DOCKETED	
Docket Number:	21-ESR-01
Project Title:	Energy System Reliability
TN #:	248739
Document Title:	Ace Hoffman Comments - Please do not extend Diablo Canyon's license to create more nuclear waste; we have enough in the state already
Description:	N/A
Filer:	System
Organization:	Ace Hoffman
Submitter Role:	Public
Submission Date:	2/10/2023 1:13:21 PM
Docketed Date:	2/10/2023

Comment Received From: Ace Hoffman
Submitted On: 2/10/2023
Docket Number: 21-ESR-01

Please do not extend Diablo Canyon's license to create more nuclear waste; we have enough in the state already

Should Diablo Canyon ever be considered "baseload"? Or: Karma is a nuclear reactor...or two.
January, 2023
by Ace Hoffman

The California Energy Commission has made it clear that their reason for advocating keeping the Diablo Canyon Nuclear Power Station open an extra five years (or perhaps 20 extra years) has to do with rare, short-lived, peak load periods that can last from mere moments to perhaps a few hours and, very rarely, for a day or so.

The best solutions for these temporary fluctuations in power requirements are those solutions which can ramp up and down quickly. Nuclear power is not one of them.

"Baseload power refers to the minimum amount of electric power needed to be supplied to the electrical grid at any given time...Baseload power must be supplied by constant and reliable sources of electricity."
-- Source: https://energyeducation.ca/encyclopedia/Baseload_power

As I write this (late January, 2023), more than half of Pakistan is without electricity -- approximately 220 million people. It's the third time in as many years that a widespread blackout has hit that country.

When blackouts occur, hospitals immediately start cancelling all non-essential services, and begin running on emergency backup generators (if they start). Street lights, home medical equipment, phone chargers, and emergency services may have to be shut down unless they have access to backup generators or backup batteries.

If the blackout lasts longer than about eight hours, cell phone towers are likely to run out of fuel for their generators and/or battery power (not all cell phone towers have ANY backup).

Invariably, the military goes on high alert.

Being without power is a nightmare in any country. If there's anything that "must be avoided at all costs" it is exactly that.

But combine a power outage with a nuclear disaster and it gets unimaginably worse. And the one can cause the other, and vice-versa.

The relevance to granting Diablo Canyon a five-year (possibly 20-year) life extension **as baseload** power is simple:

Nuclear power should **NEVER** be considered "baseload" power. And not just because it is unreliable, which it very much is.

There's a more important reason, which is that nuclear reactors ALWAYS operate on externally-supplied power -- tens of megawatts for each reactor. Without it, they must shut down the reaction immediately, and their own backup systems have to kick in to keep the reactor cool, to prevent it from melting down.

Each nuclear reactor has its own emergency diesel generators (EDGs) or other backup power systems (some have hydroelectric backup instead, or in addition).

Any disruption to the incoming "offsite" power supply to a nuclear reactor will cause the reactor to have to shut down. Shutting down a commercial nuclear reactor is not just expensive, disruptive, complicated and damaging in large and small ways to the reactor itself -- it's also risky. A LOT can go wrong during a shutdown. In fact, if any reactor has more than a couple of unplanned shutdowns in a year's time, it is subject to intensified inspections by federal regulators. But one or two unplanned shutdowns happen at most nuclear reactors almost every year. And suddenly, a thousand megawatts of so-called "baseload" power is gone!

The backup system of last resort for all nuclear reactors in America is called the Emergency Core Cooling System (ECCS). But here's the thing: The ECCS has never been tested in real conditions. Small models have been tested, with artificial heating units to replicate the core of the reactors. Why have they never tested a full-scale ECCS under realistic conditions? **Because it's too risky.** Think about that.

(At Fukushima, the valves to open additional cooling water failed because the power was out, and by the time they realized they needed the valves to open, it was too radioactive in the area where the valves were for humans to go without sacrificing their own lives -- and the valves remained closed, and the reactors melted down. Or something like that. Reports have varied, as with most tragedies.)

