CHAPTER FIVE

Hedging and Managing Nuclear Expertise in the Transition to Zero and After

Even if the nuclear-armed states were to destroy their nuclear weapons, raze their weapons complexes to the ground and submit their fissile material to IAEA safeguards, they would still, by dint of the expertise of their weapons scientists, engineers and process workers, retain a much greater ability than other states to manufacture nuclear weapons. Some nuclear hedging—that is, retention of a capability to reverse the renunciation of nuclear weapons—would be inevitable. Postures might be relatively 'passive', with lead-times to nuclear-weapons re-acquisition of at least several months (rather than a few weeks), but would represent hedging nonetheless.

It is possible that hedging might be seen as an important element of an enforcement regime, at least for a transitional period. Even if states made dramatic progress in devising the reliable verification mechanisms and robust enforcement procedures necessary to enable secure nuclear disarmament, nuclear-armed states—and states that have found security through extended nuclear deterrence—might insist, at least for an intermediate period, on retaining the capacity to reconstitute nuclear arsenals. The desire to hold on to some such capacity is likely to be at least as strong in democracies as in non-democracies, with opposition parties and lobby groups in democracies liable to challenge any government that appeared ready to agree to eliminate the last nuclear weapons. It would be easy for opposition groups to exploit public wariness about disarmament by

decrying the absence of a robust capability to reconstitute nuclear forces rapidly; governments might well be inclined to pre-empt such criticisms by making reconstitution capabilities a condition of agreeing to multilateral disarmament. It is no accident that the only country to have eliminated a home-made nuclear arsenal, South Africa, made this move in secret. The states that abandoned their nascent nuclear-weapons activities after 1970 also did so without democratic debate, with the partial exception of Brazil.[1] Judging from past experience, nuclear-weapons laboratories and their patrons would probably also be inclined to push to retain extensive technical and human infrastructure, whatever the strategic pros and cons. Once one nuclear-weapons state insisted on hedging, others would either follow suit or refuse to complete the elimination of their arsenals.

In this chapter, we consider the problems of the transitional phases shortly before and after the last nuclear weapons in national arsenals are dismantled. We discuss the desirability or otherwise of hedging, and consider how nuclear know-how could be managed—an issue that will need to be addressed whether or not hedging is ultimately deemed to be desirable. The management of nuclear knowledge has not received much attention in the past, but it is a subject that would need to receive adequate consideration before nuclear disarmament were undertaken—not least so that after disarmament were completed, the former nuclear-armed states could not be accused by the non-nuclear-weapons states, or each other, of retaining illicit capacity in the form of expertise.

An internationally controlled nuclear deterrent and/or retaliation force?

Because of the difficulties associated with the final leap from low numbers of nuclear weapons to zero and the possible danger of a break-out attempt, the international community would need to consider how it would confront a state that had illicitly retained or acquired nuclear weapons in a world that was otherwise free from them.

Several authors have suggested that, as the nuclear-armed states moved towards zero, they should hand control of some or all of their nuclear weapons over to an international body (which would require an amendment to the NPT or the subordination of the NPT to a nuclear-weapons-prohibition treaty). The concept is that the weapons thus deposited would help to deter any nuclear-armed state from seeking an advantage by refusing to give up its last few warheads, and other actors from seeking to acquire nuclear-weapons capabilities. The international body would have the authority to use its nuclear weapons, but only in the most extreme of circumstances.

The detailed model proffered by US analyst Roger Speed involves the creation of an international nuclear deterrent force in stages.[2] Initially, states that possessed nuclear weapons would retain them in small numbers, but would cede decisions about their use to the international authority of the UN Security Council. Authorisation of use could only be given by a majority vote of the Security Council, with its permanent members at this point retaining the power of veto. (Speed's proposal was made in 1994 and did not incorporate India, Pakistan and Israel.) At a final stage, the states possessing nuclear weapons would transfer their remaining arsenals to an international nuclear deterrent force, taking them beyond national control. The operators of the international force, reporting to the Security Council, would maintain these forces and manage their targeting.

Setting aside operational details, which would be exceptionally complex to negotiate, the central problem of this proposal is plausibility. In a world of competing nation-states, it is difficult to envisage any nuclear-armed state handing over control of its nuclear weapons to an international body. Speed argues that an international nuclear force would be retained only to 'deter and possibly retaliate against an outlaw state that has covertly hidden or developed nuclear weapons', and that for this specific function, the permanent members of the Security Council would surrender their veto powers. But regardless of whether or not the veto were retained, each disarming state—including India, Pakistan and Israel—would almost certainly demand an equal voice in any international body managing a centralised arsenal. Many non-nuclear-weapons states might baulk at the idea of internationally controlled nuclear weapons. They might worry about the command-and-control arrangements for such weapons, and fear that, unlike national governments, an international body would actually use them. Others might have the opposite concern—that an international body would be so unlikely to use nuclear weapons that their deterrent value would be lost, making its possession of them pointless.

