BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

FRIENDS OF THE EARTH,	)	
	)	
Complainant,	)	
	)	**Docket No. _____**
v.	)	
	)	
	)	**COMPLAINT/PETITION**
PACIFIC GAS AND ELECTRIC COMPANY (U 39 E),	)	
	)	
Defendant.	)	
_____	)	

COMPLAINT AGAINST PACIFIC GAS AND ELECTRIC COMPANY (U 39 E), OR, IN THE ALTERNATIVE, PETITION FOR THE COMMISSION TO INITIATE AN INVESTIGATION OR RULEMAKING, REGARDING ITS ADMINISTRATION OF THE DIABLO CANYON NUCLEAR POWER PLANT

Laurence G. Chaset
Keyes, Fox & Wiedman LLP
436 14th Street, Suite 1305
Oakland, CA 94612
Phone: 510.314.8386
Fax: 510.225.3848
lchaset@keyesandfox.com

Counsel to Friends of the Earth

September 30, 2014

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

FRIENDS OF THE EARTH,	)	
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I. INTRODUCTION

Pursuant to California Public Utilities Code[1] Section 1702 and Rule 4.1 of the Commission's Rules of Practice and Procedure, Friends of the Earth ("FOE" or "Complainant") files this complaint concerning Pacific Gas and Electric Company's ("PG&E") administration of the Diablo Canyon Nuclear Power Plant ("Diablo"). In the alternative, FOE petitions the Commission pursuant to Public Utilities Code Section

[1] All section references herein are to the Cal. Pub. Utils. Code unless otherwise noted.

1708.5 and Rule 6.3 of the Commission's Rules of Practice and Procedure to initiate an Investigation or Rulemaking regarding the same.

Complainant/Petitioner offers to present persuasive evidence that the current pricing of Diablo is neither just nor reasonable and is not in conformity with California policy, and, further, that the future operation of Diablo is uneconomic.

The central purpose of this Complaint/Petition is to initiate a proceeding that will focus on the establishment of a Commission-approved plan for the orderly phase-in of an array of preferred resources that would replace the power from Diablo without triggering the crisis-like atmosphere of last-minute scrambling for replacement power that surrounded the unplanned shutdown of the San Onofre Nuclear Generating Station. The proceeding that Complainant/Petitioner urges the Commission to initiate will address the two issues that, taken together, constitute the core focus of the work of this Commission impacting the electric power sector: (1) the delivery of a reliable power supply to consumers based on the Commission-approved loading order (2) at the lowest reasonable cost to consumers. A fuller explanation of the basis of this Complaint/Petition is set forth in Section III below.

Complainant/Petitioner therefore asks that the Commission initiate an on-the-record proceeding to determine these issues. Complainant/Petitioner further asks that PG&E be directed: (1) effective January 1, 2017, when the rates approved by the Commission in D.14-08-032 (PG&E's 2014-2016 rate case) expire, to begin selling all of the power generated by Diablo in the competitive wholesale market operated by the

California Independent System Operator ("CAISO"); (2) by June 30, 2015, to submit a list of sufficient competitively bid preferred resources that can completely replace the needed power generated by Diablo by the earliest possible date, but in no event later than June 30, 2018; and (3) to determine that costs relating to the possible re-licensing of Diablo by the U.S. Nuclear Regulatory Commission ("NRC") are not recoverable operating expenses unless explicitly authorized by this Commission.

II. FOE's INTEREST IN THIS PROCEEDING

FOE is a U.S. Internal Revenue Code §501(c)(3) non-profit organization that has worked for over forty years to educate the public about the costs and risks of nuclear power.

FOE uses technical and policy expertise to assist decision makers with respect to nuclear power. Most recently, FOE presented argument and evidence before this Commission in Docket No. I.12-10-013[2] that influenced Southern California Edison's decision to close the San Onofre nuclear plant and associated rate relief for the customers of Southern California Edison. In that investigation, FOE made significant contributions focusing on the uneconomic future of that plant.

Approximately 6,200 members of FOE live in California. Many of these FOE members live within the service territory of PG&E, and, as PG&E ratepayers, these FOE members are obligated to pay for the energy provided by Diablo. These FOE members

[2] *Order Instituting Investigation on the Commission's Own Motion into the Rates, Operations, Practices, Services and Facilities of Southern California Edison Company and San Diego Gas and Electric Company Associated with the San Onofre Nuclear Generating Station Units 2 and 3.*

are directly and adversely impacted by the uneconomic operation and the currently guaranteed recovery of all of Diablo's costs in rates, and would be directly affected by rates that included costs associated with the continued operation of that facility and the continued full recovery of its ever-increasing costs in rates. Such continued operation will require enormous expenditures by PG&E to enable Diablo to meet environmental, safety and other new regulatory requirements. The recovery through rates of these future expenditures will cause the cost of the power generated by Diablo -- and borne directly by ratepayers -- to increase dramatically.

Moreover, to the extent that PG&E continues to be guaranteed payback of, and profit on, its full costs of operating Diablo through rates, FOE's members who live within the service territory of PG&E, as well as all of PG&E's other ratepayers, will be forced to pay the dramatically increased costs of the power generated by Diablo, even though there are other, more efficient and environmentally preferable sources of power that will cost considerably less than the increasingly expensive power generated by Diablo.

III. FACTS IN SUPPORT OF THIS COMPLAINT

A. The President Peevey Letter

The vast scope and exorbitant nature of the added future costs of operating Diablo Canyon were recognized in the February 19, 2014 letter to PG&E from CPUC President Michael Peevey (copy attached as Attachment A). Complainant/Petitioner respectfully requests that PG&E be given a deadline of December 1, 2014 for complying with President Peevey's request, and that PG&E's reply to President Peevey's letter be placed

on the record in this Complaint/Petition proceeding as well as in all other appropriate Commission dockets.

President Peevey's February 19, 2014 letter recognizes that PG&E is likely to be required to spend very large sums of money to alleviate safety and environmental requirements in order to keep Diablo operating for the foreseeable future. The information that President Peevey requested from the utility will provide PG&E's version of those costs. However, transparency and fairness to consumers requires that the public have an opportunity to present evidence and contest PG&E's estimated costs, which, historically, have a record of being much lower than the amount that PG&E has actually spent on this plant. The initiation of an investigation/rulemaking based on this Complaint/Petition will provide such an opportunity.

B. The Problematic History of PG&E's Recovery of the Costs of Diablo

The history of PG&E's recovery of the costs associated with the construction of Diablo involves a succession of major revisions, approved by this Commission, to the manner in which PG&E was allowed to charge ratepayers for the power provided by the plant. Each of these changes ultimately served the interests of PG&E and its shareholders -- to the long-term detriment of ratepayers -- such that a strong case can be made that PG&E has, over the 30 years that the plant has been in operation, significantly over-collected its costs associated with the plant to the serious detriment of its ratepayers and the unfair enrichment of its shareholders.

There were several billions of dollars in cost overruns associated with the initial

construction of the plant, and there was an extended dispute between PG&E and ratepayer advocates (led admirably by the Commission's Office of Ratepayer Advocates ("ORA")) over how much of these cost overruns should be disallowed. After several years of fighting over the extent of these disallowances, the parties reached a settlement (which was authorized by legislation at the time) whereby PG&E would not recover the costs of the plant under then-standard cost-of-service ratemaking principles. Rather, PG&E would be allowed to charge ratepayers, under a power purchase agreement, for the actual power generated by Diablo on a specified cents-per-kilowatt-hour basis.[3] This settlement was approved in 1988 in Commission Decision D.88-12-083.

However, a curious feature of this settlement was that the 7.8 cents per kWh that PG&E was allowed to collect was predicated on the assumption that Diablo would operate at a capacity factor of 58%,[4] even though in its early years of operation, a nuclear power plant could, and should, be reasonably expected to operate at a capacity factor in excess of 70%. Indeed, in those early years, Diablo did operate at a capacity factor much higher than 58%, such that the revenues that it actually collected from ratepayers when it was operating under the settlement provided PG&E with a substantial windfall.

Thus, the terms of this 1988 settlement were highly favorable to PG&E. After the settlement was adopted, ratepayer advocate groups unsuccessfully sought to modify the

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[3] The initial charge allowed under this settlement was 7.8 cents per kWh, rising to 11.9 cents per kWh by 1994. *See*, 1988 Cal. PUC LEXIS 886, at [*204]. With subsequent inflation adjustments allowed by the settlement after 1994, charges allowed under the settlement for the power from Diablo would have reached 22 cents per kWh, or higher, by 2014. It should be noted that in 1988, 7.8 cents per kWh was substantially higher than what would have been a comparable rate for energy delivered from any of PG&E's other power plants that were in operation at the time.

[4] *See*, 1988 Cal. PUC LEXIS 886, at [*257].

settlement. Over six years later, PG&E and a number of the settling parties did agree to a modification of the settlement to revise the pricing arrangement so as to cap the total price for power from Diablo at 9 cents/kWh, effective January 1, 2000. The Commission approved this settlement in D.95-05-043.

