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Could Nuclear Plants Be Terrorists' Next Target?

by Gary Stoller

An airplane crashes into Connecticut's Millstone Nuclear Power Station, 127 miles from New York. It ignites a fire that releases large amounts of radioactive particles into the atmosphere over one of the nation's most populous regions. An area the size of Connecticut, Massachusetts, New Jersey, Rhode Island and Vermont is uninhabitable for at least 30 years, and some areas remain contaminated for 300 years. Children begin dying from leukemia 5 years after the accident, and tens of thousands of people eventually die of cancer.

Such a horrific scenario was once considered too unlikely to worry much about, but Sept. 11's events altered that perception. The threat of a plane dive-bombing into one of the nation's 103 operating nuclear plants or 16 decommissioned plants that store spent fuel cannot be dismissed, say nuclear engineers and scientists.

The Nuclear Regulatory Commission is now studying how to prevent such an attack. Most nuclear power plants are designed to withstand earthquakes and natural disasters. At a few plants near airports, the buildings containing the nuclear reactors are designed to withstand a small plane crash. But none was built to survive hits by larger planes or jets like those terrorists hijacked on Sept. 11.

The NRC is aware of that and expects to complete a thorough review of security policies this month, it says. Nuclear plants' reactors are not the only worry. They're typically housed in steel-lined reinforced concrete shells that are at least 18 inches thick at the top and 6 feet thick at the base. Of greater concern are the less protected "spent-fuel pools," where used rods of nuclear fuel that once powered the reactors are cooled and stored for years in pools of water. Some industry watchdogs say even small planes, such as corporate jets, could penetrate the buildings that house many of these pools.

Disturbing the water in the pool could cause the fuel rods to get too hot, starting a fire and causing a massive radiation leak. The amount of radioactive material discharged by an accident in the pool of Millstone Unit 3, for instance, would be five times greater than the world's worst nuclear accident to date - at the Chernobyl nuclear plant in the Ukraine in 1986 - says Gordon Thompson, executive director of the Institute for Resource and Security Studies.

Ukraine's Health Ministry says 125,000 people have died and 3.5 million people have become ill because of the accident. "A pool fire at Millstone Unit 3 would be a regional and national disaster of historic proportions," says Thompson, a mechanical engineer who has consulted for the Department of Energy. Thompson was hired by the STAR Foundation, a Long Island environmental group, to calculate the effects of a pool fire at Unit 3.

The group opposes the plant's application to more than double the pool's spent-fuel capacity. In response to the September attacks, the organization last month sued the NRC, demanding that the agency take action to prevent a "catastrophic spent-fuel pool fire" at Millstone.

The NRC has no comment. Pete Hyde, a spokesman for the plant's operator, Dominion Nuclear Connecticut, says security procedures are being reviewed, and the utility supports restrictions on the airspace within a 5-mile radius of all nuclear power plants. The NRC says the pools' security at all nuclear power plants is being studied as part of "a top-to-bottom review" begun after Sept. 11.

"There is a threat, and the agency is looking at it," says spokeswoman Rosetta Virgilio. That doesn't satisfy some members of Congress: The NRC "is still operating in a pre-Sept. 11 world," says Rep. Edward Markey, D-Mass. "While the NRC and the nuclear power industry has been saying nothing short of 'It can't happen here,' we know all too well that the terrorists of al-Qaeda (suspected of executing the Sept. 11 hijackings) have contemplated and would carry out an attack on a nuclear facility."

Rep. George Gekas, R-Pa., says the government should begin stockpiling supplies of potassium

iodide for communities near nuclear facilities. Potassium iodide can prevent the onset of thyroid cancer that could result from radiation poisoning. A bill introduced in the Senate in late November would create a federal security force for nuclear plants and would require them to establish a plan to defend against air attacks.

Presently, plant operators hire private security companies. Since Sept. 11, state and local police and, in some states, the National Guard have been present. "An air attack on a nuclear power plant could result in one of the greatest environmental disasters to ever affect civilization," says Nathan Naylor, a spokesman for Sen. Harry Reid, D-Nev., a co-sponsor of the bill. The NRC says it has not learned of a specific "credible threat" against a nuclear power plant since Sept. 11.

On Oct. 30, however, the Federal Aviation Administration banned small planes from flying over most plants "for national security considerations." Those restrictions were lifted Nov. 6. On Oct. 17, airports in Harrisburg and Lancaster, Pa., were closed temporarily after the NRC said it received information about a threat against the Three Mile Island nuclear plant outside Harrisburg. The NRC subsequently said the threat was a false alarm.

Too remote a threat?

Nuclear safety watchdogs say that for many years they have pointed out the dangers of spent-fuel pools, but that the NRC told them the terrorism threat was too remote to make it a major concern. At about one-third of the power plants, the reactor is in one building, and the spent-fuel pool is housed in a second building with only corrugated metal walls and a roof, says David Lochbaum, a nuclear safety engineer of the Union of Concerned Scientists and a former power plant consultant.

