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Keep Diablo Canyon running

Additional submitted attachment is included below.

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I urge you to support continued operation of Diablo Canyon Power Plant for at least 10 years beyond its current operating license. Diablo Canyon's 2255 MW of firm generating capacity will continue to be needed. Both CAISO and WECC have expressed concerns that a large shortfall of firm generating capacity will appear if Diablo is taken off the grid in 2024/2025. CAISO is now projecting a 2,000 MW shortfall by 2025 if Diablo Canyon's 2255 MW is taken off the grid. WECC's analysis from 2020 identified greatly increasing risks of electricity shortages for the CAMX service area in the next decade. Its estimates of the Post-Transfer Loss-of-Load hours (LOLH), which includes power imports into the region, show the number of hours at risk increases from 2 hours in 2020 to 171 hours in 2029. This is a hundredfold increase in the projected LOLH, over the period during which Diablo's baseload generating capacity is assumed to be lost. According to WECC, the expected unserved energy in 2029 corresponds to 6.6 million MWh, suggesting major adverse effects on ratepayers, especially during summer months. We could expect over 150 hours per year of rotating blackouts would plague ratepayers, causing disruptions in electrical service comparable to that of a third world country. Consider that last year's ice storm in Texas, which froze windmills and thus led to big electricity shortages during extreme temperatures, resulted in at least 111 deaths.

Wind and solar cannot supply a large fraction of California's electricity needs. They produce energy intermittently, and thus the fraction of power they can produce must be limited at all times to maintain the stability of the electric grid. Already CAISO regularly curtails wind and solar sources, because they produce more than the grid can handle at times, and not enough at other times. The large-scale battery storage needed to enable much greater use of wind and solar are far, far too expensive to be practical.

These facts underscore the need to keep Diablo Canyon, California's largest carbon-free energy source operating for decades more. It is safe, reliable, robust and cost effective. It produces energy around the clock, independent of the weather.

No reliable zero carbon emitting replacement for Diablo has been identified. The reliable power it generates around the clock would be replaced by power from natural gas or out of state coal. This would result in over 100 million tons of increased CO2 emissions from natural gas during the 20 year relicensing period. If coal from Wyoming is used CO2 emissions would increase by 250 million tons.

Diablo Canyon continues to be recognized by the NRC as one of the most well run nuclear power plants. DCPP has been built to withstand seismic accelerations of 0.7 gravity, more than any other US power plant. Detailed analysis by teams of geologists from the NRC have concluded it is "safe from all seismic effects." It's demonstrated resistance to earthquakes, such as the 2003 magnitude 6.6 San Simeon earthquake is another important factor that increases CAISO grid resilience. In addition DCPP is between 85 and 130 feet above sea level. It is impervious to any conceivable earthquake-generated tsunami for the central California coast. Furthermore DCPP safety systems include a pool located uphill containing of millions of gallons of cooling water that can supply the plant via gravity, even when power is not available.

Diablo Canyon has decades more life left in it. Because of their nature, nuclear plants are always “over”-engineered to last well beyond sixty years. Data being collected as part of Idaho National Engineering Laboratory’s Light Water Reactor (LWR) Sustainability Program supports the ability of specific plant components to last over one-hundred years. A fairly significant effort has been expended in recent years to prepare Diablo Canyon for operation through 2045, in anticipation of license extension. Significant preventive maintenance and upgrades have included replacement of the steam generators, the reactor vessel heads and the steam turbine cradles. These not only support continued long-term safe operation of the plant, but also guard against the risk of major increases in future capital expenditures. PG&E’s sworn testimony to the CPUC from 2010 has already addressed that issue during the license extension period.¹

PG&E has already replaced the large age-limited components at Diablo Canyon, e.g., steam generators, turbines, main generator Unit 1, and reactor vessel heads. The replacement components were engineered for a 50-year life. PG&E’s knowledge and experience with the aging mechanisms of the original components along with improved materials and engineering of replacement components adequately address the risk of major equipment failure or degradation. Additionally, PG&E will monitor structures and buildings for deterioration and repair them as necessary. These facilities (containment, auxiliary building, fuel-handling building, turbine building and intake structure) can last indefinitely with a reasonable monitoring and repair program.

