

Docket No.: R.23-01-007
Date: June 30, 2023
Commissioner: Douglas
ALJ: Seybert
Witness: Peter Bradford

**BEFORE THE PUBLIC UTILITIES COMMISSION OF
THE STATE OF CALIFORNIA**

Implementing Senate Bill 846 Concerning
Potential Extension of Diablo Canyon Power
Plant Operations

R.23-01-007
(Filed January 14, 2023)

**OPENING TESTIMONY OF PETER BRADFORD ON BEHALF OF SAN LUIS OBISPO
MOTHERS FOR PEACE ON PHASE 1 TRACK 2 ISSUES**

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c/o
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VERIFICATION

The statements in the foregoing document are true and correct to the best of my knowledge. The facts presented in the forgoing document are true and correct to the best of my knowledge, and the opinions expressed therein are based on my best professional judgment.

I declare under penalty of perjury under the laws of the state of California that the foregoing is true and correct. Executed on June 30, 2023, in Peru,
Vt.
_____.

Peter Bradford

Peter Bradford

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1 **Section 1 – Qualifications of Peter A. Bradford**

2 **Q. Please state your name, employer and title.**

3 A. Peter A. Bradford, CEO of Bradford Brook Associates, a firm consulting on utility
4 regulatory policy.

5 **Q. What is the subject of your testimony?**

6 A. I am testifying as to the prudence of extending the operation of the Diablo Canyon
7 powerplant.

8 **Q. What is your professional experience relating to your testimony in this proceeding.**

9 I chaired the New York State Public Service Commission (1987-1995) and the Maine
10 Public Utilities Commission (1974-75 and 1982-87). I was also a commissioner at the Maine
11 PUC (1971-77 and 1982-87). Among the statutory duties of both of these utility regulatory
12 agencies was assuring a fully adequate electric supply at just and reasonable rates. During my
13 terms on the Maine and New York commissions, I participated in deciding more than 10,000
14 utility proceedings. Several of these decisions involved issues of prudence in the context of
15 nuclear power plant operation and construction.

16 I was a commissioner on the US Nuclear Regulatory Commission (NRC) between 1977
17 and 1982. The NRC’s mission is “to license and regulate the Nation's civilian use of radioactive
18 materials to provide reasonable assurance of adequate protection of public health and safety and
19 to promote the common defense and security and to protect the environment”.¹ During my term,
20 the Commission issued more than twenty nuclear power construction permits and operating
21 licenses - more licenses, I believe, than have been issued during any five-year period since that
22 time.

23 I participated in the 2006 National Research Council of the National Academy of
24 Sciences panel evaluating the alternatives to continued operation of the Indian Point nuclear
25 units in New York. I was also a member of the 2007 Keystone Center Nuclear Power Joint Fact-
26 Finding project, which identified points of agreement among a broad range of constituencies,
27 including nuclear power plant owners and builders, on issues relating to nuclear power costs and
28 the role of nuclear power in combating climate change.

29

¹ NRC Mission Statement - <https://www.nrc.gov/about-nrc.html>

1 I chaired and served on the three-member Public Oversight Panel (2008-10) that
2 supervised the legislatively mandated comprehensive reliability audit of the Vermont Yankee
3 nuclear power plant.

4 I was President of the National Association of Regulatory Utility Commissioners (1986-
5 87) and was at different times a member of its committees on electricity, gas and
6 communications as well as its Executive Committee. I was briefly Maine's Public Advocate
7 (1982).

8 Of particular relevance to this proceeding, I chaired the New York Public Service
9 Commission when it approved the 1989 settlement between the Long Island Lighting Company
10 (LILCO) and the State of New York that foreclosed operating the recently completed and
11 licensed Shoreham Nuclear Power Plant. This settlement was opposed in prolonged litigation by
12 the US Department of Energy which forecast that without Shoreham Long Island would not have
13 a reliable power supply during hot summer months. Indeed, Department of Energy Secretary
14 James Watkins stated, wrongly as it turned out, "If activists can prevent things from being built,
15 by God, I can prevent things from being shut down when its stupid". The state of New York and
16 LILCO concluded that adequate reserves existed and that more could rapidly be brought on line.
17 Shoreham did not operate. Long Island during those hot summer months when the Washington
18 DC grid was overloaded sold surplus power south to run the air conditioning in DOE's offices.
19 LILCO and New York state government demonstrated that a utility and a state working
20 cooperatively could maintain reliability through summers of record heat even when a nuclear
21 plant representing some 20% of its power generation became unavailable on relatively short
22 notice.

23 Since leaving utility regulation, I have taught, written and consulted on regulatory issues
24 in the U.S. and abroad, including as an adjunct professor at the Vermont Law School, where I
25 taught courses entitled "Nuclear Power and Public Policy" and "The Law of Electric Utility
26 Restructuring". I have also taught Energy Policy and Environmental Protection at the Yale
27 University School of the Environment.

28 In 2008 and 2009, I testified before the Florida PSC regarding the wisdom of building the
29 Levy County nuclear units and before the North and South Carolina regulatory commissions as
30 to the likelihood of excess costs, cost overruns and delays at the Lee units. Despite approvals

1 from those state commissions, all of these units were canceled at considerable cost to the utility
2 customers.

3 In 2017, I testified before the Georgia Public Utilities Commission as to the wisdom of
4 continuing to build Vogtle units 3 and 4. The Commission granted approval, but further cost
5 overruns and delays were so great that customers would have been better served by plant
6 cancellation.

7 In 2011 I testified in the NRC license renewal proceedings for New York's Indian Point
8 units 2 and 3 to the effect that low carbon alternatives were likely to be available to replace these
9 two units on reasonable terms. These two units were closed in 2021 and 2022.

10 I have written a number of articles on utility regulation and energy policy, as well as one book
11 concerning energy policy. I am a graduate of Yale University (1964) and Yale Law School
12 (1968).

13 A more complete resume is attached to this testimony (Exhibit A).
14

15 **Section 2 – Purpose of this testimony**

16 **Q. Please describe the purpose of your testimony.**

17 A. My testimony will demonstrate that decisions and actions to extend the operations of the
18 Diablo Canyon powerplant to at least 2030 are not prudent. Fundamental elements of prudence
19 as that term is used in SB 846 and throughout utility regulation cannot be met by extending the
20 operating life of the Diablo Canyon nuclear power units.

21 Few of the analyses necessary to justify reversing the long-planned retirement of Diablo
22 Canyon have been performed. The processes necessary to test such analyses are not in place.
23 Crucial information - such as market testing, updated resource plans and studies - will not be
24 available for months in some cases, years in others. Meanwhile, the policy to extend Diablo
25 Canyon operation is damaging the prospects for development of the resource base essential to
26 meeting California's goal of a carbon free electric system by 2045.

27 **Q. Does your conclusion take into account Governor Newsom's position that Diablo
28 Canyon's operation must be extended to assure reliable electric service in California?**

29 A. Yes. Energy policy history is replete with strong statements from governmental leaders
30 embracing particular energy facilities. These endorsements must of course be considered in
31 judging the prudence of a proposed course of action, but they are not determinative. Many of the

1 facilities that receive such endorsement are then not approved or get canceled. They are then
2 missed less than the dollars that have been spent on them. A particularly stark example among
3 many is this 2017 statement from Governor Henry McMaster of South Carolina:

4 “Completion of the reactors at V.C. Summer Nuclear Station will provide our state with
5 clean and plentiful electricity for generations to come. They are critical components to
6 our future economic prosperity.... I am confident that the plans and contingencies they
7 have prepared will result in the completion of the project.”²

8 The VC Summer project was canceled four months later. Having spent \$9 billion, it was
9 worth less at the time of cancellation than when it began. The customers are paying for much of
10 the costs. South Carolina’s power supply has been and remains fully adequate without the plant.

