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#749 - Our Nuclear Achilles' Heel

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OUR NUCLEAR ACHILLES' HEEL

After 60 years of experience with nuclear power and weapons, it now seems clear that humans are unable to devise controls that work. Nuclear is too complicated and unpredictable for reliable human control. Unlike renewable sources of energy, nuclear is an unforgiving technology because normal human lapses and errors can produce unexpected consequences that are catastrophic and irreversible. Yet as a nation, our tax dollars are still massively subsidizing the expansion of nuclear.[1] Furthermore our taxes are subsidizing the deployment of even newer technologies that are far more complicated than nuclear, less predictable, and therefore likely to plague our children with endless trouble, namely biotech and nanotech.[2]

Here we examine nuclear technology from the viewpoint of rogue weaponry. This is the true Achilles' heel of nuclear technology, a fatal problem for which there is no fix: so long as we are expanding nuclear technology, we are increasing the likelihood that radioactive materials will one day be spread across an American city.[3] When it happens, it seems likely to permanently damage, if not end, our traditions of an open society with democratic checks and balances.

Tom Ridge, the President's director of homeland security, was recently asked what form of terrorism worried him the most: "He cupped his hands prayerfully and pressed his fingertips to his lips. 'Nuclear,' he said simply." [3, pg. 24]

U.S. regulatory officials have consistently failed to acknowledge the dangers posed by nuclear materials as tools for terrorists. For example, on September 12, 2001 -- one day AFTER the World Trade Center atrocities -- the U.S. Nuclear Regulatory Commission ruled that citizen concerns about plutonium fuel processing at Savannah River (in Aiken, S.C.) were not valid because the complaining citizens (Georgians Against Nuclear Energy) had failed to establish that "terrorist acts... fall within the realm of 'reasonably foreseeable' events." [NY TIMES Mar. 25, 2002, pg. A11.]

In 1982, the U.S. Nuclear Regulatory Commission (NRC) ruled that owners of nuclear plants do not have to design against such threats as kamikaze airliner crashes because to do so would make nuclear electricity too expensive to be competitive. "Reactors could not be effectively protected against such attacks without turning them into virtually impregnable fortresses at much higher cost," the NRC said.[4]

The U.S. has 103 operating nuclear power plants (plus 7 that are closed), most of which are storing intensely-radioactive spent fuel in 40-foot-deep pools of boron-treated water to shield against radiation and to keep the fuel from heating up, catching fire, and releasing radioactivity. Unlike reactor cores, the spent fuel pools are not covered by a concrete containment dome; they are covered only by a metal building.

If the water were to drain out of a spent fuel pool, the fuel would be exposed to a combination of air and steam, causing the zirconium outer "cladding" of the fuel assemblies to catch fire and burn fiercely.[4] The Nuclear Regulatory Commission acknowledges that such a fire could not be extinguished and could burn for days, releasing large amounts of radioactivity.

Water could drain from a spent fuel pool in several ways -- leakage, evaporation, siphoning, pumping, earthquake, reactor failure, accidental or intentional drop of a fuel transport cask, explosion inside or outside the pool building, or airplane impact.

The main concern in spent fuel is cesium-137, a highly-radioactive element that enters food chains masquerading as potassium. The spent fuel currently held in the U.S. contains 20 to 50 million Curies of cesium-137. A single spent fuel pool contains more cesium-137 than was released by all the atmospheric nuclear weapons tests in the Northern Hemisphere combined. The Nuclear Regulatory

Commission acknowledges that as much as 100% of the cesium-137 in spent fuel might be released by a zirconium fire.

A spent fuel pool typically holds 5 to 10 times as much radioactivity as the reactor core, and a zirconium fire would likely release more radioactivity than a core meltdown and would probably be easier for a disciplined group of suicidal terrorists to initiate. Draining the pool is all it takes.

The Indian Point nuclear power plant, 35 miles north of New York City, currently holds 1589 fuel assemblies in its spent fuel pool (compared to 386 fuel assemblies in the cores of its two operating reactors).[5] The Nuclear Regulatory Commission in 1982 estimated that a core meltdown at Indian Point could cause 46,000 fatalities and 141,000 injuries. [NY TIMES April 4, 2002, pg. A23.]