The next unfair advantage that PG&E received in connection with its operation of Diablo was in 1997 when California's electric system was being restructured. At that time, the Commission agreed, as part of the overall electric system restructuring plan, to allow PG&E to recover in rates through accelerated depreciation the full amount of its un-depreciated plant for Diablo over a five-year period. As part of this effort, the Commission required PG&E to propose ratemaking treatment for Diablo that would enable the company to recover the plant's sunk costs such that the plant's output could be priced at market rates by the end of 2003. In D.97-05-088, the Commission determined what those sunk costs were, and imposed an "incremental cost incentive price" for power delivered from the plant for a five year period, escalating from 3.6 cents/kWh in 1997 to 4.3 cents/ kWh in 2001.

Following the California electricity crisis in 2000-2001, the Commission decided to regulate Diablo Canyon on a cost-of-service basis.[5] There was concern that if PG&E was no longer able to earn any profits from the operation of Diablo under cost-of-service rates (which would have been the case once the plant was fully depreciated), PG&E would simply shut the plant down. Accordingly, the Commission determined to re-

[5] *See*, D.14-08-032, fn 140, at page 548.

regulate Diablo as a cost-of-service plan with an artificially inflated rate base. This gave PG&E yet another windfall.

However, a fundamental flaw in the Commission's determination to allow PG&E to return to a cost-of-service arrangement was that there was no independent Commission determination of what was, at the time, the actual amount of PG&E's un-depreciated net plant at Diablo. Rather, the Commission simply accepted PG&E's characterization of what this figure was. This is a particularly important issue, because PG&E earns a return on equity (*i.e.*, its profit) based on the total amount of its un-depreciated net plant in service. To the extent that PG&E had received a windfall when it was operating under the power purchase arrangement that was memorialized in D.88-12-083, an audit of its books assuming that cost-of-service rates had been in effect during that period would have shown that PG&E's net un-depreciated plant should have been valued at a considerably lower figure than what PG&E asked for -- and the Commission approved -- in D.97-05-088.

It is obvious from the foregoing recitation that over the history of Diablo's active service life, PG&E has unjustly benefitted from a series of highly favorable regulatory decisions that have allowed it to collect dramatically more revenues (likely to be in the hundreds of millions of dollars) from the operation of the plant that it otherwise should have. Indeed, there would be a certain poetic justice for the Commission to determine now that going forward, the power from Diablo Canyon should be sold in the CAISO market, because it was, after all, the runaway costs of Diablo that was a major factor in

motivating the CPUC to seek to deregulate the power generation component of the electricity system in 1995 by the creation of a wholesale market, and the State of California to enact AB 1890 in 1996.

A key policy underlying this move to electricity markets was that such markets would hopefully assure that consumers would no longer have to write "blank checks" to the utilities for the production of power from overpriced power stations, because markets would provide the discipline needed to keep such costs in check. The Declaration of Peter Bradford (attached hereto as Attachment B) urges, as a matter of sound public policy, that the power from Diablo should be sold in the CAISO wholesale market.

C. Diablo Is Now, or Soon Will Be, Uneconomic

Complainant/Petitioner will provide testimony that proves that by June 30, 2018, further operation of Diablo will be uneconomic. In addition, Complainant/Petitioner will present evidence to prove that the future environmental and safety-related costs that PG&E will incur in order to keep Diablo operating over a longer term will render the plant dreadfully uneconomic.

Complainant/Petitioner will also demonstrate that even if PG&E does not have to make these investments, the cost of preferred alternative resources is such that between now and 2024, it will be *cheaper* for consumers if PG&E meets its ratepayers' needs from alternative resources than to keep operating Diablo under an outmoded cost-of-service ratemaking approach. The Declaration of Steven Moss (attached hereto as Attachment C) provides an overview of the case in this regard that

Complainant/Petitioner proposes to make in the proceeding that Complainant/Petitioner urges the Commission to initiate as a result of the filing of this Complaint/Petition.

Complainant/Petitioner also directs the Commission's attention to the record in Commission Docket No. A10-01-022, filed on January 29, 2010, *Application of Pacific Gas and Electric Company to Recover the Costs Associated with Renewal of the Diablo Canyon Power Plant Operating Licenses*, (hereafter, "Relicensing Costs Application"), which provides ample support for the proposition that PG&E has grossly underestimated the costs of operating Diablo in the future and has seriously overestimated the costs of alternative, especially renewable, resources that could replace the energy that Diablo currently provides. In fact, serious cost overruns have been an essential element of the history of this plant. According to PG&E'S original cost estimates, Diablo Canyon Unit 1 was supposed to cost $188 million, and Unit 2 $192 million. However, construction costs escalated astronomically over the years so that by the time the two reactors began operation in 1985 and 1986 respectively, the combined cost of the plant had ballooned to $5.52 billion.[6]

In the Relicensing Cost Application, PG&E estimated that total additional capital investment in the plant between 2024 and 2044, assuming it was granted a 20-year license extension, would be approximately $3 billion in nominal dollars.[7] However, even

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6 *See*, "The Diablo Canyon Nuclear Power Plant, a 48-Year Odyssey," Leon Koenen, March 25, 2011, KCET online news story, http://www.kcet.org/updaily/socal_focus/environment/31573-diablo-canyon-nuclear-power-plant.html

7 *See*, Table 3.5, at p. 3-10 of Volume I of the Testimony accompanying the Relicensing Cost Application.

this $3 billion estimate is seriously understated, in that it fails to incorporate the multi-billion dollar estimates of the costs associated with compliance with the requirements of the State Water Resources Control Board ("SWRCB") policy that will restrict the use of "once-through" cooling water by coastal power plants.[8] With the shutdown in 2012 of the San Onofre Nuclear Generating Station, Diablo now causes 80% of the serious harm to marine life from all of the coastal power plants in California as a result of its continuing reliance on once-through cooling.[9] An SWRCB decision on this issue is scheduled for December 2014.

Another compelling reason for the Commission to promptly initiate a proceeding based on this Complaint/Petition is the continuing arrogance of PG&E's attitude toward the regulatory requirements that are imposed on it. In the Rebuttal Testimony that it served on September 17, 2010 in the Relicensing Cost Application, PG&E had the temerity to state:

> "PG&E does not intend to comply with the SWRCB Once-Through Cooling policy by installing alternative cooling technology at Diablo Canyon."[10]

In addition to spending large sums on once-through cooling upgrades, PG&E will

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8 This policy became effective on October 1, 2010 when the California Environmental Quality Act Notice of Decision was submitted to the Secretary of Resources. *See*, http://www.waterboards.ca.gov/water_issues/programs/ocean/cwa316/policy.shtml.

9 PG&E itself has estimated that it will have to spend something in the range of $10 billion to replace its current once-through cooling system with a complying system. *See*, *Independent Third-Party Final Technologies Assessment for the Alternative Cooling Technologies or Modifications to the Existing Once-Through Cooling System for Diablo Canyon Power Plant*, Report No. 25762-000-30R-G01G-00010, prepared by Bechtel Power Corporation for PG&E and the State Water Resources Control Board Nuclear Review Committee, Sept. 20, 2013, p. 177.

10 Relicensing Cost Application, PG&E Rebuttal Testimony, p. 7.

also be subject to major new safety-related upgrades in response to the Fukushima disaster three years ago in Japan. Since Diablo is located on the California coast very close to active earthquake faults, the costs to PG&E of retrofitting Diablo to meet these post-Fukushima seismic and other safety requirements are also likely to be very costly .

California enacted a market-based, competitive wholesale power system nearly 20 years ago, in large part because of the cost overruns exemplified by the history of Diablo Canyon. The best test as to whether PG&E should be allowed to continue to operate Diablo through the end of its current license term or beyond is whether it could compete economically in the wholesale market. Complainant/Petitioner's testimony will demonstrate that Diablo will be uneconomic in the wholesale market well before its current license expires, and certainly by June 30, 2018.

Given all these considerations, this Commission should promptly initiate a proceeding, based on the filing of this Complaint/Petition, to approve an orderly plan under which there will be a phased-in replacement of Diablo with preferred resources as promptly as possible (starting now) in a manner that will assure the reliability of power supply and provide long-term economic benefits to ratepayers.

D. The Replacement of Diablo with Preferred Resources

(1) Delivery of Reliable Power to Consumers

The lessons learned in 2013 from San Onofre, Crystal River, Kewaunee and Vermont Yankee are that nuclear power plants are subject to shutdown at any time. There accordingly needs to be a “Plan B” approved by this Commission, so that if Diablo

unexpectedly breaks down or is found to be permanently uneconomic for future operation, clean, carbon-free replacement power, as prioritized in the Commission's Loading Order, will be readily available. Such replacement power should be brought on line as promptly as possible. Such a planned transition will ultimately enhance overall system reliability.

Diablo, unlike San Onofre, does not provide any needed local generation capacity. Thus, Commission approval of a Plan B will eliminate any false or over-stated concerns about reliability that might otherwise cloud the issue of costs to consumers.

(2) Lowest Cost to Consumers

The proceeding herein proposed is necessary to provide consumers with the earliest possible relief from overcharges resulting from the continued operation of Diablo. In a very real way, this proceeding has already been initiated by President Peevey's request that PG&E submit its estimate of the costs of the future operation of Diablo and its alternatives. The proceeding that Complainant/Petitioner urges the Commission to initiate will provide a proper forum for the review of, and a hearing on, these cost estimates..

