SPECIAL REPORT

ASPI

March 2010 — Issue 29

ASPI
AUSTRALIAN STRATEGIC POLICY INSTITUTE

Nuclear weapons

Arms control, proliferation and nuclear security

by Rod Lyon

Over the past year, the issues of nuclear arms control and disarmament have returned to a much more prominent position in global strategic debates. President Obama's speech in Prague on 5 April 2009 calling for a range of nuclear arms control measures and—ultimately—a nuclear-weapons-free world, and his chairing in September of the UN Security Council summit that urged nuclear disarmament, point to a new US effort to quicken the pace of nuclear arms control. The expiry last December of the Strategic Arms Reduction Treaty (START) between the US and Russia has lent urgency to one particular aspect of that effort. And the publication in December of the report of the International Commission on Nuclear Nonproliferation and Disarmament (ICNND), suggests a new wave of optimism among the broader international community that progress is now possible across a range of issues on the challenging arms control agenda. All in all, that agenda currently enjoys a prominence that it has not had since the first half of the 1990s.

That renewed interest in bounding and reducing nuclear dangers seems unlikely to diminish in 2010: the forthcoming publication of the US Nuclear Posture Review, the convening of Obama's Global Summit on Nuclear Security in April, and the meeting of the Nuclear Non-Proliferation Treaty (NPT) Review Conference in New York in May all seem likely to ensure that those issues will remain a priority for policy makers in the months ahead. Moreover, by his early and prominent focus on the arms control agenda, Obama has tied his presidency to political outcomes in this area, so it would be reasonable to expect a prolonged focus on the subject area that lasts well beyond the next few months.

But nuclear arms control remains a dauntingly complex field. This report investigates a range of proposals. It approaches the topic from an important assumption: that arms control and strategy are two sides of the same coin. Both are mechanisms for enhancing security and stability. And that means good arms control is about more than weapons numbers, doctrinal declarations, and signatures on treaties—it fits, and complements, strategic needs. Poorly designed nuclear arms control can leave both its practitioners and the world worse off. This point is captured most succinctly by the opening lines of the US Strategic Posture Review Commission's final report:

> US nuclear strategy begins with the central dilemma that nuclear weapons are both the greatest potential threat to our way of life and important guarantors of US security. A breakdown of international nuclear order would be a catastrophe for the United States among many others. Preservation of that order requires that we work to reduce

> nuclear dangers by effective deterrence, arms control and non-proliferation.[1]

All major issues involving nuclear weapons touch on that 'dilemma'. To discuss nuclear arms reduction agreements, nuclear stabilisation arrangements, nuclear security requirements, nuclear arms modernisation programs, the durability of deterrence and extended nuclear deterrence, the doctrinal positions of the nuclear-weapon states, and even nuclear disarmament itself, engages the dilemma. Nuclear weapons are dangerous; but they are also embedded at the core of current international strategies.

Obama in Prague

That doesn't mean we can't aim for substantial improvement in the stability and security of the nuclear order we currently have. When President Obama outlined his vision of a world without nuclear weapons in Prague, he pointed to a rising tide of nuclear dangers: a world where the danger of nuclear war had receded but the danger of nuclear attack had increased; a world where more nations were acquiring nuclear weapons; a world where black markets traded in nuclear materials; a world where terrorists are determined to buy, build or steal a nuclear bomb; a world where the nuclear nonproliferation regime, the centrepiece of global efforts to contain those dangers, might not hold.

Obama did not claim that the ultimate objective of nuclear disarmament could be achieved easily or quickly. Rather, he suggested the goal might not be realised in his lifetime. (Obama was 47 at the time of the Prague speech. Given current life expectancies in the US, we could reasonably interpret this qualification as meaning that he believes full nuclear disarmament might not be achievable within the next 30 years.) But his list of nuclear dangers is a compelling set of reasons for us to do something rather than nothing: to identify mechanisms that address the problems rather than leave them to fester.