11

12 **Section 3 - The concept of prudence in the context of utility regulation**

13

14 **Q. Please discuss the evolution of today’s standards for assessing the prudence of**
15 **electric utility decision making.**

16 A. A fundamental principle of utility regulation in California (California Public Utilities
17 Code §451, as discussed below) and almost all states is that customers should only pay for costs
18 that are prudently incurred. This concept of prudence was advanced in detail for the first time in
19 a 1923 US Supreme Court decision in a concurring opinion in *Missouri ex. rel. Southwestern*
20 *Bell Telephone Co. v. Public Service Commission* in which Justice Brandeis wrote.

21 The term prudent investment....is applied for the purpose of excluding what might be found to
22 be dishonest or obviously wasteful or imprudent expenditures. Every investment may be
23 assumed to have been made in the exercise of reasonable judgement, unless the contrary is
24 shown.³

25 As state and federal regulators and legislators grappled with different methodologies for
26 the setting of utility revenue requirements and the rates to support them, Justice Brandeis’s
27 concept of prudent investment was central to these deliberations.

28

² <https://governor.sc.gov/news/2017-03/statement-governor-henry-mcmaster-vc-summer-nuclear-station>

³ *Missouri ex. rel. Southwestern Bell Telephone Co. v. Public Service Commission* (1923) 262 U.S. 276, 289, footnote 1.

1 Utilities sought to establish a constitutional right to the recovery of prudent investment
2 pursuant to their investors' right not to be deprived of property without due process of law. The
3 US Supreme Court rejected this argument and has not required that any particular test, prudent
4 investment or another, be used to determine whether utility expenditures must be charged to
5 customers.⁴ However, most if not all states require that rates be "just and reasonable".

6 The California's Public Utilities Code is typical of these provisions in stating "All
7 charges demanded or received by any public utility, or by any two or more public utilities, for
8 any product or commodity furnished or to be furnished or any service rendered or to be rendered
9 shall be just and reasonable. Every unjust or unreasonable charge demanded or received for such
10 product or commodity, or service is unlawful".

11 Some legislatures did not further define reasonableness. Others added provisions
12 incorporating a requirement that rates could only be reasonable if the expenses and investment
13 on which they were based were prudent.

14 These concepts were not extensively litigated in the early years of utility regulation. A
15 1985 study by the National Regulatory Research Institute notes only nine cases making
16 significant use of the prudent investment test in the 30 years between 1944 and 1973 but 42 cases
17 in the ten years from 1974 through 1983⁵. In fact, the number of cases involving the concept of
18 prudent investment between 1974 and 1983 was considerably higher since a number were settled
19 without issuance of a reported decision.

20 As cases involving very large prudence reviews swelled the dockets of state and federal
21 utility regulators and spilled over onto court dockets, a corresponding upsurge occurred in the
22 literature of prudence.

23 A full review of that literature is not necessary to establish the meaning of the basic terms
24 for purposes of this case. I have focused on my own experience as well as a leading law review
25 article and discussions from two widely used treatises on utility regulation. The substantial
26 literature and case law is to the same effect.

27 The surge of regulatory and legislative concern with prudent investment was caused
28 largely by doubts about utility management acumen as to construction cost overruns and plant

⁴ *Duquesne Light and Power v. Barasch* (1989) 488 U.S. 299.

⁵ "The Prudent Investment Test in the 1980s", pp 4-9, <https://ipu.msu.edu/wp-content/uploads/2016/12/Burns-Prudent-Investment-Test-84-16-85-1.pdf>

1 cancellations in the nuclear power industry. Forbes Magazine in 1985 famously wrote, “The
2 failure of the U.S. nuclear power program ranks as the largest managerial disaster in business
3 history, a disaster on a monumental scale... only the blind or the biased can now think that the
4 money has been well spent.”⁶

5 As a utility regulator in Maine and New York in those years, I dealt with such costs
6 relating to the Seabrook 1 and 2 plants, Millstone 3, Shoreham and Nine Mile Point unit 3.
7 While on the Nuclear Regulatory Commission in those years, I saw nine figure cost overruns and
8 cancellations in an unbroken crescent of states from the Great Lakes down the Atlantic coast
9 state and on around the Gulf Coast, across the Southwest and reaching all the way up the West
10 Coast, including Diablo Canyon.

11 Professor Richard Pierce, one of the foremost observers of regulatory law and policy in
12 those years correctly stated, “The question of how to deal with the financial problems created by
13 ill-advised investments in nuclear plants and other major energy projects is the most troublesome
14 problem facing regulatory agencies today”.⁷ He succinctly laid out the essential components of
15 prudent decision making in the context of plant construction as well as plant closure:

16 “The decision to construct a new generating plant, or to authorize such
17 construction, is complicated. At least in theory, the decision should be based on
18 forecasts of such factors as demand for electricity in the area served by the
19 utility, availability of power from the utility's other sources, the cost to the
20 utility of oil, gas, coal, and uranium, the cost of constructing the plant, and the
21 utility's cost of capital during the construction period. The accuracy of each of
22 these forecasts is critically dependent upon the accuracy of assumptions
23 concerning future economic conditions in the world, the nation, and the
24 geographic area served by the utility, as well as the accuracy of assumptions
25 concerning the future relationship between macroeconomic variables and
26 conditions in specific markets for each form of energy.... It is hard to imagine a
27 more difficult and risky decision. Even forecasts of only a few of these factors
28 made by well qualified specialists and covering much shorter time periods have
29 often proven extremely unreliable.”⁸

30

⁶ James Cook, “Nuclear Follies”, Forbes Magazine, February 11, 1985

⁷ Richard J. Pierce, “The Regulatory Treatment of Mistakes in Retrospect: Canceled Plants and Excess Capacity” University of Pennsylvania Law Review, vol. 137, 497, p. 499, https://scholarship.law.upenn.edu/cgi/viewcontent.cgi?article=4621&context=penn_law_review

⁸ Pierce, *supra* n. 4, p. 509.

1 During years of litigation in the context of nuclear power, the concept of prudence
2 developed in commission and court decisions at the state and federal levels had many common
3 elements. A 1985 Maine Public Utilities Commission decision in which I participated set forth
4 these principles as follows:

5 “The standard which we will apply is whether the utility followed a course of conduct
6 that a capably managed utility would have followed in light of existing and reasonably
7 knowable circumstances. We note at the outset that:

- 8 1. Senior utility executives are expected to have a high degree of financial and
9 technical expertise;
- 10 2. While the prevailing practice of the utility industry is relevant, it is not
11 determinative. The decisions of utility executives must also be reasonable
12 when viewed against the decisions and courses of conduct of other
13 corporations that make investment decisions of comparable magnitude and
14 complexity. If, for example, an industry’s actions or inactions do not meet the
15 standards of prudence applied in other industries to multibillion dollar
16 projects, then imprudence within the meaning (of Maine law) exists....
- 17 3. The size and nature of the undertaking being reviewed must also be
18 considered. Thus far greater care should be exercised where the magnitude of
19 the investment is in the hundreds of millions or billions of dollars when it is
20 routine or than when lesser businesses or responsibilities are involved.
- 21 4. Review of utility decisions should consider the utility’s legal obligation to
22 provide safe, reasonable, and adequate service at the lowest possible cost over
23 time throughout its service territory and to operate “as efficiently as possible”
24 using “sound management practices” 35 Maine Revised Statutes Annotated
25 §51.... a full analysis of options would include load management and
26 conservation options that avoided uneconomic new construction.... the
27 obligation to serve cannot be said to justify either undertaking or continuing a
28 project that consumes so much capital that it jeopardizes other projects of
29 greater worth by, for example, sidetracking cost-effective conversions from
30 oil to coal or the transmission lines needed for major power purchases or
31 utility investment in conservation.
- 32 5. A review of prudency requires examination not only of the initial investment
33 decision but also of the continuing action of the utilities in response to
34 changing circumstances.
- 35 6. If a utility has selected from among several reasonable courses of action one
36 which turns badly, the utility’s decision was not imprudent.
- 37 7. The utility’s course of conduct must be reviewed in light of existing facts and
38 circumstances that either were known or knowable through an effort
39 consistent with the size of the risk at the time decisions were made....The
40 prudence of decisions cannot be defined by hindsight”.⁹
- 41

⁹ Re: Seabrook Involvements by Maine Utilities, May 28, 1985, 67 PUR 4TH 161, at 166-167.

