

## Horn rivals Joshua with whistle blowing at Diablo

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SAN FRANCISCO — Here's a name to add to the list of noted American whistle blowers: John L. Horn Jr.

If Horn hadn't been troubled by an old engineering diagram, Pacific Gas & Electric Co. would be running low-power tests today at its \$2.4 billion Diablo Canyon nuclear power plant.

Horn's name isn't exactly a household word, because PG&E has been careful not to broadcast his identity, and his name has not surfaced at recent Nuclear Regulatory Commission hearings on the problems at Diablo.

But his Sept. 21 discovery that the reactor containment dome's construction was based on a fundamental design error ignited an investigatory process which will keep the plant cold, pending exhaustive studies of its seismic safety.

In his first press interview, Horn told Gannett News Service that the design error stemmed from an engineering diagram that had gone unquestioned since 1977 and that it took no calculations — just eyeballing — to spot it.

Finding the error wasn't part of Horn's job. He did it on his own.

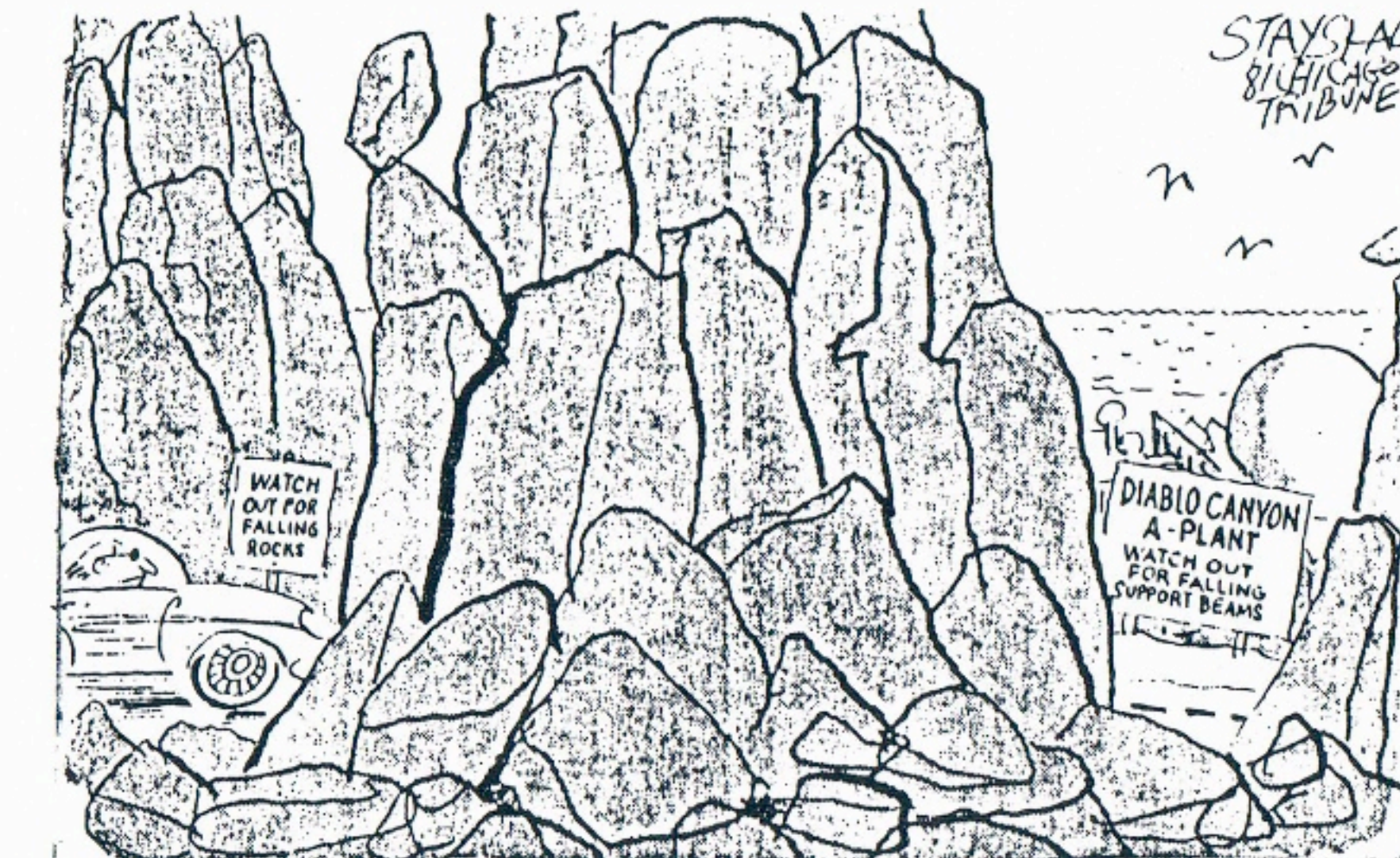
The experience has left Horn, 25, skeptical about Diablo Canyon. "I don't want to see it go on line yet. It's not finished," he said.

