PATRICIA LEWIS

Verification, Compliance, and Enforcement

The Adelphi Paper *Abolishing Nuclear Weapons* will play an important part in the whole nuclear disarmament initiative that was kicked off in 2007 by a combination of the Hoover Institution and Nuclear Threat Initiative's "Reykjavik Revisited" project; the Kissinger–Nunn–Perry–Shultz op-ed articles in the *Wall Street Journal*; Margaret Beckett's keynote address at the Carnegie International Nuclear Non-Proliferation Conference; and the Seven-Nations Initiative led by the United Kingdom and Norway. Drawing on efforts from previous decades—particularly work carried out in the mid-1980s to mid-1990s by the Verification Research, Training, and Information Centre (VERTIC); the Stockholm International Peace Research Institute; the Natural Resources Defense Council; and the Union of Concerned Scientists, among others—George Perkovich and James Acton have woven a strong fabric of possibility for the eventual elimination of nuclear weapons without glossing over the difficult problems that have yet to be solved.

The key aspect of this paper is that it doesn't try to solve all of the problems. The paper instead addresses some of the most controversial issues pertaining to global nuclear disarmament and lays the foundation for building a stable structure for future global security.

Not least of these issues are verification, compliance, and enforcement—the Golden or Bermuda Triangle of issues, depending on your perspective. This commentary will focus on them.

The three issues are intertwined in a perpetual embrace. Without information provided by verification, the determination of compliance or noncompliance of nuclear disarmament treaties will rest solely in the hands of a few (one? two? three?) national intelligence agencies—and the consequences of that approach are still fresh. The lessons from the hunt for weapons of mass destruction (WMD) in Iraq in 2003 should at the very least teach us that treaty obligations and intrusive verification, supplemented by information obtained through open sources and intelligence gathering, form the best, albeit not perfect, basis for holding states accountable. Without law, without impartial evidence, there can be no chance of enforcement. And without enforcement, the whole web of verification deterrence against the spectrum of possible infringement would have little meaning and the rule of law would be undermined.

Having said that, verification measures—however stringent, effective, or confidence-building—are no panacea. The evidence obtained from verification regimes rarely gets weighed in a court of law; instead, it is dealt with either in the various communications media and the political environment of a treaty body or in the United Nations Security Council. Coming to agreement in such environments when the evidence is overwhelming is hard enough; when the evidence has differing interpretations, decision making is fraught and enforcement is patchy—as every potential violator knows. Indeed as the authors astutely observe, enforcing a prohibition on nuclear weapons cannot escape the shadows cast by history.

In chapter 2, in which the authors deal with verifying the transition to zero nuclear weapons, the paper observes that verification is the means to an end, not an end in itself. The end is compliance and enforcement. However, to say that verification imperfections—of which there will be a few—could be offset by more robust enforcement mechanisms seems to miss the lesson of history: that, with the notable exception of 1991 in Iraq, the process of verification, from detection to identification of noncompliance, has so far been more robust than the enforcement mechanisms set in place. The issues of verification standards and practices and what might be called fine-scalpel verification standards—not an overall approach to verification adequacy but an approach in which key high-risk, high-consequence activities are monitored more closely and with a higher verification demand than low-consequence activities—need extensive investigation, experimentation, and analysis. Such an approach would be mindful of cost-effectiveness and would be aware of diminishing returns in verification practice and the dangers of high rates of false positives. The authors welcome the UK's proposal to bring together experts from the

nuclear-weapon states' laboratories as a good place to start, and indeed it is. One can only hope that the UK's efforts are being supported by the other four states that acknowledge possessing nuclear weapons and that the outlier states are paying close attention.

Verifying Zero

In approaching the crucial question of what constitutes complete nuclear disarmament, the authors refer to a range of end states. At one end of the range of outcomes is the complete dismantlement of the warheads, the delivery vehicles, and the nuclear weapons infrastructure including experimental capabilities, as well as the disposal of fissile material—all done under stringent safeguards.

Another end state, albeit a more temporary state, would be somewhat less than that: a period in which some capability is retained, perhaps to reconvene a weapons program, perhaps even some small residual hedging cache. In the end, though, that hedging state will either diminish down to true zero over time or it will creep or even spiral back up to a new nuclear-armed world, probably with different players. Therefore, the only worthwhile scenario to consider in designing a verification plan is that of complete elimination in the end—however difficult that might be to achieve and however long it may take.

