

# **Is the IAEA's Safeguards Strategic Plan Sufficient?**

**By**

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IAEA safeguards have much improved since their inception and the Safeguards Department is commendably continually improving its technical capabilities and planning to make full use of its statutory authority. The question remains: Will this be enough to keep countries from exploiting nuclear power programs to develop nuclear weapons, or to be in a position to do so rapidly should they so decide?

That question becomes much more relevant if worldwide use of nuclear power expands significantly. It isn't at all clear that this will happen. But the IAEA is doing everything it can to encourage such a development — in furtherance of its statutory mandate to "accelerate and enlarge the contribution of atomic energy to peace, health and prosperity." It should, therefore, also do its best to develop the means to protect such expanded nuclear energy use from spilling over into military applications. This, however, requires facing up to some awkward truths.

Of most concern are the fuel plants that separate fuels that can make nuclear weapons usable plutonium and uranium, such as reprocessing plants that separate plutonium or

enrichment plants producing highly enriched uranium, or can easily be used to produce such material. Countries possessing such facilities are within arm's reach of nuclear weapons—which presents the IAEA with a dilemma. The Agency's Safeguards Mission Statement says that the agency's role "is to deter the proliferation of nuclear weapons by detecting early the misuse of nuclear material or technology." But if a country has ready access to nuclear explosives it is impracticable to design a system for early detection. And if one cannot count on early detection, what happens to the deterrence that is the *raison être* for the safeguards system?

There does not appear to be any technological fix that would allow an escape from this dilemma. The shift in enrichment technology to centrifuges makes it much easier to realign a plant to produce HEU than with gaseous diffusion systems. As to reprocessing, we know, of course, that there are reprocessing enthusiasts who claim one or another form of advanced reprocessing is "proliferation resistant." But the US Department of Energy, even in supporting advanced reprocessing research, made it clear that while it had various advantages, "proliferation resistance" against military diversions by states was not one of them. A major 2006 DOE document stated that advanced reprocessing systems could help prevent nuclear terrorist from making bombs from the fuel these systems recycled but that "There is no technology 'silver bullet' that can be built into an enrichment plant or reprocessing plant that can prevent a country from diverting these commercial fuel cycle facilities to non-peaceful use."

Of course, there have been various attempts to rationalize that there is nothing to worry

about because, while such civilian facilities may be vulnerable, would-be bomb makers haven't turned to them in the past, at least not to facilities covered by IAEA inspection, and so it is unlikely that they would do so in the future. In fact, precisely the opposite is likely to be true. The historical record is in this instance a misleading guide to the future. All non-nuclear weapons states are now members of the NPT and covered by comprehensive IAEA inspections. All their nuclear activities are putatively civilian and "peaceful." Unless we believe that no country will ever again try to obtain nuclear weapons—a belief that is difficult to maintain in view of the various conflicts around the globe—the next nuclear weapons program will be in one of current non-nuclear weapon states. And in a world that is less lenient about a country acquiring nuclear weapons (and willing to try to knock out suspect weapons programs covertly or militarily), there will be a premium on shifting into weapons status as quickly as possible. That means tapping the civilian source of nuclear explosives.

This brings us back to the IAEA's safeguards system. The way the Agency has tried to address the problem of timeliness of detection has been to first assign to each type of nuclear material a conversion time—the time it would take to convert the material into nuclear explosive materials fashioned into a bomb. The pessimistic, but necessary, assumption here is that the would-be bomb maker would have done design and non-nuclear testing, and prepared the non-nuclear parts of the bomb, or bombs, in advance. Given this, the Agency assumes plutonium and HEU could be converted into weapons in a week. So far, so good.

But when it comes to the Agency's standard for detection times, we run into conceptual problems. The Agency defines detection time as "the maximum time that may elapse between diversion of a given amount of nuclear material and detection of that diversion by IAEA safeguards activities." Under the most stringent standard, which would apply to countries that don't have an Additional Protocol in place and for which the IAEA has not ruled out the possibility of undetected nuclear facilities, the "detection time should correspond approximately to estimated conversion times." For example, a one-week IAEA warning that, say, bomb quantities of plutonium or HEU are not in their assigned places. That is supposed to be the basis for "deterrence."

Think about that. "Deterrence by the threat of early detection" implies that the potential bomb maker has to fear some kind of reaction from the major NPT states. A week's warning does not permit any sort of meaningful diplomatic response — we know these things take months, if not longer. A week leaves only time for a military reaction, which is not something undertaken lightly, especially when a report of an IAEA violation is likely to be subject to all sorts of uncertainties. This also assumes that such a week's warning would actually be received, which is problematic as there are many ways to game the system. It also assumes that Agency timeliness detection goals are themselves such that routine inspections can be expected to occur before any conversion might take place. And it raises the question: even if it could be made to work, do we really want to have a system of nuclear programs whose civilian status has to be protected essentially by military forces on constant alert?

