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General Comment

Please see the attached file for the Breakthrough Institute's comment.

Attachments

BTI Comments on Diablo Canyon SEIS

BREAKTHROUGH INSTITUTE

December 16, 2024

Subject: Comment on Pacific Gas and Electric Company; Diablo Canyon Nuclear Power Plant, Units 1 and 2; Draft Supplemental Environmental Impact Statement (SEIS). [Docket ID NRC-2023-0192].

The Breakthrough Institute (BTI) appreciates this opportunity to comment on the draft supplemental environmental impact statement[1] for renewing the operating licenses of Diablo Canyon Power Plant (hereinafter DCPP), Units 1 and 2, in California, and to express our support for the facility's license renewal.

BTI is an independent 501(c)(3) global research center that advocates for appropriate regulation and oversight of nuclear reactors to enable the new and continued use of safe and clean nuclear energy. BTI acts in the public interest and does not receive funding from industry.

Executive Summary

BTI is generally aligned with SEIS's overall conclusion and recommendations. However, we hold concerns about some components of this SEIS. We believe that adjustments are necessary to more accurately address the negative impacts of the no-action alternative and consider the replacement alternatives. It is imperative for the NRC to include those adjustments in the final EIS, not only because it is required by the National Environmental Policy Act (NEPA), but also to improve how the NRC considers the negative impacts of the no-action alternative in an EIS for future cases. Improving the process for evaluating these impacts also aligns implementation of the ADVANCE Act directives to streamline a number of its licensing processes, including environmental reviews.[2]

BTI agrees with the general conclusion and recommendation

We generally support the SEIS conclusion that there are small[3] environmental impacts from almost every category. [4] We also support Section 3.14 of the SEIS, which finds no new significant

[1] Environmental Impact Statement for the Pacific Gas and Electric Company; Diablo Canyon Nuclear Power Plant, Units 1 and 2, Draft Supplemental Environmental Impact Statement (SEIS), October 2024, https://www.nrc.gov/docs/ML2429/ML24299A167.pdf. (hereinafter SEIS)

[2] U.S. Public Law No. 118-67 § 501 (2024) (herinafter ADVANCE Act)

[3] See, SEIS page 24, "Small" is defined as "Effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource."

[4] SEIS, page 68-71.

information. [5] We agree that there are no significant impacts and it is reasonable to issue a license renewal for DCPP for an additional 20 years beyond the current expiration date.[6] We commend the NRC staff for their meticulous work in this area and agree with the recommendation to move forward with the licensing process.

NEPA amendment

There are some concerns about implementation in this draft SEIS of new requirements based on recent amendments to NEPA.

As you are well aware, the Fiscal Responsibility Act of 2023 (FRA) included amendments to NEPA. NEPA, as amended, now mandates consideration of the negative impacts of "not implementing the proposed agency action", including the "no-action" alternative:[7]

> *...a reasonable range of alternatives to the proposed agency action, including an analysis of* ***any negative environmental impacts of not implementing the proposed agency action*** *in the case of a no action alternative, that are technically and economically feasible, and* ***meet the purpose and need of the proposal****.[emphasis added]*

The purpose and need of this proposal, as stated in SEIS Section 1.2, is "to provide an option that allows for baseload power generation capability beyond the term of the current nuclear power plant operating licenses to meet future system generating needs, as such needs may be determined by State, utility, system, and, where authorized, Federal (other than NRC) decision-makers".[8]

A reasonable range of alternatives and analysis of the negative environmental impacts of the alternatives, including the no-action alternative. In this case, it requires the NRC to consider the broader impacts of not renewing DCPP's operating license. Such implications could include prolonging fossil fuel use and the serious public health, environmental impacts, and climate consequences involved.

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[5] See, SEIS page 68, "For these issues, the NRC staff did not identify any new and significant 11 information that would change the conclusions of the LR GEIS (see Section 3.14 of this SEIS). "

[6] The current license expiration dates for Diablo Canyon Units 1 and 2 are November 2, 2024, and August 26, 2025, respectively.

[7] National Environmental Policy Act of 1969 § 102(2)(C)(iii), 42 U.S.C. § 4332.

[8] SEIS, page 38.