Obama made a range of specific commitments. First, he pledged that the US would take 'concrete steps' towards a non-nuclear world: reducing the role of nuclear weapons in its own national security strategy; negotiating a new strategic arms reduction treaty with Russia, setting the stage for further cuts involving all nuclear-weapons states; moving towards a global ban on nuclear testing, with his administration 'immediately and aggressively' pursuing US ratification of the Comprehensive Test Ban Treaty (CTBT); and seeking a fissile material cut-off treaty.

Second, he said the US would push to strengthen the NPT, which needed more resources and authority to enhance its international inspection regime, and a set of 'real and immediate consequences' for those 'caught breaking the rules or trying to leave the Treaty without cause'. He proposed a new framework for civil nuclear cooperation, including an international nuclear fuel bank.

Third, he proposed a new international effort to secure all vulnerable nuclear materials around the world within four years, and to break up the black markets and illicit trading in nuclear goods. (It was within this section of the speech that he proposed the US host a Global Summit on Nuclear Security within the year.)

The Prague speech outlines an extremely ambitious agenda. Even within the first tranche of commitments, those most directly under Washington's control, outcomes might not be as easy to achieve as some imagine. The difficulties that seem to have delayed repeatedly the publication of the US Nuclear Posture Review suggest, for example, that 'reducing the role of nuclear weapons' in US strategy is not a cut-and-dried process. And finding sixty-seven votes in the US Senate

for ratification of the CTBT will be difficult, especially after the Democrats' loss of the Senate seat in Massachusetts. Most importantly of all, Obama's arms control agenda raises—front and centre—the dilemma to which the Strategic Posture Review Commission has pointed. If we are headed down the path towards zero nuclear weapons, just what does that mean for strategic policies, Australia's included?

Mass war and nuclear weapons

At the risk of compressing a large topic, it might pay to rehearse, briefly, the historical path that led towards the evolution of nuclear weapons. Their invention at the end of World War II represented the zenith of an age of 'massification' of war. In the modern era, that age began with Napoleon, the military leader who designed and built mass armies. Napoleon exploited the conscription possibilities of the French Revolution to bring massed manpower to the battlefield, overwhelming his opponents. Warfare became an enterprise of nations, with increasing proportions of national resources devoted to the effort.

Once the industrial revolution came along, national armies weren't merely large numbers of soldiers with muskets on a battlefield—they were mechanised forces able to fight, and inflict damage, at increasing distances. When whole nations went to war (and not merely armies), industry and commerce were the real sinews of military power, and war quickly spread beyond the battlefield. Distinctions between soldiers and civilians started to break down, for civilians were merely military personnel not yet drafted. Cities became targets for aerial bombardment. The 'mass' wars of the first half of the twentieth century—world wars I and II—were the grandchildren of the Napoleonic model of warfare.

It was a brutal and destructive form of warfare, far removed from the more limited forms of warfare practised in the eighteenth century. Winston Churchill wrote of it in memorable terms after the end of World War I:

> The Great War through which we have passed differed from all ancient wars in the immense power of the combatants and their fearful agencies of destruction, and from all modern wars in the utter ruthlessness with which it was fought. All the horrors of all the ages were brought together, and not only armies but whole populations were thrust into the midst of them ... Every outrage against humanity or international law was repaid by reprisals often on a greater scale and of longer duration. No truce or parley mitigated the strife of the armies. The wounded died between the lines: the dead mouldered into the soil. Merchant ships and hospital ships were sunk on the seas and all on board left to their fate, or killed as they swam. Every effort was made to starve whole nations into submission without regard to age or sex. Cities and monuments were smashed by artillery. Bombs from the air were cast down indiscriminately. Poison gas in many forms stifled or seared the soldiers. Liquid fire was projected upon their bodies. Men fell from the air in flames, or were smothered, often slowly, in the dark recesses of the sea. The fighting strength of armies was limited only by the manhood of their countries. Europe and large parts of Asia and Africa became one vast battlefield on which after years of struggle not armies but nations broke and ran.[2]

The Napoleonic model of warfare opened a path to 'total war'[3], and it did so by pursuit of massification as a strategy for military victory. Nuclear weapons represent one step in that massification model. But they were a critical step, because the power increments that nuclear weapons brought to warfare made

other forms of power coagulation almost obsolete. When a city could be destroyed with a single nuclear bomb, fear of escalation forced conventional military contests into more limited forms.

