

SFGate.com**PG&E, USGS disagree on Diablo Canyon fault danger**

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In the wake of the devastating tsunami damage to the Fukushima Dai-ichi nuclear plant in Japan, seismologists in the United States are focusing on a potentially dangerous fault system near the Diablo Canyon nuclear power plant in California.

Perched over Point Buchon on the Central Coast, the Pacific Gas and Electric Co. plant was built four decades ago near two active faults: the Hosgri and the Shoreline. The electricity-generating plant on a barren stretch of coastline is about 12 miles from the college town of San Luis Obispo.

While PG&E maintains the Hosgri and Shoreline are too small to threaten the aging plant, some government scientists suspect the faults - acting with others in the region - could produce an earthquake much more powerful than the plant was built to withstand.

For now, the scientists are being cautious. Sam Johnson, a U.S. Geological Survey scientist, was reluctant to speculate about whether the area's fault system is actually much longer, and therefore more powerful, than now predicted.

"I don't want to be the one who says there could be one long rupture," he said in an interview, calling the subject a "hot-potato issue."

Fault may be longer

But during a presentation this spring at the USGS headquarters in Menlo Park, Johnson laid out a scenario showing the Hosgri Fault stretching 250 miles from Point Conception all the way to Bolinas just north of San Francisco - far longer than its current official length of 105 miles.

The longer the fault, the more powerful the rupture. Johnson's scenario shows the Hosgri Fault connecting in a system with the San Simeon and San Gregorio faults to the north of the nuclear plant.

"If the fault were to run from Point Conception to Bolinas, that would be close to an 8.0," Johnson said. "That would be a big concern."

Johnson was quick to point out that the USGS has not said the fault runs that far. He and a team of researchers from the USGS, State Coastal Conservancy, National Oceanic and Atmospheric Administration and others, including PG&E, are collecting this information through the California Seafloor Mapping Program.

Documents show that Diablo Canyon was constructed to withstand ground shaking from a magnitude 7.5 earthquake 3 miles offshore, on the Hosgri.

In 1927, a magnitude 7.1 earthquake struck offshore near Lompoc (Santa Barbara County), possibly on the Hosgri. Nobody was killed, but a concrete highway was cracked and a railroad bridge was thrown out of line, according to the Southern California Earthquake Data Center.

PG&E would not respond directly to questions about the structural integrity of the plant, or fault length and size. The utility's spokesman, Blair Jones, said in a statement: "Diablo Canyon was designed and constructed with seismic safety in mind and components of the facility were tested to withstand probable ground motions resulting from nearby faults."

Highly studied area

Scientists and top administrators for the Nuclear Regulatory Commission insist that the plant is safe and that further studies are unwarranted.

"I would offer the seismology around Diablo Canyon has been thoroughly studied," said Elmo Collins, the commission's administrator for Region IV, which includes California, Oregon, Washington and Alaska. "We have to have a solid technical and scientific conclusion about safe operation of the facility today. We believe we have that."

Fault found in '08

Still, seismologists have been paying close attending to one newly discovered fault near Diablo Canyon: the Shoreline. Located in 2008, the fault runs along the tip of Point Buchon, just a few hundred feet from the power plant.

In a 500-page report on the Shoreline Fault for federal regulators, PG&E suggested the fault is just 15 miles long, with the potential for a magnitude 6.5 earthquake.

The utility also denied the possibility that the Shoreline and Hosgri faults could act in concert.

But one respected federal seismologist who discovered the Shoreline Fault said it's logical to assume the faults are connected. If the two faults did connect, that could put a magnitude 7.2 earthquake almost right below the plant.

"With the data I'm looking at, it actually doesn't make sense to think of these faults as not connecting to each other," said Jeanne Hardebeck, the USGS seismologist who discovered the fault, using PG&E and USGS data on recorded earthquakes. "An interpretation that says they don't connect doesn't seem to fit with the observations that we have."

Hardebeck points out that a magnitude 7.2 quake on the combined faults would cause greater

ground shaking at the nuclear plant than would a magnitude 7.5 quake 3 miles offshore on the Hosgri Fault acting alone.

If the Hosgri Fault runs up to Bolinas, and if it's connected to the Shoreline Fault, there is the possibility of a magnitude 7.7 earthquake under the plant, Hardebeck contends.

"Our current thinking about how faults might work together has been really influenced by some earthquakes that have occurred over the last couple of decades," she said, "where earthquakes that have started out at one fault have actually jumped to another fault, or gone around bends in a fault and jumped gaps up to about 3 miles."

Hardebeck pointed to the recent magnitude 9.0 earthquake and tsunami in Japan that derailed the Fukushima Dai-ichi nuclear power plant. She said in that case, scientists thought there were several unconnected faults offshore, "but in fact, when the earthquake did happen ... it ruptured through all of those fault segments."

3-d study funded

PG&E has received authorization from the California Public Utilities Commission to spend more than \$16 million on 3-D seismic studies to better evaluate earthquake threats near the plant. The technology works like a CT scan on geological surfaces, showing subsurface layers, cracks and faults.

Johnson of the USGS said the 3-D seismic mapping is "likely to yield some interesting, unexpected results - answers to questions we haven't even asked. We won't know what it will mean until we see the data."

Still, the mapping won't uncover vital information about potential dangers to Diablo Canyon. While geologists and seismologists think it may provide spectacular images of the Hosgri, it is unlikely to tease out the most critical data about the fault, such as its length, the rate at which it is slipping and how often or frequently it has erupted in the past.

Weighing the risks

If the studies are inconclusive about the faults, said state Sen. Sam Blakeslee, R-San Luis Obispo, who has a doctorate in seismic studies, "that raises a really interesting question for the NRC."

"If it's reasonable to infer that a much larger earthquake could occur but the studies come back inconclusive," he said, "the NRC has one of two choices: to plan as though it could or to ignore that possibility because it couldn't be proven."

James Boyd, a member of the California Energy Commission, thinks even the best-laid plans,

predictions and models might fail in the face of unpredictability and nature.

"We don't know enough about the magnitude of a potential earthquake to say with absolute assurance that this site, based on its location on a bluff and all the other safety measures, makes us totally secure from any possible events in the future," he said. "Mother Nature has certainly demonstrated this year, particularly in Japan, what can happen."

California Watch was founded by the nonprofit, independent Center for Investigative Reporting. E-mail Susanne Rust at srust@cironline.org.

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