

Fukushima's U.S. Nuclear Nightmare

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By John Raymond

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There is no such thing as a safe nuclear reactor. “They’re all cancer factories, they’re all bomb factories,” says author Dr. Helen Caldicott in *Nuclear Power Is Not the Answer*. With radioactive contamination now spreading worldwide from the nuclear catastrophe in Japan, Caldicott’s warnings are as urgent as ever.

Nuclear safety officials have long known about—and ignored, dismissed, or subsequently attempted to remedy with an experimental “fix”—safety design flaws in General Electric’s Mark 1 Boiling Water Reactors. Three GE Mark 1 units caught fire, exploded, and had full core meltdowns at the Fukushima Daiichi plant in Japan following the station blackout that resulted from the earthquake and tsunami of March 11.

Of the 32 GE Mark 1s in operation, 23 are in the U.S. at 16 plant sites and they are near identical twins to the reactors at the Fukushima Daiichi plant. An effort to suspend operations at the U.S. Mark 1 plants has been underway since early April when the anti-nuclear organization, Beyond Nuclear, filed a petition seeking emergency enforcement action with the Nuclear Regulatory Commission.

The request for emergency enforcement was quickly denied, but two NRC meetings were held on the petition, and a final determination is pending. Over 8,000 individuals and organizations have become co-petitioners since the petition was filed.

Ignoring Warnings

The NRC ignored its own warnings, issued over decades, and repeatedly, in favor of a production agenda that is more protective of the industry it is supposed to regulate than the public it is mandated to protect,” said Paul Gunter of Beyond Nuclear. “Fukushima demonstrates that the warnings that were on the wall are now nuclear swords of Damocles hanging over all these communities.”

Warnings about the Mark 1 containment’s susceptibility to explosion and containment failure were first raised in 1972 by Stephen Hanauer, a chief nuclear safety regulator for the Atomic Energy Commission (the predecessor agency of the NRC) and a member, and then chair, of the Advisory Committee for Reactor Safeguards (ACRS). Hanauer had evidence of possible defects in the containment’s pressure-suppression design.

His memo, cited in the petition, stated that, “Recent events have highlighted the safety disadvantages of the pressure suppression containment.” In recommending that the “AEC adopt a policy of discouraging further use of pressure suppression containments,” Hanauer addressed the potential for a hydrogen explosion in the containment. Because it was “smaller than conventional ‘dry’ containments, the same amount of oxygen, formed in a postulated accident, would constitute a higher volume or weight percentage of the containment atmosphere. Therefore, such hydrogen generation tends to be a more serious problem in pressure suppression containments.”

Hanauer’s memos on “GE’s various bad design choices” are discussed in detail in Daniel Ford’s book, *The Cult of the Atom: The Secret Papers of the Atomic Energy Commission*. The book, based on files obtained through hundreds of Freedom of Information Act requests and multiple lawsuits, documents the government’s cover-up of nuclear safety issues while at the same time promoting the nuclear industry.

Hanauer Memo

Hanauer’s memo went to Joseph Hendrie, a senior AEC official, who wrote: “Steve’s idea to ban pressure-suppression containment schemes is an attractive one in some ways....” But “it could well be the end of nuclear power. It would throw into question the continued operation of licensed plants, would make unlicensable the G.E. and Westinghouse ice-condenser plants now in review and generally create more turmoil than I can stand thinking about.”

Ford writes that Hendrie, who was later appointed NRC chair, “proposed no corrective actions to deal with the safety problem Hanauer had raised. Hanauer got no reply to his memo, and the matter was resolved by being ignored.”

“The Hanauer memo was not made available until 1978, so the AEC and the NRC sat on the document before they released it publically,” said Gunter. “This was a deliberate obfuscation of the acknowledged substandard quality of the Mark 1 and it was a political decision—a promotional decision.”

The petition further notes that “safety concerns were again affirmed in 1986 by Dr. Harold Denton, the Director of Nuclear Reactor Regulation, who told a nuclear industry conference that the flawed reactor containment type has as high as a 90% chance of failure if challenged by a severe accident condition.”

Inside GE, the problems with the Mark 1 containment design were well known, Dale Bridenbaugh, a former GE nuclear engineer, told the NRC’s Petition Review Board in a meeting on October 7. Bridenbaugh and two other GE nuclear engineers, Richard Hubbard and Gregory Minor, became internationally known as the “GE 3” whistleblowers when they resigned from the company in 1976 “as a matter of conscience” over nuclear safety issues. Shortly afterward they testified before a Congressional committee on safety design defects in GE reactors.