The "standard model" for verification of elimination is sketched out in the paper, representing, with minor variations, the broad consensus on what is needed. First would be detailed declarations of nuclear possessions: where, what, how many, and so forth. All significant items would be counted, sealed, tagged, and recorded—not unlike the groceries in a supermarket, although, we can only hope, with fewer opportunities for shoplifting. Perhaps a more apt comparison would be manufacturers' identification marks on firearms or import-export codes on cars. Random sampling would be used to establish confidence in this identification and securing stage, and a robust chain of custody would be established to guarantee security. Many established technologies and methodologies exist for this stage in the process. Managed-access techniques are in common use, and procedures ranging from preventing the transmission of sensitive information, to sending in international inspectors are either in everyday use or are under development; witness the UK–Norway collaboration under the Seven-Nations Initiative.

When it comes to dismantlement of warheads and disposal of their sensitive materials, the verification procedures are far less worked through. Warhead dismantling itself is a common procedure that has been

undertaken routinely for maintenance purposes for several decades in each of the states that have possessed nuclear weapons. Verification of this stage by outside inspectors, however, would be a departure. Because of the opportunity for gleaning design information in the dismantling of warheads, the procedure would have to be conducted without the scrutiny of outside observers. Automatic, in situ remote sensing could substitute, if coupled, when practical, with sealed containment, input and output monitoring, and material balancing and witnessing of the nonsensitive procedures. It is certainly possible to verify the dismantling of nuclear warheads in this manner, although there would have to be a great deal of experimentation and practical demonstration to be able to bridge unforeseen monitoring gaps and to iron out inevitable glitches.

The paper discusses in some detail the idea of "information barriers" as a solution to the warhead authentication problem, in particular, the pros and cons of "attribute verification," in which sets of characteristics define the warhead and are monitored, and "template verification," in which the scrutinized warhead radioactive spectrum is compared with a template spectrum. Much work remains to be done on this technically tricky aspect of the verification chain. In addition to the UK–Norway practical work, other nuclear-weapon and non–nuclear-weapon states could be paired, such as the United States and Australia or perhaps France and Switzerland. China and Indonesia would make an interesting pairing, and Russia and, say, Kazakhstan could do some very useful work.

Past production and nuclear archaeology is probably one of the thorniest problems that lie ahead in the road to nuclear disarmament. Forensic techniques cannot entirely eliminate uncertainties but can help reduce them, perhaps enough to establish confidence. Measurement error may prove to be both a technical and a political problem. When dealing with large quantities of material, quite normal, reasonable, and accurate measurements can lead to what might appear to be significant uncertainties in the quantities they represent. A fascinating table depicting the results of exercises between the United Kingdom and the United States shows that the material that is unaccounted for could lead the uninformed reader to believe that tons of plutonium and uranium were missing rather than a result of unavoidable uncertainties that account for a small share of production. There's a high likelihood that such calculations could lead to confusion, at best, or even malevolent interpretation.

Such difficulties in accounting for past production in the nuclear disarmament process present a strong case for the importance of a ban on fissile material for the production of weapons. The issue is so important,

particularly when getting down to low levels of nuclear weapons and eventually to zero, that states need to find a way to include past production and stocks in the deal over a Fissile Material (Cutoff) Treaty, or FM(C)T. This could be done either as part and parcel of an FM(C)T or as a separate deal such as the proposed Fissile Material Control Initiative or as the WMD Commission's proposal for a Fissile Material Confidence-Building Measure (FMCBM).

The authors cover the issue of challenge on-site inspection in some detail. While there is a tendency these days for such inspections to be seen as not particularly useful, their verification deterrence quotient is not to be trivialized. In addition, the willingness to be subjected to such inspections is a serious indication of good faith and therefore a useful confidence-builder.

