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## *Unleashing the Nuclear Watchdog*

### Reforming the IAEA's Safeguarding Operations

In his classic book *Normal Accidents: Living with High Risk Technologies* (1984), the sociologist Charles Perrow famously argued that the more conflicts an institution has in its goals for managing complex technological systems, the more prone it is to failure. Such organizations might even actually contribute to the very disasters they were established to prevent.

Today, the International Atomic Energy Agency (IAEA) is faced with just such a predicament: conflicts within and among its various missions, including its “safeguarding” mission, threaten to undermine its ability to detect potential military nuclear diversions in a timely fashion.

First, the IAEA's membership has generally affirmed the goal set forward by the Nuclear Nonproliferation Treaty (NPT) that the superpowers should reduce their nuclear weapons arsenals. Indeed, this objective has been emphasized at the risk of undermining the agency's clear legal mandate to safeguard against illicit military diversions of declared civilian nuclear materials and facilities. These safeguards require that the NPT members that lack nuclear weapons open up their nuclear facilities to routine international nuclear inspections. Increasingly, though, many of the states without nuclear weapons argue that more intrusive inspection of their nuclear sites is unfair so long as the superpowers fail to live up to their

NPT obligation to disarm their own nuclear arsenals.

Second, although members of the agency are enthusiastic about its mission to expand the number of states enjoying peaceful nuclear energy, few, if any, are enthusiastic about shouldering the burden of safeguarding these programs. India's recent safeguards agreement with the IAEA has already dramatically increased the number of plants that the agency must inspect, although there has been little or no agreement on how to pay for these new inspections.

Meanwhile, over sixty countries have expressed interest in having an operational nuclear energy program by 2030—more than double the number of states that operate nuclear power plants today. Many of these states are currently seeking or receiving IAEA assistance to implement these programs. If even a fraction of them are established, it will significantly increase the IAEA's safeguards requirements.

Finally, key nuclear supplier states, including the United States, argue that even more should be done by the IAEA to encourage broader civilian use of nuclear energy. As a result, expansion of the agency's technical assistance programs is getting ahead of investment in nuclear safeguards. In fact, while the technical assistance program has been increased, last year the IAEA put a freeze on the safeguards department's

budget and instructed the department to plan on a 5 percent cut.

Other goals aside, even the way that the IAEA has chosen to carry out its primary mission is fraught with internal conflict and contradiction. For example, the agency has a clear mandate to detect possible misuses of nuclear energy for military purposes, but to keep nuclear plant operators happy, it will not raise its false-alarm rate above 5 percent, a standard far less stringent than what air travelers put up with every day as they go through security.

In addition, the IAEA is required to keep track of nuclear materials that are of direct use in making nuclear weapons. But this critical public safety goal is undermined by the agency's refusal to share specifics with the public about how much of these materials each state has and how much has gone unaccounted for. Also, the safeguards department must ensure that it has the resources it needs to carry out its duties, and convince its board of governors if it needs more. Yet it keeps confidential its own assessments of what it costs to carry out the different aspects of inspections.

Finally, as an international institution, the agency is inclined to operate in as nondiscriminatory a fashion and as much by consensus as possible. Yet because of its lack of funding for safeguards activities, the IAEA focuses its inspections more on facilities in countries that are considered dangerous or risky than in those it deems trustworthy—decisions that have inevitably produced controversy.

All of these problems make it more difficult for the agency to fulfill its safeguarding mission, much less to build support for it. But these challenges are not insurmountable. There are ways the IAEA could be changed to better support itself—at least to hedge against the most catastrophic outcomes (such as a bomb being detonated that turns out to have been made using “safeguarded” materials). But there are better and worse ways to reform it. Following Charles Perrow's analysis, it is crucial first to avoid bad, self-preservationist approaches.

One such approach that complex managerial organizations frequently employ is political: If you are worried that your organization may disappoint in one of its key missions, you can be vague about what failure or success means. This standard bureaucratic tactic is used extensively in educational institutions and in large governments where there are few clear metrics for performance. Of course, when it comes to important security-related issues, this is a particularly bad habit to get into.

Fortunately, the IAEA's metrics for minimal safeguards success are quite specific. One need only look at the IAEA glossary and examine its listings for timely detection, the agency's specific recommendations to assure such detection, how much time it takes to convert different civilian nuclear materials into bomb material, what the significant quantities are (how much nuclear material is required to make a bomb), and so forth to see

just how precise the agency's criteria are for achieving its safeguards mission. Whether or not these metrics, which have numerical values assigned to them, are current or accurate, and whether or not the IAEA actually can safeguard all that it monitors, are different matters. But fudging these metrics ought not to be an option.

A second possibility for an organization to deal with challenges such as these is, in a sense, corporatist: spend massive amounts of money in support of the organization's activities, in order to assure that *something* succeeds in a big way, and spotlight the successes so that the failures fade in relative significance. If money is hard to come by, though, this approach may not be an option. And when institutions face frozen or declining budgets while their workloads are increasing, there is a natural tendency to circle the wagons and defend the status quo against any new idea—especially if it requires more spending. Normally, in such cases, the organization points to its conflicting goals as evidence for why the status quo is actually the best of all possible worlds, and so things are not as bad as they look. But this vicious cycle of reduced spending, followed by highlighting existing operational conflicts to justify the status quo, followed by ever-worsening imbalances of resources to workload, only reduces the organization's odds of ever reaching higher levels of performance.

Understanding these defensive and wrongheaded ways in which institutions attempt to preserve themselves

points us to three specific recommendations for positive reform:

**(1) The IAEA should increase the scope and level of transparency about what materials are being safeguarded, and what it costs to inspect these materials and the facilities that house them.** The agency currently assesses what is required to inspect specific kinds of declared nuclear facilities. It also keeps track of what it costs to inspect declared facilities in each of the member nations. Finally, it keeps track of the materials accounted for and unaccounted for in each member state. Unfortunately, it fails to make this information public.

