

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

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

Rulemaking 23-01-007  
(Filed January 12, 2023)

**CALIFORNIANS FOR GREEN NUCLEAR POWER'S  
PHASE 1, TRACK 2 REPLY COMMENTS**

July 28, 2023

**Gene Nelson, Ph.D.**  
Senior Legal Researcher & President  
Californians for Green Nuclear Power, Inc. (CGNP)  
1375 East Grand Ave Ste 103 #523  
Arroyo Grande, CA 93420-2421  
(805) 363 - 4697 cell  
Government@CGNP.org email

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

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

Rulemaking 23-01-007  
(Filed January 12, 2023)

**CALIFORNIANS FOR GREEN NUCLEAR POWER'S  
PHASE 1, TRACK 2 COMMENTS**

**I. VERIFICATION**

The author below affirms under penalty of perjury that the information contained in this written testimony is true and correct, and is given in good faith to their best available knowledge, subject to modifications resulting from new findings.

/s/ Gene A. Nelson, Ph.D., President and Senior Legal Researcher

July 28, 2023

**II. SUMMARY OF DCISC'S RECENT FACT-FINDING REPORTS**

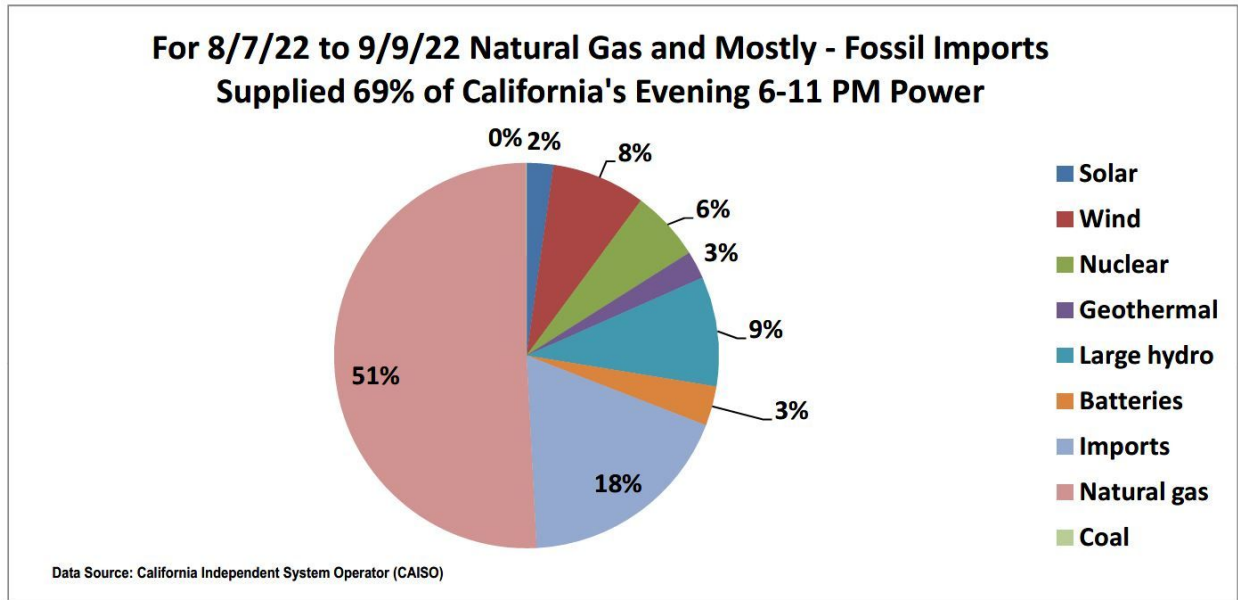
The Diablo Canyon Independent Safety Committee (DCISC) supplied four fact-finding reports which became part of the Record of this Proceeding as the

consequence of a CPUC Decision dated June 30, 2023. Passages shown as bold are in the original. CGNP believes most of the typographical errors are a consequence of an adverse interaction with the CPUC document intake system, as some of CGNP's recent filings have passages with garbled text, despite being filed with perfectly readable text. CGNP respectfully requests this apparent software issue be investigated by the Commission and corrected. CGNP stands ready to assist in this troubleshooting process.

