

CORRESPONDENCE

What Would States Sacrifice For Nonproliferation?

Christopher Paine and Thomas Cochran have produced an interesting variation on an old idea for enhancing nonproliferation by internationalizing the fuel cycle (see “Nuclear Islands: International Leasing of Nuclear Fuel Cycle Sites to Provide Enduring Assurance of Peaceful Use,” 17.3, November 2010, pp. 441–74). In the concluding discussion of their article, they state, correctly, that their idea does not conflict with most other proposals for “multilateralizing” the fuel cycle, including the establishment of an international fuel bank. The lack of conflict, however, means that their idea can in turn be thought of as a plan for realizing the establishment of an earlier proposal for an International Nuclear Fuel Authority (INFA), which has the virtue of already being in law as Section 104(a) of the Nuclear Nonproliferation Act of 1978 (NNPA) and is reproduced in Appendix A of their article.

The idea for an INFA was introduced by Senator John Glenn (Democrat of Ohio) as part of a package of amendments at the October 1977 markup of the NNPA in the Senate Governmental Affairs Committee; the package was designed to make the bill more palatable to pro-nuclear senators who were concerned about industry opposition to the bill’s regulatory aspects. After the amendments were passed, the INFA proposal was placed up front in Title I of the bill to emphasize that the purpose of the NNPA was not to halt nuclear energy expansion, but rather to channel it in ways that would prevent or slow proliferation. It was an attempt to move nuclear development onto a track more closely affiliated with proposals made in the Acheson-Lilienthal Report that nonproliferation scholars recognize as the gold standard for proliferation protection (despite the report’s error of considering plutonium as capable of being denatured).

In the NNPA, the INFA is proposed as an agency that (via *a priori* negotiations, begun by the president, among all concerned parties) is given the authority to enter into fuel supply arrangements involving suppliers and recipients

so as to provide assured supplies of nuclear fuel to countries with good nonproliferation credentials. Though it did not shift ownership of existing fuel cycle facilities, for states that had no fuel cycle facilities and pledged not to seek them—or states that had facilities and were willing to internationalize them under the INFA arrangement—the proposal would have created a reliable substitute for domestically controlled nuclear fuel cycle facilities.

In the vision of Paine and Cochran, the INFA-like body is a lease-holding agency that takes on a broader mandate than proposed in the NNPA, becoming in essence a regulatory body similar to a public service commission in the United States with the ability to certify (or reject) proposed fuel cycle facilities in accordance with internationally adopted standards for safety, safeguards, environmental protection, and nonproliferation in general. In light of this expanded approach, Paine and Cochran provide a new name for INFA, calling it an International Nuclear Fuel Cycle Association, or INFCA. I think it is important to point out that there is nothing in the NNPA language that precludes identifying INFA as INFCA (as long as the NNPA’s phrase “effective international auspices and inspection” is taken to mean arrangements blessed by international agreement to render all fuel contracts via an INFA). Indeed, the agency described by Paine and Cochran, including all of the organizational details they outline (with the exception of the agency name), could actually be established under the authority granted to the president in the NNPA.

For more than thirty years, there has been profound silence on the implementation of INFA. Considering this, one should not be surprised by skepticism as to whether the INFCA idea will have better legs, the case of Iran notwithstanding. Unfortunately, the same fly in the ointment that has bedeviled all past proposals affects the Paine/Cochran idea as well: the unshakeable notion of national sovereignty. The plain fact is that proposals that purport to tell a country what it can and cannot build are

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unlikely to go anywhere if that country believes its security or prestige are on the line. Sanctions have failed to stop Iran and North Korea, just as they failed to stop India and Pakistan earlier. So one must do what is doable to strengthen nonproliferation.

Paine and Cochran postulate that if INFCA enjoys wide acceptance among both nuclear suppliers and customers, then it will be possible to limit new nationally controlled fuel cycle facilities because customers would be under obligation to not purchase supplies from non-certified facilities. Ostensibly this would make it more politically difficult for a country to withdraw from or never join the INFCA, then build a facility and claim it is for civilian purposes even though uncertified. In essence, this is an attempt to move the public proliferation signal to an earlier stage than that provided by a move out of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), and this time, unlike withdrawal from the NPT, sanctions would be automatically attached. But how long would it take for consensus on an INFCA proposal that is a transparent end-run around the NPT to reach the point where it would be a more effective tool for discovering the intentions of others than good intelligence operations? To put it another way, how long would it take for the world's nuclear culture to reach the point where some version of the original ideas of Acheson-Lilienthal have traction?

Traction in this case means a willingness to recognize that a substantial amount of national sovereignty must be sacrificed on the altar of nonproliferation if advanced nuclear technology is to expand safely in a world concerned about nuclear weapons risk. Traction also means having an answer to many legal and policy questions concerning the operation of INFCA that have not been covered by Paine and Cochran, despite their admirable attempt to lay out a detailed plan of organization. Some of those questions were laid out in the US Security and Assistance Act of 2008 (also described in Appendix A of the Paine/Cochran article), which called for a study of the original INFA concept, and which did not get reported out of the Senate Foreign Relations Committee.