The original reason for keeping much of this information secret was the fear that revealing it might jeopardize the competitive industrial edge that some states hoped to gain in developing more advanced nuclear power and nuclear fuel technologies. Today, however, the reason agency officials give for keeping this information confidential is that revealing it might prompt a debate among member states over who should pay how much for inspections, and whose inspections are more of a burden to the agency. Such a debate, IAEA hands argue, would produce a "whittling down" effect on the safeguards budget, rather than a demand to increase safeguards funding.

None of this, however, makes sense. First, at least two political entities—Taiwan and the United States—already allow the agency to assess them on the basis of what the inspections of their facilities cost (and this information is

publicly available). This is in sharp contrast to the way the IAEA secures funding from other states for safeguarding, which is a figure derived from a complex United Nations formula based on GDP and other factors. Second, as the world is paying greater attention to nuclear security, with summits in Washington (in 2010) and Seoul (scheduled for 2012), the agency's lack of transparency about the specifics of materials accounted for and unaccounted for makes less and less sense. Finally, if the agency is ever to reform its safeguards efforts, it will be essential to make public the amount of man-hours, money, and technology it requires to inspect different types of nuclear facilities and materials. For many years it was common for the agency to compute the labor in terms of a standard metric called person-days of inspection (PDIs). Light-water reactors required 5-7 PDIs per year, while reprocessing plants needed about 1,000 PDIs per year. But the advent of new techniques both for safeguarding and for evading safeguards means that these estimates need to be discussed, debated, and updated, all of which should happen with public scrutiny.

**(2) Armed with information about which materials and facilities require safeguarding, and how much their safeguarding costs, the IAEA should encourage its members to consider new ways to meet these requirements.** One new way for member states to meet safeguarding requirements was suggested by Thomas E. Shea of the Pacific Northwest National

Laboratory at a 2006 conference, and detailed by my own organization, the Nonproliferation Policy Education Center, in our 2008 study entitled *Falling Behind* (available online at [www.npolicy.org](http://www.npolicy.org)): Make each state pay the IAEA what it would cost the agency to safeguard that country's nuclear goods. Toward this end, it would be helpful if several major nuclear energy states that currently give the IAEA supplemental safeguards contributions were to begin claiming that their contributions are based on the amount of nuclear electrical capacity they have. This "surcharge" approach would make the amount of safeguards funding supplied by a state proportional to its installed, declared nuclear energy capacity—in contrast to the U.N.'s current GDP-based system.

Once enough states used surcharge-based justifications for their supplemental contributions, the agency might suggest that this fee be levied in addition to the current U.N.-style assessment fee that each IAEA member state already pays to support IAEA operations generally. This additional fee would be allocated specifically for safeguards activities.

Adding such a safeguards surcharge would hit the United States hardest, followed by major European and Asian states, all of which have significant installed nuclear capacity. In some cases, it would create substantial additional fees for nuclear-weapons states that currently have a large supply of nuclear energy but don't have all of their civilian plants inspected by the

IAEA. Nonetheless, there would be a reasonable equity in such assessments: nuclear-weapons states have much to gain from keeping other states from acquiring nuclear weapons, so they ought to pay the most, even if their own plants are not the ones being inspected.

Initially, the percentage formulas for determining this surcharge could be kept modest so as not to increase total contributions to the agency significantly. But over time the aim would be to make the formula more demanding, so as to generate much more safeguards funding. At the very least, states like Italy that have no power reactors should not be paying more toward safeguards than states like South Korea, which has twenty nuclear power plants.

Aside from this new fee, there should be special additional fees based on how inspection-intensive specific nuclear facilities are, such as heavy water reactor systems, nuclear fuel-making facilities, and so forth. These add-on safeguards assessments should be made on a prorated basis, derived from the number of person-days of inspection these systems require each year.

**(3) The IAEA should be more candid about the safeguards system by conducting an assessment of what the agency can actually safeguard effectively and reliably so as to ensure timely detection of possible military diversions.** Currently, the agency's timeliness-of-detection goals for nuclear fuel-making are not being met for the simple reason that nuclear

fuel-making is so close to nuclear bomb-making that timely warning of diversions is simply not possible. In this regard, the time has come to be more realistic about what the IAEA can do: Instead of pretending to try to meet the impossible goal of timely and reliable *safeguarding* of nuclear fuel-making facilities (which requires being able to detect military diversions well before they result in the construction of a bomb—something that physics and engineering won't allow), we need to talk about how we might achieve the more realistic, modest goal of *monitoring* such facilities (that is, of being able to oversee fuel-making and possibly detecting a diversion well after it has taken place).

Also, in light of forty years of technical innovation, all of the numbers used in the IAEA's assessment of how it could detect nuclear diversions in time, before the material is converted into a usable weapon, should be scrubbed. Surely the conversion times, significant quantities, timeliness detection goals, and other critical values set four decades ago are no longer correct. The IAEA and its membership need to reevaluate them. The goal should be to regularly clarify what criteria must be met to fulfill the agency's safeguards mission, what we can do to upgrade our current safeguards efforts, and where no amount of additional authority or money can ensure timely detection.

Some will complain that even these modest suggestions are too controversial to plausibly be implemented.

Perhaps this is true; but if so, then the long-term prospects for the IAEA effectively meeting its goal of keeping nuclear energy from turning into nuclear proliferation is grim. But this is not by any means inevitable, and there is a clear enough path that can be taken to avoid it.

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