Nuclear weapons have essentially brought an end to major war between great powers. True, they introduced an era when two superpowers wondered if they could still 'out-mass' each other by sheer numbers of nuclear weapons. That proved to be something of a 'no-brainer' as a strategic contest, although it had important political ramifications as a contest in 'swaggering'. More importantly though, nuclear weapons were used by the United States in the Cold War to underpin a long peace in the global order—an order that deterred great power adventurism, reassured nervous allies who lived in close proximity to possible adversaries, and preferentially played to political and economic strengths by minimising the prospects for military aggression.

And that brings us to a central question: has the need for nuclear weapons to underpin that order now passed? Without the deterring and reassuring characteristics of current nuclear ordering arrangements, would the world return to Napoleonic power contests? The answer to the question is that nobody knows. Global interconnectivity has increased, norms against the easy resort to violence have been strengthened, and dispute resolution mechanisms have been improved since the end of World War II. But similar, earlier periods of 'cosmopolitanism' have occurred in human history: the Western enlightenment, for example, preceded Napoleon; and theories about the obsolescence of war preceded World War I.[4] Strategically, it seems likely that nuclear weapons will exist for some time yet—for exactly the same purposes that they have existed previously.

And there's the core of the dilemma. Nuclear weapons are immensely destructive and dangerous. Their open-ended proliferation would not be healthy for global security. States deploying them need to avoid over-reliance on them in national strategies. Nuclear weapons—and the fissile materials used to make them—need to be kept safe and secure. And—in an age of technological diffusion—it is important to ensure that nuclear weapons do not become available to those who would use them unwisely (and, yes, that can only be a subjective judgment). But the world will not be able to put aside the weapons themselves anytime soon.

So Obama is right that nuclear disarmament is probably a distant objective, rather than an immediate one. By contrast, good arms control is something we should be aiming for now. Arms control measures can ease tensions, improve predictability, enhance crisis stability, curtail arms racing, and prevent wasteful defence spending. It is somewhat ironic, therefore, that arms control doesn't have universal support. Some on the right despair that it tempts nations to base strategies on a mere 'house of cards'.[5] Some on the left worry that arms control always works towards a timid 'middle ground' on issues where there should be no middle ground.[6] Notwithstanding the naysayers, the arms control agenda is a sensible and purposive one.

US Nuclear Posture Review

The forthcoming US Nuclear Posture Review (NPR) will offer the first major indication of how the Obama Administration sees the future of nuclear weapons in US strategic policy. There's no doubt the publication has been the source of considerable tension within the administration. Some media reports suggest earlier drafts were sent back to the Pentagon because they did not mirror sufficiently the commitments of the administration in the arms control field;

others suggest an administration deeply divided over the core nuclear issues.

After Obama's Prague speech, prominent figures in the arms control community have made clear that they expect the document to reflect a substantial shift in US nuclear policy. One commentator, for example, has suggested that this year's NPR should:

- narrow the role of nuclear weapons to a 'core deterrence mission' of deterring the use of nuclear weapons by another country against the US or its allies
- reduce the US nuclear inventory to no more than 'a few hundred' deployed strategic warheads within a few years
- eliminate the need for a 'rapid launch' option in response to a nuclear attack, in order to give national leaders more time to think
- clarify that 'so long as nuclear weapons exist', the US can maintain a reliable and effective arsenal without resuming testing or building new warheads.[7]

In fact, it would require a substantial shift in US policy for the NPR to reflect even one of those positions. Some of those suggestions even stretch the borders of epistemology: how can the US *know* that it will never need to test or build new warheads for as long as nuclear weapons exist?