1 The circumstances of the Seabrook case required that the Maine Commission consider
2 whether the imprudence from which utility customers should be protected was only that of the
3 Maine utilities. The Commission decided to the contrary, that ratepayers should not be charged
4 for imprudently incurred costs, whatever the source, that a fundamental function of utility
5 regulation “is to approximate the cost controlling pressure that competition exerts in a
6 nonmonopoly environment”.¹⁰

7 The Maine decisions defining prudent and imprudent management, especially in the
8 context of high-cost, high consequence nuclear power construction and operation, are consistent
9 with similar decisions in most other states as well as at the Federal Energy Regulatory
10 Commission (FERC). As the era of 20th century US nuclear power plant construction wound
11 down, regulators were estimated to have disallowed \$14 billion on grounds of management
12 imprudence.¹¹

13 More than 20 years later regulatory jurisprudence as to prudence had expanded but had
14 not fundamentally altered.¹² However, following the shock of multibillion dollar rate
15 disallowances flowing from prudence reviews conducted years after the imprudent actions and
16 decisions had taken place, utilities and some state legislatures and regulatory agencies undertook
17 to develop methodologies for evaluating prudence before the fact.¹³

18
19 **Q. The decisions that you discuss all involve the assessment of prudence in retrospect,**
20 **that is the reviews take place after large expenditures have occurred. Does assessing the**
21 **prudence of an action that has not yet had consequences require less demanding standards.**

22 A. Not at all. The need for meeting rigorous prudence standards before the fact, when costly
23 mistakes can still be avoided, is every bit as great as it is in reviews whose purpose is to allocate
24 the unavoidable costs of past mistakes.

25 Predetermining prudence before the conduct being scrutinized has taken place imposes
26 on the decisionmakers a need for a particularly rigorous application of the standards of prudence

¹⁰ *Ibid.* at 168

¹¹ The Regulation of Public Utilities, Charles F. Phillips Jr., Public Utilities Reports, 1991, p. 341.

¹² Regulating Public Utility Performance, Scott Hempling, American Bar Association, 2013, pp. 235-256. Review

¹³ *Ibid.* pp. 255-56.

1 as well as need to define with great care just what it is that is being approved. This is because,
2 once a course of conduct has been deemed prudent, the likelihood that its costs will be passed on
3 to customers is greatly increased. Preapproval laws often require this outcome, but even when
4 they don't, pressure to approve rate increases for a project certified as prudent and necessary will
5 rise even in the face of cost overruns, delays, and other disappointments that – had they been
6 foreseen – would have doomed the project.¹⁴

7 Preapproval of prudence can in turn give rise to the phenomenon of “moral hazard”,
8 pursuant to which the transfer of risk to those least able to assess and manage it – i.e. to
9 customers and taxpayers - renders the real investors and managers more likely to incur economic
10 and operational risks that they would have shunned if they were the ones bearing the
11 consequences.

12 To avoid this phenomenon, the PUC must protect the interests of those to whom risks
13 have been shifted – in this case taxpayers and customers – with the same vigilance that the
14 financial community looks after the interests of investors. Investors would never put-up billions
15 of dollars on the basis of statements of an unsubstantiated policy affirming prudence from a
16 legislature or a governor. Neither should taxpayers or customers.

17

18 **Q. Please discuss the California PUC's application of the concept of prudent decision**
19 **making.**

20 A. Recent California PUC decisions establish requirements for prudent decision making that
21 are entirely consistent with this history. In a 2018 case¹⁵, the PUC stated

22 “In implementing Section 451 for purposes of utility reasonableness reviews, the
23 Commission utilizes an established Prudent Manager Standard as the test to evaluate
24 whether requested costs are just and reasonable. We have summarized this test as
25 follows:

¹⁴Perhaps the most colorful expression of the momentum effect's sending good money to chase bad comes from Justices Hugo Black and William Douglas in their dissent from a Supreme Court case granting a form of nuclear construction preapproval, “No agency wants to be the architect of a ‘white elephant’” (*Power Reactor Development Co. v. International Union of Electrical, Radio and Machine Workers, AFL-CIO*, 376 US 396, 417.)

¹⁵ D.18-07-025 [July 12, 2018, Order Denying Rehearing of Decision]

1 The standard for reviewing utility actions has been established as one of
2 reasonableness and prudence....The term “reasonable and prudent” means that at
3 a particular time any of the practices, methods, and acts engaged in by a utility
4 follows the exercise of reasonable judgment in light of facts known known or
5 which should have been known at the time the decision was made. The act or
6 decision is expected by the utility to accomplish the desired result at the lowest
7 reasonable cost consistent with good utility practices. Good utility practices are
8 based upon cost-effectiveness, reliability, safety, and expedition.”
9 (See, e.g., *Re SCE* [D.87-06-021], *supra*, 24 Cal.P.U.C.2d at p. 486.)

10 Further guidance is embodied in other decisions, such as D.02-08-064, which states:

11 A reasonable and prudent act is not limited to the optimum practice,
12 method, or act to the exclusion of all others, but rather encompasses a
13 spectrum of possible practices, methods, or acts consistent with the
14 utility system needs, the interest of the ratepayers and the requirements
15 of governmental agencies of competent jurisdiction.... The greater the
16 level of money, risk and uncertainty involved in a decision, the greater
17 the care the utility must take in reaching that decision....¹⁶
18

19 Of course, the level of money, risk and uncertainty could hardly be greater than it is in
20 the decision now under review.

21 **Q. What are the implications of these very high levels of money, risk and uncertainty**
22 **for the prudence determination that must be made pursuant to SB 846?**

23 A. While the terms “prudent” and “imprudent” are used several times in SB 846, only
24 Section 25548.3 contemplates action exclusively by the Public Utilities Commission. That
25 section states.

26 “(c) The department (Department of Water Resources) may enter into a loan
27 agreement with the borrower. In addition to any terms and conditions determined
28 necessary by the department, the loan agreement shall include all of the
29 following...: (5) Events that would trigger a suspension or early termination of
30 the loan agreement, including but not limited to any of the following...(C) a
31 determination by the Public Utilities Commission that an extension of the Diablo
32 Canyon powerplant is not cost effective or imprudent, or both”.
33

34 This section clearly contemplates early and continuing review by the PUC of the
35 prudence of decisions relating to extending the operating life of Diablo Canyon. For such a
36 review to be meaningful and effective, it needs to be undertaken as soon as possible, before large
37 sums are spent and the development of alternative generating resources is foreclosed.

¹⁶ *Ibid.* at pp 5-6.

1 In addition, Section 25233.2 requires that the California Energy Commission in
2 consultation with the Independent System Operator and the Public Utilities Commission shall
3 make a determination in a public process, whether the state’s electricity forecasts for the calendar
4 years 2024 to 2030, inclusive, show potential for reliability deficiencies if the Diablo Canyon
5 powerplant operation is not extended beyond 2025, and whether extending operations of the
6 Diablo Canyon powerplant to at least 2030 is prudent to ensure reliability in light of any
7 potential for supply deficiency.

8 Since the Energy Commission is required to consult the PUC, the PUC will need to
9 convey the prudence position(s) developed in the context of the loan agreement. Since the PUC
10 has far more experience with prudence reviews than does the Energy Commission (or any other
11 entity in California state government) it should do a full review in this proceeding in order to
12 give the Energy Commission the full benefit of that experience.

