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Too Cheap to Deter?

The Nuclear Power Industry Pushes Ahead Post-9-11

By Charlie Cray

With the election of George W. Bush as president, the U.S. nuclear power lobby geared itself up for yet another attempt to revive a dying industry.

Arguing that nuclear is a "clean" power source without carbon dioxide emissions, the industry sought to position itself as the remedy for global warming.

Vice President Dick Cheney and the Bush administration have warmly embraced the industry. Cheney's National Energy Strategy contemplated the construction of 400,000 megawatts of new electrical generating capacity in the United States by 2020 — a significant portion of which would come from new nuclear power plants.

The terror attack of September 11 has not shaken the administration's ardent support for the industry. President Bush even suggested in a late October speech that the case for nuclear was stronger after September 11, because it enhances U.S. energy self-reliance.

"It is in our nation's national interest that we develop more energy supplies at home," he told a group of business leaders at an October 26 White House meeting. "It is in our national interest that we look at safe nuclear power."

But while George Bush is putting on a brave face, the September 11 attacks are subjecting the nuclear power industry to a new round of scrutiny. The radiation released in an attack on a nuclear reactor could injure tens of thousands and poison a large territory for hundreds or thousands of years.

Although the U.S. Nuclear Regulatory Commission (NRC) has kept the country's 103 operating nuclear reactors on the highest state of alert since the September 11 attacks, longtime industry observers say that's not enough to prevent a disaster should terrorists strike. Current NRC plant security rules — which nuke industry lobbyists have so far kept Congress from revising — fail to require the plants to be prepared for a major attack.

Industry watchdogs such as the Nuclear Control Institute accuse the NRC of "intolerable foot dragging" on upgrading plant safety rules. Before September, for example, the NRC was poised to hand the responsibility for monitoring plant security preparedness over to the industry itself, despite its dismal record on plant security.

Even more worrisome, critics say, is that the NRC is taking preliminary steps toward licensing a new generation of nuclear power plants that could be even more vulnerable to terrorist attacks. September 11, they argue, should have finally put to rest such proposals; but the industry and its regulators appear intent on charging ahead nonetheless.

ATOMIC JIHAD?

The nuclear industry has known about the terrorist threat to U.S. nuclear plants for well over a decade, says Paul Leventhal, president of the Nuclear Control Institute. "Iran threatened attacks [on U.S. nuclear plants] as early as 1987," he says. Four days after the 1993 bombing of the World Trade Center, the New York Times received a letter from the group that carried out the bombing, threatening to attack "nuclear targets." In October, the Sunday Times of London reported that FBI officials sent a report to MI5 which suggested that the terrorists who crashed the plane in Pennsylvania on September 11 may have planned to hit a nuclear power plant.

Nevertheless, NRC's Executive Director for Operations William Travers says there has been no "general or specific credible threat" against any U.S. nuclear plant since they went on high alert in September.

Industry officials also downplay the terrorist threat, claiming that U.S. nuclear plants are "hardened targets" that would be more difficult to attack than other industrial facilities.

"The likelihood of a terrorist act against a nuclear facility is low, because plants are equipped for, and prepared to defend against, most type of attacks," the Nuclear Energy Institute asserts on its web site. Nuclear power plants "are structurally fortified to withstand the impact of natural forces like hurricanes and tornadoes and airborne objects up to a very substantial force."

"We're not saying that you can guarantee against any attack — there's no such thing as a foolproof structure or plant," says Mitch Singer, spokesperson for the Washington, D.C.-based trade association. "However, due to the robust nature of the containment — they're four feet thick, with

a steel liner — in addition to the fact that the reactor vessel and the core are all reinforced … we're fairly confident that it could stand up" to an attack like those on the Pentagon and World Trade Center.

Singer says a number of independent engineers have concluded that nuclear power plants would do a better job withstanding that kind of attack than the World Trade Center.

But Dr. Edwin Lyman, a physicist with the Nuclear Control Institute, says that after analyzing the forces involved in such an event, he is convinced that a direct, high-speed hit by a large commercial passenger jet "would in fact have a high likelihood of penetrating the containment building" that houses a nuclear reactor, causing a meltdown.