Still, it is true that in recent years arguments about nuclear weapons have haunted the strategic mainstream in the US, as well as the broader community. The *Wall Street Journal* articles by George Shultz, William Perry, Henry Kissinger and Sam Nunn reflect that increasing fragmentation of the mainstream. As one observer noted in 2007,

> Never before has the U.S. nuclear weapons establishment been so unsettled about its very *raison d'etre* and how it will manage in the future to remain substantially and meaningfully in business...The stage is set for what could be a historic turning point in America's traditional reliance on nuclear weapons to buttress its fundamental national security interests.[8]

In July 2009 two analysts depicted the US nuclear weapons debate as fractured along eight different lines, including whether nuclear weapons would remain important in dissuading potential adversaries, whether arms control agreements helped or hindered, what US nuclear doctrine ought to be, how US nuclear-weapons decisions affected nuclear proliferation, whether it made sense to pursue genuine nuclear disarmament, and whether the expansion of civil nuclear programs was an important proliferation concern.[9] US nuclear-weapons policy has traditionally approached those issues cautiously. How Obama approaches those questions in the NPR will be a key test of his nuclear policies. And how he answers them will have important ramifications for the future of the international order.

Some believe the NPR will be an important influence on how other nuclear-weapons states think about their own nuclear arsenals. It might be. But the belief that other nuclear-weapons states would automatically follow any US lead and reduce the role of nuclear weapons in their own national strategies is probably mistaken. The increasing 'conventionalisation' of the US strategic deterrence forces would be an important determinant of any US decision to reduce the role of nuclear weapons in its policy settings.[10] But not all nuclear-weapons states possess conventional forces capable of prevailing against likely adversaries. Those states worried about their conventional deficiencies would probably find it harder than the US to reduce the role of nuclear weapons in their own national security strategies. Each has its own version of the dilemma to resolve, and their calculations are likely to turn upon

factors more immediate and concrete than the US NPR.

The START timeline

One part of the Obama agenda that does seem clear is the near-term conclusion of a new strategic nuclear arms agreement between the US and Russia to replace the START accord, which expired last December. Still, even that achievement isn't a walk in the park. Issues like ballistic missile defence and missile testing data encryption—issues that have haunted the bilateral arms control arena for many years—still seem unresolved. It is almost certain that Obama and Medvedev will sign off on a follow-on agreement, and that both will see it as being in their own interests to do so before the commencement of the NPT Review Conference in early May. But the formalities of ratification will take longer, and some US senators have promised that their votes might well depend on a viable modernisation program for the ageing US strategic arsenal.

During his State of the Union address, Obama described the follow-on agreement as 'the farthest-reaching arms control treaty in nearly two decades'. But nuclear arms control treaties are typically described in such generous terms. In truth, the treaty limiting offensive strategic nuclear weapons (START) was concluded in 1991 and not much has happened in the strategic arms control field since. Negotiators failed to conclude the START II agreement, and a framework agreement for a START III was likewise abandoned. The 2002 Strategic Offensive Reductions Treaty (SORT) is a 'bare-bones' treaty that requires each side to deploy no more than 1,700–2,200 strategic warheads by 2012, but the agreement is thin in arms control terms: it does not require the elimination of excess missiles and bombers, it relies on the verification measures negotiated for the START treaty, and the warhead ceiling expires on the very day it takes effect. So any new agreement has to be more substantial.