13 In addition to these two specific mentions of the PUC in the context of findings of
14 prudence or imprudence, SB 846 imposes a further duty of prudence in Sec 5(f), which requires
15 that all relevant state agencies and the operator of the Diablo Canyon powerplant must act
16 quickly and in coordination to take all actions necessary and prudent to extend Diablo Canyon
17 powerplant operations.

18 This section too requires that the PUC undertake a prompt and thorough prudence
19 inquiry. The actions that I urge in the recommendations section of this testimony are both
20 necessary and prudent preconditions to any final decision to extend the life of the powerplant.
21 Exploring the extension of Diablo Canyon operations in the context of those measures is one
22 thing, but committing to extend operations on the basis of the work done to date would move
23 beyond imprudence and into folly.

24
25 **Section 4 - The prudence of the decisions and actions to be reviewed under SB 846**

26
27 **Q. How does SB 846’s prejudgment toward seeking to extend the operation of Diablo**
28 **Canyon comport with these principles of prudence.**

29 A. SB 846’s quest to extend the operation of the Diablo Canyon nuclear units does not meet
30 the most basic requirements for prudent electric power generation decision making. It is

1 unimaginable that a prudently managed utility would have made a decision of this multibillion-
2 dollar magnitude on the evidence and in the manner that California has pursued it to date.

3

4 **Q. What might a prudent review of the issue of continued operation of Diablo Canyon**
5 **have entailed?**

6 A. Unlike most electric prudence reviews, we know from direct experience that a
7 responsible utility, after full consideration by fully qualified management and by its Board of
8 Directors, made a very different decision from the one under consideration in this case. PG&E is
9 by law and by the terms of its franchise agreement the entity responsible for providing
10 reasonably priced electricity safely and reliably to more than 5 million customers. It also must
11 discharge its reliability obligations to the California grid. After extensive analysis and
12 deliberation, taking all relevant factors into account, PG&E decided in 2016 to close the two
13 Diablo Canyon units in 2024 and 2025. As described by the PUC in its January 2018 decision
14 approving the closing,

15 PG&E believes that the continued operation of Diablo Canyon beyond 2025 would
16 exacerbate over-generation, requiring curtailment of renewable generation. (Id. at 16-17;
17 Ex. PG&E-1 at 2-20.) PG&E’s analysis indicates that there is no need to replace Diablo
18 Canyon in order to maintain system reliability. (Transcript Vol. 6 at 957-958.)

19 PG&E has also been unequivocal that the retirement of Diablo Canyon will not have an
20 adverse impact on local reliability.¹⁷

21 The utility then adhered to that position unwaveringly through all of California’s electric
22 supply developments and proceedings until August 2022. Had PG&E or CAISO changed that
23 view, they would have been obligated to report their concerns to the state promptly. Even after
24 August 2022, the Company did not assert that operating the units was its preferred course, only
25 that it was following the direction of the state government. The company’s prefiled testimony in

¹⁷ D.18-01-022 - January 11, 2018, Decision Approving Retirement of Diablo Canyon Nuclear Power Plant, p. 8. [Additionally, at page 57, the PUC findings of fact in this decision stated “1. Continuing operation of Diablo Canyon Unit 1 beyond 2024 and Unit 2 beyond 2025 would require renewal of NRC licenses and would not be cost effective...(and) 2. The retirement of Diablo Canyon will not cause adverse impacts on local or system reliability.”]

1 this proceeding neither revokes the justifications for Diablo Canyon’s closing stated in its 2016
2 application to the PUC nor advocates for extended operation of the plant¹⁸.

3 In its data responses, PG&E states that no studies exist in which it or its consultants
4 conclude that extended Diablo Canyon operation is the least expensive way to meet PG&E’s
5 electric needs or is essential to the reliability of its electric system or is essential to meeting
6 California’s carbon reduction goals. Furthermore, PG&E also states that it is unaware of any
7 communications from the Company to California state government making these assertions or
8 urging the extended operation of the Diablo Canyon reactors.¹⁹

9 **Q. Was PG&E’s decision to close Diablo Canyon upon the expiration of the NRC**
10 **licenses in 2024 and 2025 challenged by any California state agency.**

11 A. Not to my knowledge. Neither the primary state agencies specifically charged with
12 assuring the adequacy of California’s power supply (the Public Utilities Commission and the
13 California Energy Commission) nor the state-established California Independent System
14 Operator concluded before the summer of 2022 that extended operation of Diablo Canyon was
15 necessary to assure a reliable power supply for California. Like Sherlock Holmes’s famous dog
16 that didn’t bark in the night,²⁰ this failure by all of the watchdogs to sound a reliability alarm is
17 central to answering the questions now before the PUC.

18 To the extent California was concerned about the adequacy of its power supply, it had the
19 institutions and the tools necessary to test markets and develop integrated resource plans to
20 assess the situation and compare alternatives ways of meeting its needs before choosing the
21 optimal combination of those alternatives. A hasty embrace of Diablo Canyon in the face of a
22 conspicuous lack of enthusiasm from all of the entities most qualified to identify and resolve
23 such a crisis is a classic – indeed an extreme - example of the imprudent power supply decision-
24 making that cost US customers tens of billions of dollars in the 20th century.

25 The decision to continue Diablo Canyon operation meets none of the criteria for a
26 prudent power supply decision of this multibillion-dollar magnitude:

¹⁸ Testimony of Brian Ketelsen, May 19, 2023

¹⁹ Attachment B – PG&E Response to SLOMFP Data Request 001-017.

²⁰ Gregory: Is there any other point to which you would wish to draw my attention? Holmes: To the curious incident of the dog in the night-time. Gregory: The dog did nothing in the night-time. Holmes: That was the curious incident.

- 1) No entity with power supply responsibility or management experience or experience operating an aging nuclear plant has been shown to have been involved in deciding to extend Diablo Canyon’s operating life.
- 2) No substantial comparison of alternative ways of meeting California power supply goals was made. No substantial review of the costs of continued Diablo Canyon operation was undertaken. Nor were studies or market tests performed to establish that continued operation was the most cost-effective way to spend any given sum of money to attain California’s power supply and environmental goals. No study was made of the potential adverse impacts of continued Diablo Canyon operation on the development of additional low and zero carbon renewables or on energy efficiency procurement or on the development of transmission and storage alternatives. Not even the potential cost increases of having to upgrade Diablo Canyon seismic safety levels to meet extensive new knowledge of the earthquake dangers confronting the plant and its neighbors were taken into account. The same is true as to cost uncertainties associated with pressure vessel integrity and with the possibility of needing expensive modifications to comply with water quality standards in the event that legal challenges prevail. Nor was meaningful public input sought before Governor Newsom demanded and the Legislature enacted SB 846.

Q. Please describe the manner in which the testimony of San Luis Obispo Mothers for Peace demonstrates the imprudence of extending the operation of Diablo Canyon.

A. SLOMFP witnesses demonstrate the inaccuracy of many of the key assumptions said to justify extended operation. Furthermore, as I have testified, the fact that hastily passed legislation could dramatically tilt California state government toward the option of continued operation is in itself imprudent.

SLOMFP expert witnesses demonstrate this as follows:

A) Dr. Mark Cooper

Dr. Mark Cooper’s testimony draws on the extensive and specific economic history of nuclear power, the current California power supply situation and the likely availability and cost of alternative sources to demonstrate that continued operation of Diablo Canyon is not reasonable from an economic or a system reliability standpoint. Furthermore, he shows that such

1 continued operation will undermine the development of the zero carbon alternatives necessary to
2 reaching California’s goals for combatting climate change, a phenomenon I have observed also
3 in other countries such as Germany and Great Britain.²¹

4 Dr. Cooper’s testimony is entitled to particular weight in light of the demonstrated
5 foresight in his extensive testimony and his prolific writing forecasting the economic risks of
6 reliance on nuclear power. Any regulatory commission assigning credibility to witnesses based
7 on their proven track record as to comparable topics in previous proceedings would heed Dr.
8 Cooper over most others. In recent years, he has warned state regulators in South Carolina,
9 Florida and Georgia of the likelihood of catastrophic cost overruns from nuclear projects as well
10 as the availability of superior alternatives. In each case, the power plants went forward. In each
11 case, it is now clear they have saddled state customers with billions of dollars in unnecessary
12 utility costs that Dr. Cooper’s warnings would have avoided. Indeed, in Florida and South
13 Carolina, the correctness of Dr. Cooper’s conclusions eventually became so clear that the nuclear
14 projects were cancelled after billions were spent. In Georgia, where construction continues, the
15 mounting overruns and unnecessary customer costs have been the highest of all.