Industry reports going back at least 25 years support Lyman's conclusion. As early as 1974, General Electric estimated that a "heavy" airliner (defined as over 6.25 tons — the airliners involved in September's attacks weighed over 150 tons) had a high likelihood of breaching a reactor containment wall. And the GE study didn't account for the faster speeds of today's airliners or the impact of a fuel explosion.

"Following such an assault, the possibility of an unmitigated loss-of-coolant accident and significant release of radiation into the environment is a very real one," says Lyman. "The consequences of such a release would dwarf the World Trade Center attacks."

Back in 1982, Sandia National Laboratories calculated the consequences of a major reactor accident for the NRC at each of the nation's reactors, estimating as many as 102,000 early deaths (not counting long-term radiation cancer deaths) and as much as $314 billion in damages (in 1982 dollars) from a single reactor accident.

DESIGN BASIS THREAT

After September's terrorist attacks, "the NRC can no longer dismiss the probability of an airplane crashing into a nuclear power plant as essentially zero," Representative Edward Markey, D-Massachusetts, a long-time nuclear power skeptic, wrote to NRC Chair Richard Meserve on September 20. "The NRC's planning baseline has long encompassed the improbability of accidents, but has never contemplated the high probability of an airline hitting a civilian nuclear facility once a suicidal highjacker targets the dome."

The NRC admitted a day later in a press statement that it "did not specifically contemplate attacks by aircraft such as Boeing 757s or 767s" when it established the standards for reactor containment design decades ago, "and nuclear power plants were not designed to withstand such crashes."

However chastened it was by having to make such an admission after numerous industry and NRC spokespeople claimed otherwise in the immediate aftermath of the attacks, the NRC is in no hurry make any changes to reactor containment strength standards or other parts of the Design Basis Threat — standards established to protect against external assaults.

Instead, industry and NRC spokespeople emphasize that plant security has improved since the September attacks. U.S. nuke plants have increased the number of security personnel (a few states including New York and New Jersey have called out the National Guard), conducted new background checks on employees and contractors, stopped conducting public plant tours, installed additional hardened barriers and extended the perimeter for plant security patrols.

But "these measures are not to be taken seriously by the kind of adversary that may be at large in America today," Leventhal and Daniel Hirsch of the Los Angeles-based Committee to Bridge the Gap wrote to NRC chair Richard Meserve on September 14.

"We have tried to work quietly for a decade and a half in a largely unsuccessful attempt to get the NRC to upgrade reactor security," Leventhal says. "Our principal success came in 1994 when the NRC agreed to require nuclear plant operators to erect barriers and establish setback distances to protect against truck-bomb attacks. But this reform came only after the lesson of the bombing of the World Trade Center the year before, and the NRC has refused our appeals to upgrade protection to defend against the much larger bombs used by terrorists since."

Existing security regulations are intended to protect against damage to the core from a small group of skilled and well-armed outsiders aided by one insider, a single insider acting alone, or a 4-wheel drive land vehicle bomb. But the regulations don't require plant managers to be prepared for an aerial or water-based assault, or an assault from multiple teams of land-based terrorists.

Nor do current standards fully account for "soft target" scenarios where terrorists might attack grid-supported safety equipment, backup generators or spent fuel pools, some of which are housed outside the reactor containment building.

MILITARY-INDUSTRIAL COMPLEXITY

It's not clear what it would take to protect nuclear power plants against a major terrorist assault, if they could be protected at all.

"There really must be a bottom-line examination of whether these plants can be effectively protected against the new terrorist threat that we now recognize in this country," Leventhal says. "If these plants cannot be protected effectively, then they should be shut down."

In the meantime, Leventhal and Hirsch have called upon the NRC to seek "prompt deployment of advanced anti-aircraft weapons to defeat suicidal attacks from the air." The Czech Republic and France have taken similar measures.

NRC and industry officials say that while the decision to defend the plants with military force is a decision best left to the military or the new Office of Homeland Security, they haven't ruled anything out.

"[NRC Chairman Richard Meserve] has indicated that he wants the staff to conduct a top-to-bottom thorough review of all of our regulations and policies. That could include a review" of the criteria used to evaluate nuclear plants' ability to resist terrorist attacks, says NRC spokesperson Victor Dricks.

"This is a familiar refrain. We do not have the luxury of time to allow the NRC and other federal agencies to engage in a prolonged bureaucratic review process," Leventhal says.