Still, the new agreement won't please everyone. Critics will argue that the numerical ceilings in any follow-on agreement won't cut warheads or delivery-vehicle numbers hard enough. The US and Russia are not engaged in a rush to the bottom. The numbers of warheads proposed in the joint understanding between Obama and Medvedev last July suggests the new accord will limit each country to a band of between 1,500 and 1,675 *deployed*, *strategic* nuclear warheads. (The adjectives here are not irrelevant; both countries have substantial numbers of warheads that are either non-deployed, non-strategic, or both.) The target is appreciably lower than the SORT target, but won't oblige either country to reduce their arsenal to the point where warhead numbers are measured in mere hundreds.

How low can those numbers go over the longer term? The International Commission on Nuclear Nonproliferation and Disarmament recently proposed that global nuclear warhead totals should be reduced from their current level of about 23,000 warheads down to 2,000 warheads by 2025—a reduction of more than 90% in the next fifteen years. The reductions were to be achieved essentially by the US and Russia cutting their warhead numbers down to 500 warheads each, with the other nuclear-weapons states holding about 1,000 between them. True, in terms of possible reductions there are considerable numbers of what we might call 'low-hanging fruit' in the US and Russian arsenals—the legacy of their earlier contest to 'out-mass' each other in nuclear weapons. Reducing the total number of warheads in global arsenals by well over one-half, for example, should be relatively easy to do—it would take time, because of the complexities of actual dismantlement, but wouldn't pose insurmountable strategic difficulties.

But numbers become more important as ceilings get lower. Strategic challenges become more severe. And verifying the numbers set by formal arms control agreements—now barely an issue at all, because of the passing of the Cold War strategic competition, and the amount of 'slack' in uncounted stored warheads—will return as a more important strategic concern.

The problem, of course, is not merely one of arms control and 'counting rules' (those rules that determine which weapons are accountable). The numbers have to make strategic sense. So at least in part—an important part—the START follow-on agreement is a problem of geopolitics. The US still feels the need to deploy a nuclear arsenal commensurate with its global strategic responsibilities. And Russia retains few enough of the power assets of the former Soviet Union that its nuclear arsenal is important to it. During the Cold War days, it was once lampooned as 'Upper Volta with missiles'—an unkind description, perhaps, but kinder than being painted as 'Upper Volta without missiles'. True, the bilateral relationship no longer defines the global order. And the sheer size of their remaining nuclear arsenals offers considerable scope for substantial warhead cuts. But their arsenals aren't just about a bygone era—they touch on each country's vision of its own strategic future.

Moving forward: strategy matters

And that brings us back to a central truth: strategic outcomes matter in arms control. In a recent issue of *Daedalus*, Thomas Schelling, one of the doyens of US strategic nuclear policy, took issue with much of current thinking about a nuclear-free world. Setting himself in opposition to 'the four horsemen of the apocalypse'—Kissinger, Shultz, Perry and Nunn—whose public advocacy of the nuclear disarmament position has attracted considerable comment over recent years, Schelling argued that the world had thought little about how certain strategic imperatives would be affected by drastically reduced arsenals. We would have to beware making the world safe again for major conventional warfare, he noted. Moreover, as arsenals shrank, so too would the target set that the arsenal composes for an adversary, and the ideas of dispersal, redundancy, and survivability that had helped underpin the existing policy would get harder to fulfil. In the world of zero nuclear weapons—where nuclear strategy would turn upon reconstitution capacities—an adversary's target sets would be especially small and concentrated.[11]

Many of the current proposals for both a nuclear-free world, or for 'intermediate steps' towards such a world, lack a compelling strategic narrative about what such a world would look like. The ICNND's proposal for a world of 2,000 nuclear warheads by 2025, for example, doesn't give much of a strategic case about why the figure of 2,000 was chosen, rather than, say, 1,000, or 3,000 or 5,000. A world with several thousand nuclear warheads in it is at least a world that has some strategic ballast. By contrast, would a world of zero nuclear weapons be merely one where nuclear scientists stand nervously poised over production lines to ensure rapid breakouts by strategic competitors do not go unmatched?