Complainant/Petitioner accordingly proposes replacement of the power currently generated by Diablo to be approved by the Commission in this proceeding as needed. In this way, consumer overcharges can be minimized and overall system reliability can be enhanced.

IV. RELIEF REQUESTED

The Commission should immediately initiate a proceeding directing PG&E to submit a list by June 30, 2015 of sufficient competitively bid preferred resources that can be brought on line to fully replace the power currently generated by Diablo by the earliest possible date. It is well-established by recent history that large amounts of solar and wind resources can be procured, installed and made operational within short order. Moreover, PG&E's Helms Project is available for storage of the new free-fuel renewable energy resources that PG&E will procure. Demand response and energy efficiency resources are even less time-consuming to acquire.

This proposed June 30, 2015 deadline offers PG&E ample time to conduct a competitive procurement to acquire the preferred resources needed to allow for the orderly shutdown of both Diablo units within four years or sooner. Hence, the request in this Complaint/Petition that PG&E begin immediately to make plans for replacing the power currently provided by Diablo.

In this regard, it is useful to learn from the recent experience at San Onofre where planning for replacement power did not begin until after the plant was closed down. There was no “Plan B”. It is therefore essential that an identification of the needed amount and type of replacement power be an integral part of the proceeding.

For the reasons stated above, Complainant/Petitioner respectfully requests the Commission to grant the relief requested in this Complaint/Petition, and specifically:

1. To direct PG&E, by June 30, 2015, to submit a list of sufficient competitively

bid preferred resources that can completely replace its customers' needs for electric power in the complete absence of Diablo by the earliest possible date;

2. To order PG&E, effective January 1, 2017 (when the rates approved by the Commission in D.14-08-032 expire), to commence marketing all power generated by Diablo in the existing wholesale markets of the CAISO;
3. In the alternative, if the Commission determines to maintain Diablo on cost-of-service ratemaking after January 1, 2017, to find, after a hearing, that the continuing and future operation of Diablo beyond June 30, 2018, is and will be uneconomic, and to order PG&E to complete, on the fastest possible schedule, the actual procurement of the identified competitively bid preferred resources to replace Diablo in a phased manner, to be completed by the earliest possible date, but in no event later than June 30, 2018;
4. To determine that costs relating to the possible re-licensing of Diablo by the NRC are not recoverable operating expenses unless explicitly authorized by this Commission; and
5. To take all other necessary and appropriate actions related thereto.

V. CONTACT INFORMATION

All pleadings, correspondence, and other communications concerning this complaint should be directed to Complainant FOE's attorney and principals as follows:

Laurence G. Chaset
Keyes, Fox & Wiedman LLP
436 14th Street, Suite 1305
Oakland, CA 94612
Phone: 510.314.8386

Fax: 510.225.3848
lchaset@keyesandfox.com

Damon Moglen
Senior Strategic Advisor, Climate and Energy Project
Friends of the Earth
1100 15th Street NW, 11th Floor
Washington, DC 20005
Office: 202-222-0708
DMoglen@foe.org

S. David Freeman
c/o Friends of the Earth
1100 15th Street NW, 11th Floor
Washington, DC 20005
Cell: 310-902-2147
greencowboysdf@gmail.com

The defendant in this Complaint/Petition is:

Pacific Gas and Electric Company (U 39 E)
77 Beale Street
San Francisco, CA 94015

VI. SCOPING INFORMATION AND PROPOSED SCHEDULE

Pursuant to Rule 4.2 of the Commission's Rules of Practice and Procedure, Complainant FOE requests that this matter be categorized as a ratemaking proceeding and requests an evidentiary hearing to present evidence and contest the content of Defendant PG&E's answer.

Complainant/Petitioner urges that the issues raised in this Complaint/Petition be given focused attention, such that the resolution of this Complaint/Petition would best be addressed in a new proceeding. Those issues are:

- whether PG&E should be required to market all of the power generated by

Diablo in the existing markets of the CAISO;

- whether and when the operation of Diablo on a cost-of-service basis is, or will become, uneconomic; and
- the identification and approval of appropriate preferred resources that can completely replace Diablo's generation by the earliest possible date, but in no event later than June 30, 2018.

In such event, all needed discovery can take place, hearings can be held, the issues raised in those hearings can be briefed, and the Commission should be able to arrive at a final decision in this case well within the 18 (eighteen) months allowed for ratesetting proceedings by Rule 4.2(a) of the Commission's Rules of Practice and Procedure.

The replacement of Diablo requested in this Complaint/Petition will necessarily be impacted by PG&E's ability to economically procure alternative preferred resources that can replace the generation currently provided by Diablo. Since Diablo is not needed for local capacity anywhere in the state, it should be relatively easy for PG&E to identify and procure such resources and to acquire them at least cost. Hence, in any hearings that are scheduled in response to this Complaint/Petition, PG&E must be directed to undertake its very best efforts to develop and present the most economic of the preferred resource projects with which it already has executed power purchase agreements ("PPAs"), as well as to acquire the additional preferred resources that will be necessary to economically replace the generation currently provided by Diablo.

A proposed schedule for resolving the Complaint/Petition within 18 months, independently of addressing the issues raised herein within the context of the

Commission's LTTP proceeding, would be as follows:

- Prehearing Conference: 30 to 45 days from the date of filing of this Complaint/Petition.
- PG&E submission of all cost estimates requested in President Peevey's letter of February 19, 2014: by December 1, 2014.
- Parties' comments and alternative estimates of such costs: by February 15, 2015.
- Hearings: to commence 180 days from the date of Prehearing Conference and to be completed within 30 days thereafter.
- PG&E submission of a list of competitively bid preferred resources that can meet its customers' needs for electric power in the absence of Diablo: June 30, 2015.
- Completion of briefing: 10 months from the date of filing of the Complaint/Petition.
- Decision: within 15 months of the date of filing of the Complaint/Petition.

Dated: September 30, 2014

Respectfully submitted,

By: _____

Laurence G. Chaset
Keyes, Fox & Wiedman LLP
436 14th Street, Suite 1305
Oakland, CA 94612
Phone: 510.314.8386
Fax: 510.225.3848
lchaset@keyesandfox.com

Counsel to Friends of the Earth

VERIFICATION

I, Laurence G. Chaset, declare under penalty of perjury as follows:

I am an attorney licensed to practice before the courts of the State of California. I represent Complainant/Petitioner, Friends of the Earth ("FOE"), in this matter before the California Public Utilities Commission and am authorized to make this verification on its behalf.

I have read the foregoing Complaint/Petition and know the contents thereof, and declare the contents of the document are true to my own knowledge, except for those matters that are stated on information or belief, and as to those matters I believe them to be true.

Executed this 30th day of September 2014, at Oakland, California.

/s/ *Laurence G. Chaset*

Laurence G. Chaset

ATTACHMENT A

STATE OF CALIFORNIA
Governor

Edmund G. Brown Jr.,

PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3298

February 19, 2014

Mr. Christopher Johns
President
Pacific Gas and Electric Company
77 Beale Street
San Francisco, CA 94105

Re: Diablo Canyon License Extension

Dear Mr. Johns:

On June 25, 2009 I sent a letter to Peter Darbee, then CEO-President of Pacific Gas and Electric Company (PG&E) regarding the need to ensure that we thoroughly evaluate the overall economic and environmental costs and benefits of a license extension for Diablo Canyon nuclear power plant given the facility's geographic location in a seismic hazard zone.

As a follow on to that letter, I would like to inform PG&E that when we review PG&E's application at the CPUC for ratepayer funding for the license extension of DCPP, we need to ensure plant reliability, as well as thoroughly evaluate the overall economic and environmental costs and benefits of a license extension for Diablo Canyon, especially in light of the plant's geographic location regarding seismic hazards and vulnerability assessments. Accordingly, PG&E must submit a cost effectiveness study for license extension of Diablo Canyon Power Plant (DCPP) prior to seeking any requests for ratepayer funding from the California Public Utilities Commission (CPUC). As part of this evaluation, PG&E should report on its progress in implementing the recommendations contained in the California Energy Commission's (CEC) 2013 Integrated Energy Policy Report (IEPR) issued January 2014, as related to Diablo Canyon.

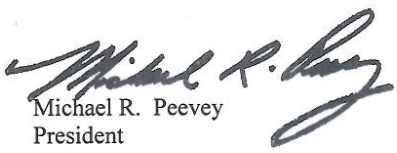
PG&E's study should address the following issues, which would provide additional information to us to ensure plant reliability for extended operation of DCPP:

1. Report on the major findings and conclusions from DCPP's enhanced seismic studies including the 2-D and 3-D surveys in the vicinity of Diablo Canyon and report on the implications of these findings and conclusions for the long-term seismic vulnerability and reliability of the plant.
2. Summarize the lessons learned from the Fukushima event and discuss any implications that PG&E evaluated that could affect Diablo Canyon, including potential expansion and maintenance of emergency planning zones.
3. Re-assess the adequacy of access roads to DCPP and surrounding roadways for allowing emergency personnel to reach the plant and for local communities and plant workers to evacuate. This assessment needs to consider today's local population and not rely on the past situation when the plant was constructed.