Members of the U.S. House Energy and Commerce Committee apparently agree. Within weeks of the attacks, a majority of the committee voted to attach a measure requiring the NRC to upgrade its plant security standards to an anti-terrorism package under consideration in the House. The bill would have required the NRC and industry to plan for a coordinated suicide attack by 20 individuals with a sophisticated knowledge of facility operations, using modern explosives and weaponry. It would have given the NRC 60 days to consult with other agencies and propose new Design Basis Threat rules.

But pressured by lobbyists from the Nuclear Energy Institute, House Republicans blocked the bill when it moved out of committee. Markey and other co-sponsors responded by attaching the measure to a bill that would reauthorize the Price-Anderson Act, the law that limits the nuclear industry's liability in the event of a major accident. The amendments would withhold coverage from any new reactor that is not designed to withstand a terrorist attack and would withhold coverage for plants not following stricter security practices.

Jeff Duncan, an aide to Markey, says nuke industry lobbyists are working hard to strip the plant security standards before Price-Anderson is marked up for a vote. He says the industry is being helped by the NRC.

Self-Administered Exams

Central to the NRC's ability to evaluate nuclear plant security have been exercises that simulate mock terrorist attacks at the plants — the Operational Safeguards Response Evaluation (OSRE) inspection program.

Until this fall, David Orrick, an ex-Navy SEAL, coordinated the attack exercises. Despite receiving an advanced warning notifying them of the exercises, 27 of 57 plants failed the test.

Orrick says the failures mean "that a real attack would have put the nuclear reactor in jeopardy with the potential for core damage and a radiological release."

Although observers say the OSRE program succeeded in uncovering serious physical protection inadequacies that have since been corrected, the program was a major source of embarrassment to the industry. In 1998, the NRC's Office of Nuclear Reactor Regulation unilaterally terminated it without formal notice. A proposal was floated to replace OSRE with an industry-run alternative known as the Safeguards Performance Assessment program (SPA — the industry's new name for the more impolitic Self-Assessment Program).

The resulting public outcry and Congressional reaction forced the NRC to reinstate OSRE shortly after it was cancelled. Nevertheless, the industry continues to advocate for SPA, which would essentially remove NRC's oversight role — replacing the seven-person OSRE assessment team with one NRC "observer."

Despite the reduction in NRC's oversight role, industry officials claim the SPA program would be more comprehensive. "OSRE is basically an inspection program, while the SPA involves testing, drilling and training," says NEI's Mitch Singer. "The tests would be done every three years as opposed to every eight years under the OSRE."

Jeff Duncan is not convinced. "The SPA program has the industry designing the tests and evaluating how their own forces performed in the tests that they themselves designed. It's like telling students that they get to write the questions for their final exam, take the test home, and grade it themselves. They'd all get A's all the time."

The industry was scheduled to demonstrate the SPA as a pilot program this fall with exercises at eight volunteer plants. But NRC officials say they have not yet made a final decision about which program to stick with and, since September, both programs have been put on hold. "We don't think right now is a good time to have mock terrorists trying to break into plants that are on high alert guarding themselves against real terrorists," says the NRC's Victor Dricks.

Daniel Hirsch says the NRC should abandon the SPA and keep the OSRE because it provides for more independent oversight. He says OSRE should be strengthened by tripling the number and frequency of tests, using a "credible force" involving large numbers of coordinated attack teams and targeting the full range of potential targets within a plant (e.g. the spent fuel storage facility).

Hirsch adds that plants that fail the test should be shut down until all the problems identified are fully rectified.

Observers say the attempt to replace the NRC's OSRE program with the SPA fits a larger deregulatory pattern whereby the NRC has responded to successive budget cuts imposed by a hostile Congress (driven by industry lobbyists) by scaling back its oversight of the industry. If enforcement penalties are any indication, then the NRC is more poodle than watchdog. In 2000, the NRC fined the industry less than half a million dollars, down from over $5 million in 1998.

NEW NUKES

One thing for which the NRC does seem to have more resources is helping the industry plan to build more reactors. NRC Chair Richard Meserve announced in February that one of the commission's priorities during the Bush era would be to develop regulations for a new generation of reactors known as the Pebble Bed Modified Reactor (PBMR).

