

Falling Behind: International Scrutiny of the Peaceful Atom

Testimony of

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Chairman Tierney, Congressman Shays, members of the committee, I want to thank you for allowing me to testify today on what can be done to strengthen international nonproliferation efforts to block diversions of civilian nuclear materials and activities to make bombs.

This issue is timely. We certainly have our hands full keeping North Korea and Iran from using their nuclear programs to make bombs. Then, there is the problem of India. Soon, Congress will have to decide whether the safeguards being proposed for that country can effectively prevent U.S. and foreign nuclear cooperation from assisting New Delhi's nuclear weapons program.

Finally, in addition to the thirty-one states that currently operate large reactors, no fewer than fourteen countries in the last eighteen months have announced their intention to acquire large reactors of their own by 2020. Many of these states—Algeria, Morocco, Tunisia, Libya, Egypt, Turkey, Jordan, Saudi Arabia, Yemen and the UAE—are located in the war-torn region of the Middle East. Morocco, Tunisia, Jordan and Yemen seem unlikely to achieve their stated goal. But the others, with U.S., Chinese and Russian nuclear cooperation, may well succeed. What's clear is that most are interested developing a nuclear program capable of more than merely boiling water to run turbines that generate electricity. Indeed, at least five have made it clear that they are interested in hedging their security bets with a nuclear weapons-option. For these states, developing purportedly peaceful nuclear energy is the weapon of choice.

Two years ago, in anticipation of the security challenges these programs are likely to present, my center began tapping some of the best minds from around the world to assess the adequacy of the nuclear safeguards system that the International Atomic Energy Agency (IAEA) administers. This system is what the world relies upon to verify compliance with the Nuclear Nonproliferation Treaty (NPT) and to keep states from high-jacking their civilian nuclear materials and activities to make bombs.

Since the fall of 2005, my center has consulted with officials from the IAEA, the U.S., the U.K., Germany and France, as well as outside experts, and commissioned thirteen separate studies on a variety of safeguards-related issues, and discussed this work at a battery of private conferences held both here and overseas. The conclusions and recommendations based on these meetings and research are attached to my written statement, which I ask to be placed in the written record of today's hearing. Because they run several single-spaced pages in length, I will only highlight three of the most significant findings.

First, unless we act to redefine the scope of what can be safeguarded, supplement IAEA safeguards funding, and make enforcement actions against nuclear violators more likely, the IAEA will be almost certain to fail sooner rather than later to prevent more nuclear proliferation, theft, and possible use.. This is so whether or not nuclear power expands. Certainly, the amount of nuclear material that can be used directly to

make bombs and that the IAEA cannot adequately safeguard is already quite large and growing. The production of the sorts of materials that go unaccounted for each year is also growing. The IAEA's accounting of these materials, the key mission of the IAEA's safeguards charter, is slipping more each year. If nuclear power expands the number of plants operating world-wide, then the amount of unaccounted nuclear materials—an amount that is already disturbingly high, equal to at least ten to twenty-thousand bombs-worth (see Chart 1)—will only grow larger faster.

Part of the answer to these problems is to be far more candid about what nuclear materials and activities the IAEA can inspect to prevent possible military diversions and about what nuclear activities and materials are simply too close to bomb-making to be kept from being quickly diverted. The later activities and materials ought not to be presumed to be “peaceful” and therefore protected under the NPT. The other part is to bulk up IAEA inspections with more spending where they can clearly be more effective — i.e., near-real time monitoring of fresh and spent fuel rods and safeguarding processed source materials (e.g., uranium hexafluoride).

Second, many of the fixes currently being pushed to avoid nuclear diversion—in particular, integrated safeguards, proliferation-resistant nuclear fuel-cycles, nuclear fuel assurances, banks and centers—may not achieve their stated goals or worse, may undermine them. Perhaps the three most popular safeguards ideas making the rounds today — integrated safeguards under the Additional Protocol, proliferation-resistant fuel-cycles under America's Global Nuclear Energy Partnership (GNEP), and international fuel assurances with fuel banks and regional fuel-making centers — are also the most unexamined. Recent analyses conducted by outside think-tanks conclude that under many circumstances each of these innovations could prove to be self-defeating.

