ATTACHMENT 3

July 29, 2012

SUMMARY OF UNRESOLVED TECHNICAL ISSUES

The following sections include summary technical discussion of some issues remaining unresolved after discussions at the IPRP and the exchange of letters in Attachments 1 and 2.

Number of streamers

The proposed survey includes 4-streamer vessel operations in water as shallow as 25 m, in order to cover targets near shore. PG&E asserts (Attachment 2, pg 13) that boats capable of towing 10 or more streamers cannot operate in water depths shallower than 75 m. Recent communication from one industry seismic contractor indicates that a 10-streamer boat can operate in 25-m water depths under nominal conditions.

This project should be submitted for a complete survey design review that would include a navigational obstruction survey of the area and modeling of streamer tracking behavior (horizontal and vertical) based on modern streamer steering and control technology. The survey design review would assess data collection efficiency, including 1) the potential use of greater numbers of streamers, and 2) the application of a second shooting boat, which is a common industry practice that improves data collection efficiency and image quality as well.

As in other issues listed below, the survey design should aim to delineate the survey best suited to accurately image the expected targets. Only after that determination, should issues of feasibility, cost and schedule be considered in modifying survey design.

Transition zone data collection and processing

The Shoreline fault, a particularly important target of the survey, is overlain by shallow water and lies close to the shoreline (in the "transition zone"). PG&E's onshore surveys have identified steeply-dipping and complex structures of interest in this area. Gaining a high-quality image of these features in a transition zone environment will be challenging.

In this case shallow water receivers (nodes) are proposed along 5 irregularly spaced and oriented lines. While plots of common-midpoint coverage have been offered, there remain questions about whether this survey geometry can image the structures of interest.

Industry standard transition zone survey design would have modeled the seismic response of expected targets and adjusted survey geometry and data processing flow to assure image quality. The data processing flow is particularly important if data from the

transition zone survey are to be merged with onshore and offshore data in a single data volume.

Spatial sampling and shooting along strike

The IPRP has suggested eliminating the northernmost part of the survey (Box 3) because little new seismic hazard information was expected to be obtained (IPRP Report #3). In their response to the IPRP, PG&E disagrees, arguing that further survey of the Hosgri-San Simeon fault intersection could reveal important geologic detail.

Note that the survey direction of Box 3 (Attachment 2, Figure 1) is along the strike of the Hosgri-San Simeon faults. PG&E argues that this shooting orientation is necessary because shallow water near the shoreline constrains boat maneuvering. Strike line shooting is less preferred because the important geologic changes occur in the perpendicular (dip) direction (Attachment 2, pg 4).

The cross-line bin size of the HESS is nominally 25-37m. PG&E discusses in Attachment 2 that the onshore data show optimal group interval is closer to 10 m. Thus, the adequacy of the cross-line (dip direction) sampling in Box 3 (and other areas shooting along strike) should be reviewed.

As with other issues above, a comprehensive survey design approach would model the expected reflection response for the proposed survey geometry and processing sequence to confirm that features could be adequately imaged. This should be especially important in the northernmost area of the survey, where geologic details are to be asssessed. A second shooting boat and streamer track overlap could also benefit cross-line resolution and should be studied.

Data processing coordination

Industry standard survey design integrates data acquisition, processing and interpretation. PG&E has helpfully listed numerous potential processing contractors and steps that appear to be state of the art (Attachment 2).

Given that, 1) data processing flows are listed as “typical” (not currently determined), 2) the expected data processing flow is complex, and 3) multiple surveys comprise the overall CCCSIP, a clear sense of how different data processing steps are coordinated is important. In particular, PG&E should identify who has the responsibility and authority to evaluate processing quality and make processing flow decisions.