Their Congressional testimony, cited in the petition, gave a list of factors that made GE reactors unsafe. It included the Mark 1 containment system and lax regulation by the NRC. They said their list “makes a nuclear power plant accident, in our opinion, a certain event. The only question is when, and where.”

Bridenbaugh said that in the year prior to his resignation, GE had initiated a safety evaluation program to address the safety risks linked to the Mark 1 containments. He served as project manager of the program and said it “devolved into an exercise in defending continued operation of the plants to arguments of the low probability of a possible event.”

He said that while “subsequent fixes were implemented to overcome design deficiencies,” the “recent events at Fukushima calls into question again whether those fixes, assuming they were properly implemented in Japan, are adequate to meet license requirements so as to safeguard health and safety of the public.”

Bridenbaugh said, “It is unreasonable for all the US citizens who could be affected by a major accident at a Mark 1 plant to be held at risk for another period of years when it is uncertain that similar consequences could happen here.”

Beyond Nuclear’s petition calls for the NRC to revoke the agency’s “pre-approval” of the key “fix” installed on Mark 1 containments in the early 1990s, a venting system that allowed operators to vent the containment and prevent a breach following a severe accident. The fix was adopted as a voluntary industry initiative, and, as such, was not subject to public hearings and did not undergo scrutiny from independent nuclear experts and citizen groups. And it didn’t work.

Industry Stonewalling

As reported in the New York Times (“In Japan, Danger Signs for the US,” May 17, 2011), “Emergency vents that American officials have said would prevent devastating hydrogen explosions at nuclear plants in the United States were put to the test in Japan—and failed to work, according to experts and officials with the company that operates the crippled Fukushima Daiichi plant. The failure of the vents calls into question the safety of similar nuclear power plants in the United States and Japan.”

Following its review of “near-term” lessons learned from the Fukushima disaster, the NRC is expected to now require installation of a “reliable” venting system. But Gunter and others argue that such a step— itself a years long undertaking that allows the industry to stonewall over defining what a “reliable” system would be—does not address the fundamental issue of the flawed reactor design.

“Instead of learning the lesson and closing these deficient reactors, the NRC staff is now proposing to make the venting systems a little better. You’re compensating for the failure of the compensation you’ve already made for the design deficiencies,” said Michael Mariotte, executive director, Nuclear Information and Resource Service, in the petition hearing.

“Since the purpose of a containment is to contain the radiation, these fixes have always been absurd to me because they allow the release of radioactivity,” Arnie Gunderson, chief engineer of Fairewinds Associates, an independent energy consulting firm, told the NRC panel.

Storage Risks

The NRC meetings on the petition also raised red alerts over the risks from the storage of high-level radioactive waste in spent fuel pools at reactor sites. At GE Mark 1 plants, spent fuel is stored in pools 100 feet above the reactor outside the primary containment structure. The reactor explosions that damaged the containment buildings at Fukushima exposed the fuel pools to the air and, in Unit 4, the spent fuel pool caught fire. The condition of the spent fuel pools in other units is not yet known with certainty, but the fire in Unit 4, which may account for nearly half the total cesium-37 released into the environment from the disaster, was “a significant factor” in the NRC’s decision to order the 50-mile evacuation of Americans from the plant, Gundersen said.

“All Mark 1s in the U.S. have the same location of fuel pools above the containment,” Kevin Kamps, of Beyond Nuclear, told the NRC panel, stating that the agency has long refused to address the risks from high-level radioactive waste storage. “A coalition of scores of grassroots and national environmental organizations have urged NRC for nearly a decade, ever since the 9/11 terrorist attacks, to empty GE BWR Mark I pools into hardened on-site storage,” he said.

“Incredibly, NRC has allowed Mark I pools to keep their high-level radioactive waste packed to maximum capacity. Mark I owners and operators seeking to defer dry cast storage costs for as long as possible have been allowed to put us all at incredible risk by keeping their pools packed to the gills,” Kamps said.

A 2001 NRC study that looked at the potential for waste pool fires calculated that 25,000 people as far as 500 miles downwind from a pool fire could die from latent cancer. Kamps noted that the recent report, “Spent Nuclear Fuel Pools in the U.S.: Reducing the Deadly Risks of Storage” (Robert Alvarez, Institute for Policy Studies), cites several GE Mark 1 sites where spent fuel pools present an imminent hazard because they are filled to capacity.

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