

Independent Peer Review Panel

*A multi-agency panel of seismic hazard specialists
established by the California Public Utilities Commission*

CALIFORNIA GEOLOGICAL SURVEY, CALIFORNIA COASTAL COMMISSION
CALIFORNIA EMERGENCY MANAGEMENT AGENCY, CALIFORNIA ENERGY COMMISSION
CALIFORNIA SEISMIC SAFETY COMMISSION, CALIFORNIA PUBLIC UTILITIES COMMISSION
COUNTY OF SAN LUIS OBISPO

October 25, 2012

Mary Shallenberger, Chair
California Coastal Commission
45 Fremont Street
San Francisco, CA 94105

Re: IPRP support for Offshore High Energy Seismic Survey

Dear Chair Shallenberger:

Thank you for the opportunity to provide expert opinion regarding the Offshore Central Coastal California Seismic Imaging Project proposed by the Pacific Gas and Electric Company (PG&E). In response to the AB1632 report by the California Energy Commission (CEC), the California Public Utilities Commission (CPUC) established the Independent Peer Review Panel (IPRP) to review and provide comments on seismic hazard studies at Diablo Canyon Nuclear Power Plant (DCPP). The comprehensiveness, completeness, and timeliness of these studies will be critical to the CPUC's ability to assess the cost-effectiveness of Diablo Canyon's proposed license renewal. We have reviewed the scope of the seismic surveys, including the proposed off-shore high-energy seismic survey, and commented on their applicability to seismic hazard analysis at DCPP in a series of reports. This letter provides our current evaluation of the proposed high-energy seismic survey.

PG&E Seismic Study Plan Progression

The off-shore high-energy 3-D seismic study plans for DCPP have evolved from the originally proposed scope as presented in PG&E Letter DCL-2012-602 dated February 6, 2012, Figure 1. The original survey consisted of two large trackline boxes as indicated in the above referenced Figure 1. In response to IPRP comments based on maximizing data collection most relevant to seismic hazard assessments, and minimizing environmental impacts the survey was replaced with four smaller trackline boxes detailed in IPRP Report No. 3 dated April 6, 2012, and presented by PG&E in Letter DCL-2012-602 Figure 2. At the June 29, 2012 IPRP meeting PG&E presented an alternative high energy seismic trackline configuration (IIIb) that eliminated the northern-most area (Box 3). This is summarized in IPRP Report No. 4, dated September 25, 2012. The survey scope was again modified in response to the California State Lands Commission (SLC) permitting process, discussions with Coastal Commission staff, and the project extension to a 2-year period in November and December of 2012 and 2013. In the current proposal, the offshore survey for 2012 is a single survey area (Box 4) located in the Los Osos-Hosgri fault intersection region in Estero Bay north of DCPP, shown in PG&E report dated September 28, 2012, (Figure 1-2 page 5). The IPRP reviewed the objectives for the proposed 2012 survey and commented to PG&E, with a request for additional information on Oct. 11, 2012. The IPRP understood the objectives for the 2012 survey to include several geologic targets as well as the potential to refine the proposed 2013 surveys:

- Validation of the survey method as a test for the feasibility to image faults in the deep (5-15 km) Franciscan Complex basement rocks.
- Image the Hosgri, Los Osos, Shoreline and related faults as they converge at depth in a small area offshore of Pt Buchon.
- An opportunity to verify that environmental impacts mitigation strategies are successful.

PG&E's responses to the IPRP's questions in PG&E Letter DCL-2012-653 dated October 17, 2012, clarified the extent of the data collection within the survey box, and show that the surveyed area does cover the primary geologic targets of the survey, which are largely in the southeast quadrant of survey Box 4. The extent of data collection within the proposed survey box was also clarified, along with operational details of the survey.

The near-shore location of the Hosgri fault, 3-4 km from DCPD limits the possibility of conducting high energy seismic surveys oriented perpendicular or along a dip line, hence strike-line surveys are planned for this region in the direct vicinity of DCPD. For the proposed 2012 survey to the north at the Hosgri-Los Osos fault intersection region, a dip line survey is planned. A determination of the Hosgri dip in this region will have seismic hazard implications.

The Morro Strand onshore geophone array is included to provide information about the deeper crustal structure beneath Estero Bay. It is understood that data collected on this array will be of primary value in assessing future onshore deployments in the vicinity of the DCPD.

PG&E's responses to the IPRP's questions also included the information that an Independent Technical Reviewer (ITR) will be assigned by PG&E's Geoscience Department to review the accuracy, completeness and adequacy of the 3D marine seismic reflection data. The independent review of survey planning, acquisition and data processing has been a concern of the IPRP as discussed in IPRP Reports No. 3 and 4. Because of these concerns, the IPRP has discussed hiring additional technical experts who would have a similar charge as the ITR assigned by PG&E. The IPRP notes that the level of independence of the ITR is of paramount importance to the quality of the technical review and public acceptance of survey results.

Summary

The IPRP finds that PG&E has responded to the questions directed to them and has shown that the initial phase of the proposed high energy survey includes an area where important information regarding the geometry and intersections of several faults may be imaged. The IPRP reached consensus that a 3D high energy seismic survey of Box 4 could provide valuable information about the faults that pose the greatest seismic hazard to Diablo Canyon Nuclear Power Plant.

The IPRP did not reach consensus on whether PG&E has demonstrated that the survey currently planned is optimally designed to provide the highest quality data. The IPRP membership, with one exception, support the proposed testing as designed. IPRP member Bruce Gibson (San Luis Obispo County) has expressed general concerns regarding the overall survey planning and data processing approach selected by PG&E, and has not received responses that demonstrate to him that the planned survey is state-of-the-art. In the proposal before the Coastal Commission, Dr. Gibson is specifically concerned that, 1) that data quality over the most important targets (SE quadrant of Box 4) will be low, and 2) the data collected by the shore-based array will not provide an adequate image of the targeted features.

The remainder of the IPRP members acknowledge Dr Gibson's concerns, but believe that the currently planned survey is appropriate to provide preliminary answers to the primary questions

it is designed to answer. The opportunity for additional review of survey design between surveys in 2012 and 2013, whether by an ITR hired by PG&E, or by contracted experts and the IPRP, give the IPRP greater confidence that high energy seismic surveys will yield valuable data to understand the seismic hazards at Diablo Canyon. Dr. Mark Johnsson, representative of the California Coastal Commission on the IPRP, concurs with the opinions expressed in this letter, but takes no position on what the Commission's action regarding the Federal Consistency determination or Coastal Development Permit application should be.

The IPRP hopes that this perspective on the value of this survey for seismic hazard analysis helps the Commission weigh the benefits and impacts of the proposed survey.

Sincerely,

A handwritten signature in blue ink that reads "Chris Wills". The signature is written in a cursive, flowing style.

Chris Wills
Chair, Independent Peer Review Panel