

September 14, 2015

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the matter of
Pacific Gas and Electric Company
Diablo Canyon Nuclear Power Plant
Units 1 and 2

Docket Nos. 50-275-LR
50-323-LR

**SAN LUIS OBISPO MOTHERS FOR PEACE'S
REPLY TO OPPOSITIONS TO MOTION TO FILE AMENDED CONTENTION C
(INADEQUATE CONSIDERATION OF SEISMIC RISK IN SAMA ANALYSIS
AS SUPPLEMENTED BY SHU-SAMA EVALUATION)**

I. INTRODUCTION

Pursuant to U.S. Nuclear Regulatory Commission (“NRC”) regulation 10 C.F.R. § 2.309(f)(h)(2) and the Atomic Safety and Licensing Board’s (“ASLB’s”) Order (Granting Unopposed Motion for Extension of Time) (Aug. 25, 2015), San Luis Obispo Mothers for Peace (“SLOMFP”) hereby replies to oppositions by Pacific Gas & Electric Co. (“PG&E”) and the U.S. Nuclear Regulatory Commission (“NRC”) Staff to SLOMFP’s Motion to File Amended Contention C (Inadequate Consideration of Seismic Risk in SAMA Analysis as Supplemented by SHU-SAMA Evaluation) (July 31, 2015) (“SLOMFP Motion”). Pacific Gas and Electric Company’s Answer Opposing Proposed Amended Contention C (Aug. 25, 2015) (“PG&E Response”); NRC Staff Answer to San Luis Obispo Mothers for Peace’s Motion to File Amended Contention C (Aug. 25, 2015) (“NRC Staff Response.”) Their arguments are without merit and therefore the contention should be admitted.

Amended Contention C is based to a significant extent on SLOMFP’s original Contention C, which was rejected by the ASLB in its August 6, 2015 Memorandum and Order (Denying Motions to File New Contentions) (“Memorandum and Order”). SLOMFP believes that the Memorandum and Order is based on clear legal and factual errors, and has petitioned the NRC

Commissioners for review. *See* San Luis Obispo Mothers for Peace’s Petition for Review of Memorandum and Order (Denying Motions to Admit New Contentions) (Sept. 14, 2015) (“Memorandum and Order”). Therefore, SLOMFP will not address issues that were decided in the Memorandum and Order.

II. DISCUSSION

A. Amended Contention C is Admissible.

Amended Contention C challenges the reasonableness of PG&E’s claim to have adequately considered, in its Severe Accident Mitigation Alternatives (“SAMA”) Analysis, post-Fukushima earthquake risk information for the Diablo Canyon nuclear power plant, collected by order of the NRC.¹ PG&E claims to have “assess[ed] the SAMA implications” of its post-Fukushima investigations and concluded that the new information “did not change the cost-benefit conclusions for the SAMAs considered for seismic event mitigation.” PG&E Response at 3. As demonstrated in Amended Contention C, PG&E lacks a reasonable basis for concluding that its post-Fukushima investigation yielded no information that would change the SAMA Analysis, because it failed to follow commonly-accepted methods for collecting and analyzing earthquake data. Thus, PG&E’s assertion that no additional seismic mitigation measures would be cost-effective lacks credibility.

¹ PG&E’s 2015 seismic hazards analysis consists of two documents: Pacific Gas and Electric Co., Seismic Hazard and Screening Report, Diablo Canyon Power Plant Units 1 and 2 (“SHS Report”), submitted by letter from Barry S. Allen, PG&E to NRC, re: Response to NRC Request for Information Pursuant to 10 CFR 50.54(f) Regarding the Seismic Aspects of Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident: Seismic Hazard and Screening Report (Mar. 11, 2015) (“SHS Report”); and PG&E’s Seismic Source Characterization for the Diablo Canyon Power Plant, San Luis Obispo County, California; report on the results of a SSHAC level 3 study (Rev. A, March 2015) (“SSC Report”).

Relying on the ASLB's Memorandum and Order, PG&E and the Staff argue that the SHS Report and SSC Report relate to the current licensing basis for the Diablo Canyon plant, and therefore are outside the scope of the NEPA review. PG&E Response at 5, NRC Staff Response at 6 (citing Memorandum and Order at 16). As discussed in SLOMFP's Petition for Review, the Board's ruling unlawfully limits NEPA by arbitrarily holding that NEPA does not apply to patently relevant information. In addition, circumstances have changed materially since April 2015, when SLOMFP submitted Contention C. At that time, PG&E had committed to addressing the results of the SHS and SSC in the SAMA Analysis, but had not done so. Now, PG&E has taken the step of affirmatively addressing the SHS Report and SSC Report in its SAMA Analysis. As PG&E stated in its Response:

To assess the SAMA implications [of the SHS and SSC Reports], PG&E incorporated the March 2015 updated seismic hazard into the Diablo Canyon PRA . . . and re-performed the evaluation. The PRA model changes had a small impact (and changed the cost-benefit conclusion for one fire event SAMA), but did not change the cost-benefit conclusions for the SAMAs considered for seismic event mitigation.

