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Diablo Canyon: Balanced on a Fault Line

Additional submitted attachment is included below.

Diablo Canyon: Balanced on a Fault Line

By Gar Smith

Excerpted from the prize-winning 2012 book, Nuclear Roulette (Chelsea Green)
Diablo Canyon's 27-year-old twin reactors overlook the Pacific Ocean from Point Buchon, a coastal bluff 12 miles southwest of San Luis Obispo. This is the plant that state senator Sam Blakeslee (whose district includes the reactor station) grimly predicts could become "our Fukushima." The plant's demise probably would not come from a tsunami (the plant is perched atop an 85-foot-tall cliff). A catastrophic earthquake is the greater threat.

In the event of a loss of outside electric power (as happened at Fukushima), Diablo Canyon's emergency generators are supposed to kick in within 10 seconds, and (assuming the 50,000-gallon underground fuel tanks survived the quake) there would be enough diesel fuel on hand to cool the two reactor cores for seven days. However, if the emergency generators fail to start (or if the emergency persists for more than a week), the only remaining backup is a set of 125-volt batteries.

According to a San Luis Obispo County press release, the batteries would provide "enough power to shut the reactors and provide emergency core cooling and other necessary safety measures for two hours." Plant engineer Rudy Ortega explained what that would mean in practical terms: "We would have two hours to get one of the six diesel generators started."

In 2011, the Union of Concerned Scientists bestowed a "Near-Miss" award on Diablo Canyon after NRC inspectors reported that plant engineers had unwittingly disabled critical valves controlling the emergency cooling system. The problem, which could have led to a partial meltdown, had gone undiscovered for 18 months.

Following the Fukushima disaster, an NRC inspection at Diablo Canyon revealed some stunning safety lapses. Doors designed to self-latch in the event of flooding proved unworkable. Four of the 30-foot cables used to power fans needed to cool the plant's six 18-cylinder diesel generators were not installed and could not be found.

All six emergency generators shared the same central location, leaving them open to a shared, "common mode" failure. And, worst of all, the NRC appeared surprised by the discovery that the two reactors had only *one* emergency cooling pump between them. (Design flaws are not new to Diablo Canyon. In 1981, in one of the industry's most embarrassing engineering flubs, plant operator Pacific Gas & Electric spent four years constructing a reactor dome before a young engineer double-checked the blueprints and pointed out that the dome had been installed upside down.)

Calls to Close Diablo Canyon

Following the Fukushima meltdowns, both of California's Democratic senators, Dianne Feinstein and Barbara Boxer, contacted the NRC to express their concern for public safety, given that "roughly 424,000 live within 50 miles of the Diablo Canyon and 7.4 million live within 50 miles of the San Onofre Nuclear Generating Station." The group San Luis Obispo Mothers for Peace joined 25 national anti-nuclear organizations to petition the NRC to suspend all relicensing

of reactors until there had been a thorough investigation of all safety issues raised by Japan's misfortune. The NRC rejected the petition in September 2011. The NRC continues to insist the plant is earthquake-safe. "The seismology around Diablo Canyon has been thoroughly studied," NRC administrator Elmo Collins assured the people of San Luis Obispo. But Jeanne Hardebeck, a US Geological Survey (USGS) seismologist, wasn't so certain.

In 2008, Hardebeck discovered a previously unknown earthquake fault, the Shoreline Fault, located offshore less than 2,000 feet from the plant. Pacific Gas & Electric (PG&E) dismissed the new evidence as flawed and said it would be perfectly safe to continue operating the reactors. In a 500-page report, PG&E informed the NRC that it viewed the new fault as inconsequential. Since it was only 15 miles long, PG&E reasoned, the Shoreline Fault could produce nothing stronger than a 6.5-magnitude quake.

However, if the Shoreline were to connect with the longer, nearby Hosgri Fault, it would more than double the assumed length of the Hosgri, extending the zone of its potential impact over 250 miles from Point Conception (about 120 miles northwest of Los Angeles) to the coastal town of Bolinas, north of San Francisco. Hardebeck questioned PG&E's conclusions: "An interpretation that says the two faults don't connect doesn't seem to fit with the observations that we have." More often than not, Hardebeck explained, earthquakes that began on one fault "have actually jumped to another fault," over distances of up to three miles. If the two faults were to move as one, Hardebeck reasoned, an offshore slippage could produce the equivalent of a 7.7-magnitude earthquake striking directly below the Diablo Canyon site. [ibid.]