4. Assess the adequacy of liability coverage in the event of a major event or potential release of large off-site release of radioactive materials.
5. Conduct a detailed study of the local economic impacts that would result from a shutdown of the plant and compare that impact with alternative uses of the Diablo Canyon site.
6. Assess low and high-level waste disposal costs for waste generated through a 20-year plant license extension, including the low and high-level waste disposal costs for any major capital projects that might be required during this period, such as replacement of steam generators or high pressure turbines. In addition, include PG&E's plans and associated costs for storage and disposal of low-level waste and spent nuclear fuel through decommissioning of DCPP.
7. Explore alternative spent fuel management schemes to expeditiously transfer spent nuclear fuel assemblies from the wet spent fuel pool to dry casks in the Independent Spent Fuel Storage Installation (ISFSI).
8. Provide an evaluation of the structural integrity of the concrete and reinforcing steel in the spent fuel pools, including any increased vulnerability to damage resulting from a seismic event, and an assessment of any radiological impacts from any prior leakages.
9. Study alternative power generation options to quantify the reliability, economic and environmental impacts of replacement power options.
10. Address the potential costs associated with mitigation or alternatives to the use of once-through-cooling at DCPP for compliance with requirements imposed by the California Water Resources Control Board.
11. Include PG&E's responses to nuclear and DCPP-related issues and any actions taken as recommended by the CEC in their IEPRs.

I would like to assure you that the safety at nuclear power plants in the state is of paramount concern to the CPUC. This Commission is obligated to address the above itemized issues related to any proposals for DCPP's license extension. This Commission would not be able to adequately and appropriately exercise its authority to fund and oversee DCPP's license extension without these issues being fully developed. Therefore, it is imperative that these issued be addressed by PG&E in a study submitted to us prior to submittal of any application seeking ratepayer funding.

Sincerely,



Michael R. Peevey
President

cc: Commissioner Catherine J.K. Sandoval
Commissioner Michael Picker
Commissioner Michel Florio
Commissioner Carla Peterman
Executive Director Paul Clanon

ATTACHMENT B

Declaration of Peter A. Bradford

I, Peter A. Bradford, declare as follows:

1. I am the CEO of Bradford Brook Associates, a consulting firm specializing in energy, water and telecommunications regulatory policy. My regulatory experience includes serving as chair of the New York Public Service Commission (1987-95), chair and commissioner of the Maine Public Utilities Commission (1971-1977 and 1982-1987) and commissioner of the U.S. Nuclear Regulatory Commission (1977-1982). I also served briefly as Maine's Public Advocate in 1982 and was President of the National Association of Regulatory Utility Commissioners in 1987.

2. I am an Adjunct Professor at Vermont Law School, where I teach a course entitled Nuclear Power and Public Policy. I also have taught or co-taught courses entitled "The Law of Electric Restructuring" at Vermont Law School and "Energy Policy and Environmental Protection" at the Yale School of Forestry and Environmental Studies. I am a graduate of Yale University and Yale Law School.

3. During my terms on the New York and Maine utility commissions, these commissions implemented competitive power procurement, starting with the Public Utilities Regulatory Policy Act of 1987 and related state laws and continuing through the early stages of electric utility restructuring in the 1990s. The New York Public Service Commission published its initial electric restructuring principles in December, 1994.

4. While in New York, I served also on the New York State Energy Planning Board, the Board of the New York State Energy Research and Development

Administration, the New York Environmental Board and as chair of the New York State Energy Facilities Siting Board. These bodies had extensive responsibility for the reliability and affordability of New York's power supply, which was at all times adequate during my term.

5. After leaving the New York PSC in early 1995, I testified in electric restructuring proceedings on the development of competitive electricity markets in many state regulatory proceedings. I also participated and advised in developing regulatory institutions for competitive power procurement in several other countries.

6. I have testified, written and advised extensively on the interplay of nuclear power with competitive power markets. I was a member of the Keystone Center "Nuclear Power Joint Fact Finding" (June 2007) and the National Research Council of the National Academy of Sciences' Committee on "Alternatives to the Indian Point Energy Center for Meeting New York Electric Power Needs" (June, 2006). I was also a member of the International Expert Panel advising the European Bank for Reconstruction and Development as to the economic case for (and the alternatives to) completing Khmelnitsky 2 and Rovno 4 (K2/R4) – two partly built Soviet-designed 1000MW VVER nuclear reactors in Ukraine – to replace the two operational 1000MW reactors at Chernobyl (February, 1997).

7. A summary of my professional experience is appended to this Declaration.

8. I have been asked by Friends of the Earth to discuss whether the California Public Utilities Commission (CPUC) should require the Diablo Canyon nuclear power plants to operate within the framework of the California power market, rather than

assuring that all of their costs are paid by customers, whether on a rate-base-rate-of-return basis or on some other basis that would permit them to charge customers more than the wholesale power market would allow.

9. I conclude that California electric customers and California environmental goals will be best served by requiring that Diablo Canyon's future revenue stream be determined by the value of its output in the California wholesale power market. There are several reasons for this. First, that market provides the best measure of the value of electricity in the state. Second, the market requires that the owners of power plants bear the risks and reap the rewards of future investments, thereby allocating those risks and rewards to those best able to manage them. Third, to the extent that the market needs to be adjusted to reflect external circumstances such as state and national climate policy, these adjustments will affect low carbon sources equally. Efforts to foresee the costs of nuclear technologies, and to single them out for special ratemaking treatment to promote particular societal ends have a long and discouraging history reflected in nine and ten figure cost overruns, plant cancellations and early plant closures in some 20 states, including California.

10. Approximately one quarter of the original U.S. nuclear fleet has closed, including five of the seven reactors in California. No U.S. nuclear power plant has ever closed because it reached the end of its licensed life. Instead, some combination of mistakes, economic misfortune and costly new safety requirements has led plant owners to conclude that the units could operate no longer.

11. After 15 years in which no U.S. nuclear reactors shutdown, 2013 saw shutdown announcements for five units, including two in California. While the specific reasons for the shutdowns varied from one site to another, several analysts have concluded that the combination of increased expense and possible down time caused by aging with the expense of new requirements brought on by the Fukushima accidents may cause additional U.S. reactors to experience significant cost increases. Taken together with lower prices for competitive power generation resulting from low gas prices as well as lower-than-forecast demand growth and the declining price of some types of renewable generation, these increases lead the same analysts to foresee a substantial likelihood of additional nuclear power plant closings in the near future.

12. This forecast of additional reactor closings has been echoed by owners of nuclear power plants operating in U.S. regions served by power markets, such as Exelon, Entergy and First Energy. These nuclear power plant owners are seeking higher rates for their nuclear units and reduced support for renewables as the price for keeping their nuclear power plants operating.

13. The Diablo Canyon units are approximately 30 years old and face unique seismic challenges that could require modifications with costs in the hundreds of millions of dollars. In addition, I understand that extensive investment to meet state water quality goals may be necessary.

14. Development of competitive wholesale power markets in the U.S. dates from the passage by the U.S. Congress of the Public Utilities Regulatory Policy Act of 1978. Following the success of independent power producers and of competitive power

auctions in the 1980s, electric restructuring led to development of today's power markets in much of the U.S., including California.

15. The Maine Public Utilities Commission in cooperation with Central Maine Power Company developed the first competitive power procurement processes under PURPA in the mid-1980s. I used this experience as a model for New York's competitive power procurement when I became chairman of the New York PSC in 1987.

16. When operating nuclear power units bid in response to New York utility requests for proposals in the late 1980s, they were never the low bidders and were never successful.

17. In the late 1980s, both the New York Public Service Commission and the Long Island Lighting Company studied the costs and benefits of operating versus closing the recently completed Shoreham nuclear power plant. New York then regulated the rates for power generation according to a traditional cost of service methodology of the type that California now uses for Diablo Canyon. To the best of my recollection, both sets of studies (New York's and Lilco's) concluded that there was a very slight net present value benefit to operating the unit over 30 years compared to closing and replacing it. However, the net benefit depended entirely on heavily positive results over the second half of that period. Operating the plant was clearly negative for the customers over the first 15 years. New York State and Lilco agreed not to operate the Shoreham nuclear power plant. Despite a power supply situation significantly tighter than California's today, Lilco did not experience power shortages, in part because the

company had responded astutely to a 1987 NYPSC directive that it plan for a future in which Shoreham did not come on line.

18. The introduction of competition in the electric generation sector was brought on in no small part by the dramatic nuclear cost overruns of the 1970s and 1980s and by the lack of confidence on the part of consumers (especially large electricity users) that regulators and monopoly utility executives would be able to control future nuclear costs, including capital investments in operating reactors. Competitive power markets have had a number of advantages over the previous system of vertically integrated monopoly utilities whose generation costs were recovered as a result of regulatory decisions rather than successful performance in power markets. Among these advantages is the fact that the risks and rewards flowing from plant operation, maintenance and investment decisions must be assessed and managed by the power plant owners rather than the customers and the utility regulators, as is the case when electricity generation cost recovery remains part of the regulated monopoly system.