16 B) Rao Konidena

17 Like Dr. Cooper, Rao Konidena has drawn exclusively from publicly available data to
18 confirm PG&E’s and the state’s longstanding and carefully arrived at conclusion that Diablo
19 Canyon is not a good choice for assuring California’s grid reliability. Dr. Konidena makes
20 points that any reasonable executive would take into careful account before reversing PG&E’s
21 PUC-approved 2016 decision to close Diablo Canyon. He also dismantles the California Energy
22 Commission staff recommendation that pursuing extension of Diablo Canyon is prudent. He
23 shows that Diablo Canyon simply does not provide the type of flexible reserves that the
24 California situation requires. To the extent that the units provide planned reserves, they can be
25 replaced with other generation serving the same purpose but with more flexibility – a process
26 that was well underway pursuant to the 2018 PUC approved settlement. He also confirms

²¹ See, for example, “How nuclear power is switching off windfarms in Scotland”, which states
“The practice of paying windfarms to cut back their energy production exists for different
reasons, including shortcomings with the grid network. But a very big reason is simply the
inability of nuclear facilities to operate flexibly”. <https://100percentrenewableuk.org/how-nuclear-power-undermines-renewable-energy-the-truth-about-wind-power-compensation-payments>

1 PG&E’s longstanding concern that operating Diablo Canyon both forestalls development of new
2 renewable and other low carbon power sources and at times requires that available renewable
3 energy not be used.

4 C) Dr. Peter Bird and Samuel Miranda

5 In testimony that illuminates another aspect of the imprudence of extending the life of the
6 Diablo Canyon units, SLOMFP witnesses Peter Bird and Samuel Miranda testify to areas of
7 safety concern that were deferred because of the 2024-25 shutdown dates. Dr. Bird concludes
8 that the 2015 Seismic Source Characterization (SSC) for Diablo Canyon Power Plant (DCPP)
9 was deficient and biased in 3 ways. The SSC study should be redone, and the result is expected
10 to show significantly higher hazard. This will, in turn, require a new Seismic Probabilistic Risk
11 Assessment for DCPP, which can be expected to show higher risk of seismic external accidents.
12 Such consequences will probably result in a choice between shutdown and expensive
13 reinforcements.

14 Mr. Miranda testifies that since the SER for DCPP’s LRA has not yet been issued, the
15 conditions, if any, that might be imposed by the NRC for license renewal are not known. It is
16 likely that the NRC staff would condition its approval of a license renewal upon those specific
17 maintenance and inspection activities that have so far been identified and deferred by PG&E, in
18 anticipation of its planned decommissioning of DCPP. These activities would have to be
19 addressed (i.e., resolved or completed) before any period of extended operation (e.g., for five or
20 20 years) could be approved. Therefore, a likely potential condition of license renewal could be
21 that all DCPP maintenance, testing and inspection actions must be complete (i.e., up to date) by
22 the time of re-licensing.

23 The Bird and Miranda opinions show that extended operation of Diablo Canyon may
24 come with a choice between accepting additional risk and making expensive repairs and
25 upgrades. Furthermore, Dr. Cooper’s work shows a strong correlation between reactor aging and
26 increases in operating costs. No such dramatic cost uncertainties exist with regard to the
27 combinations of alternatives that could replace Diablo Canyon. Furthermore, none of those
28 alternatives face possible modifications remotely as expensive as the potential costs of Clean
29 Water Act compliance for Diablo Canyon. Committing to costly and consequential actions
30 without having fully assessed the cost uncertainties of foreseeable events is conduct often
31 implicated in past imprudence decisions.

1 Since the prudence reviews required by SB 846 must take place before the decisions have
2 been implemented, their review must scrutinize the processes followed especially closely. This is
3 because there are no cost consequences visible yet to guide reviewers to particular areas. The
4 point of the reviews with which the PUC is charged is to head off such consequences before they
5 occur, not to allocate billions of misspent dollars among customers, investors and taxpayers.
6 This goal can only be attained by a close inquiry into what the ingredients of a prudent decision
7 as to extending the life of the Diablo Canyon units would be and insisting that those ingredients
8 actually take place.

9 **Q. Won't the deficiencies that you describe be remedied by this proceeding and other**
10 **ongoing work at California state agencies as well as PG&E?**

11 A. Not only is the decision to extend the life of the Diablo Canyon reactors imprudent on the
12 record as it stands, but the imprudence cannot be cured by this and other proceedings mandated
13 by SB 846.

14 One fundamental way to test the need for a major generation commitment is to subject it
15 to a market test in which the California power market seeks to acquire whatever level of
16 generating capacity is needed to meet the concerns voiced by Governor Newsom and others.
17 While it is possible that continued operation of Diablo Canyon for some or all of the next five
18 years would be a prudent choice, it is also possible that the nuclear plant would not even bid or
19 that it would be outbid by combinations of other alternatives, as has happened in power supply
20 auctions elsewhere, leading to the closing of operating reactors and to decisions not to go
21 forward with new projects. When no such test has been undertaken, a hasty commitment of this
22 magnitude simply cannot be deemed to have been prudently undertaken.

23 To make matters worse, the situation is not static. The imprudence of forcing five more
24 years of Diablo Canyon operation into PG&E's power supply mix inevitably crowds out
25 combinations of renewable alternatives with more efficient usage, load management, storage and
26 transmission enhancement. Not only must these resources curtail operation at times when they
27 are lowest cost to make room for Diablo Canyon's inflexible output, but investment in new
28 resources will be depressed by Diablo Canyon's mandatory place in the power supply market,
29 since these alternative resources (but not Diablo Canyon) are essential to California's 2045 zero-
30 carbon power supply goal, this crowding out damages prospects for reaching that goal.

1 It was precisely to avoid this crowding out that Germany, despite the hardships brought on by
2 curtailment of Russian energy supplies, recently completed its decade old plans to shut down the
3 last of its nuclear reactor fleet that once numbered more than 25 reactors.

4 **Q. Are you aware of situations in which competitive solicitations displaced large single**
5 **source solutions preferred by utilities and/or governments?**

6 A. Absolutely. In New England in the 1980s utilities often asserted that large central
7 generating station projects would be needed to keep the lights on. However, Maine and Vermont
8 both insisted on running competitive procurement processes as a check on these assertions. As a
9 result of projects not foreseen when the large projects were developed, both states were able to
10 exit the nuclear projects of favorable terms. A few years later, Central Maine Power Company
11 proposed building a major transmission line to import Canadian power. When the Maine Public
12 Utilities Commission required that the load to be served by this line be bid competitively, a
13 combination of in-state resources proved to be superior.

14

15 **Section 5 – Conclusion and Recommendations**

16

17 **Q. Please summarize your conclusions.**

18 A. The processes being used to justify the extended operation of Diablo Canyon do not
19 remotely satisfy the prudence standards developed over the last century to protect utility
20 customers, secure reliable service and compel management care and wisdom consistent with the
21 size and consequences of the commitments being made a managed. If the California PUC does
22 not call out the imprudence and set the state on a path to correct it now, it will be hazarding its
23 customers' and citizens' resources on questionable guesstimates about complex future energy
24 and economic developments rather than on the basic principles of prudent energy policy.

