CORRESPONDENCE

Create Incentives to Reduce Civilian HEU

The excellent special section "The Global Elimination of Civilian Use of Highly Enriched Uranium" makes a powerful case that the world needs a rapid "global cleanout" effort to remove this material from the world's most vulnerable sites as rapidly as practicable and to ensure that stringent security measures are maintained wherever it remains (15.2, July 2008, pp. 135–310). Every article in the section is a major contribution, providing important data and insights.

One theme that bears emphasizing is the critical importance of giving key decision makers at both the site level and the national level appropriate incentives to shift away from the use of highly enriched uranium (HEU). Several types of incentives are likely to be critical to success.

First, it is essential to ensure that in every country where significant caches of HEU or separated plutonium exist, effectively enforced regulations are put in place requiring that this material be protected against the kinds of threats that terrorists and criminals have shown they can pose. This will help ensure effective security for these materials—and the cost of complying with such regulations will provide a powerful incentive to get rid of such materials wherever possible. This means that Congress should direct the Nuclear Regulatory Commission to phase out the exemption from most security requirements for HEU that research reactors have long enjoyed, and provide sufficient funding for the Department of Energy (DOE), which provides most of the operating budget of these reactors, to cover the resulting increased security costs (which would be a

tiny fraction of the \$1.5 billion spent each year on DOE security). It means that Russia should modify its security regulations to permit nuclear sites that have only lowenriched uranium (LEU) to save money by having less security than facilities with HEU.² And in countries around the world, it would mean toughening security standards for sites with HEU or separated plutonium. In particular, such standards should no longer consider lightly irradiated HEU generating a dose rate of only 1 Sievert/hour at 1 meter to be "self-protecting" against theft. As several of the articles in the special issue make clear, this level of radiation is not remotely enough to deter determined terrorists.

Second, many operators of HEU-fueled reactors have little interest in converting to LEU, and packages of incentives targeted to the needs of each facility are likely to be essential to convince them. As just one example, donor countries could more than compensate for the few-percent reduction in neutron flux that reactors tend to suffer after converting to LEU by offering to finance new neutron guides, which can increase the neutron flux available at the actual experiment locations by more than a factor of ten, at modest cost.³

Third, it is important to add incentives to convince little-used reactors to shut down as a complementary policy tool to conversion. Nearly half of the world's currently operating HEU-fueled research reactors are not on the Global Threat Reduction Initiative's list targeted for conversion (and many of those that *are* on the list may be cheaper and easier to shut down than to convert). As Ole Reistad and



Styrkaar Hustveit show in "HEU Fuel Cycle Inventories and Progress on Global Minimization," even in the absence of any incentives, nearly twice as many HEUfueled reactors have shut down since conversion efforts began as have converted, showing the potential power of the shut-down tool. Incentives packages might include funding research at a site that does not require the research reactor, funding research as a user group at another facility in the region, or helping with shutdown and decommissioning. In some cases, the appropriate target of such discussions may be national-level decision makers who subsidize these reactors' operation. Such shut-down incentives should be institutionally separated from conversion efforts, so that the trust necessary to convince operators to convert is not undermined by the operators believing the real agenda of the conversion experts is to shut them down.

Fourth, market incentives should be used to convince the major producers of molybdenum-99 to shift production away from the use of HEU targets. A user fee imposed on all medical isotopes made using HEU, amounting to roughly 30 percent of the value of the isotopes, would create a powerful incentive to convert from HEU. Because the isotopes represent a tiny fraction of the cost of the medical procedures that use them, this fee would have little effect on patient costs or the availability of needed isotopes. The revenue could be used to assist producers willing to convert.