A recent study done by engineering professors from MIT and Stanford showed that continued operation of Diablo would be economical and save ratepayers billions of dollars over the relicensing period. Their conclusions are quite similar to the detailed analysis put forth by Californians for Green Nuclear Power in its brief in the Diablo Canyon case at CPUC.² In testimony before the CPUC CGNP previously predicted that in time natural gas prices could be expected to rise substantially again. Now natural gas prices have surged to 40 year highs. So Diablo Canyon now generates electricity at a far lower price than do gas plants. Its continued operation will result in cost savings for utility customers as well.

A previous argument made to support closing the plant relied upon a claim that cooling towers would need to be built. As CGNP previously testified before the CPUC, this claim is untrue. The law only requires some form of mitigation related to once-through cooling, not necessarily installation of cooling towers. In fact, the Regional Water Quality Board has not made any decision that cooling towers will be required in 2025.

A framework for once-through-cooling mitigation was also discussed between PG&E consultant, John Steinbeck, and members of the Regional Water Board.³ An economical solution in form of a barrier reef was discussed. San Onofre Nuclear Generating Station (SONGS) provided precedent: a compensatory reef was built and is still operating.⁴ They also discussed a different

¹ Opening Brief, Californians for Green Nuclear Power, CPUC Case A1608006, August 11, 2016, pp. 34

² Opening Brief, Californians for Green Nuclear Power, CPUC Case A1608006, August 11, 2016

³ *ibid.*, pp. 21

⁴ *ibid.*, pp. 21

option for PG&E to pay \$4 million per year to support and implement marine-protected areas.⁵ This option is currently implemented through the end of its current operating license, and allows Diablo to operate exactly as it has for the last 32 years. No determination has been made that cooling towers will be required for mitigation. And the law specifically indicates alternative approaches if the cooling towers are not feasible, or would be impractical.⁶ All of the parties in the framework discussion concluded that adding cooling towers at Diablo would not be feasible.⁷ It is the Regional Water Board, not the State Water Board that decides if cooling towers are required.⁸ Steinbeck explained:

There's a large misconception of what the State did with [the Federal Clean Water Act's] once-through cooling [once-through-cooling] requirement. I keep seeing wrong stuff in print. The State did not make once-through-cooling illegal or stop the use of once-through-cooling. Plants can still use once-through-cooling, they just have to initiate some kind of useful measures, operational or technological, to reduce the effects of once-through-cooling.⁹

and

PG&E may make the decision to shut Diablo Canyon down but under existing state regulation they can continue to operate without building cooling towers. PG&E just needs the Board to make decision that we're going to do this or that and then come up with a proposal and then they're going to move forward with that. I don't understand why PG&E is so concerned.¹⁰

Finally, no evidence has ever been presented that DCP's cooling system now causes unmitigatable damage to sea life or regional fisheries. In fact, a local marine biologist studied marine life in DCP's coastal region for ~40 years and found no negative effects.

The voluntary decision to close Diablo Canyon Nuclear Power Plant (DCPP) was the result of a deeply flawed process. It started with a set of secret, 'back-room' meetings (involving PG&E, labor unions and several anti-nuclear groups) which lead to the "Joint Proposal." Other stakeholders were completely shut out of these discussions, and indeed had no way of even knowing they were happening. Most important, those intentionally uninformed include the ratepayers, who paid for Diablo Canyon, and who stand to be denied continued access to its abundant, reliable, cost-effective emissions-free electricity. The ratepayers – all California ratepayers -- will suffer from the serious damage to system reliability if California's largest zero-carbon emitting power source, which provides 10% of its electricity, is closed. The Joint Proposal must be completely discarded.

Recently polling shows that 58% of all Californian's support Diablo Canyon, and in San Luis Obispo County near the plant it is higher at 74%.

⁵ ibid. pp. 21

⁶ ibid. pp. 21

⁷ ibid. pp. 22

⁸ ibid. pp. 22

⁹ ibid. pp. 22

¹⁰ ibid. pp. 22

Achieving deep reductions in carbon dioxide emissions while maintaining the reliability of our electric grid requires nuclear energy. Many other states have come to this conclusion. It is time to for California to take action to keep Diablo Canyon running.

Sincerely,

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*I am not representing the opinions of my employer, Lawrence Livermore National Laboratory.