Nearly sixty-five years after the Acheson-Lilienthal Report, there still has been no refutation of the report's basic claim that to effectively safeguard against proliferation, no system of inspection and material accountancy can substitute for international monopoly ownership of nuclear raw materials, reactors, fissionable materials, and fuel cycle facilities. Partial internationalization schemes such as INFA and INFCA are designed to deal with a piece of the problem—fuel cycle facilities—that appears more manageable but still harbors daunting issues requiring resolution.

Another interesting proposal to internationalize the fuel cycle in the spirit of INFA and INFCA, but with much more legal detail and issue analysis, was created via a Stanford Law school class project prompted by the passage of the NNPA in February 1978. Shortly after the bill was passed, I received a call from John H. Barton, who was then a professor of law at Stanford, inviting me to lecture to his class on the INFA concept in the NNPA. Barton said he was intrigued by the INFA idea and had begun a class project to evaluate it. The result was a monograph, published later that year and edited by Barton, that laid out many of the policy and legal issues that implementing an INFA would have to address. Unsurprisingly, overcoming sovereignty was one of the issues targeted in the study (which was entitled *Evaluation of an Integrated International Nuclear Fuel Authority*).

Much of the recent activity on the issue of internationalization stems from the push for more nuclear-generated power as a way to address global warming concerns and the fear that nuclear expansion may bring more proliferation. But there is still no clear picture as to what level of sovereignty countries are willing to forego for a higher measure of proliferation protection. Until there is a better understanding of that, prudence dictates that alternatives to fuel cycle activities and to nuclear power itself should receive high priority in establishing policies to stem global warming.

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Disarmament alongside Deterrence

The past year and a half have been especially eventful in terms of issues pertaining to nuclear nonproliferation. In December 2009, the Strategic Arms Reduction Treaty (START) expired; five months later, during what some aptly termed the “Nuclear Spring” of 2010, the Obama administration released its Nuclear Posture Review (NPR) and signed New START with Russia. Since then, we have become acutely aware of the havoc and conflict that politics can wreak when it comes to nuclear treaties: one of the reasons the approval of the resolution of advice and consent to New START ratification was held up in the US Senate is that Republican senators demanded more funding for the nuclear weapons complex.

The 2010 NPR lays out a clear roadmap of funding for nuclear complex infrastructure improvements as well as for nuclear stockpile maintenance and life extension programs. Along with the New START, President Barack Obama also submitted to Congress a ten-year nuclear complex modernization plan, indicating an investment of more than \$180 billion in the nuclear weapons complex as well as weapons delivery systems. For this reason, the arms control community—and the scientists, policy makers, and members of the military responsible for maintaining the nuclear weapons complex—anxiously watched the arduous Senate debate that resulted in the final ratification of the treaty in December 2010.

This balancing act of international arms reduction and nuclear security issues with further funding for the US nuclear deterrent has been at the forefront of the news in recent months, which is why the article “Integrating Nuclear Weapons Stockpile Management and Nuclear Arms Control Objectives to Enable Significant Stockpile Reductions” (17.3, November 2010, pp. 475–89) by Lani Miyoshi Sanders, Sharon M. DeLand, and Arian L. Pregonzer, is timely and interesting. The authors correctly identify, as they put it, that “despite inherent tensions, nuclear deterrence and nuclear arms control have long coexisted as US national security strategies,” and subsequently propose that in future endeavors involving the inevitable

intersection of arms control treaties and nuclear complex modernization, an “integrated approach” would be best. They go on to detail their approach in three sections. First, as a thought experiment, they construct a visual timeline of possible future nuclear arms control agreements, side-by-side with future nuclear complex developments. Next, in an effort to show real-world examples, they take the historical approach, and examine past attempts to synchronize requirements of arms control agreements with infrastructure updates to the nuclear weapons complex. They then set forth their own proposals for more effectively bringing together the moving landscape of nuclear arms control treaty frameworks and modernization of the nuclear complex; they also summarize how their ideas might be discussed as part of the bigger, international picture.

Though it is refreshing to see Sanders et al. making the effort to create a solution to an incredibly complex subject, the authors weaken their case by not making a distinction between *verification* and *monitoring* in arms control. A requisite component of discussions of nuclear arms control treaties and the relevant countries involved is the concept of verification. When a nuclear arms control agreement is referred to as “verifiable,” it means that the language it contains strictly defines the limits on nuclear forces and activities and that it describes how the countries involved in the agreement are allowed to monitor one another’s activities and forces. In other words, arms control agreements themselves aren’t verified; *compliance* with them is verified, and this is achieved via *monitoring*. In short, a verification regime has multiple components; monitoring is but one of these components, and in the general discussion of arms control, the words are not interchangeable.