PG&E Response at 3.

At this point, having addressed the impact of the SHS and SSC Reports on the outcome of the SAMA Analysis, PG&E has now waived the defense of irrelevance. Moreover, it would be grossly unfair to the public if the NRC allowed PG&E to claim that its SAMA Analysis was rigorous enough to stand up against important post-Fukushima investigation results while at the same time precluding members of the public from challenging the validity of that claim on the ground that the NRC considered the information to be irrelevant.

In Section 2(c)(i) of Amended Contention C, SLOMFP asserts that PG&E has failed to account for nearby earthquakes. SLOMFP contends that PG&E has failed to collect data west of the Shoreline Fault that are needed in order to reasonably locate the fault, or to address the

uncertainty created by the lack of adequate data. This lack of adequate data or uncertainty analysis affects the reliability of PG&E's risk estimates in two important ways: first, it may result in the underestimate of the frequency of seismic events of various peak ground motion acceleration rates; and second, if the Shoreline Fault or another fault is located directly beneath the Diablo Canyon plant, an earthquake could cause surface fault rupture, large ground velocity, and large ground displacement as well as strong acceleration. SLOMFP Motion at 8-9.

PG&E claims that there is a "clear consensus" regarding the location of the Shoreline Fault, but this is a self-serving assertion because any consensus that exists is among PG&E's own consultants. And PG&E admits that its conclusion regarding the location of the Shoreline Fault is based only on "the *available* geologic mapping and imaging data" (PG&E Response at 8 n.26) (emphasis added). As Dr. Jackson asserts, PG&E's conclusion regarding the location of the Shoreline Fault may have been different if PG&E had collected data from the west side of the fault or evaluated the uncertainty raised by the lack of adequate data.

The NRC Staff argues that SLOMFP "does not acknowledge the more recent, detailed offshore mapping investigations that were used to accurately locate the Shoreline Fault for the current seismic hazard analyses." NRC Staff Response at 11 n.56 (citing PG&E Report on Seismic Source Characterization for the Diablo Canyon Power Plant, San Luis Obispo County, California at 5-17 (March 2015)). To the contrary, SLOMFP pointed out that PG&E did *not* collect offshore data to locate the Shoreline Fault, either for the SSC or SHS. SLOMFP Motion at 7-8. Moreover, in the context of the Hosgri Fault ("HFZ") (for which only onshore data were collected), the SSC affirmatively discusses the uncertainty that is caused by collection of only onshore data:

Three alternative geometries relative to the seismicity beneath the surface traces of the HFZ, as shown on Figure 7-10. These alternative geometries are intended to capture the following information:

- The range of uncertainty indicated by the scatter of hypocenters in the current catalogs.
- The stated uncertainties in hypocentral locations.
- The possibility that *systematic errors in hypocentral locations*² may exist within the current catalogs because of both uncertainty in the crustal velocity model and poor azimuthal coverage (the recording of these earthquakes come only from onshore).

SSC Report at 184 (emphasis added). The concern regarding systematic errors in hypocentral locations also applies to the Shoreline fault, but PGE has not considered alternate geometries of the Shoreline as it did for the Hosgri.

Similarly, the NRC Staff claims in footnotes 53 and 54 that the PG&E geophysical and geological studies locate the Shoreline fault accurately. As stated by the Staff: “Direct rupture of the main Shoreline Fault under the plant is of negligible concern because the fault is located offshore 600 meters from the plant’s power block.” *Id.*, n.53 (citing Research Information Letter (“RIL”) 12-01, Confirmatory Analysis of Seismic Hazard at [DCPP] from the Shoreline Fault Zone at 91 (Sept. 2012) (ADAMS Accession No. ML121230035) (“RIL-12-01”). In reality, as stated in the Shoreline Fault Report, the asserted location of the Shoreline Fault is a matter of “interpretation.”

The mapping based on high-resolution MBES bathymetric data clearly shows a sharp, well defined lineament that lies offshore and west of the DCPP. This lineament is *interpreted* as the surface expression of the Shoreline fault zone. Immediately offshore of DCPP, the Central segment of the Shoreline fault zone is located 300 m southwest of the intake structure and 600 m southwest of the power block (Figure 4-10).

