EG&G BRUSKE, S	1	1	LPDR	2	2
	NRC PDR	1	1	NSIC	1	1

TOTAL NUMBER OF COPIES REQUIRED: LTTR 26 ENCL 23

[illegible]

[illegible]

[illegible]

PACIFIC GAS AND ELECTRIC COMPANY

PG&E 77 BEALE STREET • SAN FRANCISCO, CALIFORNIA 94106 • (415) 781-4211 • TWX 910-372-6587

JAMES D. SHIFFER
VICE PRESIDENT
NUCLEAR POWER GENERATION

May 18, 1987

PGandE Letter No.: DCL-87-116

U.S. Regulatory Commission
ATTN: Document Control Desk
Washington D.C. 20555

Re: Docket No. 50-275, OL-DPR-80
Docket No. 50-323, OL-DPR-82
Diablo Canyon Units 1 and 2
NRC/PGandE Workshop, Diablo Canyon Long Term Seismic Program
Geology/Seismology/Geophysics, May 5-8, 1987,
San Luis Obispo, California

Gentlemen:

On May 5-8, 1987, PGandE representatives met with the NRC and its technical advisors for a Geology, Seismology, and Geophysics Workshop ("Workshop') in San Luis Obispo, California. The combination of office-based presentations and discussions along with a one-day field trip enabled us to cover a wide range of topics in our work plan for the Diablo Canyon Long Term Seismic Program. During the course of the Workshop, we reported our progress and the status of regional tectonic evaluations and specific fault studies and summarized our results and tentative conclusions. The technical developments regarding these topics that have occurred subsequent to our previous geology, seismology, geophysics workshop in October 1986 are summarized as follows:

HOSGRI FAULT: During November and December 1986, PGandE collected an extensive high-resolution geophysical data set that was intended to supplement and extend geological interpretations derived from existing geophysical data sets. The interpretation of these data sets is leading to a more detailed understanding of the Hosgri fault zone. In the offshore south-central coastal California area, including the vicinity of the DCPP, the Hosgri fault zone is a component of the Coastal Tectonic Boundary Zone, which has had a long history of tectonic activity. This zone contains folds and shallow listric-appearing faults that were active 5 to 7 million years ago but appear to have subsequently ceased deforming. The Hosgri fault zone consists of several fault traces that collectively extend from a point offshore of Cambria on the north to the area offshore of the Santa Ynez River on the south. The Hosgri fault zone appears to be segmented by interactions with the Los Osos and Casmalia faults where they extend offshore.

A001
1/1

In the vicinity of the area offshore of the DCPP site, the Hosgri fault zone contains two traces that range in distance from the plant site between 4 and 6 km. The western trace is identified by a localized zone of gas-charged sediments overlying a buried small fold. The fault appears to be nearly vertical. Evidence for geologically recent deformation along this trace consists of local minor warping of late Quaternary sediments and a local scarp that is presently interpreted as a fault scarp younger than 18,000 years. The total amount of deformation on this fault trace within the past several million years appears to be very limited, as there is no evidence of displacement of buried structures in the geophysical data.

The eastern trace of the Hosgri fault zone opposite the DCPP site is vertical to steeply east-dipping. Several seafloor scarps have been observed that suggest possible faulting within the past 18,000 years. The eastern trace of the Hosgri fault appears to be a more significant structural element within the Coastal Boundary Zone than the western trace.

LOS OSOS FAULT: Detailed mapping and trenching along this zone by PGandE subsequent to the October 1986 Workshop has shown that there is a zone of late Quaternary and Holocene (less than 10,000 years old) fault scarps along the southwest margin of Los Osos Valley associated with a northwest-striking, southwest-dipping reverse fault. The Los Osos fault lies as close as 11 km from the DCPP site. Mapping of the marine terraces at Montana de Oro suggests an average slip rate of about 0.6 mm per year. This is an order of magnitude lower than the rate of slip on the Hosgri fault, about 4 mm per year. Investigations are continuing to assess the lateral extent, down-dip geometry, continuity, and degree of segmentation of the Los Osos fault in order to refine our characterization of its seismic potential.