Arms control advocates are naturally drawn into thinking that smaller arsenals are better than larger ones. But it is not obvious that there's any direct correlation between the sheer number of nuclear weapons in the world and global security. The size of an arsenal bears on a range of strategic calculations—in particular, on what the owner of the arsenal wants the arsenal to do. The arsenal has to be sufficient to provide credible

nuclear commitment to the protection of vital national interests. For the US, which 'extends' nuclear deterrence to about thirty other countries (including NATO allies, Japan, South Korea, Australia, Israel and Taiwan), the size of its arsenal has to be a credible signal to allies that Washington is prepared to defend their vital interests as well as its own. And even for other nuclear-weapons states that don't extend deterrence, arsenals have to be sufficiently large that they don't tempt adversaries into disarming first strikes, that they signal strategic commitment, that they are tolerant of technological failure, and that they can fulfil the strategic missions that they are meant to accomplish.

Indeed, in terms of strategic stability, some analysts have long argued that the *size* of an arsenal is less important than its *shape*—that is, that warhead numbers are less important than the overall make-up of the arsenal. Certainly the ratio of 'fast-flier' delivery vehicles (ballistic missiles) to 'slow-fliers' (aircraft) is an important determinant of stability. So too is the basing mode of the arsenal, and hence its survivability. National leaders don't have to race to use 'survivable' weapons (like submarine-launched weapons), and that's a good thing—a more important thing, in fact, than the absolute numbers of warheads that are kept 'on alert'.

Do 'no-first-use' declarations help?

Because nuclear arms control can't rest on numerical reductions alone, arms control proponents have long sought some form of shift in nuclear-use doctrines that might make the relationships between the nuclear powers more stabilising. One of the propositions that has attracted interest over many years is the idea that nuclear-weapons states should issue 'no-first-use' declarations, under which they would pledge not to use their nuclear weapons first in a crisis.

The ICNND has recently lent its support to the cause, noting that its 'preferred position', pending the ultimate dismantlement of nuclear weapons, was for all nuclear-armed states to issue clear and unequivocal 'no first use' declarations. The commission observed, however, that in the first instance it might be better to settle for 'a different formulation of essentially the same idea. This would be a declaration to the effect that "the sole purpose of the possession of nuclear weapons is to deter the use of such weapons against one's own state and that of one's allies".'[12]

Regardless of the format they might take, such declarations hold a superficial attraction, because they seem to reinforce the notion that nuclear-weapons states should use nuclear weapons only as a last resort. And the disarmers are especially keen to push nuclear-weapons states down this doctrinal path—because if one country's nuclear weapons exist only to deter another's use of nuclear weapons, and have no other role, the dilemma that complicates the necessary balancing of strategy and safety is essentially broken. In theory, all nuclear weapons could then be thrown away simultaneously.

But at a deeper level, such declarations are conceptually problematic. To contribute meaningfully to strategic stability, no-first-use declarations have to be important barriers to the behaviour of nuclear-weapons states during crises. That is, they would have to reflect a genuine commitment by the nuclear-weapons states to refrain from first use in hard cases—for example, when they are going backwards in a conventional war which affects their own vital interests. But if they are content to refrain from nuclear use in those cases—content to lose at the conventional level rather than to cross the nuclear threshold—why would they have built nuclear weapons in the first place? Indeed, in the only actual case of direct use of nuclear weapons in history, a nuclear-armed

state—tired after years of war—resorted to nuclear use to avoid anticipated high conventional costs during the war termination phase. First use can have strategic appeal in very serious cases when other options are simply unattractive.

Moreover, in a crisis between two nuclear-armed states which looked likely to escalate to the nuclear level, it would typically make strategic sense for the nuclear-weapons state with the less survivable arsenal to fire first. That state faces the 'use-them-or-lose-them' problem in a more compelling form than its opponent—if it doesn't fire first, its arsenal could be severely depleted by its opponent's doing so. Reluctance to fire first, therefore, is more a structural determinant of arsenal 'shape' than it is the product of a declaratory statement—and all nuclear-weapons states know this to be true.