² The hypocenter of an earthquake is its location, including its depth.

Id. at 4-23 (emphasis added). While the lineament shown by bathymetric data may be “sharp” and “well-defined,” the lineament is only a surficial feature: it does not necessarily follow that the Shoreline Fault has been located conclusively, or even to a reasonable degree.³

PG&E also claims that the possibility of earthquakes causing surface ruptures was “addressed as part of the *initial* licensing review.” SLOMFP Response at 8-9 (emphasis in original). *See also* NRC Staff Response at 10-11. But during the original licensing review, the existence of the Shoreline Fault was not known. And, as pointed out in Amended Contention C (and supported by Dr. Jackson), PG&E’s assumption that all earthquakes are on known faults is outdated, having been repudiated repeatedly by experience. SLOMFP Motion at 9-10.

PG&E further argues that it reasonably limited its consideration of earthquake risk to peak ground acceleration. PG&E Response at 9. As PG&E asserts, this is the standard for the Diablo Canyon licensing basis, NRC seismic design requirements, and the post-Fukushima studies ordered by the NRC. The additional parameters advocated by Dr. Jackson – *i.e.*, ground displacement, velocity, and shaking duration -- are, according to PG&E, “at (or beyond) the borders of accepted methodologies.” *Id.* at 10. *See also* NRC Staff Response at 7 (arguing that SLOMFP has shown only that other parameters are merely “preferred” and “possible.”) But, as set forth in Amended C, with the highly-qualified expert support of Dr. Jackson, the parameters and methods advocated by SLOMFP are accepted and well-established in the field of

³ Similarly, in footnote 54, the NRC Staff quotes a statement from the 2011 Shoreline Fault Report (at page 7-1) that: “The results of these investigations accurately document not only the location of the Shoreline fault zone 300 m west of the Intake structure, but also the absence of either primary or secondary faulting through the DCPD site area.” As discussed above, the location of the Shoreline Fault is a matter of interpretation of data, not an established fact. And SLOMFP has placed into dispute the question of whether the absence of surface indications of faulting necessarily means no fault exists. Earthquake ruptures can occur kilometers away from the nearest mapped fault; indeed, SLOMFP has listed a number of major earthquakes that occurred where there were no previously identified faults at all. SLOMFP Motion at 11.

seismology, and provide significant information about the nature and severity of earthquake risks that is not revealed by peak acceleration alone. In contrast, PG&E's methods are outdated and insufficient to predict earthquake risks. While peak acceleration remains an important parameter, it can no longer be considered to be the only relevant measure of the impact of an earthquake. The fact that additional parameters were not used in the past, or are not now used by PG&E, only establishes the existence of a dispute between the parties.

B. Amended Contention C is Timely.

PG&E and the Staff argue that Amended Contention C is not timely because it presents new information that could have been presented when original Contention C was filed. PG&E Response at 10-12, NRC Staff Response at 13-14. In the Memorandum and Order, however, the ASLB held that the original Contention C was premature, because:

[I]t alleged deficiencies in the 2015 seismic analysis that had not yet even been incorporated in PG&E's SAMA analysis. At that time, any complaints that SLOMFP might have had about a future, updated SAMA analysis were necessarily speculative.

Id., slip op. at 17.n.75. That decision is the law of the case. Under the terms of NRC admissibility regulations and the Memorandum and Order, all of Amended Contention C's assertions are timely because they were filed within 30 days of SLOMFP's receipt of the revised SAMA Analysis.⁴

⁴ SLOMFP also notes that while SLOMFP has provided additional explanation of the factual basis for Contention C in Amended Contention C, the statement of the contention itself has not changed since the filing of the original Contention C.

III. CONCLUSION

For the foregoing reasons, the ASLB should admit SLOMFP's Amended Contention C.

Respectfully submitted,

[Electronically signed by]

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**SAN LUIS OBISPO MOTHERS FOR PEACE
CERTIFICATE OF SERVICE**

I certify that on September 14, 2015, I posted on the NRC's Electronic Information Exchange SAN LUIS OBISPO MOTHERS FOR PEACE'S REPLY TO OPPOSITIONS TO MOTION TO FILE AMENDED CONTENTION C (INADEQUATE CONSIDERATION OF SEISMIC RISK IN SAMA ANALYSISAS SUPPLEMENTED BY SHU-SAMA EVALUATION).It is my understanding that as a result, the NRC Commissioners, Atomic Safety and Licensing Board, and parties to this proceeding were served.

Respectfully submitted,

Electronically signed by

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