PISMO SYNCLINORIUM: Continued mapping of the bedrock geology and marine terraces in the vicinity of the Pismo synclinorium subsequent to the October 1986 Workshop has shown that the synclinorium lies within a structural block that has experienced uplift at a generally uniform rate of 0.14 mm per year. Except for a small reverse fault identified by PGandE a few weeks ago in a roadcut adjacent to the San Luis Bay Inn, and possibly for some minor faulting of middle Pleistocene terraces (approximately 500,000 years old) along the northern projection of the Edna fault, the block does not appear to be deforming internally. Detailed mapping of the shoreline angles of late to mid-Pleistocene marine terraces indicates there is no deformation of the marine terraces across the axis of the synclinorium. Therefore, a folding-related (Coalinga type) earthquake associated with the Pismo synclinorium is not credible.

WILMAR AVENUE FAULT: Faulting in the sea cliff at Wilmar Avenue is about 20 km southeast of the DCPP site. Evidence for Quaternary displacement on this fault was first reported by Steve Nitchman (UNR) at the

August 1986 field trip. Subsequent investigations of this fault by PGandE have shown that the Wilmar Avenue fault is a capable reverse fault that has a very low degree of activity. Based on the displacement of marine terraces, the rate of slip on the fault is about 0.05 mm per year. In general, this slip rate is an order of magnitude lower than the rate on the Los Osos fault, two orders of magnitude lower than the late Quaternary slip rate on the Hosgri fault, and three orders of magnitude lower than the San Andreas fault.

The fault exposed at Wilmar Avenue can be traced discontinuously for approximately 16 km from Pismo Beach southeastwards to Los Berros Canyon. It may extend an additional 10 km to the southeast to about Nipomo. At Pismo Beach the fault trends more east-west and measured dips range from 45° to 60° north. Offshore geophysical data suggest that the fault may extend an additional 5 km to the west into San Luis Obispo Bay. Geologic investigations in the Nipomo Mesa area and investigations of the offshore geophysical data are continuing to assess the lateral extent and continuity of this fault.

SAN LUIS BAY FAULT: The San Luis Bay fault is exposed in a roadcut immediately south of the San Luis Bay Inn, about 10 km southeast of the plant. It displaces 124,000-year-old marine terrace deposits. In this single exposure of the fault, the fault strikes about north 70° west. Near the surface it dips 20° to the north, steepening downwards within the roadcut bedrock exposure to 45°. The fault has a reverse sense of slip with the north side up.

The fault is capable according to NRC criteria, but has a very low rate of activity. The average rate of slip is calculated to be about 0.06 mm per year, which is two orders of magnitude lower than the estimated slip rate on the Hosgri fault. The fault is projected to extend westwards through the saddle between San Luis Hill and the main San Luis Range to the mouth of Deer Canyon and/or Pecho Creek, where there are apparent south-side-down steps in the marine terraces.

Investigations are continuing to assess the lateral extent, continuity, and possible segmentation of the San Luis Bay fault. Based on the small amount of cumulative slip on this fault and on its low rate of Quaternary slip, it is judged that the San Luis Bay fault will not be a significant seismic hazard for DCPP.

SAN MIGUELITO FAULT: The San Miguelito fault is about 4 km southeast of the DCPP site. The investigations to assess the nature, extent, and capability of this fault have been completed since the October 1986 Workshop and the results were presented at the recent NRC/PGandE Workshop. Based on the results of detailed geologic mapping and trenching of the fault, and results of mapping of Quaternary marine and fluvial terraces, the San Miguelito fault is classified as not capable. The fault is mappable for about 9 km from the coast at Mallagh Landing to Vineyard Canyon, about 4 km east of the plant. The sense of displacement

is generally right slip, with right-oblique slip locally on the west-northwest to east-west reaches of the fault. Several marine terraces ranging in age from about 100,000 to more than 500,000 years old have been traced across the mapped fault and are not displaced or deformed.

The results of our investigation of the San Miguelito fault are consistent with the findings of the UNR students who have been conducting parallel investigations. The NRC staff and their consultants concurred with our assessment that the San Miguelito fault is not a capable structure.

The foregoing technical developments have been considered by Mr. Lloyd Cluff, Manager of our Geosciences Department and head of the LTSP effort, in his review of the progress and results of the integrated geologic, seismologic, and geophysical studies conducted to the present. His review indicates that the only significance of the comparatively minor faults recently identified and studied is that they serve to enhance our understanding of regional tectonics and the complex stress environment that exists in the Central Coast Ranges of coastal California. The Hogri fault zone remains the controlling seismic source; none of the minor faults are significant when compared to the Hosgri, even if they might be slightly closer to the plant. It is our assessment that none of these seismic sources adversely affects the safety of the DCPP. The active faults discussed above are the focus of continuing investigations involving both field data acquisition and analysis. During the remaining course of the LTSP, in accordance with our scope of work and schedule, these additional results will be incorporated in our final assessments, as required by the license condition.