PBMRs use tennis ball-sized fuel pellets — each containing about 14,000 uranium dioxide "microspheres," or particles coated in ceramic and set in a graphite matrix — which are constantly cycled through the reactor. A mechanical system would inspect the pellets as they exit the reactor, sending damaged fuel one way, spent fuel another, and fuel with additional unused uranium back through for continued use. The reactor would operate like a giant gumball machine that never has to be shut down for refueling. This is in contrast to current reactors, where fuel rods are inserted, used and then replaced while the reactor is shut down.

Meserve's announcement is consistent with Vice President Cheney's National Energy Strategy and accommodates the business strategy of Exelon and other utilities that survived a recent industry shakeout that has left fewer players, each with a greater number of nuclear plants.
Along with British Nuclear Fuels and South African-based ESKOM, Exelon is investing millions in a consortium that plans to build the first commercial PBMR in Koeberg, South Africa. The company hopes to use the South African PBMR prototype to obtain a license from NRC to begin construction of seven new reactors on one U.S. site by the summer of 2004. Exelon officials told the NRC in January that they want the agency to establish a speedy and reliable regulatory framework for the new reactors by next July. (That timeline may be pushed back by recent events.)

NRC spokesperson Victor Dricks says the commission has been meeting with Exelon, other utilities and the Nuclear Energy Institute in "what we call a pre-application review, a process we expect will take a year before they submit a formal application. … We're simply in the discussion phase, since we haven't licensed any plants for many years. We're trying to establish what kinds of information we'd want to see if they came to us with an application."

Although Dricks says the commission hasn't determined if the PBMR would be able to withstand a terrorist assault since the industry has not submitted a specific design, industry officials claim that the PBMRs are "inherently safe" by design.

"It's flabbergasting that they can make any claims about reactor safety without producing a design," says Paul Gunter of the Washington, D.C.-based Nuclear Information Resource Service (NIRS). Gunter says it's unclear from preliminary descriptions of the PBMR if critical systems would be vulnerable in the event of a terrorist attack. "You would think that the issue of terrorism and the lack of containment would have come up in the initial discussions between the NRC and Exelon. It didn't — it had to be brought up by public interest groups."

Gunter says that rather than using a thick concrete structure designed to contain internal pressures generated by a water-based cooling system, the PBMR is a gas-cooled reactor design that relies on a passive convection cooling feature that works like a chimney — and therefore requires no thick containment to deal with sudden internal forces generated by steam pressures. Before September, the industry touted the lack of a containment as a cost-saving feature of PBMRs. Gunter says that having to add a containment now could make PBMRs prohibitively expensive.

He adds that PBMRs rely on the integrity of "billions of tiny containments" — the ceramic-and-graphite pellet cladding used to contain the radioactivity of the fuel. No one knows how the fuel pellets would behave if doused in jet fuel. In most forms, graphite (which would also be used to line the reactor core) is flammable — graphite components played a key role in the Chernobyl disaster and a fire at the Windscale reactor in the U.K. in 1957.

National Energy Insecurity

The threat of a terrorist attack further complicates a number of other nuclear power issues, such as waste transportation security, the renewal of licenses for currently operating reactors and the proposed introduction of mixed-oxide fuel (MOX) — a scheme to dispose of warhead-grade plutonium by burning it in commercial reactors, which critics say increases the attractiveness of nuclear power plants as targets not only for radiological sabotage, but also for theft.

Nuclear industry watchdogs say the bottom line is that the Bush Administration's fundamental commitment to nuclear power — articulated long before September in its national energy strategy — only adds to U.S. national insecurity. While Dick Cheney hunkers down in a bunker ready to defend the industry at all cost, countries such as Germany (which relies upon nuclear energy for 10 percent more of its domestic power needs than the U.S.) are taking the terrorist threat to nuclear plants seriously enough to consider accelerating their current commitment to phasing out nuclear

power by 2030, even while maintaining a commitment to reducing the country's reliance on fossil fuels under the Kyoto Protocol.

As the war drags on and the terrorist threat to U.S. nuclear plants persists, the industry's critics believe nuclear power will be increasingly hard to defend and political support for renewable energy will grow.

"No terrorist is going to fly a plane into a windmill or solar panel," Gunter concludes.