There is one important point on which I strongly disagree. In "Nuclear Terrorism and the Global Politics of Civilian HEU Elimination," William Potter argues that making an implosion bomb is "beyond the technical capability" of terrorists

without state assistance. This is too complacent a view. Making an implosion bomb would be significantly more difficult than making a gun-type bomb, and the terrorists' probability of success would be lower. Therefore, to ensure that HEU does not pose a higher overall risk of successful theft followed by successful bomb construction would require somewhat more stringent security measures for HEU than for plutonium—though this does not mean that there are stockpiles of plutonium that should have less security than they currently do. But repeated government studies have concluded that a sophisticated terrorist group might well be able to make a crude implosion bomb, particularly if they acquired knowledgeable help, as they have been attempting to do. As one Department of Defense report put it:

A terrorist with access to >50 kg of HEU would almost certainly opt for a gun-assembled weapon despite the inherent inefficiencies of such a device, both because of its simplicity and the perceived lack of a need to test a gun assembly. ... If the subnational group had only [plutonium-239] or needed to be economical with a limited supply of HEU, then it would likely turn to an implosion assembly.⁴

Ultimately, it is important to ensure that *all* stocks of nuclear weapons, HEU, and plutonium are consolidated and secured effectively.

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NOTES

- The goal of reducing the costs of post-9/11 security requirements is a major factor driving the large-scale consolidation at DOE's nuclear complex, in which Sandia National Laboratories in Albuquerque, New Mexico was cleared of potential weapons material this year (including the shutdown of two research reactors), saving tens of millions of dollars a year in security costs.
- 2. Russia's 1997 physical protection regulations required effectively the same security measures for LEU as for HEU. In a July 2007 conversation with V.P. Struyev, director of the Krylov Shipbuilding Institute, the first Russian facility to eliminate all of its HEU in cooperation with DOE's Material Conversion and Consolidation program, Struyev indicated that for this reason, he expected no security savings as a result of giving up HEU—a situation that gives Russian facilities little incentive to consider changing their reliance on HEU. The new Russian physical protection regulations are more graded, but exactly what savings a facility could realize by eliminating its HEU remains unclear.
- Alexander Glaser, "Neutron-Use Optimization with Virtual Experiments to Facilitate Research-Reactor Conversion to Low-Enriched Fuel," in Proceedings of the Institute for Nuclear Materials Management 48th Annual Meeting, July 8–12, 2007, Tucson, Arizona (Northbrook, IL: INMM, 2007).
- Department of Defense, "Section V: Nuclear Weapons Technology," in Militarily Critical Technologies List, 1998, < www.fas.org/irp/threat/mc tl98-2/p2sec05.pdf>.

Capturing the Complexity of North Korea

I read with interest Hugh Gusterson's article on media coverage of the North Korean nuclear issue ("Paranoid, Potbellied Stalinist Gets Nuclear Weapons," 15.1, March 2008, pp. 21–42). In the spirit of disclosure, I should point out that I have known Gusterson for many years, and he interviewed me as part of his research for the article. Still, we have disagreed on many topics. Moreover, I would be surprised if the views

offered here are not broadly representative of outside experts who work on the Korean nuclear issue.

Gusterson finally said in print what has been obvious to many Korea watchers for some time: U.S. press coverage of events related to North Korea has been at best incomplete and at worst misleading. Six years after the WMD fiasco in Iraq, one would have expected more informative, skeptical, and balanced coverage of a topic at the top of the U.S. security agenda. Such has not been the case. The print media's explanations of the Agreed Framework and "coverage" of allegations of transfers of North Korean nuclear material to Pakistan are particularly egregious examples. Given the number of reports that have appeared over the past several years, it will always be possible to cite a story that breaks the norm, but that does not alter the fact that the overwhelming amount of coverage plays to form.

Unfortunately, the problems have persisted. Prior to the recent breakthrough leading to the virtual disablement of the Yongbyon reactor, press coverage singlemindedly emphasized the DPRK's failure to file what the United States considered to be a full declaration of its past nuclear activities. As per usual, there was very little discussion of U.S. tardiness in following through on its promises to resolve the Banco Delta Asia issue and provide fuel oil shipments. Similarly, there was bare mention of fact that the United States had done nothing with regard to its promise of removing the DPRK from its list of state sponsors of terror. Most importantly, there was no attempt to put the issue into context, namely that U.S. complaints focused primarily on the past and on activities that have nothing to do with the DPRK's extant plutonium-based nuclear arsenal.

Even after recent successes, many in the media (and in public office as well) seem to have missed the significance of the results. The destruction of the cooling tower was called a photo op (which it was), but there was no further explanation that most of what was important regarding disablement had taken place inside the reactor building. Moreover, one would never know from reading the coverage that North Korea has essentially capped and frozen its nuclear weapons program a huge move forward by any historical nonproliferation/disarmament metric. These steps have resulted in a Korean Peninsula that is far safer today than it has been for vears.