A truly internationally controlled nuclear deterrent force would only be feasible—and, indeed, desirable—if the eight nuclear-armed states had such mutual confidence that they would be willing to hand control of their nuclear arsenals to other actors and, in the case of the P5, to give up their exceptional power of veto in international-security decision-making. This would be a world in which the perceived need to hedge against uncertainties in the international-security environment had been so reduced that almost all the problems for which nuclear weapons are supposed to be a solution would have been resolved. Because this is an exceptionally distant

prospect, the hedges that the nuclear-armed states would be likely to seek instead would be national 'virtual' arsenals or 'surge' capabilities, to which we now turn.

Weapons reconstitution: virtual arsenals and surge capabilities

A more likely hedging scenario than an international nuclear deterrent force would be one in which states retained some capabilities to reconstitute nuclear weapons to deter or retaliate against break-out. Famously, in 1984, US journalist and nuclear analyst Jonathan Schell made a detailed case for 'virtual' nuclear arsenals, or 'weaponless deterrence', as he called it.[3] In his proposal, nuclear-armed states would keep the capability to produce nuclear weapons at very short notice (for instance, in a matter of weeks), instead of the weapons themselves. To enable this, the nuclear-armed states would maintain stockpiles of fissile material, trained workers and production facilities on the point of readiness. In the event of a break-out, the 'virtually' nuclear-armed states would be able quickly to reconstitute their nuclear arsenals in order to oppose the aggressor. Many different models for a reconstitution capability can be imagined, depending on exactly which facilities, materials and personnel the nuclear-armed states were permitted to keep. These factors would affect the amount of time required to produce a (presumably small) operational nuclear force. The minimal capability required for more passive hedging postures, in which the lead time was months rather than weeks, might be termed a 'surge capability'. The exact details of any reconstitution capability would of course need to be specified in negotiations.

The existence of virtual arsenals with a short lead-time might help to deter break-out. If deterrence failed, real nuclear weapons could be reconstituted in an effort to realign the strategic balance. Short-lead-time virtual arsenals might also prevent a proliferation free-for-all, by making it less likely that the allies of erstwhile nuclear-weapons states would seek to acquire nuclear weapons. Because of their longer lead-times, however, it is not clear that surge capabilities would also have this effect.

One possible advantage of legitimising virtual nuclear arsenals or surge capabilities would be that it might make the nuclear-armed states more willing to pursue disarmament in the first place. Indeed, US Special Representative for Nuclear Non-Proliferation Christopher Ford stated in 2007 that 'the potential availability of countervailing reconstitution would need to be a part of deterring "breakout" from a zero-weapons regime'. Ford also remarked that 'this possibility has been incorporated explicitly

into US nuclear weapons planning as a way to provide a "hedge" against a technical surprise or geopolitical risk'.[4] The assumption of a hedging option has contributed to the willingness of the US to reduce its—still enormous—nuclear arsenal. The security logic behind reconstitution capabilities and the political motivation to make sure they existed would be even more powerful if the US were thinking seriously about joining or leading a global effort to eliminate all nuclear arsenals.

Virtual nuclear arsenals are, nonetheless, a controversial idea. There are feasibility questions: given that weapons establishments are worried even today about the loss of expertise and the difficulty of recruiting and retaining skilled staff, for how long would they be in a position to deploy the human, financial and technical resources necessary to maintain effective virtual nuclear arsenals in a denuclearising world? Might virtual arsenals be vulnerable to attack, including from the conventional arsenals of an advanced military power? For Schell's concept of weaponless deterrence to work, it must be effectively impossible for one state to destroy another's nuclear-weapons complex. Schell envisages that, in the event of rearmament, nuclear-weapons-production facilities could be dispersed to reduce their vulnerability. However, he also argues at other points that intrusive inspections would be required to ensure that these facilities were not being used to produce nuclear weapons. Such inspections would necessarily reveal the facilities' location, potentially making them vulnerable to destruction by an enemy before they could be dispersed.

Furthermore, there are reasons to worry that virtual nuclear arsenals would foster instability. Schell sees virtual arsenals as a way of preventing the use of nuclear weapons by giving states some degree of genuinely flexible response to major threats. The problem with giving states this option, however, is that they might use it. For instance, during a crisis, a virtual nuclear-weapons state might try to signal its resolve by beginning to reconstitute its nuclear arsenal, which might then provoke a capable adversary, or a belligerent state's security patron, to race to balance it. The potential crisis instability of virtual arsenals has led defence expert Michael Quinlan, for example, to conclude that as a long-term posture, having a few states with modest nuclear arsenals of low political–military salience would give more stable global security than would the existence of only virtual arsenals.