Denver-reared Horn, who graduated from Stanford University in 1979 as a mechanical engineer, was hired by PG&E in April 1980. It is his first professional job.

As a member of a 10-man nuclear-mechanical engineering section, his principal duties were writing Diablo Canyon computer programs and analyzing its piping.

The job included "manipulating the earthquake spectrum," that is, describing where stresses would fall in the containment dome during acceleration caused by a major quake on the Hosgri Fault, about three miles offshore.

The bedrock of Horn's spectrum manipulation was a diagram prepared by John Blume and Associates, PG&E's seismic consultants. "It was a pretty ambiguous diagram to begin with," Horn said. "I had asked everyone about it and they



didn't know.

"I was getting expert on spectra, and people were coming and asking me questions, and in a way I felt it was kind of my responsibility to find out about it," Horn said.

What Horn found when he compared the diagram with blueprints was that "it was 180 degrees off. It's as if you put a quarter on the table and assumed that you were looking at heads, when actually tails was showing."

The mistake was obvious, even though it was hard to believe, he said. "You didn't need any calculations. Once you see it — there it is."

Since the five wedge-shaped sections of the dome outlined in the diagram are of varying sizes, building the containment dome with upside-down plans threw estimates for quake stress resistance for piping supports out of whack. The basic error caused faulty engineering in other parts of the dome, as in the calculation of the weights of five giant fan coolers, he said.

Horn went over his findings with his boss the next day, but it wasn't until Friday, Sept. 25 — just three days before PG&E was to start loading the reactor — that he laid them before an engineer with a hot line to the utility's chief decision-makers.

The engineer — Horn declined identification — "didn't really say very much. He just sat and shook his head." But there was no argument, and Horn's unwelcome discovery got onto PG&E's fast track. "Facts are facts," Horn said.

Although it had already issued a low-power test license for Diablo Canyon, the NRC blocked fuel loading when PG&E pointed out the error.

Last Tuesday, in the wake of disclosures of further design errors, it ordered three additional independent studies on the plant's seismic safety design.

Horn still finds it "amazing that one little diagram — it was only three inches across — should have so much impact."

He acknowledged that he was about as popular as a mongoose at a cobra convention around PG&E headquarters when the news broke that Diablo Canyon wouldn't be fired up on schedule. That in-house resentment has subsided, he said. "How can they be mad at me when I just noticed something?"

Since he found the error, Horn said his job has changed in that, "I have more responsibility at work, and I'm writing procedures and verifying that things are done."

"I kind of get the feeling that my future here isn't in jeopardy. A vice president called me up to the 32nd floor and assured me of that," he said.

PG&E maintains that the design errors discovered so far are not serious enough to have posed a safety problem at the coastal reactor site even in the event of a 7.5 magnitude earthquake on the Hosgri fault.

Assuming the absolute worst — that PG&E is wrong, that the design errors had not been discovered and that a quake flattened the plant — Horn said investigators could have learned the cause. "The paper would still be there," he said.

He said he is "pretty happy with the way they (PG&E) have come forward" since the design error was disclosed. "They're not stonewalling."

For a man who has earned his living for more than a year working on a colossal nuclear power plant, Horn is curiously ambivalent about nuclear energy. But he denies being a closet anti-nuke. He would go no farther than to concede that he wouldn't mind seeing Diablo Canyon going on line, "when all the work is done."

Discovering the design flaw that kept Diablo Canyon from going on line is one of just two footnotes in history that the young engineer has already chalked up. He is also one of a handful of steel-nerved souls to have conquered the 4,000 sheer granite feet of El Capitan in Yosemite National Park, which is the Mt. Everest of rock climbing.

To date, Horn's whistle-blowing at Diablo Canyon has brought him neither fame nor fortune. PG&E hired him at \$2,200 a month, and that's what he is still being paid.