19. Risks and rewards should flow to the entities best able to manage them. In the case of electric power generation, power plant owners and managements have more information, more expertise, more training and more time for generation management than utility regulators. They are well compensated to perform exactly these functions, whereas utility regulators have a multitude of other responsibilities. In most states, the CEO of a large generating company receives compensation well in excess of the total of the salaries of all of the state's utility commissioners. As long as shareholder and customer interests are properly aligned (as they are in well-functioning competitive

markets), power plant owners acting on behalf of their stockholders should manage the risks of power plant operation and investment better than state utility regulators. If PG&E must recover the costs of Diablo Canyon (plus a return to its investors) in the California power market, its management will have every incentive to measure whether the operating costs and risks plus those of necessary new investments will be successful in competition with the alternatives available in the California power market. This set of incentives will almost inevitably produce more economically efficient power generation and better results for California customers than the laborious cost of service review of Diablo Canyon expenditures exemplified in the recent California PUC decision 14-08-032, in which the Commission was forced to concern itself more with the allowable cost of paving the Diablo Canyon access road than whether the plant's kilowatt hours are likely to be a good buy for California consumers.

20. For the most part, competitive wholesale power markets have proven incompatible with generation owned and operated by distribution utilities such as Pacific Gas & Electric. Indeed, the Diablo Canyon plants are among very few that remain vertically integrated with a distribution utility in a region reliant on a competitive wholesale power market.

21. Power markets functioning without taking account of unregulated externalities (or externalities that are insufficiently regulated) will favor the cheapest generating source. However, competitive power procurement and power markets can be adjusted to reflect the costs of externalities in various ways, including renewable power purchase and energy efficiency purchase requirements and across-the-board adders

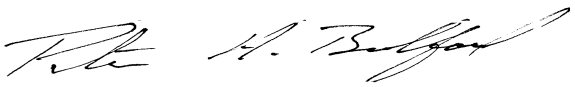
favoring low carbon energy. Integrated resource planning of course provides guidance as to the value to be attached to such externality adjustments. Such adjustments retain the benefits of competitive power procurement by avoiding having the state designate particular resources as essential and offering them special support or ratemaking treatment unavailable to other alternatives.

22. Nothing in the draft EPA rule on carbon emissions is inconsistent with requiring Diablo Canyon to obtain its revenue through the California wholesale market. Indeed, once that rule is finalized and the wholesale market is able to reflect its impacts, such a change in Diablo Canyon ratesetting will assure that the price paid for Diablo Canyon reflects those units' true value in a market in which climate change may no longer be an externality.

23. If the Commission chooses not to require Diablo Canyon to obtain its revenues through participation in the California wholesale power market, it should at least require a competitive power solicitation in the next few years to ascertain whether there are combinations of preferred resources available that will be less costly than continued operation of one or both of the Diablo Canyon units. Such a solicitation is likely to provide the most comprehensive and accurate answer to item number 9 in Chairman Peevey's February 19, 2014 letter. Because PG&E has an obvious conflict in running such a solicitation while owning the Diablo Canyon units, the Commission would need to take special care to devise a framework that avoids favoritism, which will discourage participation as well as biasing the outcome.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge.

Dated: September 30, 2014



Peter A. Bradford
Bradford Brook Associates
341 Bradford Road
Peru, Vermont, 05152

PETER A. BRADFORD
P.O. BOX 497
PERU, VERMONT 05152
(802) 824-4296

PROFESSIONAL EXPERIENCE:

March 1998 – present – Adjunct Professor, **Vermont Law School**
Teaching courses on "Nuclear Power and Public Policy" and "The Law of Electric Restructuring"; participating in VLS Energy Law Center programs

March 2011 – present – Commissioner, **Texas-Vermont Low-Level Radioactive Waste Compact Commission -** o*ne of two Vermont commissioners on this two-state compact*

May 2014 – Present – Member Advisory Council, **Bipartisan Policy Center Project on Nuclear Waste**

March 1996- present - **Consultant on energy and utility regulatory policy -** advising and teaching utility regulation, restructuring, nuclear power and energy policy in the U.S. and abroad

- Visiting lecturer in energy policy and environmental protection at Yale University
- Served on State of New York Moreland Commission on Utility Storm Response (2012-13) and as a member and co-chair on Vermont's 2008-10 Public Oversight Panel on the Comprehensive Reliability Audit of the Vermont Yankee nuclear power plant
- Served on a 2007 Keystone Center fact finding collaboration on nuclear power and a 2006 National Academy of Sciences panel evaluating the alternatives to continued operation of the Indian Point nuclear power plants in New York
- Also affiliated with the Regulatory Assistance Project, which provides assistance to state and federal energy regulatory commissions regarding economic regulatory policy and environmental protection
- Has advised on regulatory and restructuring issues and has testified on aspects of energy and telecommunications regulation in many U.S. states
- In recent years (2007-present) has testified in regulatory and legislative proceedings in Maine, Indiana, Florida, North Carolina, South Carolina and Vermont as well as before the U.S. Nuclear Regulatory Commission and in U.S. federal district court
- Taught and/or advised abroad on energy and water issues and electric restructuring in China, Canada, Armenia, Russia, India, Indonesia, Kazakhstan, Kyrgyzstan, Czech Republic, Mongolia, St. Lucia, Kosovo, South Africa, Georgia, Trinidad and Tobago, Bangladesh and Samoa;
- Member, Policy Advisory Committee of the Packard Foundation's China Sustainable Energy Project
- Served as one of two U.S. representatives on international panel advising European Bank for Reconstruction & Development on least cost energy alternatives in Ukraine to continued operation of the Chernobyl Nuclear Station (1996-97) and on an international expert panel assessing the safety of the Mochovce Nuclear Power Station in Slovakia (1998).

February 1995 - March 1996 Fellow**, Regulatory Assistance Project**
Project funded by the U.S. Dept. of Energy, the Environmental Protection Agency and foundations to provide assistance to state and federal regulatory commissions on energy and environmental matters.

June 1987- January 1995 Chairman, **New York State Public Service Commission**, Albany, New York
CEO of state agency charged with overseeing $29 billion annual revenues of New York utilities. Responsible for developing and implementing consumer and environmental protection policies, transitions from monopoly to competition in energy and telecommunications industries. 700 employees, $65 million budget.

July 1982- June 1987 Chairman, **Maine Public Utilities Commission**, Augusta, Maine
CEO of state agency charged with overseeing $2 billion annual revenues of Maine utilities. Responsible for developing and implementing consumer and environmental protection policies, including competitive bidding for independent power production and energy conservation services as well as adjusting to the break-up of AT&T. 60 employees, $4 million budget.

March 1982-June 1982 ***State of Maine Public Advocate***
First full-time Maine public advocate; intervened on consumers' behalf in telephone and energy cases; oversaw staff of 6; prepared briefs; cross-examined witnesses.

Aug. 1977-March 1982 Commissioner, **United States Nuclear Regulatory Commission,** Washington, D.C.
One of five commissioners of the federal agency whose responsibilities include safety of nuclear power plants and other nuclear facilities; preparing licensing criteria for a nuclear waste repository; licensing exports of nuclear fuel and reactors pursuant to Nuclear Nonproliferation Act; assisted in major upgrades of regulatory and enforcement processes in wake of Three Mile Island accident. 3000 employees, $250 million budget.

Dec. 1971-Aug. 1977 Commissioner, **Maine Public Utilities Commission**, ***Chairman*** (9/74-7/75).

Sept.1968- Dec. 1971 ***Federal-State Coordinator,*** State of Maine
Responsible for many oil, power, environmental and housing matters. Assisted in preparation of landmark Maine laws relating to oil pollution and industrial site selection. Staff Director, Governor's Task Force on Energy, Heavy Industry and the Coast of Maine.

Aug. 1964-June 1965 **Athens College, Greece**, ***Teaching Fellowship***

PROFESSIONAL AFFILIATIONS:

1999-present - Member, Policy Advisory Committee, China Sustainable Energy Project (funded by the David and Lucille Packard Foundation and the Energy Foundation).

1998-2002 - Member, Advisory Council, New England Independent System Operator

Nov. 1986-Nov. 1987 President, National Association of Regulatory Utility Commissioners

1977-1995 NARUC positions**,** Member, Executive Committee; Member, Electricity Committee (1977-1989); Member, Gas Committee (1989-1993); Member, Communications Committee (1975-1977); Board of Directors, National Regulatory Research Institute (1985-1987).

1975-1977, 1982-1986. Advisory Council, Electric Power Research Institute

1987-1995, Member of New York State Energy Planning Board

1987-1995, Member, Board of Directors, New York State Energy Research and Development Administration

!987-1995, Member, New York State Environmental Board;

1987-1995, Chair, New York State Energy Facilities Siting Board

1992-1994, State co-chair, New York State Task Force on Telecommunications Policy

Vice-chair, Board of Directors, Union of Concerned Scientists

EDUCATION:

1964 *B.A*. History, Yale University, New Haven, CT
1968 *L.L.B.,* Yale University School of Law, New Haven, CT

PUBLICATIONS:

Books

Fragile Structures: A Story of Oil Refineries, National Security and the Coast of Maine, 1975, Harpers Magazine Press.

Law Review

Maine's Oil Spill Legislation, Texas International Law Journal, Vol.7, No.1, Summer 1971, pp.29-43.

