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FROM THE
DIRECTOR OF
THE JOY LUCK CLUB

May 7, 2011

Nuclear Agency Is Criticized as Too Close to Its Industry

By **TOM ZELLER Jr.**

In the fall of 2007, workers at the Byron nuclear power plant in Illinois were using a wire brush to clean a badly corroded steel pipe — one in a series that circulate cooling water to essential emergency equipment — when something unexpected happened: the brush poked through.

The resulting leak caused a 12-day shutdown of the two reactors for repairs.

The plant's owner, the [Exelon Corporation](#), had long known that corrosion was thinning most of these pipes. But rather than fix them, it repeatedly lowered the minimum thickness it deemed safe. By the time the pipe broke, Exelon had declared that pipe walls just three-hundredths of an inch thick — less than one-tenth the original minimum thickness — would be good enough.

Though no radioactive material was released, safety experts say that if enough pipes had ruptured during a reactor accident, the result could easily have been a nuclear catastrophe at a plant just 100 miles west of Chicago.

Exelon's risky decisions occurred under the noses of on-site inspectors from the federal [Nuclear Regulatory Commission](#). No documented inspection of the pipes was made by anyone from the N.R.C. for at least the eight years preceding the leak, and the agency also failed to notice that Exelon kept lowering the acceptable standard, according to a subsequent investigation by the commission's inspector general.

Exelon's penalty? A reprimand for two low-level violations — a tepid response all too common at the N.R.C., said George A. Mulley Jr., a former investigator with the inspector general's office who led the Byron inquiry. "They always say, 'Oh, but nothing happened,' " Mr. Mulley said. "Well, sooner or later, our luck — you know, we're going to end up rolling craps."

Critics have long painted the commission as well-intentioned but weak and compliant, and incapable of keeping close tabs on an industry to which it remains closely tied. The concerns have greater urgency because of the crisis at the Fukushima Daiichi plant in Japan, which many experts say they believe was caused as much by lax government oversight as by a natural disaster.

The Byron pipe leak is just one recent example of the agency's shortcomings, critics say. It has also taken nearly 30 years for the commission to get effective fireproofing installed in plants after an accident in Alabama. The N.R.C.'s decision to back down in a standoff with the operator of an Ohio plant a decade ago meant that a potentially dangerous hole went undetected for months. And the number of civil penalties paid by licensees has plummeted nearly 80 percent since the late 1990s — a reflection, critics say, of the commission's inclination to avoid ruffling the feathers of the nuclear industry and its Washington lobbyists.

Although the agency says plants are operating more safely today than they were at the dawn of the nuclear industry, when shutdowns were common, safety experts, Congressional critics and even the agency's own internal monitors say the N.R.C. is prone to dither when companies complain that its proposed actions would cost time or money. The promise of lucrative industry work after officials leave the commission probably doesn't help, critics say, pointing to dozens over the years who have taken jobs with nuclear power companies and lobbying firms.

Now, as most of the country's 104 aging reactors are applying for, and receiving, 20-year extensions from the N.R.C on their original 40-year licenses, reform advocates say a thorough review of the system is urgently needed.

The agency's shortcomings are especially vexing because Congress created it in the mid-1970s to separate the government's roles as safety regulator and promoter of nuclear energy — an inherent conflict that dogged its predecessor, the Atomic Energy Commission.

"It wasn't much of a change," said Peter A. Bradford, a former N.R.C. commissioner who now teaches at Vermont Law School. "The N.R.C. inherited the regulatory staff and adopted the rules and regulations of the A.E.C. intact."

Mr. Bradford said the nuclear industry had implicitly or explicitly supported every nomination to the commission until Gregory B. Jaczko's in 2005. Mr. Jaczko, who was elevated to chairman by President Obama in 2009, had previously worked for both Representative Edward J. Markey, the Massachusetts Democrat and longtime critic of the

nuclear industry, and Senator [Harry Reid](#), the Nevada Democrat and current Senate majority leader who sought to block a nuclear waste repository in his state.

Mr. Jaczko acknowledges that the agency needs to move faster on some safety issues. But he defends its record. “I certainly feel very strongly that this is an independent regulator that will make what it thinks are the right decisions when it comes to safety,” he said. “There will be people who will agree, and some people who will disagree. That’s part of the process.”

For all the agency’s shortcomings as a regulator, even the most vocal critics acknowledge that it should not be compared to the [Minerals Management Service](#), the scandal-plagued agency that oversaw the [oil](#) and gas industry and was reorganized by Mr. Obama after the [BP oil spill](#) last year.

Still, David Lochbaum, a frequent critic of the N.R.C. who recently worked as a reactor technology instructor there, said the agency too often rolled the dice on safety. “The only difference between Byron and Fukushima is luck,” he said.