Many spent fuel pools were not designed to hold all the fuel assemblies they presently hold. Spent fuel was supposed to be "reprocessed" at plants like the one that contaminated West Valley, N.Y. (see REHN #748) but the technology failed to materialize. In the 1982 Nuclear Waste Policy Act Congress promised to take all private-sector spent fuel and bury it in the ground somewhere by 1998, but it didn't happen. Current plans call for a spent fuel mausoleum beneath Yucca Mountain, Nevada, but it won't be ready before 2010 at the earliest and it, too, may never materialize.[6; and NY TIMES Feb. 15, 2002, pg. A19.] Meanwhile more spent fuel is being squeezed into existing pools each year. Astonishingly, the nuclear industry is now planning to build 25 to 50 new nuclear power plants in the U.S. and the Bush administration has announced that it will provide millions of tax dollars, plus relaxed regulations, to help them do it.[1]

Nuclear reactors of course are not the only source of material for creating radioactive havoc. When the Soviet Union disintegrated, its nuclear weaponry fell under the control of various smaller governments, the economy of Russia went into a tailspin, and many Russian nuclear scientists and military weaponeers found themselves without jobs and without a way to feed their families. [NY TIMES Nov. 2, 2001, pg. B4.] As Russia lurched into the early phases of a capitalist economy, a black market in nuclear materials and expertise quickly developed. The NEW YORK TIMES MAGAZINE summarizes it this way: "Russia is a country with sloppy accounting, a disgruntled military, an audacious black market and indigenous terrorists." [3, pg. 26]

Russia has somewhere between 4,000 and 30,000 nuclear weapons -- no one is sure of the true number, including the Russians. [3, pg. 27] Some of these weapons have only crude safeguards against detonation: "setting one off would be about as complicated as hot-wiring a car," says the NY TIMES. [3, pg. 28] Furthermore, Russia has an additional 80 metric tonnes of plutonium "stored under less than ideally secure conditions." [NY TIMES Aug. 27, 2001, pg. A20.] Russia's stored plutonium is enough to make 10,000 A-bombs, assuming it takes 17 pounds to make a bomb. Some say it takes only 12.

The simplest raw material for an A-bomb would be about 110 pounds of highly-enriched uranium. [3, pg. 29.] The world's total inventory of weapons-grade uranium is at least 1300 metric tonnes -- enough to make 26,000 small but effective A-bombs. A crude A-bomb could be delivered in a standard "conex" shipping container -- 2000 of which arrive in the U.S. each hour, and only 2% of which are opened for inspection.[7; and 3, pg. 28]

Reflecting on the dangers of a crude "conex A-bomb," Eugene E. Habiger, the four-star general who was in charge of America's nuclear arsenal until 1998 and then ran nuclear anti-terror programs for the Department of Energy, says, "How do you protect against that? You can't.... It's not a matter of IF; it's a matter of WHEN." [3, pg. 28; emphasis in the original.]

The NEW YORK TIMES reported May 26, 2002, that a very small

nuclear bomb (1/15th the size of the Hiroshima weapon), set off in Times Square, would immediately kill 20,000 people and would condemn another 250,000 to a painful death by fire and radiation sickness.[3, pg. 57] It is difficult see how the U.S. could remain an open, democratic society after such an event.

A bi-partisan U.S. commission on rogue weapons reported in 1999 that "Russia has no reliable inventory of its fissile material," meaning plutonium and enriched uranium.[7] The commission said it knew of at least seven instances in which weapons-grade fissile material had been stolen from Russian plants or storage sites between 1992 and 1999.[7; NY TIMES Jul. 9, 1999, pg. A13.]

In 2001 the International Atomic Energy Agency reported that 376 incidents of cross-border radioactive smuggling occurred between 1993 and autumn 2001, including military, industrial and medical materials; 18 of those instances involved plutonium or enriched uranium. [NY TIMES Nov. 2, 2001, pg. B4.] American intelligence officials say the scope of smuggling remains uncertain but they strongly believe that "only a fraction of shipments are intercepted." The TIMES adds, "The worries are heightened by the slackness of border controls and the economic instability that has left customs officials vulnerable to bribes." [NY TIMES Sep. 11, 2001, pgs. A1, A8]

Pakistan -- an impoverished, politically unstable nation -- has assembled about 20 nuclear bombs (NY TIMES Nov. 2, 2001, pg. B4), which were "built almost entirely through black markets and industrial espionage," according to the NY TIMES [3, pg. 26].