To be fair, reporters work with limited space, do not write the headlines, and must fight with editors for every word. Still, the systemic, persistent problems in the print press cannot not be ignored. They raise fundamental questions about the nature of the news coverage. One does not have to assume that reporters and editors have some personal grudge against North Korea (they don't), or that they are a wholly owned subsidiary of the U.S. government (they aren't). Instead, the same problems that plagued print coverage in the run-up to the war in Iraq appear to be at work again: a preference for "inside" information that gives greater weight to off-the-record administration sources, a lack of diversity of quoted sources, and a failure to get the DPRK side of the story even as other media outlets (CNN and AP Television News, for example) succeed in doing so.

Of course, North Korea's own news coverage is completely biased, and the DPRK's views are often an exercise in myth making. Still, Americans rightly expect news that is tough, balanced, and not captive to insider sources. Broadcast and cable cover-

age is often unfavorably compared to the elite print media, but in its longer-format programming (e.g., specials and documentaries), it provides superior coverage to its print competitors. U.S. print media can do a better job, but that will only happen when they openly acknowledge the systemic and continuing problems that characterize their current efforts.

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Debating Article VI

Christopher Ford's article, "Debating Disarmament: Interpreting Article VI of the Treaty on the Non-Proliferation of Nuclear Weapons" (14.3, November 2007, pp. 401–428), ends with a disclaimer: "The views expressed in this article are the author's own and do not necessarily represent those of the State Department or the U.S. government." Ford's views, however, seem extremely closely aligned with those of the State Department, which he joined in 2003 and where he served until September.

Article VI of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) states: "Each of the Parties to the Treaty undertakes to pursue negotiations in good faith on effective measures relating to the cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a treaty on general and complete disarmament under strict and effective international control." This article is the principal tradeoff in the NPT, in which the non-nuclear weapon states are given the promise that the playing field will be

leveled by "negotiations in good faith on ... nuclear disarmament."

When the International Court of Justice (ICJ) considered the legality of the threat or use of nuclear weapons in 1996, the judges unanimously concluded, based on Article VI of the NPT, that "[t]here exists an obligation to pursue in good faith *and bring to a conclusion* negotiations leading to nuclear disarmament in all its aspects under strict and effective international control" (emphasis added).

In his article, Ford seeks to substitute his judgment for that of the ICJ, the world's highest judicial body. He dismisses the view of the court on the nuclear disarmament obligation as mere dictum, "generally ... regarded as having minimal authority or value as precedent." But, in fact, the court viewed this portion of its opinion as essential to close the gap in international law that it found in the threat or use of nuclear weapons "in an extreme circumstance of self-defense, in which the very survival of a State would be at stake."

Ford uses his impressive rhetorical skills to place emphasis on the word "pursue," making the claim that "pursuit" of negotiation in good faith is all that is required of a party. He uses the term "pursue" to mean "to seek" or "to chase," rather than in the sense of "to carry something out" or "to continue with something," meanings that the ICJ likely had in mind in reaching its opinion that negotiations must not only be pursued but also brought "to a conclusion."

It seems unlikely that the non-nuclear weapon states would have been (or now would be) satisfied with Ford's view of "pursue." Like the bold lover on the Grecian urn in Keats' famous ode, the non-nuclear weapon states would be denied their reward, "though winning near the goal."

In other words, they could only watch as the nuclear weapon states pursued the goal of negotiations on nuclear disarmament without real hope that the goal would ever be reached.

Article VI of the NPT makes far more sense when the emphasis is placed on the good faith of the parties in pursuing—as in carrying out—negotiations for nuclear disarmament. Ford's parsing of words literally deprives Article VI of meaning as he seeks to exonerate the United States for its failure to act in good faith.

Ford is predictably also dismissive of the 13 Practical Steps for Nuclear Disarmament that were adopted by consensus in the Final Document of the 2000 NPT Review Conference. He argues, "Structurally, contextually, and grammatically ... the 13 Steps amount to no more than any other political declaration by a convocation of national representatives: their statement of belief, at that time, regarding what would be best." Since the United States has also been dismissive of the 13 Practical Steps, Ford is certainly in line with U.S. policy on this point.