Other Published Work

"Foreword, World Nuclear Industry Status Report", July 2013, WNISR, pp. 4-5, http://www.worldnuclearreport.org/IMG/pdf/20130716msc-worldnuclearreport2013-lr-v4.pdf

"*How to Close the U.S. Nuclear Industry: Do Nothing*", Bulletin of the Atomic Scientists, March, 2013, pp. 12-21

"*Transparency and Nuclear Regulation: A U.S. Perspective*", prepared for International Right to Know Day, Tokyo, September 2012

After-math: Fukushima, Three Mile Island and Nuclear Power's U.S. Prospects, ABA Energy Committees Newsletter, June 2012, p. 12, http://www.americanbar.org/content/dam/aba/publications/nr_newsletters/energy/201206_energy.authcheckdam.pdf

The Nuclear Landscape, Nature, March 8, 2012, p. 151, http://www.nature.com/nature/journal/v483/n7388/full/483151a.html

"*Taxpayer Funding for Nuclear Power: Issues and Consequences*", Chapter 5 of Nuclear Power's Global Expansion: Weighing Its Risks, Henry Sokolski, ed. http://www.npolicy.org/userfiles/image/Taxpayer%20Financing%20for%20Nuclear%20Power,%20Precedents%20and%20Consequences_pdf.pdf

Remarks, Memorial for Alfred Kahn, Ithaca, New York, June 25, 2011, http://www.hks.harvard.edu/hepg/Papers/2011/FredKahn0611.pdf

Book review, *The End of Energy*, The Wall Street Journal, May, 2011

Nuclear Power's Search for the Taxpayer's Wallet, Blue Ridge Press, November, 2010
Honey, I Shrunk the Renaissance: Nuclear Revival, Climate Change and Reality, Electricity Policy.com, October, 2010, http://www.electricitypolicy.com/bradford-5-18-11-final-edit.pdf

Minnesota's Nuclear Moratorium, Twin Cities Pioneer Press, March 3, 2010, http://www.twincities.com/alllistings/ci_14506848?source=rss

The Nuclear Renaissance Meets Economic Reality, Bulletin of the Atomic Scientists, November-December 2009, www.vermontlaw.edu/Documents/IEE/20100109_bradfordArticle.pdf

Massive Nuclear Subsidies Won't Solve Climate Change, Madison Capitol Times, November 3, 2009, http://host.madison.com/ct/news/opinion/column/guest/article_37b3c6b1-dff6-5ef1-a21c-8a511e278961.html

Nuclear Agency Needs Independent Appointees, Atlanta Journal Constitution, September 17, 2009, http://www.ajc.com/opinion/nuclear-agency-needs-independent-140954.html

Three Mile Island: Thirty Years of Lessons Learned, Subcommittee on Clean Air and Nuclear Safety, U.S. Senate, March 24, 2009

Nuclear Power and Presidential Politics, Blue Ridge Press, October, 2008

Recent Developments Affecting State Regulation of Nuclear Power, Regulatory Assistance Project Issue letter, July, 2008

Nuclear Power, Taxpayer Financing and Radical Governance: Precedents and Consequences, for the Nonproliferation Policy Education Center, April, 2008

Contribution to New York Times Forum "Choking on Growth: China and the Environment", New York Times Online, November 20, 2007, http://china.blogs.nytimes.com/2007/11/20/answers-from-peter-bradford/#more-24

Contributions to the Bulletin of the Atomic Scientists online forum on Nuclear Power and Climate Change, (with Amory Lovins and Stephen Berry), http://www.thebulletin.org/roundtable/nuclear-power-climate-change/, March-August, 2007

The Economics of Nuclear Power (with Steven Thomas, Antony Froggatt, and David Millbrow) for Greenpeace International, May, 2007

Assessing Iran's Nuclear Power Claim, (Proliferation Analysis, Carnegie Endowment for International Peace, January, 2007
http://www.carnegieendowment.org/publications/index.cfm?fa=view&id=18951&prog=zgp&proj=znpp

Nuclear Power's Prospects in the Power Markets of the 21st Century, for the Nonproliferation Policy Education Center, February, 2005

China's National Energy Plan: Some Energy Strategy Considerations, (with Thomas Johansson) The Sinosphere Journal, Spring 2004

Some Environmental Lessons from Electric Restructuring, IUCN Colloquium on Energy Law for Sustainable Development, Shanghai, Winter 2004

Where Have All the Safeguards Gone? Foreword to "Financial Insecurity: The Increasing Use of Limited Liability Companies and Multi-Tiered Holding Companies to Own Nuclear Power Plants" The Star Foundation August 7, 2002

Nuclear Power after September 11, OnEarth, December 2001.

The Unfulfilled Promises of Electric Restructuring, Nor'easter, summer 2001.

Considerations Regarding Recovery of Strandable Investment, PUR Utility Quarterly, December, 1997.

Ships at a Distance: Energy Choice and Economic Challenge, The National Regulatory Research Institute Quarterly Bulletin, Volume 18, Number 3, Fall, 1997, p. 287 (Originally the 1997 George Aiken Lecture at the University of Vermont)

Book Review: *The British Electricity Experiment - Privatization: the Record, the Issues, the Lessons*, Amicus Journal, June, 1997

Gorillas in the Mist: Electric Utility Mergers in Light of State Restructuring Goals, The National Regulatory Research Institute Quarterly Bulletin, Spring, 1997

'Til Death Do Us Part or the Emperor's New Suit: Does a Regulatory Compact Compel Strandable Investment Recovery?, PUR Utility Quarterly, October, 1996

Electric Bargain's Cost Is Dirty Air, Newsday, L.A. Times Features Syndicate, 4/18/96

A Regulatory Compact Worthy of the Name, The Electricity Journal, November, 1995, pp.12-15

Paved with Good Intentions: Reflections on FERC's Decisions Reversing State Power Procurement Processes, (with David Moskovitz), The Electricity Journal, August/September, 1995, pp.62-68

That Memorial Needs Some Soldiers and Other Governmental Approaches to Increased Electric Utility Competition, The Electric Industry in Transition, Public Utility Reports & NYSERDA, 1994, pp.7-13

Market-Based Speech, The Electricity Journal, September, 1994, p.85

In Search of an Energy Strategy, Public Utilities Fortnightly, 1/15/92

Parables of Modern Regulation, The Electricity Journal, November 1992, p.73

Foreword to: *Regulatory Incentives for Demand Side Management*, Nickel, Reid, David Woolcott, American Council for Energy-Efficient Economy, 1992, pp. ix-xi

Boats Against the Current: Energy Strategy in Theory and Practice, The Electricity Journal, October, 1991, p.64

The Shoreham War Has Got to End Now, Newsday, 5/9/89

Parallel to the Nuclear Age, Yale University 25th Reunion book, 1989

Book Review: *Safety Second, A Critical Evaluation of the Nuclear Regulatory Commission's First Decade* IEEE Spectrum, February, 1988, p.14

Somewhere Between Ecstasy, Euphoria and the Shredder: Reflections on the Term 'Pronuclear', Journal of the Washington Academy of Sciences, Vol.78, no.2, June 1988, pp. 139-142

Book Review: *Power Struggle: The Hundred Year War Over Electricity*, Amicus Journal, Winter 1987, pp. 46-47

Wall Street's Flawed Evaluation of State Utility Regulation, Bangor Daily News, Sept. 3, 1984

Reflections on the Indian Point Hearings, New York Times, 1/83

Paradox and Farce: *Trends in Federal Nuclear Energy Policy* Los Angeles Times, June 6, 1982; *Keeping Faith with the Public*, Nuclear Safety, March-April, 1981

Regulation or Reassurance, Washington Post, August 16, 1979

Report of the Governor's Task Force on Energy, Heavy Industry and the Maine Coast, 1972

A Measured Response to Oil Port Proposals, Maine Times, July, 1971

Other Papers

Integrated Resource Planning in the Context of China's Electricity Situation, for the Regulatory Assistance Project, September 2005

The Nexus between Energy Sector Reform and Democracy & Governance (co-lead author), for USAID, February, 2005

Public Interaction in the Georgian Energy Regulatory Process: Case Study for the USAID Project on the Nexus between Democratic Governance and Energy Sector Reform, April, 2004

Report on the Establishment of the State Energy Regulatory Commission of China (with David Moskovitz, Richard Weston and Wayne Shirley) for the Energy Foundation and the World Bank, January, 2003

A Plan of Action for a Multisector Regulatory Commission in Armenia, for USAID, February 2003

Economic Regulatory Issues in the Armenian Water Supply and Wastewater Treatment Sectors, for USAID, January 2003

Some Potential Approaches to the Enforcement of License Conditions and Regulatory Orders in Armenia, for USAID, June 2002

The Process of Auditing Utilities: A Primer for the Energy Regulatory Commission of Armenia, for USAID, June 2002

Some Potential Approaches to the Difficulties of Enforcement of License Conditions and Regulatory Orders in Georgia and Other NIS Countries, for USAID, December 2000

Public Interaction in the Georgian Energy Regulatory Process, for USAID, September 2000.
Regulatory Policy and Energy Efficiency: Considerations for Tariff Setting and Licensing, for USAID, April 2000

Public Interaction in the Armenian Regulatory Process, for USAID, July 1999

The License as an Instrument for Regulation and the Furtherance of Competition in the N.I.S., for USAID, September, 1998

