BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA
Application of Pacific Gas and Electric)
Company to Recover the Costs Associated)
With Renewal of the Diablo Canyon Power)
Plant Operating Licenses **Application No. 10-01-022**

REBUTTAL TESTIMONY OF ROCHELLE BECKER REPRESENTING THE ALLIANCE FOR NUCLEAR RESPONSIBILITY, SIERRA CLUB, CALPIRG AND ENVIRONMENT CALIFORNIA REASEARCH AND POLICY CENTER (A4NR, ET AL)

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SUMMARY AND CONCLUSIONS

SCE and DRA have based their Testimony on selective citations from documents or evidence that does not provide the Commission with an adequate or complete evidentiary basis on which to fund PG&E's License Renewal Application. In addition, A4NR, agrees with TURN that the use of "very optimistic assumptions" by PG&E make it "…not unreasonable to posit that there are a number of circumstances in which the costs to ratepayers of relicensing Diablo Canyon would exceed the benefits."

- DRA relies on the NRC's denial to Stay PG&E's License Renewal as justification that the CPUC should also abrogate its authority. Historical evidence questions the Commission's reliance on both PG&E and the NRC without CPUC investigation.

- DRA fails to analyze consequences of the recent Atomic Safety and Licensing Board ruling regarding the inadequacy of seismic information in PG&E's NRC License Renewal Application.

- SCE and DRA incorrectly assert that study and resolution of issues surrounding the "Shoreline Fault" satisfy the seismic study requirements of the AB 1632 California Energy Commission assessment.

- DRA fails to analyze and acknowledge omissions and deficiencies in PG&E's Supporting Testimony regarding both lessons learned from the Kashiwazaki-Kariwa incident and other seismic matters as required in fulfillment of the AB 1632 study recommendations.

Absent PG&E's obligation to <u>fully</u> develop all AB 1632 assessment related issues which were specifically linked to the PG&E's rate case D.07-03-044, the Commission will not be able to adequately and appropriately exercise its authority to fund and oversee Diablo Canyon's license extension.

DRA begins its rebuttal by stating:

> Funding for PG&E's Diablo Canyon License Renewal Application Can Be Resolved Before the Seismic Studies Recommended by the CEC are Completed

DRA and SCE support their Testimony by quoting an NRC letter to the A4NR:

> [the] NRC has concluded that 'Diablo Canyon nuclear plant's design would withstand the effects of a potential new fault line off the California coast….a[t] this time, it is not necessary for the NRC staff to delay the reviews it recently began of the license renewal application submitted by Pacific Gas and Electric (PG&E) for DCPP."[1]

A4NR disagrees with the position of DRA and SCE for the following reasons:

It should be noted that footnote 2 in DRA's assertion is based on a "***Preliminary*** Deterministic Analysis of Seismic Hazard at Diablo Canyon Nuclear Power Plant from Newly Identified 'Shoreline Fault," (emphasis added on "preliminary"). The Nuclear Regulatory Commission has subsequently issued an "Action Plan For The Study Of The Shoreline Fault."[2] The "Action Plan" final section concludes with the following sentence:

> "The above results will be summarized in a report to be completed by 4th quarter 2010."

This summary of the Shoreline Report is not due until the end of the 4th quarter, 2010, therefore, the NRC record on this issue is incomplete and any conclusions drawn premature.

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[1] DRA Direct Testimony, Aug 18, 2010

[2] http://a4nr.org/?p=1150 Diablo Canyon Power Plant, Unit Nos. 1 and 2 - Shoreline Fault Study.

In addition, DRA's assertion from the NRC that:

"…[a]t this time, it is not necessary for the NRC staff to delay the reviews it recently began of the license renewal application submitted by Pacific Gas and Electric (PG&E) for DCPP" is drawn from a "Letter from NRC to Ms. Rochelle Becker/Alliance for Nuclear Responsibility, July 6, 2010." The conclusion drawn from that letter was subsequently questioned by the NRC's own Atomic Safety and Licensing Board (ASLB) in their decision of August 4, 2010.[3] The ASLB writes:

> "In conclusion, we rule that, as narrowed, EC-2 presents an admissible contention alleging that PG&E's ER fails to comply with 10 C.F.R. Part 51 because it fails to address the airborne environmental impacts of an SFP accident at DCNPP caused by an earthquake. *The fate of EC-2 therefore rests with the Commission, which must determine whether to grant a waiver, i.e., whether the new information and earthquake situation at Diablo Canyon constitute special circumstances warranting site-specific consideration of these risks under NEPA*. See 10 C.F.R. § 2.335(b), (d). [emphasis added]

Therefore, the question of whether the new seismic information at Diablo Canyon may be made an admissible part of NRC license renewal awaits further hearings and adjudication by the NRC, which may happen in later 2011. In addition, the full reading of the ASLB decision also raises the question of PG&E's needing to perform a *probabilistic* assessment of the new earthquake hazards instead of the deterministic study done in the document cited in footnote 2 of DRA. Until the NRC resolves the issues raised by the ASLB, any conclusions regarding seismic safety at Diablo Canyon are premature and fail to provide an adequate record upon which the CPUC can base a reasonable and just decision.

[3] http://a4nr.org/?attachment_id=1045 NRC ASLBP No. 10-890-01-LR-BD01

The DRA and SCE's reading of the CEC seismic study requirements per AB 1632, as noted above, deals only with the "Shoreline Fault." However, the actual language of the CEC AB 1632 seismic study includes far broader recommendations:

> "PG&E should assess the implications of a **San Simeon-type earthquake *beneath* Diablo Canyon**[6] [emphasis added] This assessment should include expected ground motions and vulnerability assessments for safety-related and non-safety related plant systems and components that might be sensitive to long-period motions in the near field of an earthquake rupture."[4]

Likewise, in a letter dated March 12, 2010, Tom Luster, Energy, Ocean Resources and Federal Consistency Division of the California Coastal Commission (CCC) notified Kimberly Green, NRC Project Manager—Diablo Canyon License Renewal as well as PG&E that:

> "…renewal of PG&E's NRC operating license for Diablo Canyon Power Plant is subject to federal consistency review by the Coastal Commission, pursuant to the requirements of the California Coastal Management Program (CCMP) and the associated federal regulations at 15 CFR 932 et seq. PG&E submitted a consistency certification to the Commission in December 2009; however, as detailed in the attached December 29, 2009 letter from Commission staff to PG&E, that certification is incomplete, in part due to the need for results from updated seismic studies."[5]

This letter further goes on to define the requirement of the studies specifically as:

> "…characterization of the Hosgri and Shoreline Faults, including fault geometry, seismicity, and sense of movement; the estimates of maximum credible

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[4] http://www.energy.ca.gov/2008publications/CEC-100-2008-009/CEC-100-2008-009-CMF.PDF
An Assessment of California's Nuclear Power Plants, Commission Report, adopted November 20, 2008.

[5] http://a4nr.org/?p=1156 Letter from California Coastal Commission to NRC regarding PG&E compliance with federal equivalency review, March 12, 2010

> earthquake (from a deterministic perspective) on these **and all other faults** [emphasis added]; the ground shaking expected at the site from such earthquakes; and the deep crustal structure beneath the plant (in particular an evaluation of the "Namson model" of thrust ramps beneath the plant)…and "as recommended by the Technical Advisory Team established pursuant to AB 1632, …the three-dimensional seismic data…collected and interpreted as part of this evaluation."

As of this writing, the above quoted requirements for federal consistency have not been met. Absent their full resolution, the CPUC does not have the satisfactory evidentiary record on which to base their judgment. As CPUC President Peevey wrote to PG&E CEO Peter Darbee on June 25, 2009:

> "PG&E's rate case, D. 07-03-044, specifically linked PG&E's license renewal feasibility study for Diablo Canyon to the AB 1632 assessment and PG&E is obligated to address the above itemized issues in its plant relicensing application. This commission will not be able to adequately and appropriately exercise its authority to fund and oversee Diablo Canyon's license extension without these AB 1632 issues being fully developed.

A further requirement of the AB 1632 seismic study recommendations states:

> • As part of their license renewal feasibility analyses for the CPUC, PG&E and SCE should summarize the lessons learned from the Kashiwazaki-Kariwa plant experience in response to the 2007 earthquake and any implications for Diablo Canyon and SONGS, including whether any additional pre-planning or mitigation could minimize plant outage times following a major seismic event."

