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It Could Happen Here

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IT will be years before we know the full consequences of the disaster at the Fukushima Daiichi nuclear power plant in Japan. But the public attention raised by the problems there provides an opportunity to rethink nuclear-power policy in the United States and the rest of the world — and reduce the dangers of a similar disaster happening elsewhere.

From one perspective, nuclear power has been remarkably safe. The 1986 Chernobyl accident will ultimately kill about 10,000 people, mostly from cancer. Coal plants are much deadlier: the fine-particulate air pollution they produce kills about 10,000 people each year in the United States alone.

Of course, for most people this kind of accounting is beside the point. Their horror over even the possibility of a meltdown means that the nuclear-power industry needs constant and aggressive regulation for the public to allow it to stay in business.

Yet despite the 1979 accident at the Three Mile Island nuclear plant in Pennsylvania, the Nuclear Regulatory Commission has often been too timid in ensuring that America's 104 commercial reactors are operated safely. Nuclear power is a textbook example of the problem of "regulatory capture" — in which an industry gains control of an agency meant to regulate it. Regulatory capture can be countered only by vigorous public scrutiny and Congressional oversight, but in the 32 years since Three Mile Island, interest in nuclear regulation has declined precipitously.

In 2002, after the commission retreated from demanding an early inspection of a reactor, [Davis-Besse in Ohio](#), that it suspected was operating in a dangerous condition, [its own inspector general concluded](#) that it "appears to have informally established an unreasonably high burden of requiring absolute proof of a safety problem, versus lack of a reasonable assurance of maintaining public health and safety."

Even before Three Mile Island, a group of nuclear engineers had proposed that filtered vents be attached to buildings around reactors, which are intended to contain the gases released

from overheated fuel. If the pressure inside these containment buildings increased dangerously — as has happened repeatedly at Fukushima — the vents would release these gases after the filters greatly reduced their radioactivity.

France and Germany installed such filters in their plants, but the Nuclear Regulatory Commission declined to require them. Given the influence of America's example, had the commission demanded the addition of filtered vents, they would likely have been required worldwide, including in Japan.

More recently, independent analysts have argued, based on risk analyses done for the commission, it is dangerous for the United States to pack five times more spent fuel into reactor cooling pools than they were designed to hold, and that 80 percent of that spent fuel is cool enough to be stored safely elsewhere. It would also be more expensive, however, and the Nuclear Regulatory Commission followed the nuclear utilities' lead and rejected the proposal. The commission has even fought relentlessly for decades against proposals — and more recently a Congressional requirement — to distribute potassium iodide pills beyond the 10-mile emergency zones around American reactors, arguing that the probability of a large release of radioactivity was too low to justify the expense. And yet the American Embassy in Tokyo [is handing out potassium iodide pills to Americans](#) 140 miles from the Fukushima plant.

The commission's defenders often argue that it must be cautious because increased costs from safety requirements could kill the nuclear power industry. But the cost of generating electricity from existing plants is actually low: the construction expenses have been paid off and running them is relatively cheap. Requiring the operators of plants to install new safety systems would not result in them being shut down.

Therefore, perhaps the most important thing to do in light of the Fukushima disaster is to change the industry-regulator relationship. It has become customary for administrations not to nominate, and the Senate not to confirm, commissioners whom the industry regards as "anti-nuclear" — which includes anyone who has expressed any criticism whatsoever of industry practices. The commission has an excellent staff; what it needs is more aggressive political leadership.

Fukushima also shows why we need to develop reactors that are more inherently safe. Almost all the world's power reactors, including those at Fukushima, are descended from the much smaller reactors developed in the 1950s by the United States for submarines. As we saw in the Fukushima accident, they depend on pumps to keep them from catastrophic

failure, a major weak point. New designs less dependent on pumps have been developed, but there has not yet been enough research to make certain that they would work effectively.

One promising design is the high-temperature gas-cooled graphite reactor; its fuel is in the form of small particles surrounded by layers of material that could contain their radioactivity if a cooling system fails. The United States built two such prototypes in the 1960s, and Germany built one in the 1980s. With the virtual end of new reactor orders in the United States and Western Europe, as well as their small generating capacity compared to current water-cooled reactors, they were not pursued further.

China, however, which accounted for over 60 percent of the world's nuclear power plant construction during the past five years, is now planning two prototypes and, if these work, 36 more. Such a demonstration could help determine the commercial viability of gas-cooled graphite reactors worldwide, and the Department of Energy should offer the expertise of its national laboratories to help China make this effort a success.

ANOTHER area that requires review is unrelated to the Fukushima accident, but would benefit from some of the attention generated by the crisis — namely, the need to strengthen the barriers to misuse of nuclear-energy technology to develop nuclear weapons.

The unintended effect of much of governmental research and development has been to make nuclear proliferation easier. Most notably, over the past 50 years the developed world has spent some \$100 billion in a failed effort to commercialize plutonium breeder reactors. Such reactors would use uranium more efficiently, but would also require the separation of plutonium, a key component in nuclear weapons.

Even though plutonium breeder reactors have yet to make it past the research and development phase into commercial production, enough plutonium has been separated from spent power-reactor fuel to make tens of thousands of nuclear weapons, creating an enormous security risk. The technology's spread raises the possibility that it could be diverted to military purposes. In fact, this has already happened: in 1974 India tested a nuclear weapon design using plutonium that had been separated out for its breeder reactor program.

Meanwhile, General Electric has applied for a license to build a plant that would use lasers to enrich uranium for commercial use, which could provide yet another way to produce weapons-grade material. A coalition led by the American Physical Society, a professional organization of physicists, has petitioned the Nuclear Regulatory Commission to assess the risk that this technology poses to non-proliferation efforts before it issues a license. The commission, predictably, has been reluctant to do so.

It is critical to find more effective ways to control such dangerous nuclear technologies. In 1946, the United States proposed that uranium enrichment and plutonium be put under international control, a proposal that failed because of the onset of the cold war.

More recently Mohamed ElBaradei, the former director general of the International Atomic Energy Agency, made the more modest proposal to place such dangerous activities under merely multinational control, which would make it more difficult for any one country to divert the material to military ends. In fact, Urenco, the West's most successful uranium enrichment enterprise, is already under the joint ownership of Germany, the Netherlands and Britain.

The United States should help shape this industrial model into an international one, in which all enrichment plants are under multinational control. Doing so would make it more difficult for countries like Iran to justify building national enrichment plants that could be used to produce nuclear weapons materials.

While new plants are unlikely to be built in the United States over the next 25 years, nuclear power provides 20 percent of our electrical power and is climate friendly. We therefore must make existing reactors safer, develop a new generation of safer designs and prevent nuclear power from facilitating nuclear proliferation. As tragic as the Fukushima disaster has been, it has provided a rare opportunity to advance those goals.

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