The 13 Practical Steps call for, among other things, ratification of the Comprehensive Nuclear-Test-Ban Treaty (CTBT), applying the principle of irreversibility to nuclear disarmament, conclusion of START III, preserving and strengthening the Anti-Ballistic Missile (ABM) Treaty, and "[a]n unequivocal undertaking by the nuclear-weapon States to accomplish the total elimination of their nuclear arsenals leading to nuclear disarmament to which all States parties are committed under Article VI."

The United States has, in fact, failed to ratify the CTBT, explicitly not applied the principle of irreversibility in negotiating the Strategic Offensive Reductions Treaty in 2002, failed to negotiate START III with

Russia, withdrawn from the ABM Treaty to pursue missile defenses and space weap-onization, and not made the "unequivocal undertaking ... to which all states are committed under Article VI."

Despite Ford's protestations concerning Article VI and his argument that "the United States has made enormous progress" on nuclear disarmament, the fact remains that the United States still relies heavily on its nuclear arsenal, is the only country capable of leading the way toward a world free of nuclear weapons, and has not done nearly enough to rid the world nor its own citizens of the existential threats posed by nuclear weapons. The United States, for example, has continued to maintain a significant portion of its nuclear arsenal on hairtrigger alert, has sought to develop a new generation of nuclear weapons, has failed to initiate a policy of no first use of nuclear weapons, and in 2007 voted against all fifteen nuclear disarmament measures that came before the UN General Assembly.

From a practical point of view, this means that other nuclear weapon states will continue to rely upon their nuclear arms for what they believe provides for their security. In fact, as the nuclear weapon states continue to rely upon these weapons, other states will choose to provide such "security" for themselves, and nuclear weapons will proliferate, eventually ending up in the hands of extremist organizations that cannot be deterred from using them against even the most powerful states. In other words, while Ford's rationalizations and analysis ("it would be unfair and inaccurate to extend any special Article VI compliance criticism to the United States") may provide comforting justifications for some, they in fact contribute to a sense of nuclear complacency that undermines U.S. security and progress on nuclear disarmament.

It will not be possible to maintain indefinitely the double standards on which the NPT was formulated and which can only be cured by achieving the nuclear disarmament provision in Article VI of the treaty. This will require substantially more effort than pursuing good faith negotiations; it will require actual good faith. U.S. leaders would do well to set aside Ford's approach to papering over U.S. failures to act in good faith with a thin veneer of rhetorical justifications and legal advocacy, and get down to the serious business of leading a global effort to eliminate nuclear weapons before they eliminate us.

David Krieger

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I have read Christopher Ford's ideas on Article VI of the NPT. From the legal point of view, Ford's arguments appear to be attractive and very informative. However, I wouldn't miss arguing with some of the points he raised. But this is not the real issue because I agree strongly with Ambassador Thomas Graham Jr.'s comments on Ford's paper that Article VI "should be viewed largely through the prism of political analysis as part of the NPT's central bargain of nonproliferation in exchange for nuclear disarmament (and peaceful nuclear cooperation referred to in Article IV)." [Graham's comments, as well as Ford's article, are online at the Nonproliferation Review website: cns.miis.edu/npr/index.htm.1

In analyzing Article VI we shall deal mainly with the obligation to pursue negotiations. This entails a discussion of the parties to the obligation to negotiate and the choice of the three areas of negotiations specified in the obligation. In this framework I'll try to respond legally and politically to a number of facets of Ford's article.

It is guite clear that the obligation is incumbent on each of the parties to the NPT. However, the nature of the measures envisaged in Article VI left no doubt that the nuclear weapon states have direct obligations. And in fact the negotiating history of the NPT indicates that both the United States and Russia have admitted their primary responsibility. This responsibility was viewed by the non-nuclear weapon states not only in the context of achieving a more secure world, but also as quid pro quo for the non-nuclear states' renunciation of nuclear weapons. This was a matter of principle. The responsibility of the non-nuclear weapon states is of no less importance. The role of non-nuclear weapon states can be seen not only in exercising pressure on the nuclear weapon states to achieve early and tangible results, but also in their active participation in negotiations.