Other criticisms are political. The nuclear potency afforded to disarming states by reconstitution capabilities could undermine the principle of global nuclear equity championed by the many non-nuclear-weapons states dissatisfied with the current nuclear order. Moreover, for many

states, nuclear disarmament is not only about equity in an abstract sense, it is also a practical means of reducing the relative power of the US to intervene unilaterally or in small coalitions of its allies and friends around the world. For others, an objective of disarmament is to lessen Russian and Chinese regional assertiveness by removing the emboldening power of their nuclear weapons. In one sense, virtual arsenals would be consistent with the formal abolition of nuclear weapons, and states would no longer be able to use such weapons at very short notice. However, given that the whole purpose of the substitution of virtual nuclear weapons for real ones is to maintain some of the latter's deterrent value, a 'virtual' arrangement would probably not be seen as equitable. Furthermore, because the nuclear-armed states could reconstitute their arsenals in days or weeks, disarmament on these terms would hardly be irreversible. On the other hand, virtual nuclear arsenals could be approached as simply another step on the road to 'genuine' abolition (in the same way that the reduction of numbers of nuclear weapons from thousands to hundreds is). Viewed in this way, they might be seen as more legitimate than the possession of actual arsenals, and hence acceptable for some finite period.

Such questions as these can be resolved only through discussion and, ultimately, negotiation. Once again, there is an imperative for genuine international discussion and debate; taking nuclear disarmament seriously means acknowledging that the states that now possess nuclear weapons would probably insist on retaining, at least for some time, virtual arsenals to deter break-out or retaliate in the event of failure to enforce a nuclear-disarmament regime. These states and leading non-nuclear-weapons states should address this issue head on. To facilitate such deliberations and demonstrate their disarmament bona fides, the NPT nuclear-weapons states should task their nuclear establishments with beginning to model what sorts of reconstitution capabilities would make them most secure in a nuclear-weapons-free world, and what verification arrangements would be needed to ensure that real nuclear weapons were not being produced. The modelling should look beyond unilateral considerations (which are currently the main focus of research in the US) and explore multilaterally what sorts of reconstitution capabilities states would find tolerable in each other, and more or less stabilising. Non-nuclear-weapons states should encourage such modelling and discussions by publicly recognising that states that participate are taking an important step to comply with their disarmament obligations.

Managing residual know-how

Even if reconstitution capabilities were ultimately agreed to be undesirable, it would be inevitable that inequalities between former nuclear-armed states and non-nuclear-weapons states would exist in a nuclear-weapons-free world for at least some time after nuclear weapons had been abolished. Dismantling nuclear weapons and destroying their associated infrastructure would not destroy the nuclear know-how that nuclear-armed states currently possess. It would be impossible to conclusively verify that states had not retained some sensitive documentation, just as it is impossible now to verify the extent of the distribution of the nuclear-weapon designs sold by the A.Q. Khan network. In any case, much nuclear knowledge is embodied in scientists, engineers and other workers.

As destruction of the knowledge embodied in people rather than documents would not be possible—at least, not without committing gross violations of human rights—the knowledge of former nuclear-weapons workers would need to be managed in some way. One aspect of verification that would be peculiar to the transitional period would be verifying the activities of these workers. Many scientists are likely to continue their careers in civilian research establishments, and monitoring their publications would be a useful first step. More intrusive monitoring would provide added reassurance that nuclear-weapons designers and engineers had not resumed their old careers, but this would conflict with privacy rights. What could be done about process workers trained in how to fabricate nuclear weapons and their components? Would their activities need to be monitored, and, if so, how would this be done practically, and without harm to civil liberties? Measures discussed earlier that would make it an international crime for individuals to contribute to the proliferation of nuclear weapons and which would require states in a nuclear-weapons-free world to legally oblige citizens to report evidence of a violation to an international body might help to deter individuals with sensitive expertise from participating in break-out schemes. These are issues that would require careful international examination as part of any serious movement in the direction of nuclear disarmament.

Nuclear know-how would be even more difficult to manage if reconstitution capabilities were retained. But if and when states reached the point where they decided no longer to employ cadres of nuclear-weapons experts, the problem of lingering nuclear know-how might not last indefinitely. There is evidence to suggest that 'tacit' knowledge—in the words of sociologists Donald MacKenzie and Graham Spinardi, 'knowledge that