We acknowledge that the staff is integrating new requirements in NEPA from the 2023 amendments. The way these requirements are implemented could improve the final EIS and future EISs. However, the following points are missing in the draft SEIS:

1. **Replacement Power Alternatives**

Under NEPA, the NRC has an obligation to consider reasonable alternatives to the proposed action. The state of California and the California Energy Commission have already unsuccessfully attempted to replace the power from DCPP, and as a result have rejected the proposed alternatives as unviable, instead requiring DCPP to remain operational. The NRC does not have the authority or control over energy system decisions[9] and, therefore must also reject the proposed alternatives as unreasonable. In addition to state decision-making, there are energy system limitations that prevent the viability of the alternatives that must be considered. **The proposed alternatives are not viable and should be rejected, resulting in no viable alternatives to the proposed action.** In the face of evidence that California unsuccessfully planned to retire DCPP and changed course to require a continued operation, the NRC would have to supply evidence that the proposed alternatives are, in fact, viable.

In 2016 California chose to retire DCPP and replace it with alternative clean energy. The NRC cited the California Energy Commission's (CEC) analysis in the SEIS: "Adequate renewable energy resources could not be brought online before the operating licenses for Diablo Canyon Units 1 and 2 expire (CEC 2023-TN10081). "[10] The renewables as an alternative so far have not been able to replace the capacity of DCPP as intended, and California has not been able to deploy sufficient additional capacity of any kind to meet grid reliability. The state has instead experienced significant electricity scarcity in recent years. Projected demand growth will further challenge the ability to deploy surplus generation capacity capable of realizing any of the proposed alternatives.

In SEIS Section 2.3.2, Replacement Power Alternatives include purchased power and renewables combination. The NRC already states that those alternatives have their limitations in the SEIS. The purchased power "may also rely on older and less-efficient power plants operating at higher

[9] See, SEIS page 38, "the NRC has no role in the energy-planning 9 decisions of power plant owners, State regulators, system operators, and, in some cases, other 10 Federal agencies as to whether a particular nuclear power plant should continue to operate"

[10] SEIS, page 57.

levels of power generation than current operations. "[11] It is also unsustainable because "Natural gas-fired power plants can be a source of purchased power until 2045. " [12]

In SEIS Section 3.15.3.1, the impact of purchased power on climate change was concluded as "SMALL to MODERATE" because the GHG emission will be "negligible" after 2045 according to SB 100.[13] The conclusion for purchased power was based on the assumption that California's carbon neutrality goal can be achieved by SB 100. For the first 20 years, GHG emissions could be higher than the estimation because the calculation uses the 2022 California energy mix as a base, but the purchased power could include more fossil fuel plants from other states.

The impact of renewable combination alternatives on climate change was "SMALL" because of "negligible" GHG emissions. This is also not plausible. According to the SEIS, "GHG emission sources during construction of the renewables combination alternative would be similar to the construction of an industrial facility and include construction equipment, engine exhaust, and workforce commuting."[14] However, the construction and most equipment GHG emissions of DCPP have already been emitted when it was built. Potential newly built renewable power facilities will have much more environmental impacts than the status quo option.

There are more unaddressed limitations for the proposed replacement power alternatives. The NRC only considered the two replacement power alternatives because "California's 100 Percent Clean Energy Act of 2018 requires all energy generation to be renewable and zero-carbon after 2045 (State of California 2018-TN9855). "[15] However, the NRC did not address the fact that if the renewal were not approved, slowing and impeding the safe and efficient deployment of nuclear clean energy could have far-reaching environmental consequences.

The analysis for Replacement Power Alternatives should also be rejected for higher costs and lower reliability, consistent with other recent SEIS's.[16] The DCPP SEIS doesn't consider these factors

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[11] See, SEIS page 58, "Until 2045, purchased power would likely come from the most common types of existing electric power generating technologies including nuclear power, natural gas-fired, coal, solar, and wind energy, some of which could be located outside of California."

[12] SEIS, page 58.

[13] SEIS, page 272.

[14] SEIS, page 272.

[15] SEIS, page 58.

[16] For example, the Virgil C. Summer Nuclear Station, Unit 1 SEIS claimed that "Purchased power is not a reasonable alternative to V.C. Summer SLR, therefore, due to its higher cost and lower reliability." Environmental Impact Statement for the Subsequent License Renewal of Virgil C. Summer Nuclear Station,

at all and argues that purchasing power is a reasonable alternative. This is far beyond just an inconsistency; it rejects the very purpose of the proposed action (license renewal for grid reliability). Cost and reliability are more significant in California where supply and reliability are so extremely constrained that the legislature passed a law to keep DCPP online for those very reasons. These factors are sufficient to reject purchased power in other SEISs and are more than sufficient to support the same determination for DCPP.