From page 14 of 96, the first DCISC report reads, "**Conclusions: DCP's wide-ranging and longstanding program (sic) for achieving and maintaining seismic safety is robust and has adequate resources. Important new analyses were being developed at the time of this meeting and were expected to be available over the next several months, i.e., second quarter 2023. To support (sic) the DCISC's legislative mandate under SB 846 to perform a seismic-safety evaluation, the DCISC currently has sufficient information to complete the evaluation. The DCISC will also need to review the new reports and evaluations as they become available, including the contribution of FLEX capabilities to further reduce seismic risk. At this time, the DCISC concludes that there are no concerns with the adequacy of seismic safety at DCP.**"

The remaining DCISC Fact Finding Report conclusions appear in Appendix A, immediately following CGNP's Reply Comments. CGNP believes the DCISC Fact Finding reports are consistent with DCP being able to safely operate during extended operations to 2030 or beyond.

**III. DURING DEADLY HEAT STORMS SUCH AS THE ONE CALIFORNIA EXPERIENCED IN AUGUST - SEPTEMBER 2022, RELIABLE DIABLO CANYON WAS A LIFESAVER (BATTERIES WERE UNRELIABLE)**



Here's the summary chart:

Monthly Total MWh		Percentage
141,756	Solar	2.25%
495,569	Wind	7.87%
146,613	Geothermal	2.33%
3,197,345	Natural gas	50.80%
578,914	Large hydro	9.20%
1,150,390	Imports	18.28%
209,329	Batteries	3.33%
372,506	Nuclear	5.92%
1,805	Coal	0.03%
6,294,227	Total	100.00%

The dominant energy source during the time interval from 6-11 PM is in-state natural gas fired generation at 51% followed by mostly fossil - fired imports at 18% for a total of 69%. While fossil-fired power is firm, it pollutes both air and water (in the case of coal) with toxic waste products. In contrast, DCP provides "clean firm power."

Opponents to DCP extended operation now offer grid-scale batteries as a replacement for DCP, just as they offered expansion of California hydroelectric pumped storage in a now-debunked 2016 FoE - TURN - CEERT report.<sup>1</sup> Relative to DCP, batteries have a poor safety record. The batteries at Moss Landing experienced three hazardous fires recently. One of those fires caused activation of the emergency sirens, with residents advised to shelter in place with windows closed for a day. Appendix B provides the detailed evening performance information by energy source during the August - September 2022 California heat storm. Note the dramatic difference in performance between batteries and DCP.

The summary monthly statistics are that dependable DCP provided a daily mean of 11,288 MWh during the evening hours with a standard deviation (or dispersal about the mean) of 35 MWh [0.31% of the mean.] (A lower value for the standard deviation means the values are more tightly clustered around the mean.) On the other hand, batteries had a daily mean of 6,343 MWh with a standard deviation of 918 MWh [14.5% of the mean.] Inspection of the CAISO daily generation data between August 7 - September 8, 2022 shows many of California's 4-hour batteries were exhausted long before the demand decreased, such as occurred during the CAISO EEA3 Emergency on September 6, 2022.

---

<sup>1</sup> "The Faulty Diablo Canyon Study that Started it All - How Friends of the Earth and a Prominent Renewable Energy Lobbyist Hoodwinked California Policy-Makers," Jonah Messinger, Seaver Wang, and Adam Stein, August 30, 2022, The Breakthrough Institute, Oakland, California.  
<https://thebreakthrough.org/issues/energy/the-faulty-diablo-canyon-study-that-started-it-all>

Increased fossil-fired generation filled in for the exhausted batteries, to the detriment of the environment. California would be ill-advised to replace reliable DCPD with unreliable batteries. (Previously, CGNP noted in 2011 that the CEC commissioned a pair of studies asking how to cost-effectively decarbonize the California power grid from the eminent scientists and engineers of the California Council on Science and Technology. The scientists and engineer's answer was a dramatic expansion of nuclear generation in California. )

Note the significant increases in daily natural gas fired generation and mostly fossil-fired imports on September 6, 2022 relative to their monthly averages. Unsurprisingly, statewide locational marginal prices (LMPs) were high during the CAISO EEA3 emergency, peaking at about \$1,767.30 around 6:20 PM. CGNP estimates based on CAISO load and LMP statistics that Californians paid about \$210 million during the 2 hour and 43 minute CAISO EEA3 emergency, far above state averages for that time of day. See Appendix C for details. In her 2020 book, Angwin asks, "Is the result a feature or a bug?"<sup>2</sup> Given the natural - gas - centric nature of California's grid, CGNP notes with concern a recent 50-state ranking showing California has the third highest electricity prices and the fourth highest natural gas prices in the nation.<sup>3</sup> The next section discusses DCPD costs in greater detail.