As to the obligation to pursue negotiations, if I were to agree with Ford's analysis that all that is required is to negotiate in good faith, we could end up going in circles. Negotiations usually aim at reaching an agreement. Article VI, when it speaks of cessation of the nuclear arms race at an early date, is introducing a time frame to these negotiations. "Early date," then, doesn't mean aimlessly negotiating for years or decades. And although "early date" was linked to the cessation of the nuclear arms race, it is transmittable to the other subject matters of negotiations, namely nuclear disarmament and general and complete disarmament. (The "early date" was a contribution made by Sweden

during the negotiation amending draft Article VI language.) Therefore, I agree with the ICJ's advisory opinion that there "exists an obligation to pursue in good faith and bring to a conclusion negotiations leading to nuclear disarmament in all its aspects under strict and effective control." I disagree with Ford that the ICJ exceeded its authority in interpreting Article VI. In answering the question put to the court, it was entitled to examine the NPT, including Article VI as a major international instrument related to nuclear weapons.

In terms of negotiations, we should not miss the Preamble of the NPT with regard to disarmament—and more particularly nuclear disarmament and the achievement of a comprehensive test ban. Highlighting the latter in the Preamble is of great significance, indicating the kind of measure that was badly needed. U.S. ratification of the CTBT would definitely trigger more ratifications, which may bring the treaty into force in the near future.

The raison d'etre of NPT review conferences is to keep the achievements and prospects in the fields of arms control and disarmament under constant review. This is also another indication that nuclear weapon states are expected to make progress in these fields, and not just negotiate. I agree with Ford that there have been many breakthroughs, especially in the area of the cessation of the nuclear arms race. but after forty years of NPT implementation, the record should be more impressive. I was also surprised that Ford did not make any call to launch serious efforts to accomplish nuclear disarmament within the framework of the Conference on Disarmament in Geneva, which has been left idle since the completion of the CTBT in 1996. (And who is at fault for that?)

Lastly, Ford also discussed non-parties to the NPT such as India and Pakistan and their advanced nuclear arms race, which in his view constitutes a great challenge to regional stability and a potential source of catastrophic conflagration. I wish he would have said the same thing about Israel's nuclear weapon capabilities and their impact on Middle East security and stability.

Ambassador Mohamed I. Shaker Vice Chairman Egyptian Council for Foreign Affairs

Christopher A. Ford responds

David Krieger and Mohamed I. Shaker offer more commentary on my article than space permits me to address in detail here. Since I feel my article stands quite well on its own feet notwithstanding their criticism, however, I would encourage readers to reread my piece for what was, in effect, a preemptive rebuttal of these critiques.

For the most part, Krieger's letter simply rehashes a familiar litany of complaints and assumptions by the disarmament community about U.S. policy—my degree of agreement with which Krieger finds axiomatically apparently reputable—and accuses me of "papering over" a policy of disarmament "bad faith" that he assumes, though does not demonstrate, to exist. By contrast, Shaker is on more interesting ground when he picks up Thomas Graham's complaint (15.1, March 2008, pp. 7-9) that I downplay a "political bargain" inherent in Article VI of the NPT.

Both letters, however, reflect and illustrate—though to different degrees—the structural flaw in modern Article VI

debates: the mutually polluting intermixture of policy and legal issues in today's disarmament discourse. The central thrust of my article was not to provide the last word on the public policy challenges raised by the question of disarmament, but instead to point out the intellectual poverty, from a specifically legal perspective, of the disarmament community's conventional understanding of Article VI. I wanted it to be clear what Article VI actually says, what it doesn't say, how its negotiating history demonstrates and explains its lack of concrete disarmament content, and what a sloppy job the ICJ did in its self-appointed excursion into interpreting this provision of the treaty. But mine was at its core a legal analysis, and not more. I deliberately did not address broader issues of disarmament policy, precisely for fear of replicating the confusion—and often sheer genuousness—that characterizes so much of what one elsewhere sees in connection with Article VI.