No Rejections

In recent years, the Vermont Yankee nuclear plant in Vernon, Vt., has had several serious operational problems.

Situated on the banks of the Connecticut River, the 39-year-old Vermont Yankee, whose reactor is similar in design to the stricken plant in Japan, suffered the partial collapse of a cooling tower in 2007. In January 2010, the plant’s operator, [Entergy](#), discovered that nearby soil and groundwater had been contaminated by radioactive tritium, which had apparently leaked from underground piping. Just months before, the company assured state lawmakers that no such piping existed at the plant.

The Vermont Senate, concerned about the problems, voted overwhelmingly last year to prevent the plant from operating beyond the scheduled expiration of its license on March 21, 2012 — invoking a 2006 state law, unique to Vermont, that requires legislative approval for continued operations.

But one day before the quake and tsunami that set Japan’s crisis in motion, the N.R.C. approved Vermont Yankee’s bid for license renewal — just as it has for 62 other plants so far. [Its fate is now](#) the subject of a federal lawsuit.

“How does a place like that get a license renewal?” Mr. Lochbaum said. “Because they asked for one. Absent dead bodies, nothing seems to deter the N.R.C. from sustaining reactor operation.”

Indeed, no renewal application has been turned down by the agency since the first one was granted in 2000, although some have been sent back for more work before winning approval.

It was not always so.

When the industry first set out in the 1980s to prove that the original 40-year licenses on its aging plants could be safely renewed for 20 years, two plants — Yankee Rowe in Massachusetts and Monticello in Minnesota — were offered as test cases. The N.R.C.'s criteria for relicensing essentially required that operators prove that they were in compliance with their current license and that they had an adequate plan to manage the aging equipment for the extra 20 years. That tripped up Yankee Rowe's bid, because inspectors looking at its current operations found serious flaws in its reactor vessel. Rather than earn a renewal, the plant shut down with eight years left on its original license.

The failure threw the industry into turmoil. In 1992, Northern States Public Power, owner of the Monticello plant, complained that the agency was examining details beyond those necessary for license renewal.

With billions of dollars of revenue and investment at stake for each plant, the N.R.C. changed the rules in 1995, scrapping the requirement that operators prove they were complying with their current license. Instead, the renewal process would focus only on the aging management plan. The agency described the change as providing a "more stable and predictable regulatory process for license renewal."

But James Riccio, a nuclear policy analyst with [Greenpeace](#), said, "The N.R.C. rule change gutted a substantive process and replaced it with a rubber stamp. They placed industry profits ahead of public safety."

To be sure, license renewal is still arduous. According to a 2007 audit by the inspector general's office, an operator typically spends two years and up to \$20 million preparing an application, and the commission on average spends two years and \$4 million reviewing it.

But the audit also concluded that it was often impossible to know whether the agency had truly conducted an independent review of an application or why approval was granted. In some cases, for example, long passages in the commission's assessment of a renewal appeared to have been simply copied and pasted directly from the application.

And in a 2008 follow-up memo described to a reporter, the N.R.C.'s inspector general, Hubert T. Bell, went further, suggesting that the N.R.C. staff was unable to adequately document its reviews and may have destroyed essential records.

Asked about those issues, Mr. Jaczko said that the copying and repetition was intentional.

"We want licensees to take those programs that we find are the best practices and use those," he said. "So in many cases, those were showing up in applications and the staff was then looking at those and saying yes, those were acceptable."

As for the lack of documentation backing up each decision, "not all of that information gets incorporated into a formal docket for license renewal," Mr. Jaczko said. "We did reconfirm that there had not been any information that had been missed or any information that would change any of the conclusions in the license renewal decisions."

Deference to Industry

The N.R.C.'s slowness in addressing serious problems is another concern.

In 1975, a blaze at the Browns Ferry plant in Alabama crippled electrical wiring used to control critical cooling equipment in one of the reactor units. The incident set off alarm bells at the N.R.C., which issued new fire protection regulations in 1980.

But over the next three decades, according to two internal agency investigations, the commission approved a succession of faulty or ineffective fire barrier materials. It then dragged its feet in the face of mounting evidence that the materials, even after being installed in dozens of plants, were failing to perform as advertised.

One of the earliest materials, Mr. Mulley said, was a product called Thermo-lag, which the commission approved based on what turned out to be fraudulent lab tests submitted by an obscure company. "No inspector ever bothered to check out the lab or to question the results," said Mr. Mulley, who investigated the case for the agency.

Last year, the N.R.C. issued a 355-page report in which it suggested that the fire barrier issue had been finally sorted out, even though most plants were technically still not complying with the regulations.