---

<sup>2</sup> Shorting the Grid: The Hidden Fragility of Our Electric Grid, Paperback, Page 279 of 378 – October 13, 2020 by Meredith Angwin

<sup>3</sup> "2023's Most & Least Energy-Expensive States," Adam McCann, WalletHub Financial Writer, WalletHub, July 5, 2023, <https://wallethub.com/edu/energy-costs-by-state/4833>

#### IV. THE CANARD OF A4NR'S "ABOVE MARKET" CLAIM

In A4NR's June 30, 2023 Opening Comments regarding DCPD in this Proceeding, the phrase "above market" appears twice on page 28 of 39 at lines 6 and 8. While the values are redacted in the public version on this page, A4NR has attempted to create the impression that DCPD's power is expensive in comments in other forums. Construction and upgrade costs associated with DCPD will no longer be eligible for rate recovery because the plant's construction and upgrade costs to 2025 will have been paid for by ratepayers. Furthermore, PG&E indicates DCPD's decommissioning fund will likely be fully funded by 2025. Thus, DCPD's power generation cost per kWh will likely decrease during extended operations. A4NR and other opponents to DCPD's ongoing operations forced these excess costs on ratepayers as a consequence of their insistence that DCPD shut down in 2025 in CPUC Proceeding A1608006, instead of running the plant for its design lifetime of approximately a century. CGNP believes the excess costs are a significant component of the "above market" costs referenced above. A4NR can't have it both ways by complaining about costs they helped impose on ratepayers.

The anti-nuclear power Environmental Working Group (EWG) aggressively disseminated their recent study asserting outrageous costs associated with DCPD extended operations to 2045.<sup>4</sup> California - based DCPD opponents have attempted to amplify EWG's claims. Quoting from the EWG study, ... EWG used testimony recently filed by the Utility Reform Network, or TURN, in PG&E's current rate case to parse the capital and operating expenses

---

<sup>4</sup> "Outrageous costs, deadly dangers: The real risks of keeping Diablo Canyon open - Flawed push to prolong life of aging nuclear plant may cost California ratepayers over \$45B," By Grant Smith and Anthony Lacey, July 25, 2023, Environmental Working Group, Washington, DC.

<https://www.ewg.org/research/outrageous-costs-deadly-dangers-real-risks-keeping-diablo-canyon-open>

of the plant....Even assuming PG&E's cost estimates, Californians will be on the hook for over \$20 billion....

DCPP's nominal annual generation has been 18 TWh per year, where a TWh is a billion kilowatt-hours (kWh.) Running DCPP to 2045 means running DCPP for 23 more years. The projected DCPP generation is the product of 18 TWh and 23 years or 414 TWh. To calculate the cost per kWh, \$20 billion is divided by 414 TWh. The result is a very reasonable \$0.0483 per kWh - hardly outrageous. While DCPP's likely future cost is greater than the cost of electricity generated by California's large hydroelectric dams, this cost is likely lower than the cost to generate electricity in many of California's natural-gas-fired power plants, as natural gas prices will trend higher relative to stable uranium costs. During dry years, the capacity factor, or percentage of full power output during a year of California hydroelectricity has been approximately 25%. Contrast that with DCPP's capacity factor which has been at or near 90%.

TURN's estimates of DCPP's future costs employ similar cost inflation exaggerations like those used in the discredited 2016 FoE - TURN CEERT study. For validation, current DCPP costs are significantly lower than those predicted in 2016 by the FoE - TURN CEERT study.

## **V. SLO MFP'S EMBRITTLEMENT EXAGGERATIONS**

On page 193 of 218 of Digby Macdonald Ph.D.'s July 11, 2023 SLO MFP supplemental opening testimony is the sentence, "For the lay person who may not immediately see the connection between temperature, pressure, and fracture toughness or brittleness, a similar and more-well know (sic) example of such an embrittlement failure mode is what sank the *Titanic*." While Digby



Macdonald Ph.D. attempts to create the impression there is an engineering consensus supporting his claim, this is not the case.