Third, Congress and the White House can advance what's needed to hedge against the worst and dramatically enhance the IAEA safeguards well before there is complete international consensus. The study, in fact, identifies at least ten specific measures Congress and the Executive could take unilaterally or with like-minded states. Some of these measures — e.g., promoting non-nuclear, non-petroleum alternative sources of energy with other countries and conducting country-specific assessments — merely require implementing laws that Congress has already passed. Other measures — e.g., creating a formula to determine how much the U.S. and others should give in support of the IAEA's Department of Safeguards that is tied to the number of kilowatt hours our nuclear power systems produce in each country annually; requiring routine reports from our intelligence agencies on the effectiveness of IAEA safeguards; and spelling out what sanctions the U.S. might take against countries that violate agreed to nonproliferation restraints — would entail no federal spending.

In short, there is plenty that can be done to strengthen the IAEA safeguards system now, and good reason to do so. The specifics of what should be done can be found in the attached set of recommendations, which you and your staff have had a chance to examine. I look forward to answering any questions you might have.

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Recommendations of
“Assessing the IAEA’s Ability to Verify the NPT,”
A Nonproliferation Policy Education Center-sponsored Study

1. *Resist calls to read the NPT as recognizing the per se right to any and all nuclear technology, no matter how unsafeguardable or uneconomic such technology might be.* If the current permissive and mistaken interpretation of the NPT continues to be acted upon, the world will soon have twenty or more nations on the verge of acquiring nuclear weapons. At this point, the IAEA’s ability to detect military diversions in a timely fashion will be marginal at best. For this reason, as well as a series of legal, historical and technical reasons, it is essential that members of the IAEA Board of Governors make safeguardability and economic viability two clear criteria for what is peaceful and protected under the NPT. In this regard, thirty years ago, the U.S. stipulated in Title V of the Nuclear Nonproliferation Act of 1978 that the U.S. executive branch should create a series of specified technical cooperative programs to promote the use of non-nuclear and non-petroleum renewable sources of alternative energy internationally. The law also requires the Executive Branch to conduct country-specific energy assessments toward this end and to report annually on the progress of U.S. and international efforts to employ such energy sources abroad.¹ Unfortunately, since the law’s passage, the White House and the U.S. Departments of Energy and State have yet to comply with any of the specific legal requirements of this title.

Specific Recommendations:

A. The U.S. and like-minded nations should stipulate that all future civilian nuclear energy projects should only enjoy the protection of the NPT if they are: (1) able to be monitored in non-nuclear-weapon states in such a manner as to afford timely warning of military diversions as stipulated by the NPT and the IAEA’s own definitions of what the purpose and criteria for “effective safeguards” are; and (2) economically viable enough to be financed *without* nuclear-specific government subsidies.

B. The U.S. government should begin full implementation of Section V of the Nuclear Nonproliferation Act of 1978 and urge its closest allies to cooperate with it in achieving its stated goals.

¹. See, Title V, The Nuclear Nonproliferation Act of 1978, (P.L. 95-242) Sections 501-503.

2. ***Distinguish between what actually can be effectively safeguarded, and what can be, at best, monitored.*** Currently, the IAEA is unable to provide timely warning of diversions from nuclear fuel-making plants (enrichment, reprocessing, and fuel-processing plants utilizing nuclear materials directly useable to make bombs). For some of these plants, the Agency loses track of many nuclear weapons-worth of material every year. Meanwhile, the IAEA is unable to prevent the overnight conversion of centrifuge enrichment and plutonium reprocessing plants into nuclear bomb-material factories. As the number of these facilities increases, the ability of the Agency to fulfill its safeguards mission dangerously erodes. The IAEA has yet to concede these points by admitting that while it can monitor these dangerous nuclear activities, it cannot actually do so in a manner that can assure *timely detection* of a possible military diversion – which is the key criterion for an inspection procedure to be regarded as a safeguard. In addition, the IAEA’s original criteria for how much nuclear material is required to make one bomb (one “significant quantity”), for how much time is required to convert various materials into bombs (“conversion time”) and what the IAEA’s own inspection goals should consequently be (“timeliness detection goals”) were set over thirty years ago and may no longer be up to date.