In the case of countries that adhere to the Additional Protocol and for which the Agency has ruled out the presence of undetected materials and covert enrichment or reprocessing plants, longer detection times are acceptable to the Agency. That assumes the Agency can rule out clandestine facilities with high confidence, which again is problematic, and especially so if the Agency's projections of nuclear power growth come true, and it has very much more on its plate than it does today. In fact, along with the further expansion of nuclear power comes the further spread of large reactors. These will require tons of fresh low enriched uranium be stockpiled at each site for refueling. Each reactor also will produce tons of spent reactor fuel and hundreds of kilograms of weapons usable plutonium. We are counting on none of these countries having covert enrichment or reprocessing plants that could convert these materials into weapons usable explosives and on the Agency to be able to detect any military diversions of these materials in declared reprocessing and enrichment plants to military purposes.

One could argue that worrying about such scenarios is unwarranted, that in most circumstances there would be indicators picked up by national intelligence agencies and that there would be a longer detection time. Perhaps. At the same time, we have to acknowledge that there have been some considerable surprises. Take the Syrian reactor, for example, obviously intended for military use, for otherwise it would have been announced to the Agency. It was constructed undetected over what had to be a lengthy period of time. And in the end, ironically, a non-NPT country bombed it. Is this the way we want nuclear proliferation detection and enforcement to work?

The inescapable conclusion is that when it comes to nuclear explosive materials, or the enrichment and reprocessing facilities that produce them, the notion of deterrence by means of early detection is simply impracticable. The Agency cannot, in this respect, no matter how it expands its effort, meet its stated goal.

What should we do? The first step is to make this clear. Up to now, while the Safeguards Department has been clearly motivated to carry out its technical activities competently, it has taken a relatively passive view of its role in matching safeguards to the worldwide development of nuclear power. Whatever nuclear technology comes into use, and whoever deploys it, the Department exerts its best effort to safeguard. But what has happened is that the distinction between “safeguarding” (i.e., inspecting to provide timely detection of military diversions well before any bomb could be made) and merely inspecting or monitoring them (in hopes of at least learning about possible diversions after they have occurred) has gotten blurred.

The Department should be more open about what it can or cannot realistically safeguard, and make clear that although it can inspect or monitor enrichment and reprocessing facilities, and it is essential that it do so, but that it cannot “safeguard” them. The significance of this would be that those national and commercial interests that want to proliferate such facilities would not be able to use the argument that as the IAEA “safeguards” them, they are entirely peaceful and so all countries have the right to possess them. If there is anything those concerned with proliferation agree on, it is that such facilities should be limited to a small number.

One could go further. While adequate enrichment capacity is essential to fuel current generation nuclear plants, there is no longer any economic argument for reprocessing plants. Plutonium recycle in thermal reactors makes no sense at all—it never did—and the onset of fast breeder reactors has receded beyond any planning horizon. Any close examination of waste disposal also shows that reprocessing does not improve the process — it complicates it. It would be helpful from the point of view of nonproliferation if the Agency adopted this view.

The Agency could also exercise more boldly its rights under its statute. Under Article XII, when requested to apply safeguards, the Agency has the right *and responsibility* to examine the design “and to approve it only from the view-point of assuring that it will not further any military purpose . . . and that it will permit effective application of the safeguards provided for in this article.” And if it does not permit effective application of safeguards — the kind of safeguards that deter diversion by the threat of early detection—then the IAEA has the right to withhold the safeguards label. The IAEA certainly should not be participating in giving the world’s public the illusion of security concerning facilities that were understood from the first—and so labeled in the original 1946 Acheson-Lilienthal Report — as dangerous.

Honesty on this score would be salutary in a number of ways. It could lead to agreement that all enrichment facilities be organized on a multinational basis, thus ruling out any further deployment on a strictly national basis. It could also lead to eliminating reprocessing of spent fuel altogether, which would actually result in economic savings.

Above all, the Agency should be candid about the difference between safeguarding and merely inspecting or monitoring.

These suggestions may be viewed by the nuclear community as unhelpful, in fact will likely be so viewed. It seems to us that while the Agency's statute mandates that it further the worldwide use of nuclear energy, the Safeguards Department, which has to protect against possible harm from such use, should take a less enthusiastic view of its unbridled expansion. Yet the Department's Long-Term Strategic Plan says at the outset that its verifications assist the Agency to fulfill its statutory objective to "accelerate and enlarge the contribution of atomic energy..." In our view, the Department should judge itself by how well it promotes international security, not by its contribution to expanding nuclear power use. The Department's Vision, laid out in its Long-Term Strategic Plan, includes "to advance States' aspirations for a nuclear weapons free world." That vision should include keeping states from deploying technologies that put them within easy reach of nuclear weapons.