25

26 **Q. The prudence standards that you discuss above invariably state that choosing one**
27 **reasonable alternative among several or choosing a reasonable alternative that turns out**
28 **badly are not proof of imprudence. Isn't continued operation of Diablo Canyon a**
29 **reasonable alternative to the courses you would recommend even if it is not your preferred**
30 **choice.**

1 A. Absolutely not. For the reasons that I have discussed, locking in extension of Diablo
2 Canyon has not resulted from a reasonable review of prudent alternatives. Without such a
3 review, a commitment of this magnitude, especially one with these uncertainties, risks and
4 unavoidable disadvantages cannot be prudent.

5 **Q. What recommendations do you make to the California PUC?**

6 A. To restore state policy regarding Diablo Canyon to the prudent and reasonable position
7 that it occupied from the time of the PUC decision of January 2018 until early 2022, the PUC
8 should declare that extension of the Diablo Canyon powerplant is imprudent and that the loan
9 agreement should therefore be suspended or terminated. It should also so advise the California
10 Energy Commission pursuant to its duty to consult with CEC on its determination of prudence,
11 and it should, pursuant to its duty to “to take all actions necessary and prudent to extend Diablo
12 Canyon powerplant operations” pursue both a comprehensive market test and a revived
13 Integrated Resource Planning designed not to justify continued operation of Diablo Canyon but
14 instead to discover and implement the most just and reasonable combination of policies to assure
15 the safe and economic reliability of PG&E electric service and the timely decarbonization of its
16 electric system.

17 **Q. Does this conclude your testimony?**

18 A. Yes, it does.

Attachment A

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PROFESSIONAL EXPERIENCE:

Peter Bradford chaired the New York State Public Service Commission from 1987 until 1995 and the Maine Public Utilities Commission from 1982 until 1987. During these years, New York resolved its stalemate over operating the Shoreham nuclear power plant and Maine resolved its involvement in Seabrook, both on favorable economic terms. He was Maine's Public Advocate in 1982 and was President of the National Association of Regulatory Utility Commissioners during 1987.

He served on the U.S. Nuclear Regulatory Commission from 1977 until 1982. During his term, the NRC undertook major upgrading of its regulatory and enforcement processes in the wake of the 1979 Three Mile Island accident.

Prior to becoming a member of the NRC, he had served on the Maine Public Utilities Commission (1971-1977) and was Chairman in 1974-1975.

Until 2018 he was an adjunct professor at Vermont Law School, where he taught “Nuclear Power and Public Policy” and “The Law of Electric Utility Restructuring”. He also advises and teaches on utility regulation, restructuring, nuclear power and energy policy in the U.S. and abroad. He was a member and chair of the Public Oversight Panel for the Comprehensive Vertical Assessment of Vermont Yankee Nuclear Power Plant and has served as an expert witness on investment in new nuclear power plants in several states. He is one of Vermont’s two representatives on the Texas/Vermont Low Level Radioactive Waste Disposal Compact Commission and served on the advisory panel for the Bipartisan Policy Center project on nuclear waste. He has been a visiting lecturer in energy policy and environmental protection at Yale University and served on New York State’s 2012-13 Moreland Commission on Utility Storm Response.

One prominent regulatory scholar termed him “generally regarded as the nation’s brightest and most thoughtful regulator” (Irwin Stelzer, New York Post, 07/14/1994). Another called him a “regulatory legend” (<https://www.scotthemplinglaw.com/essays/the-decisive-regulator>).

He served on the 2007 Keystone Center fact finding collaboration on nuclear power and the 2006 National Academy of Sciences panel evaluating the alternatives to continued operation of the Indian Point Nuclear Power Plants in New York. He is also on the board of the Regulatory Assistance Project, which provides assistance to state and federal energy regulatory commissions regarding economic regulatory policy and environmental protection.

He served on a panel advising the European Bank for Reconstruction and Development on how best to replace the remaining Chernobyl nuclear plants in Ukraine and also on an expert panel advising the Austrian Institute for Risk Reduction on regulatory agency issues associated with the opening of the Mochovce nuclear power plant in Slovakia. He advised the Vermont Legislature on issues relating to spent fuel storage at Vermont Yankee and the Town of Wiscasset, Maine, on issues related to the storage of spent nuclear fuel at the site of the former Maine Yankee nuclear power plant.

He has advised on electric restructuring issues and has testified on aspects of nuclear power, electricity and telecommunications restructuring in many U.S. states.

He has also advised on energy, telecommunications and water utility restructuring issues in China, Armenia, Azerbaijan, Canada, Georgia, India, Indonesia, Kazakhstan, Kyrgyzstan, Mongolia, Russia, Samoa, South Africa, St. Lucia, Trinidad and Tobago and Turkey. He was a member of the Policy Advisory Committee of the China Sustainable Energy Program, a joint project of the David and Lucille Packard Foundation and the Energy Foundation from 1999 until 2014.

Mr. Bradford was an advisor to Maine Governor Kenneth Curtis from 1968 to 1971, with responsibilities for oil, power and environmental matters. He assisted in preparing landmark Maine laws relating to oil pollution and industrial site selection and was Staff Director of the Governor's Task Force on Energy, Heavy Industry and the Coast of Maine.

Mr. Bradford is the author of Fragile Structures: A Story of Oil Refineries, National Security and the Coast of Maine, a book published by Harper's Magazine

Press in 1975. (“In a number of respects a rare book...The presentation is a balanced one”, New York Times, 11/30/1975; “If sanity is ever declared illegal, Peter Bradford ought to be one of the first people arrested...A work of political education that transcends partisanship”, Kirkus Reviews, May, 1975).

His articles on utility regulation and nuclear power have appeared in many publications, including The New York Times, The Washington Post, The Los Angeles Times, The Boston Globe, The Atlanta Journal Constitution, The Bulletin of the Atomic Scientists, and The Electricity Journal.

He is a 1964 graduate of Yale University and received his law degree from the Yale Law School in 1968.

He and his wife Susan live in Peru, Vermont.

PROFESSIONAL AFFILIATIONS:

2011-present – Commissioner, Texas/Vermont Low Level Radioactive Waste Compact Commission

1998-present, Board of Directors, Union of Concerned Scientists

2020-present – Board of Directors, the Regulatory Assistance Project

2017-present - Board of Directors, the Nonproliferation Education Center

2013-2015 – Member Bipartisan Policy Center panel on disposal of high-level nuclear waste.

1999-2015 - Member, Policy Advisory Committee, China Sustainable Energy Project (funded by the David and Lucille Packard Foundation and the Energy Foundation).

2012-13 – Commissioner, New York State Moreland Commission on Utility Storm Response

2007 – Member, Keystone Center project on the future of nuclear power

2006 – Member of the National Research Council Center on Alternatives to the Continued Operation of the Indian Point Nuclear Power Plants

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

1987-1995, 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

EDUCATION:

1964 *B.A.* History, Yale University, New Haven, CT

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

AWARDS:

Honorary Degree, Unity College, 1981.

Environmental Award, Natural Resources Council of Maine, 1979.

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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 Committee;

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 Stars 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;

Other Papers

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.

Attachment B

**PACIFIC GAS AND ELECTRIC COMPANY
Diablo Canyon Power Plant Operations Extension OIR
Rulemaking 23-01-007
Data Response**

| | | | |
|------------------------|---|-------------------|-----------------|
| PG&E Data Request No.: | SLOMFP_001-Q001-028 | | |
| PG&E File Name: | DiabloCanyonPowerPlantOperationsExtensionOIR_DR_SLOMFP_001-Q001-028 | | |
| Request Date: | May 25, 2023 | Requester DR No.: | 001 |
| Date Sent: | June 9, 2023 | Requesting Party: | SLOMFP |
| PG&E Witness: | | Requester: | Sabrina Venskus |

QUESTION 001

Please provide the following DOCUMENTS: All reports, analysis, calculations, data, modeling and metal sample stress testing RELATED TO embrittlement of Diablo Canyon Power Plant Units 1 and 2 from January 1, 2001, to present.