Specific Recommendations:

A. Require the IAEA Department of Safeguards to distinguish between those nuclear activities and materials for which timely detection of a diversion is actually possible and those for which it is not yet possible.

B. In light of the nuclear inspections experience of the last fifteen years with North Korea, Iraq, Iran, Egypt, Taiwan, Libya and South Korea, each member of the IAEA Board of Governors should undertake its own national reassessment of whether or not the IAEA’s current significant quantities criteria, conversion times and timely detection goals need to be revised to assure timely detection of diversions sufficient to allow states to intervene to block the possible high-jacking of civilian facilities and materials to make bombs. On the basis of these analyses, the IAEA Board of Governors should instruct the IAEA Department of Safeguards to conduct its own analysis, and to report back to Board regarding desirable revisions to the Agency’s criteria for what nuclear safeguards over different nuclear materials and activities require.

C. Call for increased monitoring of those nuclear facilities for which such timely detection is not yet possible (e.g., nuclear bulk-handling facilities) at the very least to increase the prospect of detecting diversions (mostly well after they may have occurred) while warning that timely detection of diversions (i.e., detection of diversions *before* they are completed) from such facilities is not yet possible.

D. Avoid involving the IAEA in verification of a military fissile material cut-off treaty (FMCT). As currently proposed, a FMCT assumes that the timely detection of diversions from nuclear fuel-making plants is possible when, in fact, it clearly is not.

E. Call for physical security measures at those facilities where timely detection is not possible that are equivalent to the most stringent standards currently employed in nuclear-weapons facilities in the United States, Britain, Russia, China, and France.

3. ***Re-establish material accountancy as the IAEA's top safeguards mission*** by pacing the size and growth in the Agency's safeguards budget against the size and growth of number of significant quantities of special material and bulk handling facilities that the Agency must account for and inspect (see Chart 1, appended below). As noted above, the amounts of special nuclear material under IAEA safeguards that go unaccounted for is increasing every year. These increases are most acute in non-weapons states that are making nuclear fuel (e.g., Iran, Japan, the Netherlands, Germany, and Brazil). In addition to being unable to meet its own detection goals for separated plutonium, highly enriched uranium and mixed oxide fuels, the IAEA, at most of the sites that it must safeguard, lacks the near-real time monitoring capabilities necessary to determine if the Agency's own monitoring cameras and other sensors (which are left unattended for 90 or more days) are turned on. As such, a proliferator could divert entire fuel rods containing significant quantities of enriched uranium and nuclear weapons-usable plutonium without the Agency finding out either at all or in a timely fashion. Before the IAEA takes on additional dubious or extremely challenging missions, such as monitoring fissile production cut-offs or searching for nuclear weapons-related activities, it must arrest this growing gap between the amounts of nuclear materials it must safeguard and its technical ability to do so.

Specific Recommendations:

A. Pay greater attention to what the IAEA can clearly do better – count fresh and spent fuel rods – by quickly increasing and optimizing its remote near-real time monitoring capabilities for all of its monitoring systems, and increasing the number of full-time, qualified nuclear inspectors necessary to conduct on-site inspections.

B. Require the IAEA Department of Safeguards to report annually on its safeguards budget and identify not only the number of man-hours dedicated to on-site inspections and the number of significant quantities under the IAEA's safeguards charge, but also the amount of direct-use materials under its charge (by type) *for which the Agency could not achieve its own timeliness detection goals*, the amount of direct-use materials for which the Agency could achieve its own timeliness detection goals; the number and location of facilities under near-real time surveillance; the amount of money dedicated to wide-area surveillance; and the amount of money dedicated to IAEA safeguards research and development.

C. In addition, each member state of the IAEA Board of Governors should routinely conduct its own national analysis of what it believes the proper ways to

the address the problems noted above are and publicly identify and explain what it thinks the Agency's top safeguards priority should be to improve these numbers.