Both DRA and SCE fail to address the adequacy of PG&E's response in their "Supplemental Testimony to the CPUC" in which PG&E states:

> The Institute of Nuclear Power Operations (INPO) summarized the lessons learned from this event in Significant Event Notification (SEN) No. 269, "Earthquake at Kashiwazaki-Kariwa". This report provides a summary of Diablo Canyon Power Plant's (DCPP's) evaluation of each INPO SEN lessons learned, including any recommended changes to plant components or procedures.[6]

The INPO report which provides the sole source for the PG&E evaluation is dated October 24, 2007, a scant 90 days after the earthquake at Kashiwazaki-Kariwa. Only two of the seven units have since been restored to service, and they remained off-line for more than two additional years. Thus, any lessons learned from this extended shutdown period—the examination and analysis—are undocumented and unexplored by PG&E. Further, in response to A4NR Data Request ANR-004-01, PG&E replies:

> c. There is no additional PG&E's and/or STARS review of "lessons learned" from the Kashiwazaki-Kariwa Nuclear Power Station" based on documentation and analysis collected *after* the issuance of the INPO SEN No. 269 in October 2007, and during the subsequent two-plus years extended outage that lasted until 2010, including:
> Utility, official agency and governmental reports, comments, analyses reviewed for "lessons learned" released in 2008
> Utility, official agency, and governmental reports, comments, analyses reviewed for "lessons learned" released in 2009
> Utility, official agency and governmental reports, comments, analyses reviewed for "lessons learned" released in 2010

A4NR's cursory search of the Internet revealed what DRA did not find: additional and more contemporary "lessons learned" were available that PG&E did not utilize. The

[6] Pacific Gas and Electric Company, Diablo Canyon Power Plant License Renewal, Supplemental Reports recommended by the California Energy Commission

International Agency on Atomic Energy (IAEA) issued three reports covering analysis of the Kashiwazaki-Kariwa earthquake, dated from 2008 and 2009.[7]

In addition, in December 2007, the Working Group on the *Review of in-house Fire Brigade Systems and Emergency Information/Public Communications Measures (WG)* was established under the Chuetsu-Oki Earthquake Nuclear Installations Investigation and Study Subcommittee. On February 13, 2009, this Japanese agency issued a study, "Measures of the Nuclear and Industrial Safety Agency concerning the Kashiwazaki-Kariwa Nuclear Power Station, affected by the Niigataken Chuetsu-oki Earthquake (Interim Report)"[8] that is more recent than the INPO report PG&E relied upon. PG&E had submitted a single document as its source for "lessons learned" (INPO) – and chose one issued a mere 90 days after the event.

DRA and SCE's failure to recognize these omissions emphasizes the incomplete nature of PG&E's review of "lessons learned" from the Kashiwazaki-Kariwa earthquake and prolonged outage. PG&E also did not include the lessons learned regarding the fiscal ramifications of the incident—for ratepayers and shareholders—which can be traced in TEPCO's annual shareholder reports.[9] Nor did they study or report on the lessons learned from the impacts of the extended outages to the local economy, jobs, tourism, and the costs of replacement power. As such, PG&E's efforts to satisfy this part of the AB 1632 recommendations are incomplete and provide a scant evidentiary basis for the CPUC to make an informed decision, particular as regards grid reliability and ratepayer impacts from the prolonged outages caused by seismic events.

In another recommendation of the CEC AB 1632 analysis, "The California Energy Commission recommended PG&E to evaluate whether there are any additional preplanning or mitigation steps that the utility could take for the power plant that could

[7] http://www.iaea.org/NewsCenter/News/2009/kashiwazaki290109.html

[8] http://www.nisa.meti.go.jp/genshiryoku/doukou/files/090213eiyaku.pdf

[9] http://www.tepco.co.jp/en/corpinfo/ir/tool/annual-e.html

minimize plant outage times following a major seismic event." On April 12, 2010, PG&E submitted ATTACHMENT 2.3--SEISMIC ASSESSMENT OF DIABLO CANYON POWER PLANT NON-SAFETY RELATED STRUCTURES, SYSTEMS, AND COMPONENTS, in which they reply to the concerns of the CEC. Their methodology is explained on page 15:

> The seismic fragility determination is based on statistics collected from post-earthquake investigations sponsored by Electric Power Research Institute (EPRI). The results are presented in Appendix 3. Using the EPRI database of historical performance of comparable earthquakes was a much better assessment methodology than code comparison as the UBC and CBC do not directly assess function and operability during and after an earthquake. Furthermore, the historical data from 1971 to present allows performance assessment of SSCs that were designed to older codes.