The agency has little choice but to tolerate violations, said Mr. Lochbaum, who heads the Nuclear Safety Project with the [Union of Concerned Scientists](#), an environmental and nuclear watchdog group based in Cambridge, Mass. "Otherwise, nearly all the U.S. reactors would have to shut down," he said.

Asked about the fire barrier fiasco, Mr. Jaczko said he would like the agency to put safety rules into effect more quickly. "I've certainly been pushing for some time that we do these things in a more timely manner," he said.

But the issues are complicated. "They involve very complex, technical findings, and then ultimately they involve complex plant modifications in some cases," he said.

Mr. Mulley suggested that the companies themselves played a role in delaying the rules.

"There were good fire barrier materials on the market from 3M and other companies that people knew and trusted," he said. "But these plant operators kept complaining that they were too expensive. So some company that no one has ever heard of comes along, with tests from a lab that no one has ever heard of, for a material that's cheaper than anything else on the market, and the N.R.C. says, 'Perfect! Use this!'"

The agency's deferential attitude also brought the Davis-Besse plant in Ohio to the brink of the worst American nuclear accident since the Three Mile Island meltdown of 1979.

On Aug. 3, 2001, armed with mounting evidence of potentially dangerous cracks and leaks in control nozzles that penetrate the vessel heads at most reactors, the commission asked 12 nuclear plants to conduct inspections. The inspections required a temporary but expensive shutdown, so regulators gave the plants until the end of the year to comply, and most did so.

But FirstEnergy, owner of Davis-Besse, said it would look for the cracks during its next planned refueling shutdown — on March 22 the following year. In the test of wills that followed, the agency's inspector general later concluded, it was the N.R.C. that blinked, agreeing to allow FirstEnergy to operate until mid-February.

On March 6, 2002, workers finally conducted the inspections and found that acid used in the cooling water had eaten almost completely through the lid of the reactor. The plant was closed for two years for emergency repairs, two FirstEnergy engineers were convicted of lying to investigators and the company paid more than \$33.5 million in civil and criminal penalties.

"They should have just shut them down," said Mr. Mulley, who investigated the case. "But the attitude at N.R.C. was always, 'You can't shut them down. They'll fight us in court.'"

The Byron case in Illinois, while not as dangerous as Davis-Besse, was similar in that it revealed the industry's predilection for deferring maintenance until more serious safety problems developed. Indeed, since the Three Mile Island accident, at least 38 nuclear power

reactors have been forced to shut down for a year or more because of an accumulation of safety problems.

Marshall Murphy, an Exelon spokesman, said the company took “good learnings” from the Byron incident and improved its procedures.

Eliot Brenner, an N.R.C. spokesman, said in an e-mail that the agency had also made several changes to its guidelines after the Byron case, including provisions that require inspectors to “tour areas that become accessible on an infrequent basis to assess the material condition and status of safety systems, structures, and components.”

But Mr. Lochbaum said the slap on the wrist delivered to Exelon ensured that similar incidents would occur in the future. “There’s no real regulatory discomfort imposed, so this sort of thing just continues,” he said.

Agency’s Gains

What frustrates some critics is that the N.R.C. has the expertise and resources — a staff of 4,000 and one of the highest densities of Ph.D.’s in government — to do a better job. Indeed, there are some examples of the commission making tough decisions.

In 2008, for example, workers at the Oconee plant in South Carolina discovered that a crucial line in the cooling system at Reactor Unit 1 was blocked by a broken gasket. The workers fixed it and the reactor was restarted.

But the two N.R.C. inspectors assigned full time to Oconee quickly began asking why [Duke Energy](#), the operator, wasn’t also inspecting corresponding valves and lines at the plant’s other two reactors. Duke said the clogging was isolated and a blocked line could be bypassed in a pinch.

In February 2010, when the company finally agreed to look at the other two reactors, it discovered that the lines there had the same problem and that the bypass option would never have worked.

The commission issued a “yellow finding” to Duke, its second-highest category of safety problem. The finding, which is rarely imposed, generally brings far more N.R.C. and media scrutiny, and can have financial implications for the company on Wall Street.

N.R.C. officials said that the current oversight system, begun in 2000 and refined since then, has improved safety by focusing on the reactor systems most prone to failure — and most likely to pose a safety risk. Fewer violations are issued, but when they are, the agency uses

different colors — green, white, yellow and red — to signal the severity of the problem in a public way.

“Bottom line is, we drive for long-term improvements in safety,” Mr. Brenner said.

And by several measures, the N.R.C. notes, the nation’s nuclear plants appear to be getting safer.