North Korea -- another deeply impoverished, unstable nation -- is now reported to have manufactured two nuclear bombs and to have acquired enough plutonium to manufacture 10 more, making it the world's 9th known nuclear power. North Korea is one of three countries that Mr. Bush has labeled the "axis of evil." Perhaps hoping to appease the North Koreans, the Bush Administration has begun building a new nuclear power plant in North Korea. [NY TIMES Aug. 8, 2002, pg. A9.]

For terrorists, an easier alternative to an actual A-bomb would be a simple but terrifying "dirty bomb" made by wrapping "high explosive" around some radioactive waste -- thus spreading radioactivity downwind. High explosive is fuel oil and ammonium nitrate fertilizer -- the ingredients Timothy McVeigh used to blow up the Murrah Building in Oklahoma City April 19, 1995. [NY TIMES Dec. 2, 1997, pg. A22.] Even if no one were killed immediately, such a "dirty bomb" detonated in a city could create extraordinary panic and could contaminate a huge area at great cost. According to the Federation of American Scientists, a single foot-long pencil of radioactive cobalt-60 from a food irradiation plant, plus 10 pounds of TNT, detonated in lower Manhattan could contaminate large parts of three states. Most of Manhattan could be as contaminated as the area around the Chernobyl nuclear plant. The economic and psychological damage would be enormous. [3, pg. 51]

What is the answer? We cannot prevent all terrorism (though reducing our military-industrial intrusions into the Middle East to protect "our" oil would help, after we seriously commit to reducing our dependence on oil). More immediately, we could stop promoting and subsidizing unnecessary and uncontrollable nuclear technologies such as nuclear power plants, food irradiators, and nuclear bombs. As it is, the nuclear industry -- with massive subsidies from U.S. taxpayers -- is greasing the skids for the next level of domestic terror -- a Timothy McVeigh-type bomb blasting a spent fuel truck into smithereens in Chicago, or a teacup of cobalt-60 from a food irradiation plant atomized by a few sticks of dynamite in downtown Atlanta or Minneapolis or Washington, D.C.

The looming fight to stop the government-subsidized "renaissance" of nuclear technology[1] will be one of the most important

environment-and-health fights of the 21st century. Environmental justice and anti-nuclear activists, unite!

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[1] http://www.nei.org/documents/Speech_Abraham_2-14-0_2.pdf and http://www.nei.org/documents/Vision2020_Folder.pdf and <http://www.nuclear-gen.com/>.

[2] http://www.rafi.org/text/txt_search.asp?type=communique; see issue #76.

[3] Bill Keller, "Nuclear Nightmares; Experts on terrorism and proliferation agree on one thing: Sooner or later, an attack will happen here," NEW YORK TIMES MAGAZINE May 26, 2002, pgs. 22-29, 51-57. Keller is a senior writer for the NY TIMES.

[4] Reported by Robert Alvarez, "What About the Spent Fuel?" BULLETIN OF THE ATOMIC SCIENTISTS Vol. 58, No. 1 (Jan./Feb 2002), pgs. 45-47. Available at: http://www.thebulletin.org/-issues/-2002/jf02/jf02_alvarez.html.

[5] Congressman Edward J. Markey, "Security Gap: A Hard Look at the Soft Spots in Our Civilian Nuclear Reactor Security." Report published March 25, 2002. Available at: http://www.house.gov/markey/iss_nuclear_rep020325.pdf.

[6] U.S. Government Accounting Office (GAO), NUCLEAR WASTE: TECHNICAL, SCHEDULE AND COST UNCERTAINTIES OF THE YUCCA MOUNTAIN REPOSITORY PROJECT (Washington, D.C.: GAO, Dec., 2001.) GAO-02-191; <http://www.gao.gov/new.items/d02191.pdf>.

[7] <http://www.fas.org/spp/starwars/program/deutch/>