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DRA and SCE fail to notice that the earthquakes at power generation facilities identified in the EPRI Study (Appendix 3), while international in scope, includes only conventional power plants that are *not nuclear*. There are at least two current examples in Japan of earthquake related outages at *nuclear* plants that have extended longer than six months, and that could have been included in the study. First, as reported in Nuclear News Flashes, Thursday July 29, 2010:

> --CHUBU ELECTRIC POWER SAID IT WILL AGAIN DELAY RESTART OF HAMAOKA-5, this time by about two months, until the end of September. Hamaoka-4 and -5 in central Japan automatically shut down August 11, 2009, after the region was hit by an earthquake measuring 6.5 on the Richter scale. Hamaoka-3 was already shut for maintenance. Unit 4 resumed commercial operation in September and unit 3 in October. Chubu Electric said July 29 that it decided to extend Hamaoka-5's shutdown because it is still analyzing why the reactor underwent a maximum seismic acceleration of 426 Galileo units -- a measure of earthquake ground motion -- significantly higher than that

> experienced by other reactors. Chubu Electric originally planned to restart Hamaoka-5 in December but has repeatedly revised its target dates for returning the unit.

Also missing from the analysis was the Tohoku Electric Company Onagawa reactor (3 units) that tripped offline during a M7.2 earthquake on August 16, 2005, caused by ground motions exceeding the design basis for the plant. The first unit restored to service was in January 17, 2006, after five months, with other units following even later.

Although the above captioned incidents are not included in PG&E/EPRI's report (appendix 3), on page 25 it is stated:

> As indicated in the EPRI data base, most generating plants recovered from their earthquake within 24 hours. This does not mean that the plant site did not suffer damage; only that damage was sufficiently minor that repairs could be completed in less than a day or deferred until a scheduled maintenance. **The one notable exception** to this is the KKNPP plant in Japan which experienced a M6.8 earthquake in 2007 with peak ground accelerations exceeding 0.6 g. The station consists of seven 1200 MW Boiling Water Reactor plants and was shutdown for **more than a year after the 2007** earthquake. The plant site experienced significant ground subsidence and ground settlement; however, the power block buildings and equipment were relatively undamaged because of adequate foundation designs under the power block buildings. **The extended shutdown was due to regulatory issues and public concerns of earthquake design adequacy, not for plant damage. (emphasis added)**

First, this information is out of date and incomplete; only two of the seven reactor units at Kashiwazaki-Kariwa have been restored to service, both in early 2010, making the outage nearly two and a half years. Second, while the utilities would probably like to support PG&E/EPRI's final conclusion that it was "regulatory issues and public concerns," and not damage that kept the plant shut down, where nuclear power is

concerned, regulatory issues and public concerns *are of the utmost importance* and should not be dismissed—particularly by Division of *Ratepayer Advocates*—as if they were simply a nuisance.

In conclusion, A4NR finds DRA and SCE's recommendation that "funding for PG&E's license renewal application can be resolved before the seismic studies recommended by the CEC are completed" to be without a sufficient evidentiary support.

The historical record of failures by the appropriate regulatory agencies (AEC, NRC, CPUC) to adequately assess and analyze the seismic hazards of the Diablo Canyon site is voluminous. In the matter of CPUC culpability, the quickest path may be to start at the beginning, and then move to what should be an endpoint. In the CPUC's Decision 73278, Application 49051 (November 7, 1967), granting PG&E's request for a Certificate of Public Convenience and Necessity, it is written:

> Applicant's consulting geologist after making an extensive study of the site including the deep exploratory trenches, testified that the site has a good bedrock foundation with only insignificant faults that have shown no movement for at least 100,000 and possibly millions of years.
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> A consulting seismologist testified as to the maximum size earthquakes that can be expected to occur on active faults located some 20 to 50 miles from the site and a consulting structural design engineer testified and presented a study showing that the plant can be designed and constructed to operate safely during and after such earthquakes.[10]