The bases for these judgments are as follows:

HOSGRI FAULT ZONE:

- The Hosgri fault zone is comprised of several fault strands within a zone several kilometers wide that is segmented along its length. The evidence for segmentation indicates that the maximum earthquake magnitude for the Hosgri is likely to be lower than previous estimates used in the Hosgri reevaluation of DCPP.

- Because the DCPP site lies within the near-field distance range from the Hosgri fault, the sensitivity to small variations in distance, such as between 4 and 6 km, of ground motion predictions at the site is considered to be low. This generally accepted engineering consideration, combined with the segmented nature of the Hosgri zone, indicates that the refined distance between the Hosgri fault and the DCPP site does not adversely affect the safety of the plant.

- The Hosgri fault zone remains the controlling seismic source for DCPP in terms of the potential size and proximity of earthquakes.

LOS OSOS FAULT:

- The Los Osos fault lies at a distance of 11 km and dips to the west. The fault appears to steepen with depth in a manner observed for many other faults in the region and worldwide. Even allowing for a somewhat closer approach of the fault at depth than the surface distance of 11 km, the distance between the Los Osos fault and the DCPP site is greater than the Hosgri distance.

- The earthquake potential of the Los Osos fault is less than that of the Hosgri fault. The total length of the fault is shorter than the Hosgri fault zone, and the Los Osos fault appears to be segmented as well.

PISMO SYNCLINORIUM:

- Tectonic deformation within the region, including the Pismo synclinorium, has been decreasing in rate since a peak about 5 to 7 million years ago. Folding within the Pismo synclinorium part of the Pismo block has ended; deformation is presently concentrated on the block margins (the Hosgri and Los Osos faults). Thus, significant folding-related earthquakes are not considered credible.

- Within the Pismo block, very minor deformation has been observed on two small faults, the Wilmar Avenue fault and the San Luis Bay fault. Such faults serve to accommodate low-level internal deformation and do not represent sites of significant or frequent earthquakes.

WILMAR AVENUE FAULT:

- The distance to the DCPP site from the closest approach of the Wilmar Avenue fault is much greater than the distance between the site and the Hosgri fault.

- Based on slip-rate comparisons, the Wilmar Avenue fault has a rate of possible seismic activity that is two orders of magnitude less than that of the Hosgri fault.

- The minor nature and segmented character of the Wilmar Avenue fault indicate an earthquake potential that is much less than that of the Hosgri fault.

SAN LUIS BAY FAULT:

- The mapped exposure of the San Luis Bay fault is 10 km from the plant site, and the fault may continue along a westerly trend. Potential ground motions produced by earthquakes on this fault would be less significant than those considered possible for the Hosgri due to the low earthquake magnitude potential of the San Luis Bay fault.

- Based on slip-rate comparisons, the San Luis Bay fault has a rate of possible seismic activity that is two orders of magnitude less than that of the Hosgri fault.

- The minor nature and segmented character of the San Luis Bay fault indicate an earthquake potential much less than that of the Hosgri fault.

During the coming months our investigations of the topics discussed herein will proceed in accordance with the overall scope and schedule for the Long Term Seismic Program. We will continue to inform you of additional results of our studies. We will also be preparing a technical report on these topics to be submitted to the NRC shortly before our next Geology/Seismology/Geophysics workshop, tentatively planned for November or December 1987.

Kindly acknowledge receipt of this material on the enclosed copy of this letter and return it in the enclosed addressed envelope.

Sincerely,

for J. D. Shiffer

cc: K. Aki
S. T. Archuleta
D. Bernreuter
R. D. Brown, Jr.
L. J. Chandler
C. J. Constantino
J. Davis
S. M. Day
G. Gazetas
E. G. Igne, ACRS
G. Knighton
J. B. Martin
M. M. Mendonca
P. P. Narbut
B. Norton
D. Perkins
M. Reich
J. B. Savy
D. B. Slemmons
C. M. Trammell
A. S. Veletsos
R. Youngblood
CPUC
Diablo Distribution

1452S/0050K/JLP/1857