4. ***Focus greater attention on useful safeguards activities that are necessary, but have yet to be fully developed.*** To assure that the IAEA's material accountancy assets do not risk becoming cannibalized for other urgent missions that might arise (e.g., inspections for India if the U.S.-India nuclear deal should go forward, more intrusive inspections for Iran, and North Korea, etc.), it would be useful for the Agency to develop stand-by wide-area surveillance teams for the imposition of sudden inspections requirements. The Agency might also usefully do more to account for source materials in processed form, as it was information regarding the shipment of such material that originally tipped off the IAEA to suspicious nuclear activities in Iran. The Agency also needs fully to fund and properly staff its sampling analysis facilities, and its efforts to secure overhead imagery of the sites that it must inspect. Finally, the Agency needs to do more to establish what its own safeguards research and development requirements are.

Specific Recommendations:

A. Members of the IAEA Board of Governors should assess on their own what would be required to conduct wide-area surveillance inspections of Iran and North Korea (i.e., what it would cost to stand up and maintain a wide-area surveillance unit in terms of dollars and staff), and ask the IAEA Board of Governors to task the IAEA Department of Safeguards to do likewise.

B. The IAEA Board of Governors should ask its members for supplemental contributions to stand up and maintain such surveillance units. The supplemental should be based on a formula tied to the kilowatt hours each member produces (see recommendation 5 below).

C. Similar studies should be conducted and supplemental assessments made in support of IAEA efforts to improve their ability to account for nuclear source material, and to fund nuclear sampling analyses, and of inspections-related overhead imagery and analysis.

5. ***Complement the existing UN formula for raising IAEA funding with a user-fee for safeguards paid for by each nuclear operator.*** The IAEA has repeatedly noted how small the Agency's safeguards budget is, but has yet to propose how to increase it. As a stop-gap measure, the U.S., E.U., and Japan have been giving token amounts of voluntary, "supplemental" contributions to the Agency. Currently, the U.N. formula used to raise IAEA funds has nations that possess no power reactors, such as Italy, paying more than nations, such as South Korea, that possess twenty power reactors. Countries such as the U.S., Canada, Brazil, Japan and India, meanwhile, are taxing the IAEA safeguards system (or soon will be) with nuclear fuel-making and bulk-handling facilities, and on-line fueled reactors that are expensive to monitor. Although the IAEA

inspects the nuclear reactors and facilities of nuclear-weapon state members of the NPT far less than they inspect those of the non-nuclear-weapon states, the nuclear-weapon NPT states arguably have to the most to gain from IAEA efforts to prevent the further spread of nuclear weapons. Both the insufficiency of the IAEA safeguards spending and the inequity of the way funds are currently raised for this function suggest the need to complement existing country assessments with a safeguards user-fee based on the amount of nuclear power generated in each country. This fee is needed to assure the Agency's budget not only grows significantly above its current level (which is too low by one or two orders of magnitude), but also to keep up with the possible expansion of nuclear power.

Specific Recommendations:

A. The U.S., E.U. and Japan each should base all of their current supplemental contributions to the IAEA safeguards budget on a national formula of dollars, euros, and yen per kilowatt hour their reactors generate per year.

B. The U.S., E.U. and Japan should, then, try to agree among themselves on what the agreed safeguards funding formula should be and encourage others to follow suit as a mandatory requirement for determining the majority amount of their contribution to the IAEA rather than only for determining the amount of their supplemental voluntary contributions.

C. The IAEA Board of Governors should instruct the Agency's Department of Safeguards to identify those nuclear facilities that require the greatest amount of resources to inspect and pose the greatest difficulty in meeting the Agency's own timely detection criteria. The IAEA Board of Governors should ask those countries possessing these identified facilities to pay a yet an additional amount to the IAEA Department of Safeguards to cover the costs associated with their effective inspection.