Applicability of U.S. Administrative Law Concepts to Regulatory Systems in the Newly Independent States, for USAID, June 1998

Performance-Based Regulation in a Restructured Electric Industry, (with Bruce Biewald, Paul Chernick, Susan Geller, Jerrold Oppenheim and Tim Woolf) for the National Association of Regulatory Utility Commissioners, November 1997

Selected Other Presentations Concerning Nuclear Energy

Did Nuclear Power Jump or Was It Pushed? Some Impacts of the Three Mile Island Accident; Presentation to Symposium on the 35th Anniversary of the Accident at Three Mile Island, Dartmouth College, March 28, 2014

Nuclear Power and Market Reform: Some Lessons from the U.S. and Europe; Presentation to the Japan Renewable Energy Foundation, February, 2014

Early Cost Recovery for Nuclear Reactor Construction: The Downside, Presentation to the Southeast Conference of Utility Regulatory Commissioners, April, 2012

Nuclear Power in Florida: A Review of Early Cost Recovery for Nuclear Reactor Construction; Presentation to Energy and Utilities Committee, Florida House of Representatives, March, 2013

New Nuclear Reactors Are to Climate Change What Caviar is to World Hunger, Presentation to Yale Alumni in Energy, March 23, 2012

Schrodinger's Renaissance: Anatomy of a Public Policy Fiasco, presentation to Princeton Program on Science and Global Security, December, 2011

After-Math: TMI, Fukushima and Nuclear Power's U.S. Prospects, presentation to the American Bar association, October 2011

How Many Renaissances Will It Take to Build a New U.S. Nuclear Power Plant?, presentation at the Aspen Institute, July 2011

Aside From That, Ms. Lincoln, How Do You Like Nuclear Risk?, presentation to the New York Society of Security Analysts, March 2011;

Nuclear Power Is to Fighting Climate Change as Caviar Is to Fighting World Hunger, presentation at Columbia Law School Debate on Nuclear Energy, November, 2010

It's Not A Renaissance Until You've Seen a Masterpiece: Nuclear Power and Climate Change in 2010, Speech, Hannover, Germany, September 2010

Better Never Than Late: Nuclear Power, Energy Policy and Climate Change, Vermont Law School Hot Topics Lecture, June 2010

"Nuclear Regulatory Commission Oversight Hearing", Senate Committee on Environment and Public Works, Subcommittee on Clean Air and Nuclear Safety, May, 2010

Testimony on Nuclear Loan Guarantees Before the Domestic Policy Subcommittee of the U.S. House Oversight and Government Reform Committe*;*

"Nuclear Renaissance Myths and Realities", Testimony before the Michigan Senate Energy Committee, Lansing Michigan, April 23, 2009

"Three Mile Island: Thirty Years of Lessons Learned", Testimony before the U.S. Senate Committee on Environment and Public Works, Subcommittee on Clean Air and Nuclear Safety, March 24, 2009

Don't Call It A Renaissance Until They've Shown You a Masterpiece; Italian Embassy/Brookings Institution Forum on "The Rise In Demand for Civil Nuclear Power", Italian Embassy, December 9, 2008

Subsidies Without Borders: The Case of Nuclear Power, Nonproliferation Policy Education Center and Marshall Institute forum, Washington, D.C., June 13, 2008

Nuclear Power: Are the tar Aligned? Harvard Electricity Policy Group; May 29, 2008

Nuclear Power As "Federal Infrastructure", Nonproliferation Policy Education Center, Prague, Czech Republic, March 18, 2008

Nuclear Power, Energy Security, and Climate Change, Center for Energy and Environmental Security, University of Colorado Law School, Boulder, Colorado, February 1, 2008

Of Risks, Resources, Renaissances and Reality, Institute of Public Utilities, Charleston, South Carolina, December 4, 2007

Nuclear Power and Climate Change; Chicago Humanities Festival; November 10, 2007

Risks, Rewards, Resources, Reality; Briefing on the Loan Guarantee Provisions of the 2007 Energy Legislation; Environmental and Energy Study Institute; Washington, D.C., October 30, 2007

Fool Me Twice? Rules for an Unruly Renaissance: Carnegie International Nonproliferation Conference, Washington D.C., June 26, 2007

Regulation, Reality and the Rule of Law: *Issues for a Nuclear Renaissance*: Washington and Lee University, June 23, 2007

The Future of Nuclear Energy, Bulletin of the Atomic Scientists Conference; University of Chicago, November 1, 2006

Nuclear Power and Climate Change, Society of Environmental Journalists, Burlington, Vermont, October 27, 2006

Nuclear Power, Climate Change and Public Policy, National Conference of State Legislatures, April, 2006

Electric Restructuring after Ten Years: Surprises, Shocks and Lessons, State Legislative Leaders' Foundation, November, 2005

Nuclear Power's American Prospects, Presentation to the California Energy Commission Nuclear Issues Workshop, August, 2005

Decommissioning Financing: Alternatives and Policies, Conference on the Future of the Medzamor Nuclear Power Plant, Yerevan, Armenia, June 2005

The Value of Sites Capable of Extended Storage of High Level Nuclear Waste, report for the Town of Wiscasset, Maine, December, 2004

Nuclear Power's Prospects, NPEC/FRS/CAP/CEA Workshop, Paris, October 2004

Did the Butler Really Do It? The Role of Nuclear Regulation in Raising the Cost of Nuclear Power, Cato Institute, Washington D.C. March 2004

China's Energy Regulatory Framework China Development Forum, Beijing, November 17, 2003

China's National Energy Plan (with Thomas Johansson) Background Reports to "China's National Energy Strategy and Reform", Development Research Center of the State Council, China Development Forum, November, 2003

Repeating History: Nuclear Power's Prospects in a Carbon-Conscious World Yale School of Forestry and Environmental Studies, Leadership Council Meeting, October 24, 2003

What Nuclear Power Can Learn from Electric Restructuring, and Vice Versa, Aspen Institute, July 5, 2003

Renewal of the Price Anderson Act Testimony before the United States Senate Committee on Environment and Public Works Subcommittee on Transportation, Infrastructure and Nuclear Safety, January 23, 2002

Events Now Long Past: The 20-Year Road from Three Mile Island to Electric Utility Restructuring TMI 20th Anniversary Commemoration, National Press Club, Washington D.C., March 22, 1999

Preparing Nuclear Power for Competition NARUC Conference on “Nuclear Power in a Competitive Era: Asset or Liability?" January 23, 1997

Call Me Ishmael: Reflections on the Role of Obsession in Nuclear Energy Policy, NARUC annual meeting, November 13, 1989

Nuclear Power and Climate Change; Harvard Energy and Environmental Policy Center, January 13, 1989

Somewhere between Ecstasy, Euphoria and the Shredder: Reflections on the Term Pro-Nuclear Symposium on Nuclear Radiation and Public Health Practices and Policies in the Post-Chernobyl World, Georgetown University, September 18, 1987

Searching the Foreseeable Past: Nuclear Power, Investor Confidence and Reality Public Utilities Institute, East Lansing Michigan, July 30, 1987

Where Ignorant Armies Clash by Night: Relationships Among Nuclear Regulators and Regulated NARUC/INPO Seminar on Nuclear Power Plant Safety and Reliability, January 22, 1987

Why Do We Have a Nuclear Waste Problem Conference on Nuclear Waste, Naples, Maine, March 22, 1986

With Friends Like These: Reflections on the Implications of Nuclear Regulation Institute of Public Utilities, Williamsburg, Virginia, December 13, 1982

A Framework for Considering the Economic Regulatory Implications of the Accident at Three Mile Island Iowa State Regulatory Conference, May 20, 1982

The Man/Machine Interface Public Citizen Forum, March 8, 1982

A Perspective on Nuclear Power The Groton School, January 15, 1982

Reasonable Assurance, Regulation and Reality ALI-ABA Course of Study on Atomic Energy Licensing and Regulation, September 24, 1980

Misdefining the National Security in Energy Policy from Machiasport to Three Mile Island Environmental Law Institute, University of Maine, May 1, 1980

Condemned to Repeat It? Haste, Distraction, Rasmussen and Rogovin Risks of Generating Electricity, Seventh Annual National Engineers’ Week Energy Conference, February 21, 1980

Lightening the Nuclear Sled; Some Uses and Misuses of the Accident at Three Mile Island Seminar on the Problems of Energy Policy, New York University, November 21, 1979

The Nuclear Option: Did It Jump or Was It Pushed? NARUC Regulatory Studies Program, August 2, 1979

How a Regulatory View of Nuclear Waste Management is Like a Horse’s Eye View of the Cart 90th NARUC Annual Convention, November 15, 1978

Sentence First: Verdict Later: Some Thoughts on the Level of Acclaim Thus Far Afforded the Nuclear Siting and Licensing Act of 1978 ALI-ABA Course of Study, September 28, 1978

Some Observations on Recent and Proposed Changes in Nuclear Regulatory Commission Jurisdiction, Atomic Industrial Forum Workshop on Reactor Licensing and Safety, April 5, 1978.