For example, as part of their central thesis, the authors focus on “verification measures,” when in fact they are actually referring to monitoring technology. Specifically, they say: “Historically, military requirements for creating and sustaining the nuclear deterrent dominated nuclear weapons enterprise planning and

operations. . . . Arms control verification was not a source of requirements for new weapons systems because verification focused on the delivery system rather than on the weapons. Verification measures were assessed in the context of their impact on operations and security and were accommodated within the existing nuclear weapons enterprise system. This may not be sufficient in the future" (p. 476).

Later in their paper, they propose "a more flexible enterprise that would be compatible with multiple arms control outcomes and also would benefit the nuclear weapons enterprise in the near term," and give examples of three possible strategies, including "warhead monitoring," using the example of the Warhead Monitoring Technology Project (WMTP). Their reasoning is that "If future treaties include warheads themselves as treaty-accountable items, for example by requiring declarations of stockpile sizes or by requiring monitoring of warheads in storage or during the dismantlement process, then there would be a much greater impact on the National Nuclear Security Administration (NNSA) complex in the Department of Energy" (p. 482) and will hence require closer integration with activities at the nuclear complex level. They use the WMTP field trials from the late 1990s through the early 2000s as an example of successful warhead monitoring, but again, in trying to make their case, they confuse verification and monitoring.

Despite the blurring of the lines between verification and monitoring, the authors' examples of development of better weapons monitoring technology underline the larger point that the limits in arms control treaties are part of a complex synergy: they are defined based upon what our technology can monitor, and technologies are in ongoing development based upon the potential limits of an arms control treaty. If future treaties do, indeed, require individual warhead monitoring, and limit actual stockpile numbers, then the verification regime would most likely focus on monitoring warhead storage areas; therefore, the authors' "warhead monitoring" proposal is perhaps the most practical of the three they propose. The other two proposals involve modifying actual nuclear complex infrastructure as well as life

extension programs (LEPs) to anticipate treaty requirements. These ideas are interesting; however, infrastructure and LEP integration with arms control goals are a distraction from the central focus of arms control treaties, which is the reduction of warhead numbers. In other words, the authors would do well to focus on one thing at a time. Begin by being very clear on what constitutes a treaty's monitoring requirements, and then go from there.

Regarding the recent convoluted political battles over the nuclear complex budget and New START, a friend of mine wryly remarked, "What? There's a *treaty* involved here?" The ultimate strength of the article at hand is that the authors ask readers to take a step back from the policy and the politics of arms control and take a good look at how we might streamline and simplify things at a more mechanical, basic level. They ask us to think about treaty issues and nuclear complex issues at the same time. Is there a way for the scientists and the military to move in tandem with the politicians and the arms treaty negotiators? It's an important question; focusing on forging ties between an anticipated arms control treaty's verification regime and its related monitoring requirements is a simple, direct approach, and one well worth considering.

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***Lani Miyoshi Sanders, Sharon M. DeLand
& Arian L. Pregonzer respond***

We are pleased that our article prompted such a thoughtful and insightful letter to the editor. The past year was indeed eventful and dynamic in terms of nonproliferation, arms control, and nuclear strategic planning. Ratification of New START is especially noteworthy in that the 2010 Nuclear Posture Review positions New START as the last bilateral agreement on strategic nuclear warheads; future bilateral agreements are intended to address total stockpiles, including non-strategic and non-deployed nuclear warheads, and will likely need to address new and significant verification challenges. As a result of

existing asymmetries in capability and numbers (for example, production capability vs. number of non-deployed warheads vs. number of non-strategic warheads), new and difficult trades may need to be negotiated in the future, with little precedent as a guide. Multilateral nuclear arms control will also pose entirely new challenges, and may not focus on numerical limitations in the near term.

Therefore, we do not agree that exploring technical measures focused beyond warhead monitoring “is a distraction from the central focus of arms control treaties, which is the reduction of warhead numbers.” The thought experiment elucidated in our paper hypothesized that the scope of future treaties could shift into new areas, particularly as limitations on total stockpiles are likely to bring discussion over production and dismantlement to the forefront. Monitoring and transparency of nuclear weapon complexes and infrastructure may be included in future bilateral treaties and could also be a first step in multilateral arms control. Technical approaches to warhead monitoring may be necessary, but not sufficient, for verification of such future treaties. Given the planned investments for modernizing the nuclear weapons complex, we believe that it is essential to consider possible

future requirements for monitoring and transparency during the design process, rather than waiting until such requirements are imposed.

Page van der Linden also notes the importance of the distinction between verification and monitoring in arms control. Her point is well taken. Our intention was to discuss technical monitoring (which is itself distinguished from monitoring technology) as part of an overall verification regime. We would also note that technical monitoring could be useful for providing transparency or for implementing confidence-building measures in the absence of formal arms control treaties.

We hope that our article and this subsequent exchange prompts additional discussion among those responsible for nuclear arms control and those responsible for assuring the safety, security, and effectiveness of the US nuclear deterrent.

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