At the rest of the plants, a spent-fuel pool sits in a concrete building that's farther from, but attached to, the reactor building. The corrugated metal structures could be penetrated by a small plane, such as a Cessna, Lochbaum says. The concrete structures, which are at least 6 inches thick, could be penetrated by a larger plane or a jet, Lochbaum and other engineers say.

A severe pool fire could render about 188 square miles uninhabitable and cause as many as 28,800 cancer fatalities and \$59 billion in damage, Brookhaven National Laboratory said in a 1997 report for the NRC. NRC spokesman Victor Dricks says he can't comment on the study.

Storage of spent fuel has been a controversy for decades. A 1982 law mandated that the Department of Energy be responsible for accepting nuclear plants' waste, but no storage site exists. Steve Kerekes, a spokesman for the Nuclear Energy Institute, which represents 35 major power companies, says spent-fuel pools are well-protected, and it would be "extremely difficult for a plane to strike directly without major portions of the plane being shredded on the way in."

The pools and the reactor buildings have redundant safety systems to protect against loss of coolant, Kerekes says. But he doesn't know what would happen, he says, if a large jet struck either the containment building or the fuel pools. "We've said since Sept. 11 that we can't guarantee we're impervious to every scenario one might envision," Kerekes says.

Lochbaum says that many spent-fuel pools are in the open, and if a plane made a direct hit, the back-up cooling system could fail. Spent-fuel pools hold five to 10 times more "long-lived radioactivity" than a radioactive core inside the reactor of an operating plant, says STAR Foundation executive director Robert Alvarez, a former Department of Energy adviser. At some nuclear plants, some of the spent fuel has been removed from the pool and stored in lead-lined concrete casks.

These casks, says Lochbaum, could be split open in a crash but are probably less vulnerable than the spent fuel in the pools. The amount of spent fuel stored at nuclear plants is growing, making accidents even more dangerous in the future. Under typical weather conditions, about 46,598 square miles of land would be rendered uninhabitable for at least 30 years - and some for hundreds of years - if all radioactive material were discharged from the current inventory of fuel assemblies in Millstone Unit 3's spent-fuel pool, Thompson says. A similar accident in late 2004 would render about 55,923 square miles - more than the size of New York state - uninhabitable, he says.

"I don't think anyone can accurately predict what would happen," says Hyde, the Millstone spokesman. He says the spent-fuel pools, composed of "industrial steel frames with concrete around them," are designed to withstand an earthquake but not the impact of a large jet. If such an accident occurred at the Harris Nuclear Plant near Raleigh, N.C., there would also be great devastation, says Thompson.

If all fuel in two of the plant's fuel pools ignited, enough radioactive material would be released to contaminate for at least 30 years 93,000 square miles of land - 8,700 more than the entire state. Keith Poston, a spokesman for Progress Energy, the parent company of the plant's operator, Carolina Power and Light, calls Thompson "a full-time anti-nuclear activist" and says he won't comment on Thompson's calculations.

"We're confident our facilities are safe, and they've been deemed to be safe by the federal government," the spokesman says. Poston says, however, that both the spent-fuel pools and the operating nuclear reactor's containment building were "not designed to withstand a direct hit from a Boeing 747."

Decommissioned power plants, nuclear-safety watchdogs say, may be even more of a danger, because they may be housing more spent fuel and have fewer security personnel than operating reactors. The NRC's Dricks says the agency, by law, has "always considered the possibility of terrorist threats against our nuclear plants." On Sept. 12 an NRC document filed in a licensing proceeding said that "terrorist acts" do not "fall within the realm of reasonably foreseeable events." Dricks says the filing was prepared before Sept. 11.

Presently, says NRC spokeswoman Virgilio, the NRC communicates with other government agencies for intelligence information and "reviews threat information" with the new Office of Homeland Security.

Airport security a 'prime focus'

Lochbaum, of the Union of Concerned Scientists, says beefing up airport security should be "the prime focus." Since Sept. 11, the federal government has taken steps to improve security at major airports, but experts say there are still holes. At small airports, which accommodate private planes and corporate jets, there is very little security, experts say. The Union of Concerned Scientists, which has former NRC commissioner Peter Bradford on its board, says NRC security tests prior to 1998 revealed "significant weaknesses" at 27 of 57 operating nuclear power plants.

The NRC's Dricks says all weaknesses found have been corrected. "It doesn't necessarily follow," he says, "that because significant weaknesses are identified, power plants wouldn't be able to defend themselves against (an) attack." Kerekes, the spokesman for the group representing 35 nuclear power companies, says nuclear power plants are well-protected. But, "like any other commercial enterprise, we have to look to the federal government to protect us in acts of war like those that occurred on Sept. 11."

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