

Our own fault

Matt Fountain, San Luis Obispo New Times, 3-25-10

The devastating earthquake in Haiti, the massive rocker in Chile, and the small offshore quakes in Northern California in recent months have heightened concerns about local geologic faults, especially the potential for damage to the nuclear reactors at the Diablo Canyon power station and the storage casks for spent fuel there.

What is the risk?

Though still in the early stages, studies of the newly discovered seismic fault off the Central Coast—known informally as the Shoreline Fault by Pacific Gas & Electric (PG&E)—are beginning to reveal its geology and proximity to the plant in Avila Beach. Nothing so far discovered worries regulatory officials or PG&E brass but scientists emphasize the data are preliminary.

The U.S. Geological Survey has yet to publish any information about the Shoreline Fault, or even list it on the agency's website as a known seismic feature. A scientific journal article recently written by USGS geophysicist Jeanne Hardebeck will be the first independent publication to formally define the rift. According to Hardebeck, the article is undergoing peer review and will likely reach print in June.

In a June 2009 report to the Nuclear Regulatory Commission (NRC), the PG&E geosciences department outlined its preliminary findings. The fault was discovered in late 2008, the result of a PG&E-USGS cooperative research agreement. Tom Brocher, the USGS geologist who lead the team that discovered the fault, told *New Times* it was discovered through analysis of a cluster of small earthquakes that occurred off the Central Coast since 1987.

“We started by plotting locations of these historical events along the Hosgri fault, but then this linear trend of quakes popped out that we hadn't seen before,” Brocher said, adding that these were seismic episodes in the 2-3 magnitude range, small enough to escape notice by residents and avoid posing a threat to safety.

According to the latest PG&E information, which Brocher confirmed, the Shoreline Fault is a verticle strike-slip fault, which moves in a horizontal motion. It is approximately 24 kilometers long, intersecting with the nearby Hosgri fault to the north, and roughly 12 kilometers deep. According to PG&E, it lies 600 meters from the plant's power block and 300 meters from the intake structure. It is considered capable of producing up to a magnitude 6.1 earthquake (the plant was built to withstand a 7.5-magnitude event).

“We don't know yet how rapidly the two sides are slipping past each other and that's key,” Brocher said. “We don't know if it's releasing energy continuously, or storing it up. We don't know when the last significant earthquake—if any—was on this fault, or the magnitude. There's a lot of question marks.”

Another question is whether the location is entirely accurate, whether the fault could run onshore directly under the plant.

Assemblyman Sam Blakeslee earned a PhD studying earthquakes on the Central Coast and is the author of Assembly Bill 1632, now law, which mandates that the California Energy Commission (CEC) analyze the state's two nuclear plants regarding seismic, environmental, and economic factors.

“The state depends upon the reliable operation of Diablo Canyon,” Blakeslee told *New Times*. “We need to know

whether this large fault could run under or possibly affect the reliable operation of the plant. The actual length of the fault, the proximity to the plant; is it some yards away, is it hundreds of yards—these are critical questions.”

On January 15, PG&E filed an application with the California Public Utilities Commission (CPUC) to recover costs associated with additional seismic studies at and around Diablo Canyon, as recommended by the CEC. As of this printing, the CPUC has not made a decision on that filing.

According to PG&E spokesman Kory Raftery, if funded, further research will be conducted by PG&E’s geosciences department.

The forthcoming data and interpretations in 3-D would then be made available for review by the broad earthquake science community.

But as far as the Shoreline fault is concerned, PG&E officials are confident about the data they already have. “While we see the 3-D studies as a useful tool in continued examination of the Hosgri fault and the Los Osos fault, we do not expect the studies to yield new information on the Shoreline Fault, particularly when it comes to the maximum magnitude of an earthquake the fault could, in theory, deliver,” Raftery said.

But for Blakeslee, it’s important to do the research to avoid what happened in Japan in 2007, when a quake shook the largest nuclear plant in the world. Though the Japanese plant survived with minimal damage, more than 300 gallons of radioactive cooling water leaked into the ocean.

“The earthquake that knocked out the Japanese plant cost \$12 billion to ratepayers. A fraction of that amount spent to strengthen the plant could have prevented that outage,” Blakeslee said. “That quake knocked out critical facilities that support the plant and many of the lesser components that support Diablo haven’t been through that testing.”

According to a PG&E cost estimate, the company anticipates \$500,000 will be used for study design and planning, \$11 million for 3-D offshore seismic studies, \$2.025 million for 2-D onshore studies, \$2.052 million for ocean bottom seismometers, and \$1.15 million for project management and peer review, bringing the total for the upcoming seismic studies to \$16,727,000.

PG&E expects to have the Shoreline Fault study complete by the end of 2010 and tectonic modeling for the central California region wrapped up by 2012. If the utility is granted recovery of costs, all seismic studies—including 3-D testing—are expected to be completed by 2013, about a year after the process of re-licensing the plant is expected to be complete. Given the uncertainty about dangers the fault could present, the SLO Board of Supervisors and other parties contend the plant should not be issued a new operating license until all seismic studies are completed.