Nearly twenty years later, on June 9, 1987, the California Legislature held a Joint Hearing of the Senate Energy and Public Utilities Committee and Assembly Utilities and Commerce Committee on the subject of "Diablo Canyon Nuclear Plant: Public Utilities

[10] Decision 73278, Application No. 49051 (November 7, 1967) PG&E Co. granted certificate to construct and operate a nuclear generating unit of approximately 1,060,000 Kilowatts at Diablo Canyon, San Luis Obispo County

Commission Staff Report recommending $4 billion disallowance." By this time, seismic underestimations and miscalculations had led to decades of delays and billions of dollars in cost overruns for the Diablo Canyon Nuclear Power Plant. It was the Public Staff Division of the CPUC—predecessor to the office of DRA—that was brought to testify before Chairman Herschel Rosenthal and this joint committee.[11] After hearing a recap of the seismic history regarding PG&E's late disclosure of discovery of the Hosgri fault by Shell geologists, that eventually required major and costly changes in the design and construction of the Diablo Canyon nuclear plant, Assemblyman Richard Longshore asks Edward O'Neil, CPUC staff council, the following:

> ASSEMBLMAN LONGSHORE: That being the case, wouldn't it also have been reasonable for the PUC to have had this same information?
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> MR. O'NEIL: The PUC has some information about the 1927 earthquake. It was disclosed on a seismicity map that was filed with the Public Utilities Commission in the 1960s. The fact of the matter is the PUC didn't appreciate the significance of the 1927 earthquake. The PUC also didn't investigate any oil company data. So to some degree, you know, we had an opportunity which we didn't take advantage of. But on the other hand, we didn't have geologists reviewing PG&E's application either. And we relied on their statement that the area was free of earthquake faults in the immediate vicinity and was in an area of low seismicity. We basically relied on the representations made by PG&E.
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> ASSEMBLYMAN LONGSHORE: Without any backup material?
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> MR. O'NEIL: In retrospect, that was a mistake.
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> ASSEMBLYMAN LONGSHORE: On PUC's part?

[11] California Legislature, Senate Committee on Energy and Public Utilities, Joint Hearing Subject: Diablo Canyon Public Utilities Commission Staff Report recommending $4 billion disallowance. June 9, 1987, page 11.

MR. O'NEIL: That's right.

CHAIRMAN ROSENTHAL: Well, let me just comment that the PG&E informed the NRC that its consultants considered offshore studies unnecessary.

ASSEMBLYMAN LONGSHORE: That's true, Mr. Chairman, but on the same token, what I'm really relying here is that I'm not questioning the $4.1 billion or the amount of the decision of the members as regards as to how this should be distributed. What I'm saying is that with that fore-knowledge, it would have been prudent and reasonable for the PUC to have denied their license until they had received proper backup information. That would have been reasonable…

Today, in 2010, the DRA at the CPUC finds themselves in a similar situation. Will it repeat the mistakes of the past and abrogate its responsibility, as Assemblywoman Gwen Moore reminded its predecessor, the Public Staff Division, when she said at the 1987 joint hearing:

ASSEMBLYWOMAN MOORE: …one of the reasons that we have state agencies or regulatory agencies are because we don't necessarily believe that those people that they're regulating are going to do all the things they're supposed to do because they're obligated; and of course, you know, for oversight and, you know, jurisdiction of those authorities, we look to those state agencies that have that, that power and that mission and that duty.[12]

There is a costly historical record regarding seismic miscalculations and assumptions at the Diablo Canyon Nuclear Power Plant. DRA and SCE assume that a reasonable and prudent decision regarding funding for the license renewal process can proceed absent complete and full development of seismic concerns. This position is not that of the California Energy Commission, the Coastal Commission or the mandate of the *current*

[12] California Legislature, Senate Committee on Energy and Public Utilities, Joint Hearing Subject: Diablo Canyon Public Utilities Commission Staff Report recommending $4 billion disallowance. June 9, 1987, page 7.

California Legislature and may demonstrate—once again to the detriment of ratepayers statewide—the adage that those who ignore the past are condemned to repeat it. This is a mistake the state of California can ill afford to make again.

Respectfully submitted,
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