Quoting from the cited text, ...I wish to touch on four points. Triggered by the interest in the film *Titanic* and bearing in mind the failures of Liberty ships and tankers in World War II, we might ask first whether the *Titanic* failed by brittle fracture when it hit the iceberg - it was clearly an impact at low temperature. To an extent, the jury is still out, but it depends on precisely what is meant by the question. The *Titanic* did break in two, but Ballard's underwater investigations tend to suggest that the main cause of the disaster was heavy flooding, due to the initial impact and ripping open of riveted plates. Although some individual plates appear to have broken in a brittle manner, this seems to be a secondary, rather than a primary effect. A recent examination of the properties of the steel, reported in the January 1998 edition of the *American Journal of Metals* concludes that the steel used was probably the best ship plate available at the time, but would not be acceptable today. Nevertheless, the final comments are 'If the *Titanic* had not collided with the iceberg, it could have had a career of more than twenty years, as the *Olympic* had. It was built of similar steel in the same shipyard and from the same design. The only difference was a big iceberg.'<sup>5</sup>.... The second source in the footnote offers further rebuttals of the *Titanic* myth and appears in Appendix D. Section II, above, and Appendix A show the DCISC does not share Digby Macdonald Ph.D.'s heightened sense of concern regarding DCPD reactor pressure vessel embrittlement under

---

<sup>5</sup> Structure: In Science and Art - Pages 142-143, Wendy Pullan, Harshad Bhadeshia, editors, 2000. <https://tinyurl.com/Titanic-Myth>

and "'She was fine when she left here' – Dispelling the Titanic myth," by Matthew Symington, April 18, 2012 Updated: August 22, 2012, eamonmallie.com. <https://tinyurl.com/Titanic-Myth2>

temperature transients. As a consequence of large safety margins in DCP's designs, neither do CGNP's experts.

## VI. CURRENT COMMENTARY SUPPORTS DCP EXTENDED OPERATIONS

CGNP's most recent OpEd in the *Santa Barbara Independent* supports extended operations.<sup>6</sup> This OpEd appears in Appendix E. Veteran energy analyst and author Robert Bryce provides some eye-opening statistics regarding the lavish funding<sup>7</sup>, principally from fossil fuel interests to oppose nuclear power. As CGNP noted previously with concern, when PUHCA-1935 was repealed in 2005, utility holding companies and their allies such as the Western States Petroleum Association (WSPA) could directly lobby state utility regulators such as the CPUC. On the other hand, groups representing the economic interests of small California ratepayers rarely have the requisite financial resources to lobby the CPUC. Bryce's article is located in Appendix F. In the July 20, 2023 Substack, Doomberg, a group of writers that covers energy, finance, and the economy-at-large revealed the adverse political consequences to a political party in the province of Ontario, Canada that backed wind, solar, batteries, and biomass while shunning nuclear. This political party was roundly rejected after voters experienced the huge costs and related reliability problems of such a unreliable grid. There are instructive lessons for California energy policy.<sup>8</sup> See

---

<sup>6</sup> "Keep Diablo Canyon Running," By Gene Nelson, Ph.D., July 21, 2023, *The Santa Barbara Independent*. <https://www.independent.com/2023/07/21/keep-diablo-canyon-running/>

<sup>7</sup> "The Anti-Industry Industry - What the media won't tell you about the \$4.5 billion-per-year NGO-corporate-industrial-climate complex," Robert Bryce, Feb 18, 2023, <https://robertbryce.substack.com/p/the-anti-industry-industry>

<sup>8</sup> "Cheat Codes," DOOMBERG, JULY 20, 2023. <https://doomberg.substack.com/p/cheat-codes>

Appendix G. Finally, Doomberg also discusses relative risk of different energy sources in a timely July 25, 2023 Substack.<sup>9</sup> This article is located in Appendix H. All of these articles support the perspective that Diablo Canyon Power Plant operations should be extended for the ratepayer, reliability, and environmental benefits of extended operation.

## VII. CONCLUSION

The Commission should not make the same mistake twice. Diablo Canyon is needed now, and in the foreseeable future, and its clean nuclear power can be beneficial to California ratepayers and the environment for decades to come.