What are our alternatives? Are wind turbines reliable? Yes, very. The wind isn't, but the turbines are, and that's a key factor in reliability -- it's a much simpler technology than a nuclear reactor (which includes one very massive turbine, which occasionally fails in various ways, causing unplanned shutdowns). A fleet of just 70 wind turbines (15 Megawatts each) would be orders-of-magnitude less likely to all fail at once, but can provide the same amount of electricity as one nuclear reactor. One point of failure.

Are solar rooftops reliable? Yes, very. No moving parts, for one thing. But mustn't we turn to fossil fuels if it's cloudy on a windless day?

No, not at all -- there are numerous backup options: pumped storage, compressed air,

lifted weights, fleets of electric vehicles, and industrial-sized battery storage are all available (or can be). And all are far more reliable than diesel generators. And because they come online far faster than gas "peaker" plants, battery backup allows system operators to "cut it closer to the edge" when deciding if they need to resort to more expensive and/or less clean energy alternatives.

And not having to worry about losing 1,000 megawatts in a single instant, for an undeterminable amount of time, also makes it much easier to manage the grid -- with greater reliability for everyone, at far lower cost and less damage to the environment -- let alone, potential damage.

When nuclear power plants are considered baseload, system operators have to be much more careful.

Oregon has identified two potential significant offshore wind locations that could supply ALL of California's energy needs. The two areas are along the southern edge of Oregon (close to California!) and could be developed to the extent of completely replacing both nuclear units at Diablo Canyon within two years. Similar offshore wind farms have been built that quickly elsewhere in the world. California has lots of offshore wind options available as well. So why can't California build offshore wind? The seventh largest economy in the world -- like all large economies -- depends on cheap, clean, reliable energy to grow, thrive and produce.

Baseload power refers, by definition, to things that MUST have power for society to function even in an emergency situation. And the #1 thing that NEEDS baseload power -- is a nuclear power plant. And the worst source for reliable baseload power -- is a nuclear power plant. Just about any distributed renewable power source, combined with any assortment of clean energy storage solutions, would be better.

For example, the Los Angeles area could -- quickly, while boosting the local economy -- have a million more solar rooftops than it currently has. These could power electric vehicles, AND be available (either directly or through those vehicles) as emergency backup or "baseload" power for hospitals and other critical infrastructure in the rare event where other power sources are lost for some reason: a downed transmission line due to a wildfire, or a leak at Diablo Canyon requiring a "SCRAM" (where one or more reactors shuts down unexpectedly ("unplanned")). SCRAMs occur, on average, once or twice a year. But for how long? Could be days, could be months, could be forever, like what happened to San Onofre Nuclear (Waste) Generating Station near San Diego over 10 years ago.

What are the chances that ALL the solar panels in the Los Angeles area would ALL fail all at once? It would NEVER happen! And would ALL the cars instantaneously, in unison, all discharge and never work again? No. Massive distribution of energy sources, including storage, is the most reliable system possible. Nuclear power, on the other hand, is the LEAST reliable energy system possible!

So nuclear power doesn't fit ANY of the definitions of "baseload": It is not reliable, it requires massive amounts of offsite power itself, it is far too expensive (baseload should be the cheapest source of power, NOT the most expensive!). And last but far from least:

We still don't know what to do with the waste. All the waste from San Onofre, long closed, is still at San Onofre. The federal Department of Energy (DOE) is so desperate to find a national solution to the waste problem that, today, they upped the "reward money" available to communities that simply are willing to **DISCUSS** siting a permanent repository for the nation's nuclear waste in their midst -- from $16 million to $26 million.

They (the DOE) are desperate, because nuclear waste is so toxic. And after 70+ years, who wouldn't be? California?

Can we face reality? It's time to stop making nuclear waste, it's time to stop thinking of nuclear reactors as "baseload", or as "reliable", and it's time to get serious about renewable energy.

Ace Hoffman
www.acehoffman.org
Carlsbad, CA

The author has studied nuclear issues as an independent researcher for more than 50 years. He has a collection nearly 600 books on nuclear war, nuclear weapons, nuclear power, nuclear engineering, including several dozen on nuclear waste issues alone.