2. No-action Alternative

Since the alternatives do not meet their purposes as stated above, the no-action alternative becomes the focus of the SEIS. **The proposed no-action alternative is not being addressed appropriately.** In SEIS Section 2.3.1, the NRC acknowledged that "the no-action alternative does not meet the purpose and need of the proposed action."[17] The NRC states the result of the no-action alternative as "the total cessation of electrical power production at Diablo Canyon….because the no-action alternative does not provide a means of delivering baseload power to meet future electric system needs. "[18] In SEIS Section 3.15.3.1.2, The NRC staff anticipates that GHG emissions for the no-action alternative would be less than the DCPP's operation and the environmental impact will be SMALL.[19] The unmentioned negative environmental impacts include, but are not limited to:

1) More GHG emissions which deviates from the US and California's clean energy future. If DCPP is not renewed, California may keep more gas-fired facilities or even build more, to fulfill the energy demand as the first priority before the carbon neutrality goal comes in 20 years. The state's commitment to carbon neutrality by 2045 will be undermined if DCPP is not renewed. The +Final EIS must acknowledge that closing DCPP risks perpetuating fossil fuel use, potentially delaying the state's transition to a carbon-free grid.

2) The closure of DCPP will increase the demand for minerals and mining required for other energy sources, which has a significantly higher environmental and economic cost

Unit 1, Draft Report for Comment, November 2024, https://www.nrc.gov/docs/ML2433/ML24330A271.pdf. Page 2-18.

[17] SEIS, page 56.

[18] SEIS, page 56.

[19] SEIS, page 272.

compared to nuclear[20]. Nuclear power has the lowest (0.6-1.4) tons of infrastructure raw materials per gigawatt-hour (GWh) of electricity produced. Whether it is solar(1.8 tons/GWh), wind(onshore: 7.1 tons/GWh; offshore: 2.0 tons/GWh), or other energy being purchased, will directly or indirectly increase the mineral and mining costs.

3) If DCPP is not renewed, California's electricity grid will face increased instability and price volatility. There could be a huge price spread of electricity among different areas of California and during different time periods. The continued operation of DCPP will provide sustainable energy to California statewide and locally without skyrocketing the customer's electricity bill. The Final EIS must clearly state that the continued operation of DCPP is critical to maintaining energy reliability and preventing significant cost increases for Californians

The impact of no-action alternatives will be at least as bad, if not worse, than the proposed replacement power alternatives. Potential new construction of alternative energy sources will have a negative environmental impact, and delays in construction will degrade energy reliability in California. California can potentially build a new natural gas facility to keep the grid reliable and retire it by 2045 due to SB 100, only with more GHG emissions, environmental impacts on local communities, extra capital and labor costs on transmission lines, etc. On the other hand, there is no additional environmental impact (based on the SEIS) from issuing this license renewal. Nonetheless, if the license renewal is approved, it will expire in 20 years when California can re-evaluate its energy mix according to SB 100. Whether DCPP is to be included or not in 20 years is irrelevant to this decision.

No action is inconsequential, but the no-action alternative does not result in a feasible future —California will not simply cease to use electricity. We urge the NRC to accurately consider the broader implications of the "no-action" alternative. The NRC has touched on this previously with Hermes 2 design EA.[21]

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[20] See Breakthrough Institute, "Updated Mining Footprints and Raw Material Needs for Clean Energy" (Apr. 25, 2024),https://thebreakthrough.org/issues/energy/updated-mining-footprints-and-raw-material-needs-for-clean-energy.

[21] Environmental Assessment and Finding of No Significant Impact for the Construction Permits for the Kairos Hermes 2 Test Reactors, Draft Report for Comment, April 2024, https://www.nrc.gov/docs/ML2410/ML24103A002.pdf. "The applicant could still build Hermes but would not have the ability to test elements of the Hermes 2 design absent from the Hermes design, such as the intermediate cooling loop. While forgoing the opportunities provided by Hermes 2 might not necessarily preclude future development of reactors using the KP-FHR technologies, it could slow or impede safe and efficient development of the technology."

3. Meeting the Purpose and Need of the Proposal

One key consideration has to be that the alternative proposed solutions, including purchasing alternative power or renewable energy generations are considered to be **viable** alternatives and meet the purpose and goal of this proposal.