While reluctant to predict the faults might be connected, USGS scientist Sam Johnson did confide to colleagues at a Spring 2011 USGS meeting in Menlo Park, that, having looked at the evidence, it was fair to conclude that the potential force of this compound fault "would be close to an 8.0. That would be a big concern."

New Fault Raises Megaquake Concerns

There is a lot of talk at the NRC about responding to "the lessons of Fukushima," but so far the NRC continues to ignore the fact that the unexpectedly violent quake that triggered the Japanese tsunami occurred when several faults assumed to be "unconnected" suddenly surged at the same time. When the Fukushima quake hit, Hardebeck emphasized, "it ruptured through all of those fault segments."

State senator Sam Blakeslee has a Ph.D. in earthquake studies, so his words carry extra weight when he faults the NRC for not taking the risk seriously enough. Blakeslee was astonished that PG&E sped up its bid to win its relicensing approval *before* the new Shoreline fault earthquake data could be properly assessed. "I could not understand the utility racing to relicense before the seismic information came forward," Blakeslee told the Center for Investigative Reporting (CIR). "It was almost as if they were afraid of what they would find." With Fukushima in the rearview mirror, Blakeslee called a hearing and grilled NRC officials. "There is a new fault, in my district, next to my constituents, and you're telling me you're just going to continue business as usual and not delay to

get the information before you do your safety review?" Blakeslee fumed. "That's unacceptable!"

Asked to justify its decision to relicense, an NRC official told Blakeslee that the commission had relied on safety evaluations submitted by PG&E. "We expect licensees to do those studies," the NRC official testified.

Documents obtained by the CIR revealed that PG&E's scientists had, in fact, looked into the probability of a 7.2 quake occurring along the combined faults and even produced a graph showing that the potential shaking could exceed the stresses the plant was built to withstand. But in its public presentations, PG&E provided Blakeslee and the NRC with a different graph, one showing that a serious quake along the Shoreline Fault was impossible. Hardebeck was not convinced. She insisted her geological mapping evidence showed "earthquakes along the Shoreline Fault very clearly go all the way to the Hosgri Fault."

The Wisdom of Solomon

Activist and author Norman Solomon (co-author with Harvey Wasserman of the 1982 anti-nuclear classic, *Killing Our Own: The Disaster of America's Experience with Radiation*) was so concerned about the danger of California's two coast-sited nukes that he decided to run for a US congressional seat on an anti-nuclear platform.

Solomon called for an immediate shutdown of both Diablo Canyon and San Onofre. As to the NRC's call for more studies, Solomon responded, "I reject the notion that we should wait for such nuclear-enthralled agencies to tell us whether nuclear power is an acceptable risk for Californians." Solomon praised Germany's bold decision to abandon nuclear power—which means replacing 23 percent of the country's power needs with new renewable energy.

California, by comparison, produces only 15 percent of its electricity by frying atoms. "Effective conservation options are readily available, and widespread use of renewables like solar is in reach," Soloman wisely concluded.

California's Attempt to Close Diablo

The Golden State has the right political climate to go nuclear-free. In 1976, a citizens group succeeded in placing an initiative on the June ballot. Proposition 15 called for a ban on new reactors in the state. After the nuclear industry spent millions of dollars to defeat the proposal the state legislature took a stand against a nuclear renaissance by passing a law banning further construction of nuclear power plants until the NRC could provide a proven means of safely disposing of nuclear waste.

As of December 2010, 13 states had either banned or placed restrictions on the construction of new reactors. More recently, anti-nuclear campaigners circulating a petition for a statewide initiative calling for the closure of California's existing plants got an unexpected boost from Mother Nature.

On April 26, 2012, Diablo Canyon was forced to shut its Unit 2 reactor when seawater intake pipes became clogged by a swarm of salps—jellyfish-like sea creatures. With Diablo's other reactor down for maintenance and San Onofre's reactors ordered shut for safety reasons, California had become a *de facto* nuclear-free zone.