As a result, Ambassador Shaker is in one sense right to upbraid me for failing, in my article, to address arguments that there is a "political bargain" behind Article VI. Anyone who thinks that I have not addressed such questions at all, however, has neglected to read the remarks I delivered at a November 2007 Nonproliferation Review seminar. (The Review has kindly made these available at cns.miis.edu/cns/activity/071129_nprbriefing/media/071129_nprbriefing_ford_comments.pdf.)

In fact, I believe that the question of disarmament should be a focus for debate in NPT fora and that a strategically stable and peaceful world free of nuclear weapons and other weapons of mass destruction is highly desirable. And I certainly understand that, whether or not Article VI says anything about nuclear disarmament as a matter of

law, the NPT regime might be threatened if non-nuclear weapon states become so unhappy at the failure to achieve complete nuclear disarmament that they refuse to cooperate in ensuring fidelity to the treaty's core of nonproliferation rules.

As I noted many times in my previous position as U.S. special representative for nuclear nonproliferation, if achieving nuclear disarmament is ever to be possible, it will require serious and substantive discussions, of a sort that have yet to occur, aimed at addressing the challenges it presents. The disarmament community needs to understand that moral outrage is, by itself, an inadequate response to the strategic dilemmas faced by nuclear weapons possessors. If disarmament is ever to be seen by national leaderships as a realistic and compelling policy choice, it will need to be "sold" in terms that make strategic sense to these leaders—as an outcome in the real world that is simultaneously desirable, achievable, and sustainable. Some disarmers understand this; many apparently do not.

It is hardly a given that nuclear disarmament can be persuasively shown to be all three of these things. All the same, it is certainly the case that disarmament will remain merely a dream unless and until disarmament debates have progressed further than they have to date. In the context of the issues raised by Ambassador Shaker, however, I suspect that making such advances will require addressing disarmament as a more or less purely policy challenge—that is, without pretending that the drafters of Article VI (or the political determinations of this or that NPT Review Conference) have already resolved every tough question for all time through some kind of legalistic deus ex machina. It is my belief-which, unfortunately, some criticisms of my article tend to reinforce—that far too much time and energy is spent trying desperately to massage "legal" requirements out of Article VI when what we should really be doing is debating these issues on the merits.

As a tool of advocacy literature, accusing one's opponents of "breaking the law" is a powerful argumentative device, and a powerful rhetorical temptation. Nevertheless, when the legal provisions cited in such endeavors provide as little actual support as does Article VI for the proposition that the NPT entails a raft of highly specific disarmament requirements, the effort to squeeze such legal blood out of a textual stone debases the coinage of both legal and policy analysis.

The "legalization" of policy discourse in connection with Article VI impedes our collective ability to have serious policy discussions about disarmament. An obsession with Article VI "legality" makes it harder to engage in constructive debates over the kind of political bargain dynamics identified by Ambassadors Graham and Shaker, diverting attention and intellectual capital away from critical substantive questions about global stability and security, and into pseudo-prosecutorial gamesmanship—not to mention the defensive lawyering such tactics elicit from the opposing party.

At the same time, the "policy-ization" of Article VI legal analysis—to wit, the disarmament community's all-too-common wishful thinking and historical revisionism with regard to the legal import of Article VI—cheapens genuine legal analysis. To treat compliance analysis under the NPT with no more than whatever scant degree of rigor proves useful for scoring policy-political points is to risk sending the message that issues of "compliance" with the treaty are essentially political

determinations—a message that would be gravely damaging to the core nonproliferation rules that are clearly written into the NPT and that remain enormously important to maintaining a safe and sane global security environment.

Accordingly, the ambition of my article was to undertake a kind of mercy killing of conventional jurisprudential wishful thinking about Article VI—not in order to "paper over" anything, but rather precisely in order to make possible the kind of rich and constructive policy debates the world needs to have about nuclear disarmament. To keep wrapping ourselves around the axle of what Article VI allegedly requires is to duck our collective responsibility to figure out exactly what global

security, peace, and stability should require with regard to nuclear disarmament. My article, therefore, aspired to be a wake-up call—a catalyst for a new era of substantive discussions shorn of the sterile legalistic posturing that has distorted international disarmament discourse and distracted us from this great responsibility.

Perhaps my article has not yet succeeded in this. I am grateful, however, that it is being read and eliciting such concern. That, I suspect, is a necessary first step.

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