ANSWER 001

PG&E objects to this data request on grounds that it is overbroad, burdensome, irrelevant to and outside the scope of the proceeding. The Nuclear Regulatory Commission (NRC) has exclusive jurisdiction over the safe operations of Diablo Canyon, including embrittlement of Units 1 and Unit 2.

QUESTION 002

Please provide the following DOCUMENTS: All reports, analysis, calculations, data, modeling and metal sample stress testing RELATED TO embrittlement at other Nuclear Power Plants that PG&E utilized as a replacement of, or alternative to, embrittlement analysis of Diablo Canyon Power Plant from January 1, 2001, to present.

ANSWER 002

PG&E objects to this data request on grounds that it is overbroad, burdensome, irrelevant to and outside the scope of the proceeding. The NRC has exclusive jurisdiction over the safe operations of Diablo Canyon, including embrittlement of Units 1 and Unit 2.

QUESTION 003

Please provide responses to the following requests:

- 1) State the justification for using embrittlement data from another nuclear power plant reactor that may not have the same metallurgical specifications to analyze embrittlement at Diablo Canyon Power Plant.

- 2) State why this substitution, replacement or alternative was deemed necessary and why it was deemed sufficient to meet CFR requirements.

ANSWER 003

PG&E objects to this data request on grounds that it is irrelevant to and outside the scope of the proceeding. The NRC has exclusive jurisdiction over the safe operations of Diablo Canyon, including embrittlement of Units 1 and Unit 2.

QUESTION 004

Please provide the following DOCUMENTS: All reports, analysis, calculations, data, modeling and metal sample stress testing REGARDING Diablo Canyon Power Plant's compliance with Upper Shelf Energy Specifications from January 1, 2001, to present.

ANSWER 004

PG&E objects to this data request on grounds that it is irrelevant to and outside the scope of the proceeding. The NRC has exclusive jurisdiction over the safe operations of Diablo Canyon, including embrittlement of Units 1 and 2.

QUESTION 005

Please provide the following DOCUMENTS: All COMMUNICATIONS between PG&E and the Diablo Canyon Independent Safety Committee REGARDING embrittlement modeling, calculations and metal sample testing from January 1, 2001, to present.

ANSWER 005

PG&E objects to this data request on grounds that it is irrelevant to and outside the scope of the proceeding. The NRC has exclusive jurisdiction over the safe operations of Diablo Canyon, including embrittlement of Units 1 and 2. Subject to and without waiving that objection, PG&E responds that information provided to or presented to the Diablo Canyon Independent Safety Committee can be found at www.dcisc.org or by direct request to the DCISC.

QUESTION 006

Please provide the following DOCUMENTS: All COMMUNICATIONS between PG&E and another person, agency or entity REGARDING Diablo Canyon Power Plant's compliance with Upper Shelf Energy Specifications from January 1, 2001, to present.

ANSWER 006

PG&E objects to this data request on grounds that it is irrelevant to and outside the scope of the proceeding. The NRC has exclusive jurisdiction over the safe operations of Diablo Canyon, including embrittlement of Units 1 and 2.

QUESTION 007

Please provide the following DOCUMENTS: All PG&E's submissions and applications for NRC License Renewal from January 1, 2001, to present.

ANSWER 007

PG&E objects to this data request on grounds that it is irrelevant to and outside the scope of the proceeding. PG&E has been directed by the NRC to submit a new license renewal application by December 31, 2023.

QUESTION 008

Please provide the following DOCUMENTS: A copy of the executed loan agreement mentioned on page 5 of PG&E's October 7, 2022, Comments on Assigned Commissioner and Assigned Administrative Law Judge Amended Scoping Memo and Ruling in A.16-08-006.

ANSWER 008

PG&E objects to this data request on grounds that it is irrelevant to and outside the scope of this proceeding.

QUESTION 009

Please provide the following DOCUMENTS: A copy of PG&E's September 2, 2022, application to the U.S. Department of Energy Civil Nuclear Credit program, mentioned on page 4 of PG&E's October 7, 2022, Comments on Assigned Commissioner and Assigned Administrative Law Judge Amended Scoping Memo and Ruling in A.16-08-006.

ANSWER 009

PG&E has received executed Nondisclosure Agreements from the designated reviewing representatives and will provide the September 2, 2022, Application submitted to the U.S. Department of Energy (DOE) in regard to the Civil Nuclear Credit program via a secure transfer site.

PG&E's Application is confidential in its entirety and PG&E's Application is identified as "Protected Materials" under PG&E's NDA with SLOMP. Certain files contained within PG&E's Application are also market sensitive within the meaning of (D.) 06-06-066 and subsequent CPUC decisions. Market sensitive files contained within the Application files may contain confidentiality designations that comport with the DOE's instructions for the Application.

QUESTION 010

Please provide the following DOCUMENTS: A copy of the executed loan agreement for the \$1.4 billion loan under the Department of Energy Civil Nuclear Credit program referenced on page D.6-9 of the Administrative Law Judge's Ruling Requesting Comments Served As Testimony On Statutory Interpretation And Issues Of Policy, And Incorporating Certain Reports Into The Record of This Proceeding (R.23-01-007).

ANSWER 010

PG&E objects to this data request on grounds that is vague. Subject to and without waiving that objection, PG&E responds that no such document exists.

QUESTION 011

Please provide the following DOCUMENTS: A copy of any written responses made by PG&E to requests for additional information by the U.S. Department of Energy REGARDING PG&E's application to the Civil Nuclear Credit program.

ANSWER 011

PG&E objects to this data request on grounds that it is irrelevant and outside the scope of this proceeding. Subject to and without waiving that objection, PG&E responds that the Commission considered and rejected similar requests for information in the *Assigned Commissioner's Scoping Memo and Ruling*, dated April 6, 2023, in which it required only that PG&E produce to parties, who execute an NDA, its September 2, 2022 application for certification by the DOE as an eligible bidder in the DOE Civil Nuclear Credit program (p. 9).

QUESTION 012

Please provide the following DOCUMENTS: All reports, analysis, calculations, data, and load flow (summer peak and summer off-peak) modeling results RELATED TO the Loss of Load Expectation (LOLE) reliability assessment of retirement of Diablo Canyon Power Plant Units 1 and 2 from January 1, 2015, to present.

ANSWER 012

PG&E objects to the request for production of documents related to any LOLE assessment as overbroad, unduly burdensome and not likely to lead to admissible evidence in this proceeding. Subject to and without waiving that objection, PG&E clarifies that PG&E does not conduct Loss of Load Expectation (LOLE) studies solely related to the retirement of Diablo Canyon Power Plant.

QUESTION 013

Please provide the following DOCUMENTS: The list of generating units and their fuel types in the summer peak and summer off-peak load flow models for study years in the time frame 2018-2032 for the PG&E Control Area that were either re-dispatched or their generation backed down to accommodate output of Diablo Canyon Power Plant Units 1 and 2.

ANSWER 013

PG&E objects to the request for documents as irrelevant and outside the scope of the proceeding. Subject to and without waiving that objection, PG&E responds that PG&E has no such responsive documents in its possession and clarifies that CAISO transmission planning studies for the timeframe of 2018-2032 do not consider whether generating units are re-dispatched or their generation backed down to accommodate output of Diablo Canyon Power Plant. PG&E further clarifies that SLOMFP may obtain CAISO models, including summer peak models, from the CAISO through the execution of a relevant Non-Disclosure Agreement with CAISO, and details concerning access to CAISO models are available at <https://www.caiso.com/rules/Pages/ContractsAgreements/Default.aspx>.

QUESTION 014

Please provide responses to the following requests:

According to CAISO 2012-2013 ISO Transmission Plan, "The absence of DCPD results in avoiding several overloads on the PG&E bulk system during off-peak load conditions (i.e., Westley-Los Banos 230 kV and Gates-Midway 230 kV line overloads)." Source - Page 169, <http://www.caiso.com/Documents/BoardApproved2012-2013TransmissionPlan.pdf>

- 1) Does extension of DCPD cause overloads on the PG&E bulk system during off-peak load conditions?
- 2) If so, which transmission lines will be overloaded and by what percentage?