6. ***Establish default actions against various levels of IAEA safeguards agreement non-compliance.*** Currently, any proliferator that violates their IAEA comprehensive safeguards agreement knows that the deck is stacked against the IAEA Board of Governors reaching a consensus to (1) find them in non-compliance, and (2) take any disciplinary action. The key reason why is simple: The current burden of proof regarding any non-compliance issue is on the IAEA staff and the Board of Governors rather than on the suspect proliferator. In the absence of political consensus in the IAEA Board of Governors, the proliferator can be assured that no non-compliance finding will be made, much less any disciplinary action taken. This set of operating assumptions needs to be reversed. The best way to assure this is to establish a set of country-neutral rules regarding non-compliance that will go into effect automatically upon the Board of Governors inability to reach a consensus on (1) whether or not a given party is in full compliance with its comprehensive safeguards agreement, and (2) what action to take in the event that a party is found to be in non-compliance.

Specific Recommendations:

A. The U.S., E.U. and other like-minded nations should announce -- independent of NSG consensus -- that they will suspend transfers of controlled nuclear goods to a country that the IAEA Board of Governors has been unable to find in full compliance with its safeguards obligations, and urge the IAEA Board of Governors and the NSG to agree to do the same. Under such a regime, the IAEA Board of Governors would be forced to suspend nuclear cooperation from any IAEA member to the suspected state until the Board could unanimously determine that the suspect state was in full compliance.

B. The U.S., E.U. and other like-minded nations should call on the United Nations Security Council (UNSC) to pass resolutions prohibiting states found in non-compliance by the IAEA Board of Governors from making nuclear fuel for a decade, and requiring such non-compliant states to submit to wide-area surveillance to establish that they are completely out of the bomb-making business.

C. The U.S., individual E.U. member states and other like-minded nations should take national actions to sanction states that withdraw from the NPT while in violation of the treaty, and call on the UNSC to pass a country-neutral sanctions resolution that tracks these sanctions measures.

D. At the very least, the U.S. and like-minded states should adopt national laws and executive orders to establish what sanctions they would be willing to impose against any non-nuclear-weapon state that tests a nuclear device and call on the UNSC to pass a country-neutral sanctions resolution that tracks these national sanctions. The sanctions could be lifted after the testing state has disarmed and demonstrated to the IAEA Board of Governors that they are out of the bomb-making business.

7. Plan on meeting future safeguards requirements on the assumption that the most popular innovations – integrated safeguards, “proliferation-resistant” fuel-cycles, and international fuel assurances – may not achieve their stated goals or, worse, may undermine them. Perhaps the three most popular safeguards innovations – integrated safeguards under the Additional Protocol, proliferation-resistant fuel-cycles under America’s Global Nuclear Energy Partnership (GNEP), and international fuel assurances with fuel banks and regional fuel-making centers – are also the most unexamined. Recent analyses conducted by outside think-tanks (including the Council on Foreign Relations, The International Panel on Fissile Materials run by Princeton University, the Keystone Group, and the U.S. National Laboratories), however, conclude that each of these innovations could prove to be ineffectual or even self-defeating. GNEP proliferation-resistant fuel-cycles, for example, do not appear to be very proliferation-resistant, especially with respect to state-based proliferation, and could easily increase the

use and availability of nuclear weapons-usable fuels worldwide. Fuel banks and fuel-making centers, if they make fuel available at “affordable” or “reasonable” prices, could end up subsidizing nuclear power development in regions where such activity would not be economical or safe. Fuel-making centers also could end up spreading nuclear-fuel making technology. Finally, integrated safeguards, which reduce the number of inspections per safeguarded facility, could easily end up becoming a crutch for the IAEA to evade its material accountancy responsibilities.

Specific Recommendations:

A. The U.S. government should create a board of outside experts to serve as quality-assurance panel to spot the potential downsides of any nonproliferation initiative. This group would be created and report to Congress on what sorts of potential unintended or self-defeating consequences of any proposed government initiative that was justified on nonproliferation grounds might have prior to Congress authorizing or appropriating to support it.

Chart 1

Falling Behind: IAEA Safeguards Spending vs. Mounting Weapons Usable Material Stockpiles

- From 1984 to 2004, IAEA safeguards spending roughly doubled to \$105 m in constant '04 dollars.
- Amounts of HEU and separated Pu, meanwhile grew nearly 6-fold, enough to make 12,000 to 21,000 crude nuclear weapons