ATTACHMENT C

Declaration of Steven Moss

I, Steven Moss, declare as follows:

1. I am a co-founder and partner with M.Cubed, a consulting firm launched in 1993 that provides resource economics and analytical consulting services to public and private sector clients. M.Cubed's practice areas include water and energy utility resource planning and ratemaking, resource use efficiency and conservation measures, project impact analysis, regional economic modeling, and natural resource allocation policies. I hold a Masters of Public Policy from the University of Michigan, Ann Arbor and a B.S. in Conservation of Natural Resources from the University of California, Berkeley. A brief summary of my professional experience is appended to this Declaration.

2. I have been retained by Friends of the Earth ("FOE") to provide an analysis comparing the costs of electricity from Pacific Gas & Electric Company's ("PG&E") Diablo Canyon nuclear reactors with that of electricity that could otherwise be procured on the open market.

3. For purposes of the Complaint/Petition, which this Declaration accompanies, I have been asked to specifically examine whether the costs associated with continued operation of the Diablo Canyon would, overall, be greater than the likely cost of substitute power purchases to replace Diablo Canyon if it was closed.

4. My conclusion is that by June 20, 2018, even with no additional major capital investments, the cost of substitute power is quite likely to be less than the cost of power from Diablo Canyon, such that ratepayers would benefit from a planned permanent shutdown of Diablo Canyon by June 30, 2018.

5. Moreover, I conclude that if PG&E is obligated to make the major investments in environmental and safety upgrades that will likely be required later in this decade, the overall costs of power from Diablo Canyon will increase substantially, such that by the end of this decade, the cost of substitute power could be significantly less than the cost of power from Diablo Canyon.

6. My analysis, based on available public data related to the costs of power from Diablo Canyon, indicates the following:

- Over the past three years, the average cost of owning and operating Diablo Canyon has been $61.90 per megawatt-hour (MWh) on the basis of a 92.1% load factor.
- About half of this amount is committed return on investment and depreciation expenses, and may not be fully avoided if the plant closes before the expiration of its current Nuclear Regulatory Commission ("NRC") license. However, this estimate is based on the assumption that the California Public Utilities Commission ("CPUC," or "Commission") will determine that PG&E is entitled to recoup the full amount of return on its investment, an assumption that is debatable if the plant shuts down before the end of its current NRC license.
- The avoidable incremental cost associated with closure of the plant based on the above stated assumptions was $28.65 per MWh in 2012. This amount grows over time, reaching $76.95 in 2024, the year when the plant's current NRC license expires. Again, these numbers assume that the Commission will

determine that PG&E is entitled to recoup the full amount of return on its investment.

- However, PG&E is continuing to invest in capital additions at Diablo Canyon. Such investments are typically reported in terms of cost levelized over the life of the plant. Using this method, the levelized costs for Diablo Canyon (excluding committed return on investment and depreciation expenses) are $46.85 per MWH in 2014, again reaching $76.95 in 2024.

7. It should be noted that none of the estimates noted in paragraph 6 assume that PG&E will be required to invest any additional capital in order to satisfy pending environmental and/or safety upgrades that are already or may soon will be mandated by the regulatory agencies with direct authority over Diablo Canyon. Although the level of these expenses would depend on regulatory actions and engineering expenses, capital costs associated with these mandates could exceed $3.5 billion.

8. Assuming that these additional costs would have to be depreciated over the next 10 years that the plant's current license remains in effect (and assuming, further, that plant continues to operate at the average capacity factor of 92.1% that it has experienced for the last 10 years), the depreciation costs alone of these investments would add a minimum of $20 per MWh to the cost of power from Diablo Canyon.

9. I note that the $20 per MWh supplemental cost figure indicated in paragraph 8 is limited to depreciation costs only, and excludes additional operation and maintenance costs, debt service, return on equity, taxes and other expenses that PG&E would necessarily bear in connection with any required plant upgrades. Likewise, the

outages and associated reduction in capacity factor triggered by the need to install cooling towers and seismic upgrades could serve to double the $20 per megawatt-hour additional cost for several years. Collectively, these other expenses could further increase the overall supplemental cost estimate, such that it is reasonable to expect that the cost per MWh of power from Diablo Canyon could rise by at least $40 per MWh should PG&E be required to make these plant investments. In this event, by 2024, the avoidable incremental cost of operating Diablo Canyon would reach $116.95 or even higher.

10. By contrast, the energy-only costs of power from preferred resources that would replace the energy currently generated by Diablo Canyon are falling. Indeed, recent power purchase agreements for preferred resources in the Southwest of the United States have been approved at prices significantly below $60 per MWh. Also, investments in energy efficiency are already much lower than the cost of Diablo power.

11. Moreover, the price for preferred resources has been declining significantly over the past few years. Within four years, the cost for the energy produced or deferred from such resources could be in the low $50s per MWh or less.

12. Taken together, the projected increases in the costs of power from Diablo Canyon over the next 10 years (even if PG&E is not required to make $3+ billion in capital upgrades for environmental and safety reasons) can be expected to parallel the projected cost decreases in power generated from preferred resources, such that within four years or less, the power generated or deferred by preferred resources should be, overall, less expensive than the power generated by Diablo. (As noted above, these costs

do not attribute to the Diablo-generated power PG&E's costs associated with committed return on investment and depreciation expenses on existing plant).

13. I would also note that during many hours of the day (primarily between 10 p.m. and 6 a.m.), much of the power produced by Diablo Canyon is not needed to meet the demand of electricity customers. However, during that large number of hours per year, ratepayers continue to pay the Commission-approved regulated cost for that power. Moreover, the generation of that unneeded power from Diablo Canyon contributes to the growing problem of system over-generation and could displace other, cleaner and less expensive sources of energy (e.g., wind power) that would otherwise not be curtailed.

14. Because about 30% of the kilowatt-hours (KWh) generated by Diablo Canyon may have zero or even negative value, an assessment of the economics of Diablo Canyon as a merchant plant selling into the wholesale market would shed light on its true economic contribution to the grid. However, due to the confidentiality of current and recent data on the costs of power in California Independent System Operator ("CAISO") markets, M.Cubed was not able to obtain the information needed to make that calculation. I would urge Commission staff to obtain these data so as to determine whether a significant percentage of the power generated by Diablo Canyon is being paid for at a price that exceeds the price set by the CAISO market.

15. In summary, a comparison of the costs of electricity from Diablo Canyon nuclear reactors with that of electricity procured on the open market (which over the next few years will increasingly be generated by preferred resources) suggests that within a few years, ratepayers would be better off if PG&E were to procure power from other

sources or replace these power needs with conservation or other demand reducing strategies.

16. I would note in conclusion that my research into these issues is continuing, such that if I am called upon at a future date to submit testimony in a Commission proceeding addressing these issues, I reserve the right to amend, expand and/or update the details of my analysis to reflect such additional research.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge.

Dated: September 30, 2014

Steven Moss
M.Cubed
2325 Third Street, Suite 344
San Francisco, California 94114
Phone : 415-643-9578
E-mail: steven@moss.net

STEVEN J. MOSS

PROFESSIONAL HIGHLIGHTS

- Founded innovative nonprofit that develops, markets, and implements programs to help low-income families and small businesses in the San Francisco Bay Area better manage their energy and water use; created sustainable green jobs training and employment initiatives; achieved more than 10 megawatts of energy savings (2000 to present).

- Conducted a number of state-of-the-art pilots examining how to change agricultural, residential, and small business energy users' behaviors, relying on pricing signals, information, education, and technology interventions; and whether distributed energy resources could be used to better manage utility distribution systems. (2000 to present).

- Examined electric and natural gas utilities capital and operating expenditures to ensure that spending was linked to stated goals and outcomes; recommended specific disallowances amounting to hundreds of millions of dollars; designed innovative rate tariffs for agricultural, residential, and small enterprise energy users (1994 to present).

- Examined tactics to close two power plants in the San Francisco Bay Area, including deployment of distributed energy resources and installation of transmission upgrades. Both power plants were ultimately shuttered, with no adverse consequences to reliability (2001 to 2010).

PROFESSIONAL EMPLOYMENT

Partner, M.Cubed, 1988 – Present. Provided analytical, management, and strategic consulting services to public and private sector clients, including related to natural resource valuation. Founded San Francisco Community Power, www.sfpower.org, which closed two power plants, trained and employed dozens of low-income individuals in energy and water conservation, developed innovative pilot programs to address global climate change, and spun-off a successful energy management program oriented to small businesses. Led a large number of analytical projects that examined the implications of and inter-relationships between projects and policies related to energy, water, and land use. Developing action-oriented strategic plans.

Adjunct Lecturer, Public Administration Program, San Francisco State University; Mills College, 1997 - 2012. Taught graduate- and undergraduate-level courses in policy analysis and political systems.

ACADEMIC AND PROFESSIONAL ACHIEVEMENTS

Board member, Equal Opportunity Council of San Francisco, 2010-11; Board member, Agahozo Shalom Youth Village, 2010-13; Member, BAQMD Air Risk Evaluation, 2008-09; Member, CEC PIER Distribution Research Committee, 2008-09; Supervisor's Appointee, Potrero Power Plant Citizen's Task Force, 2002-10; Fulbright Indo-American Environmental Leader Fellowship, 2004; MPP, University of Michigan, Ann Arbor, 1985; B.S., Conservation of Natural Resources, UC Berkeley, 1982; Lyndon Johnson Scholar, 1981.