ANSWER 014

PG&E objects to this data request as irrelevant and outside the scope of the proceeding. Subject to and without waiving the foregoing objection, PG&E clarifies that the 2012-2013 CAISO Transmission Plan is outdated, and the resources studied as part of the 2012-2013 CAISO Transmission Planning Process are not reflective of those energy generation and/or storage resources that exist in the CAISO energy market or transmission projects completed as of today.

QUESTION 015

Please provide responses to the following requests:

According to CAISO 2012-2013 ISO Transmission Plan, CAISO states this referring to the Diablo Canyon Special Protection Scheme (SPS) "The need for this SPS is clearly evident and hence the recommendation is to have this SPS in-service all the time."

Source - Page 201, <http://www.caiso.com/Documents/BoardApproved2012-2013TransmissionPlan.pdf>

- 1) Does extension of DCPD remove the need for the Diablo Canyon SPS?
- 2) What impact does DCPD extension have on other SPS in PG&E bulk system?

ANSWER 015

PG&E objects to this data request as irrelevant and outside the scope of the proceeding. Subject to and without waiving the foregoing objection, PG&E clarifies that it expects the SPS will remain in place for any extended operations of DCPD and PG&E has not studied the potential removal of the SPS at DCPD.

QUESTION 016

Please provide responses to the following request:

- 1) Which transmission projects in the time frame 2018-2032 for the PG&E Control Area will be either delayed or re-assessed for reliability, economic and policy reasons to accommodate output of Diablo Canyon Power Plant Units 1 and 2?

ANSWER 016

PG&E objects to this data request as irrelevant and outside the scope of the proceeding. Subject to and without waiving the foregoing objection, PG&E clarifies that PG&E has not conducted any such analysis to determine whether "transmission projects in the time frame 2018-2032 for the PG&E Control Area will be either delayed or re-assessed for reliability, economic and policy reasons to accommodate output of Diablo Canyon Power Plant Units 1 and 2" and further clarifies that any such assessment would be performed by CAISO.

Question 017

Please provide the following DOCUMENTS: All reports, analysis, calculations, data, modeling and studies performed by or for PG&E after September 30, 2018, showing that operating Diablo Canyon until or beyond 2030 is the least expensive way to meet PG&E's electric needs.

ANSWER 017

PG&E objects to this data request on grounds that it is irrelevant and outside the scope of this proceeding. Subject to and without waiving that objection, PG&E responds that no such documents exist.

QUESTION 018

Please provide the following DOCUMENTS: All reports, analysis, calculations, data, modeling and studies performed by or for PG&E after September 30, 2018, showing that operating Diablo Canyon until or beyond 2030 is essential to assuring the reliability of PG&E's electric system.

ANSWER 018

PG&E objects to this data request on grounds that it is irrelevant and outside the scope of this proceeding. Subject to and without waiving that objection, PG&E responds that no such documents exist.

QUESTION 019

Please provide the following DOCUMENTS: All reports, analysis, calculations, data, modeling and studies performed by or for PG&E after September 30, 2018, showing that operating Diablo Canyon until or beyond 2030 is essential to meeting California's carbon emission reduction goals.

ANSWER 019

PG&E objects to this data request on grounds that it is irrelevant and outside the scope of this proceeding. Subject to and without waiving that objection, PG&E responds that no such documents exist.

QUESTION 020

Please provide the following DOCUMENTS: All COMMUNICATIONS from PG&E to any agency of California state government after September 30, 2018, showing that operating Diablo Canyon until or beyond 2030 is the least expensive way to meet PG&E's electric needs.

ANSWER 020

PG&E objects to this data request on grounds that it is irrelevant and outside the scope of this proceeding. Subject to and without waiving that objection, PG&E responds that it is not aware of any communications that would be responsive to this data request.

QUESTION 021

Please provide the following DOCUMENTS: All COMMUNICATIONS from PG&E to any agency of California state government after September 30, 2018, showing that operating Diablo Canyon until or beyond 2030 is essential to assuring the reliability of PG&E's electric system.

ANSWER 021

PG&E objects to this data request on grounds that it is irrelevant and outside the scope of this proceeding. Subject to and without waiving that objection, PG&E responds that it is not aware of any communications that would be responsive to this data request.

QUESTION 022

Please provide the following DOCUMENTS: All COMMUNICATIONS from PG&E to any agency of California state government after September 30, 2018, showing that operating Diablo Canyon until or beyond 2030 is essential to meeting California's carbon emission reduction goals.

ANSWER 022

PG&E objects to this data request on grounds that it is irrelevant and outside the scope of this proceeding. Subject to and without waiving that objection, PG&E responds that it is not aware of any communications that would be responsive to this data request.

QUESTION 023

Please provide the following DOCUMENTS: All COMMUNICATIONS from PG&E to any agency of California state government after September 30, 2018, recommending that the Diablo Canyon nuclear reactors operate until or beyond 2030.

ANSWER 023

PG&E objects to this data request on grounds that it is irrelevant and outside the scope of this proceeding. Subject to and without waiving that objection, PG&E responds that it is not aware of any communications that would be responsive to this data request.

QUESTION 024

Please provide the following DOCUMENTS: All reports, analysis, calculations, data, modeling and studies prepared by PG&E or on PG&E's behalf of sources of generation and load from January 1, 2015, to present, including but not limited to analysis RELATED TO:

- a) cost
- b) quantity
- c) cost associated with meeting load at all times (firming costs)
- d) avoided cost and value
- e) integration cost
- f) potential storage costs
- g) Efficiency
- h) Solar
- i) Solar hybrid (solar + battery)
- j) Wind
- k) Wind hybrid (wind + battery)
- l) Standalone Batteries
- m) Nuclear power
- n) Natural gas combined cycle
- o) Carbon capture and storage

ANSWER 024

PG&E objects to this data request on grounds that it is vague, overbroad, burdensome, irrelevant and outside the scope of this proceeding.

QUESTION 025

Please provide the following DOCUMENTS: All load projections for the entire 24 cycle from January 1, 2015, to present.

ANSWER 025

PG&E objects to this data request on grounds that it is vague, overbroad, burdensome, irrelevant and outside the scope of this proceeding.

QUESTION 026

Please provide the following DOCUMENTS: All analysis prepared by CAISO from January 1, 2015, to present or load and reserve margins, including but not limited to all forecasts and actual performances.

ANSWER 026

PG&E objects to this data request on grounds that it is vague, overbroad, burdensome, irrelevant and outside the scope of this proceeding. Subject to and without waiving that objection, PG&E refers SLOMFP to the CAISO with requests for CAISO information.

QUESTION 027

Please provide the following DOCUMENTS: Studies conducted by PG&E of the environmental impact, including all scenarios considered, with respect to ongoing operations of Diablo Canyon Nuclear Power Plant.

ANSWER 027

PG&E objects to this data request on grounds that it is irrelevant to and outside the scope of this proceeding. Subject to and without waiving that objection, PG&E responds that PG&E will submit an environmental report to the NRC as required in connection with its license renewal application no later than December 31, 2023.

QUESTION 028

Please provide responses to the following requests:

- 1) Specify which analyses in the CLB show that PTS will not cause any cracking in DCPD during extended operations
- 2) Identify the manufacturer, and dates of forging for the DCPD reactor vessels. Compare the DCPD vessels in terms of operation, i.e., in effective full power years (EFPYs).
- 3) Identify other vessels, in other plants, of similar composition and age, and possibly in the same heat.

ANSWER 028

PG&E objects to this data request on grounds that it is vague, irrelevant and outside the scope of the proceeding. The NRC has exclusive jurisdiction over the safe operation of Diablo Canyon, including the current licensing basis and aging of plant equipment.