The alternatives evaluated in the SEIS constitute a reasonable range only under the assumption that they are available. There is no substantial basis to assume availability, particularly in California, where current generating capacity is insufficient. California is the largest importer of electricity and the third largest electricity consumer among the states[22]; California has an emergent need for a sustainable, GHG emission-free clean energy supply. DCPP provides 9% of California's electricity generation and 17% of the current clean electricity generation.

As of 2024, half of California's energy supply is from natural gas. Growth of renewable energy is expected but not sufficient to pick up the slack of this huge energy demand in California. The SEIS assumes that SB 100's goal of 100% renewable energy by 2045[23] is a foregone conclusion. This overlooks that the continued operation of DCPP is also highlighted in the law (SB 846) for grid reliability and the inability to replace the power with alternatives[24]. The CEC confirmed the importance of DCPP to California's grid reliability and agreed with SB 846.[25] [26]

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[22] See, U.S. Energy Information Administration, "California State Energy Profile," 2023, https://www.eia.gov/state/?sid=CA.

[23] See California Legislature, "SB 100 - California Renewables Portfolio Standard Program: Emissions of Greenhouse Gases," 2017, https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180SB100.

[24] See California Energy Commission, "CEC Determines Diablo Canyon Power Plant Needed to Support Grid Reliability," February 2023, https://www.energy.ca.gov/news/2023-02/cec-determines-diablo-canyon-power-plant-needed-support-grid-reliability.

[25] See California Energy Commission, "CEC Determines Diablo Canyon Power Plant Needed to Support Grid Reliability," February 2023, https://www.energy.ca.gov/news/2023-02/cec-determines-diablo-canyon-power-plant-needed-support-grid-reliability.

[26] See Los Angeles Times, "Battery Storage Rapidly Increasing but Not Enough to End Blackouts, Governor Newsom Says," April 25, 2024, https://www.latimes.com/environment/story/2024-04-25/battery-storage-rapidly-increasing-but-not-enough-to-end-blackouts-governor-newsom-says.

California residents are facing the challenge of blackouts.[27] In recent years, the California government has been extending the closure date of some gas plants to avoid blackouts.[28] The California Public Utility Commission (CPUC) ordered utilities to procure an additional 4,000 MW of Net Qualifying Capacity in addition to the 11,500 MW ordered in June 2021.[29] California has issued emergency orders to procure any available electrical capacity and emergency gas-operated generators for grid reliability.[30] The California grid operator CAISO has also been forced to request emergency orders under the Federal Power Act to operate power plants notwithstanding their emissions or permit limits.[31] The existing and persistent challenge with deploying alternative resources to enable the retirement of DCPP, recurring electricity scarcity and emergency orders, and resulting CA statute and CEC analysis to retain the operation of DCPP supports the conclusion that **the alternatives as framed in the SEIS are not viable and do not meet the purpose of the proposal.**

Only firm capacity can meet the purpose and need for reliability. The SEIS seems to assume that California's renewable energy goals can be met without considering the substantial need for reliable, firm capacity, which DCPP provides. If a future goal in law (SB100) is substantial enough to guide conclusions in the SEIS, then a near-term need in law (SB 846) should be as well. Renewable energy like solar and wind can provide capacity additions, but not necessarily a firm and consistent power supply. This is another reason that the purpose and need of this proposal can not be met with the renewable energy alternative.

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[27] See The New York Times, "California's Power Grid Strains to Keep Up With Heat and Demand," September 25, 2022, https://www.nytimes.com/2022/09/25/business/energy-environment/california-energy-grid-heat.html.

[28] See Los Angeles Times, "Despite Climate Goals, California Will Let Three Gas Plants Keep Running," August 15, 2023, https://www.latimes.com/environment/newsletter/2023-08-15/despite-climate-goals-california-will-let-three-gas-plants-keep-running-boiling-point.

[29] See California Public Utilities Commission, "CPUC Augments Historic Clean Energy Procurement Goals to Ensure Electric Reliability," 2023, https://www.cpuc.ca.gov/news-and-updates/all-news/cpuc-augments-historic-clean-energy-procurement-goals-to-ensure-electric-reliability-2023.

[30] For example, see https://www.gov.ca.gov/wp-content/uploads/2021/07/Energy-Emergency-Proc-7-30-21.pdf

[31] For example, see https://www.caiso.com/documents/sep7-2021-request-department-energy-emergencyorder-section202c-federalpoweract.pdf

DCPP is the only remaining nuclear power plant in California, and it provides nearly 9% of the state's electricity and generates 17% of its zero-carbon energy. [32]With the California Energy Commission estimating that power demand across the state will rise roughly 43% in the next 15 years, DCPP will only become a more critical clean, reliable energy asset.[33]

4. Other benefits of DCPP and impacts of alternatives

Additionally, the SEIS fails to adequately consider the critical ancillary services that DCPP provides, such as frequency response and grid inertia, which are essential for grid stability and reliability. These services were not sufficiently addressed in the renewable alternative, which fails to account for the full scope of reliability needs.