Diversifying Intelligence

The role of national intelligence gathering and analysis requires a great deal more evaluation. Considering the catastrophic 2003 war over Iraq's "clandestine" WMD supposedly possessed by Saddam Hussein's regime, and all the damage that has been done to so many people, a whole territory, and the institution of the United Nations as a result, forgive me if I appear more than a little skeptical of the trust that is placed in national intelligence gathering. It is not that there is no role; indeed, quite the reverse. My problem is that information gleaned from national intelligence gathering—perhaps because of the secrecy involved—is usually assigned more weight (not to mention glamour and excitement) than information obtained through thorough on-site inspection. This is a dangerous tendency when security is involved. We can all come up with several good examples of when open source information was of higher quality and greater accuracy than official, top-secret intelligence. The experience in Iraq of the United Nations Special Commission and its successor, the United Nations Monitoring, Verification, and Inspection Commission, is that on-site inspections are in fact a very good way of obtaining information. The problem is that we did not understand that well at the time, in part because the verification information stream was often at odds with received wisdom and governments chose the latter because of its sources. The fact is that as many independent streams of information as possible are needed on such matters. Those responsible for analyzing security information must be as wary of false triangulation as they are of complacency in inspection strategies and mindless group-think. Open source, investigative journalism, on-site inspections, reports by nongovernmental organizations, human intelligence, overhead imagery, and so on are all valid forms

of information that can lead to increased understanding of a situation and thus to increased security. I would argue strongly for keeping the information lines as clean and independent as possible, so that for those with open inquiring minds, there are truly independent sources of information from which to make better judgments.

Civil Society Monitoring

On the subject of civil society monitoring, it is quite clear that the nuclear disarmament community is way behind the curve. The debate seems to be stuck in the 1980s discussion of whistle-blowing and the ability of citizens to come forward with information. It is as if nobody has read the Landmine Monitor or the BioWeapons Prevention Project's BioWeapons Monitor or the work done by VERTIC on nuclear testing or the Small Arms Survey or the International Committee of the Red Cross on the Convention on Cluster Munitions or the Institute for Science and International Security on the use of satellite imagery. Rather than go through the whole set of experiences in civil society that demonstrate the strength of that sector and its experience over more than a decade to monitor, verify, report, and act on treaty compliance, I shall instead point the interested reader to a series of books and analyses by the Disarmament as Humanitarian Action project of the United Nations Institute for Disarmament Research. Part of the learning from that project has been the issue of bringing cognitive diversity into arms control problem solving, finding new levers to pull to achieve compliance (such as the Norwegian ethical investment policy), and so on. There is much to learn from other disarmament processes, particularly those that have been steadily making progress over the past decade while nuclear arms control stagnated.

How to Pay

On costs and who should pay, Susan Willett's analysis has clearly shown that the costs of disarmament, including verification, should be part of the birth-to-death life cycle of the nuclear weapons themselves.[1] Just as with any large-scale, dangerous and potentially polluting industry (the nuclear energy industry, for example, or automobiles or refrigerator manufacturing), the costs of decommissioning are seen as part of the whole technology and the responsibility of the manufacturer and operators. In most countries, a car buyer pays a tax that covers the eventual demise of the car and the cost of hauling it away and crushing into a cube. When a nuclear power plant is commissioned, factored into the commissioning

costs are the costs of waste management and of the plant eventually being shut down and mothballed. Why isn't this done with weapons? Actually, it already is. As Willett showed, all nuclear weapons reach the end of their lifetime at some point and are then decommissioned by the government as part and parcel of the costs of routine stockpile management. Disarmament treaties merely increase the speed at which that happens. There is a marginal extra cost for the increased storage of materials and also for verification. As with the "polluter pays" principle, those costs should be shared by the defense departments that commissioned the weapons and the contractors that built the weapons. In addition, Willett studied the opportunity cost of nuclear buildup and the savings of nuclear disarmament.

Consistent Enforcement

Finally, on enforcement, there are no easy answers. Clearly the authors came to the same conclusion as others who have studied some sort of automatic enforcement or a scale of reprisals for noncompliance: that in practice it just would not work. Real-politics and unique circumstances will always prevail in such fraught processes. How to ensure some form of consistency and effectiveness in enforcement is perhaps the greatest challenge in nuclear disarmament. Recent experiences in Iraq, North Korea, Iran, Libya, and Syria demonstrate a woeful lack of consistency. Non–nuclear-weapon states cannot help but be perplexed in knowing how to interpret such widely varying actions, with their limited (or lack of) effectiveness.

Just by asking the questions and attempting to answer them, George Perkovich and James Acton have done the world a great service. We are way overdue in getting this disarmament ball rolling again toward the elimination of nuclear weapons, and this paper has at least given the venture a serious push in the right direction.

Note

[1] Susan Willett, *Costs of Disarmament—Rethinking the Price Tag: A Methodological Inquiry into the Costs and Benefits of Arms Control* (Geneva: UNIDIR, May 2002).