Incidents of worker radiation exposure and safety system failures are at their lowest levels in more than a decade. The number of “scrams” — which the N.R.C. defines as “the sudden shutting down of a nuclear reactor by rapid insertion of control rods, either automatically or manually by the reactor operator” — has been dropping as well.

Still, the nuclear industry is not shy about complaining, and if necessary, throwing around its weight with Congress, which approves the N.R.C.’s budget of roughly \$1 billion a year.

That was borne out in June 1998, when then-Senator [Pete V. Domenici](#), a New Mexico Republican with strong ties to the nuclear industry and chairman of the subcommittee that funded the N.R.C., threatened to slash the agency’s budget.

Although the budget was not ultimately cut, Shirley Ann Jackson, then chairwoman of the commission, said in a speech to her staff that the industry had sent a clear message: “That we are inefficient, that we over-regulate, that we inspect too much, assess too much, enforce too much, take too long on licensing actions and employ an overly restrictive body of regulation.”

Industry Connections

As with many regulatory agencies, the movement from N.R.C. jobs to industry jobs — and sometimes vice versa — is a recurring issue.

Many engineers and technicians, of course, join the agency directly out of school, work in the field and remain with the commission their entire careers. But for others, particularly officials at the highest levels, the commission can be a steppingstone to more lucrative work in the private sector.

That was certainly the case for one commissioner, Jeffrey S. Merrifield.

Shortly after Mr. Merrifield retired from the commission in 2007, Shaw, a nuclear services company, announced that he was taking a top executive position with the company. That

stirred the suspicions of the Project on Government Oversight, a nonprofit watchdog group, which complained to the N.R.C.

Federal law prohibits government employees from taking part in matters that they know could financially benefit them or anyone with whom the employee is negotiating or seeking employment. But according to an inspector general's report on the case, Mr. Merrifield sought employment with not just Shaw but also **General Electric** and Westinghouse, both nuclear reactor makers, while still voting on two issues that affected them.

The conflict-of-interest case — which also included an allegation that Mr. Merrifield failed to disclose, upon departing the government, that he accepted travel reimbursements of \$3,552.47 during his job hunt — was referred by the N.R.C. to the Justice Department for possible civil action and to the United States attorney's office in Maryland for potential criminal action. Both offices declined to pursue it.

Mr. Mulley, who took part in the investigation, was outraged. "Even if the lawyers don't want to go after him, the N.R.C. could make an example of him if they wanted to," he said. "They could speak out in some way. But they don't."

In a statement last month, Mr. Merrifield said he told investigators and prosecutors that he did not believe, based on legal advice, that he had acted inappropriately, but that if he had been told a conflict existed, he would have recused himself. He added that when he was alerted to the disclosure oversight, he immediately filed the correct forms.

"Though the antinuclear community continues to try to raise these concerns," Mr. Merrifield said, "I firmly believe that throughout my time as an N.R.C. commissioner, I acted in a fair and impartial manner and in the best interest of public health and safety."

Other commissioners have also had close ties to the industry.

Environmental groups and industry monitors were angered, for example, when Mr. Obama nominated William D. Magwood, a former employee of Westinghouse Electric and more recently director of the Energy Department's nuclear expansion program, to fill a vacant seat on the commission last year.

"Given his more than a dozen years promoting nuclear power, we do not believe Mr. Magwood has the independence from the nuclear power industry, nor the security oversight background, to regulate it," said Danielle Brian, executive director of the Project on Government Oversight.

In a letter in March to the oversight project about the Merrifield case, Mr. Jaczko rejected the group's recommendation that job-seeking employees be required to recuse themselves in writing from matters affecting possible postcommission employers.

"The failure of employees to disqualify themselves has not previously been an issue at the N.R.C., and absent evidence of a wider problem, the N.R.C. does not believe that additional reporting requirements are warranted," he wrote.

Marvin S. Fertel, the president and chief executive of the Nuclear Energy Institute, the main industry lobby, took issue with the notion that the N.R.C. was captive to business interests.

"Is there too much coziness? No," Mr. Fertel said. "Do I think there's respect? Yes." That includes a willingness on the part of N.R.C. to consider the financial impact of its rules on operators, he said.

Mr. Fertel said that as the N.R.C. has expanded to deal with the flood of relicensing applications, it has increasingly hired talent from within the industry. "It's only a problem if you think getting good expertise is a problem," he said.

But Mr. Mulley argued that the prospect of one day landing a lucrative position with a private company almost certainly played a role in softening the positions of some commission employees.

"The N.R.C. is like a prep school for many of these guys, because they know they've got a good shot at landing much higher-paying work with the people they're supposed to be keeping in line," Mr. Mulley said. "They're not going to do anything to jeopardize that."