When it comes to land use and visual resources, the SEIS concluded the impact of both no-action alternatives and purchased power alternatives as SMALL [34], and MODERATE for the renewable alternative. The SEIS did not consider the potential land use of purchased power and argued it is hard to evaluate due to the complexity: "This alternative is not expected to create any new land use and visual impacts but could intensify environmental effects at existing energy generating facilities."[35] In fact, the no-action alternative could increase land use and visual resources if new plants are under construction to fuel California's energy demand. Furthermore, the SEIS did not sufficiently analyze the water use required for constructing and operating new energy facilities, nor did it address the impacts of new transmission infrastructure for the alternatives.

The SEIS is sometimes overly focused on the environmental impact of DCPP and ignores those aspects for the alternative analysis. For example, the SEIS considered SOx, NOx, and other pollutants when analyzing DCPP's renewal, [36] but it only considered CO2 equivalent without mentioning other pollutants from the alternatives. [37] When it comes to air quality, the SEIS

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[32] See Pacific Gas and Electric, "Nuclear Power," 2023, https://www.pge.com/en/about/pge-systems/nuclear-power.html#:~:text=Serving%20our%20planet,the%20state's%20total%20electricity%20supply.

[33] See PR Newswire, "PG&E Launches First Commercial Deployment of On-Site Generative AI Solution for the Nuclear Energy Sector at Diablo Canyon," 2023, https://www.prnewswire.com/news-releases/pge-launches-first-commercial-deployment-of-on-site-generative-ai-solution-for-the-nuclear-energy-sector-at-diablo-canyon-302304042.html.

[34] SEIS, page 75.

[35] SEIS, page 75.

[36] SEIS, page 270-271.

[37] SEIS, page 272.

estimates commuting for DCPP workforce[38] while excluding that for the alternative analyses. This aspect should either be considered for both the proposed action and the alternatives, or completely excluded from any analysis.

A comprehensive life cycle analysis, which compares the environmental impacts of all the alternatives, is essential to fully understanding the broader implications of the proposed alternatives. Notably, nuclear energy, as provided by DCPP, emits significantly fewer GHGs than solar and other renewable sources when considering the full lifecycle, including manufacturing, construction, and waste management.

For these reasons and more the alternatives as framed do not meet the purpose of the proposal. A more thorough and balanced evaluation is necessary to ensure that all relevant factors, including environmental, economic, and reliability considerations, are properly addressed.

Conclusion

The SEIS correctly concluded that the environmental impact of DCPP is SMALL and recommends that "preserving the option of license renewal for energy-planning decision-makers would be unreasonable."[39] BTI agrees with the overall conclusion and recommendation in the SEIS.

However, the proposed and no-action alternatives in the SEIS, do not necessarily meet the stated purpose. The continued operation of DCPP is crucial for meeting California's energy needs, ensuring grid reliability, and supporting the state's climate goal - carbon neutrality goal by 2045. A recent poll shows strong local and statewide support for DCPP's license renewal[40], and similar voices were conveyed in the public meeting held by NRC on this topic on November 14th, 2024. [41]

The SEIS should fully account for the negative impacts of alternatives, ensuring that any potential delays or harm to decarbonization efforts are addressed in its final analysis. Currently, California has been unable to meet its renewable deployment objectives in GHG reductions and has been required to meet grid reliability by deploying additional natural gas generation. **These impacts should be accurately addressed as part of the alternative analyses.**

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[38] See, SEIS page 84, "Engine exhaust emissions would be from heavy construction equipment and commuter, delivery, and support vehicular traffic traveling to and from the facility as well as within the site."

[39] SEIS, page 287.

[40] See World Nuclear News, "Californian Support Grows for Diablo Canyon — Poll," 2022, https://www.world-nuclear-news.org/Articles/Californian-support-grows-for-Diablo-Canyon-poll.

[41] See U.S. Nuclear Regulatory Commission, "Public Meeting Schedule: Meeting Details," 2024, https://www.nrc.gov/pmns/mtg?do=details&Code=20241314.

Sincerely,

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