July 28, 2023

Respectfully submitted,

/s/ Gene Nelson, Ph.D.  
Senior Legal Researcher & President  
Californians for Green Nuclear Power, Inc. (CGNP)  
1375 East Grand Ave Ste 103 #523  
Arroyo Grande, CA 93420-2421  
(805) 363 - 4697 cell  
Government@CGNP.org email

---

<sup>9</sup> "Frame of Reference," DOOMBERG, JULY 25, 2023. <https://doomberg.substack.com/p/frame-of-reference>

**Appendix A: Selected conclusions from the four DCISC Fact Finding Reports included in the Record of R2301007 on June 30, 2023**

From page 17 of 96:

**" Conclusions: The DCISC reviewed a 2010 seismic consultant report on the seismic response of non-safety related structures and equipment at DCPD (the "Enercon report") and found that, in conjunction with follow-on PG&E technical analyses, no concerns affecting nuclear (sic) safety were identified. Additionally, the DCISC concludes that the performance of building structures (sic) at DCPD during a seismic event lower than the design-basis earthquake would not represent a significant hazard to the safety of personnel needed to respond following a seismic event at DCPD. One non-safety item, the main turbine thrust bearings, although susceptible to earthquake forces, would require about one month to repair, if damaged."**

From page 18 of 96:

**"Conclusion: DCPD Maintenance Department overall performance was reported as Green (good) and stable based on industry performance indicators. Maintenance was aggressively hiring for possible retirements and a five-year plant operations extension to 2030."**

From page 32 of 96:

**Conclusions: DCPD's process for reviewing the need for changes to Preventive Maintenance activities, Corrective Maintenance activities, and projects to support five years of extended operations (the PMO++ Program) appeared well planned and implemented to date. Final detailed outputs of the process were not yet available for review by the DCISC, and the DCISC should complete those reviews during future (sic) Fact-Finding Meetings as soon as the detailed information becomes available. Unfortunately, DCPD's current timetable for (sic) providing the information would not support the DCISC completing its reviews prior to its June 2023 Public Meeting, which was the original target date to provide timely information to the California Public Utilities Commission.**

From page 47 of 96:

**Conclusions: DCP's Reactor Coolant Systems' health was rated as Green (Healthy) with several minor issues being tracked for resolution in the Corrective Action System. The DCISC should follow up on the status of reviews for actions being considered under the PMO++ Program to address several long-term issues.**

From page 56 of 96:

**Conclusion: The DCP Radiation Monitoring System health was considered "Good and Improving" with several of its subsystems having problems. These subsystems are being considered for selective replacement with the PMO++ process based on needs for life extension through 2030 and beyond. This process is expected to conclude in the second quarter of 2023. The DCISC is following the progress of this process and will report (sic) on it in (sic) future fact-finding meeting. (sic)**

From page 59 of 96:

**Conclusion: DCP's Buried Pipe and Tanks Program health was rated as White (acceptable needing improvement) due to the program owner's time in position being one year (sic) versus three years for Green. The remainder of health measures were all Green. For (sic) the upcoming NRC License Renewal Application DCP anticipated major efforts to augment inspections, projects, and aging management plans. The DCISC should follow these efforts.**

From Page 60 of 96:

**Conclusions: DCP was satisfactorily planning and preparing for its Refueling Outage 1R24, which is scheduled to occur Fall 2023. This is a particularly important outage because new modifications, maintenance activities, and inspections will be implemented for NRC License Renewal and likely extension of operations from 2025 to 2030, plus removal of a reactor vessel material coupon for analysis of vessel fracture toughness. The DCISC should review the detailed outage scope and outage safety plan in its August or September 2023 fact-finding meetings.**

From Page 61 of 96:

**Conclusions: DCP's Equipment Reliability performance has improved substantially since 2021 and 2022, and its health has improved to Green (good) and stable.**

From Page 62 of 96:

**Conclusions: The DCPD Non-Licensed Operator training class on the Main Generator (sic) Hydrogen (H<sub>2</sub>) and Carbon Dioxide (CO<sub>2</sub>) System appeared satisfactory and effective.**

From page 64 of 96:

**Conclusions: The DCISC Fact-Finding Team learned that a single FLEX Strategy was currently incorporated into DCPD's Probabilistic Risk Assessment (PRA) analysis of a greater than design basis earthquake with loss of AC power; however, the PRA considers the first 24 hours of an event, and FLEX is assumed not available for 24 hours, thus FLEX is not typically useful in (sic) PRA analyses. The DCISC should also review post-earthquake procedures for the fire department and for security personnel with respect to FLEX equipment and plant access.**

From page 68 of 96:

**Conclusions: DCPD's process for reviewing the need for changes to Preventive Maintenance activities, Corrective Maintenance activities, and projects (sic) to support five years of extended operations (the PMO++ Program) appeared well planned and implemented. Final detailed outputs of the process are expected to be available for review by the DCISC in July and/or August, permitting DCISC's conclusions and recommendations to be ready for approval at its September 2023 Public Meeting. (This type of review and approval process is a normal, ongoing one at DCPD, such that it (sic) could change at any time.) The DCISC should complete those reviews during future Fact-Finding Meetings as soon as the detailed information (sic) becomes available.**

From Page 69 of 96:

**Conclusions: DCPD's plans and schedules appeared satisfactory for augmenting its Aging Management Plans for its application to the NRC for License Renewal.**

From page 70 of 96:

**Conclusions: An industry study to analyze the dose consequences for a hypothetical through-wall crack of a spent fuel storage container was delayed until at least 2025 in order to obtain additional research data from the Department**

**of Energy. The DCISC should continue to monitor the status of the study and review the final report after its issuance.**

From Page 71 of 96:

**Conclusion: Offices, classrooms and shops in DCP's Maintenance Training Building had the proper anchoring or bottom weighting of tall furniture to assure personnel safety in the event of earthquakes.**

From Page 71 of 96:

**Conclusions: The local NRC meeting on May 3, 2023 in San Luis Obispo was informative on NRC regulations, regulatory process, and license renewal. PG&E described their plans for applying for NRC license renewal. Many local organizations and individuals provided their opinions on DCP license extension, most of which were favorable.**

From Page 80 of 96:

**Conclusions: The Independent Peer Review Panel (IPRP) meeting was successful in discussing the major items on its agenda, including providing feedback and comments from the IPRP to the DCISC about the DCISC's November 2022 Fact-Finding Report on seismic safety. The DCISC should take account of IPRP input as it finalizes its positions and conclusions on DCP seismic safety. The DCISC should also continue to attend future IPRP meetings and consult with the IPRP concerning the IPRP's deliberations, findings, and recommendations.**

From Page 91 of 96:

**As background, when the DCISC reviewed the PG&E probabilistic seismic hazard analysis (PSHA) in 2016 and the seismic probabilistic risk assessment (SPRA) in 2018, the Committee was satisfied that the seismic safety achieved by DCP was acceptable at that time - indeed, the DCISC believed that it represented industry-leading performance in the seismic safety achieved by the facility (Reference 6.2.15). Based on its review as reported here, the DCISC has developed the following broad conclusion:**

After reviewing the new and updated information presented by PG&E in the November 2022 Fact-Finding Meeting, supplemented by earlier DCISC Fact-Finding Meetings and Public Meeting presentations, by other industry-wide information, and by information

arising from both the October 2022 IPRP meeting and the May 2023 IPRP meeting, the DCISC concludes that the seismic safety of the DCPD reactors is fully adequate now, and requires no additional upgrades or other changes to bring it up-to-date or to improve it. The DCISC also concludes that no upgrades or improvements to seismic safety would be necessary to assure that the seismic safety of the DCPD reactors would be adequate for extended operation beyond 2025, if so authorized.

From Page 93 of 96:

**First, the DCISC should review any new seismic-related information that could be forthcoming when PG&E submits a new (updated) License Renewal Application to the NRC at the end of 2023. The DCISC should undertake a thorough review of that submittal's sections relevant to seismic safety, as well as any underlying information that PG&E will rely on in that submittal.**

**Second, the DCISC should review the seismic-safety review that PG&E will conduct as required by California legislation SB846.**

**Third, the DCISC should review any analyses that may be performed by the NRC or other entities in response to the May 2, 2023, SLOMFP filing with the NRC claiming that PG&E has underestimated the seismic hazard at DCPD. It (sic) is currently understood that this filing will be evaluated by PG&E as a part of the SB846-mandated seismic-safety review and the DCISC should review PG&E's evaluation of this filing following its completion.**