Some say that no-first-use declarations are merely symbolic, meant to underline ritualistic nuclear-weapon-state bonding during good times, and not intended to be actual constraints on behaviour in hard strategic cases. But this is one symbol that it makes little sense to advocate. It is destructive of the relationships of trust on which nuclear-weapons states depend during the difficult strategic moments. Nuclear-weapon states could usefully declare that their nuclear weapons were 'primarily' intended to deter other states' nuclear use—but forcing them towards strict no-first-use declarations is strategically unhelpful.

Rather, we should be encouraging nuclear-weapons states to reinforce the real norms of nuclear ownership: that they regard nuclear weapons as 'special', and not as mere extensions of their conventional capabilities; that they see their principal strategic role as being to deter conflict, not to promote it; that nuclear weapons are weapons of last resort, to be used only in circumstances relating to vital interests; that their use is constrained to defensive rather than offensive scenarios; and that nuclear weapons require special protective measures to ensure their safety and security. All those 'norms' probably sound somewhat minimalist for the more ambitious disarmers. And, truly, they are norms for continued possession, not norms for dismantlement. But those norms are the ones that allow us to live more confidently in a world where nuclear weapons will remain important for decades to come.

The Comprehensive Test Ban Treaty

What are the prospects then for finally bringing into force the CTBT concluded in 1996? It has failed to enter into force, because it lacks the ratifications from the necessary states—forty-four of them—specifically listed in the treaty. The US Senate's decision against ratification (in October 1999) has helped to marginalise the treaty for a decade. And even Obama's pledge that he would push again ('immediately and aggressively') for ratification is still no guarantee that the Senate will vote differently this time around. Indeed, building a consensus for ratification is difficult precisely because of the fracturing in the US nuclear-weapons debate sketched above. And the Strategic Posture Review Commission, set up by Congress to attempt to define common ground across the political spectrum split evenly (six commissioners for, six against) on the issue of whether it made sense to move forward with CTBT ratification.

Senate worries will probably centre on a series of inter-related issues. Is the agreement verifiable? Might it harm the maintenance or impede the modernisation of the US nuclear arsenal? Will it constitute an important technical barrier to potential adversaries? How much momentum towards a safer world is gained by ratification, in exchange for the costs a CTBT imposes? Those are hard questions—and they go to the core of

the 'dilemma' sketched above. The Stockpile Stewardship Program that currently oversees the US nuclear arsenal has so far sufficed to allay concerns about an ageing arsenal. And the Obama Administration has indicated that it is willing to spend substantial sums of money on renovating the US's ageing nuclear infrastructure. But there is a vocal minority opinion in the US that says future testing options shouldn't be ruled out.

The nuclear-weapons states can, in good conscience, sign and ratify an agreement prohibiting further testing only if they believe they do not need—and will not need—new nuclear warheads. It isn't obvious they all do believe that. India, for example, one of those still to sign, might well see a need for future testing. Its 1974 'peaceful nuclear explosion', for example, is widely thought to have achieved a yield of only about five kilotons, substantially below India's claimed yield of twelve kilotons.[13] Its 1998 tests are also surrounded by doubts over weapons effectiveness, especially in relation to the principal test on 11 May of a two-stage thermonuclear device. That device, supposed to provide a yield of 45 kilotons, seems to have encountered problems: a low yield from the fission trigger apparently failed to ignite the fusion stage of the weapon.[14] With its relatively poor testing record to date, and bearing in mind Pakistan's vigorous expansion of its own nuclear arsenal recently, India probably is not ready to forsake the option of future testing.

Proliferation—has the danger passed?

Quick progress on much of the traditional arms control agenda remains difficult. And yet the longer nuclear arms control remains hamstrung by the continuing strategic utility of nuclear weapons, the more other states might decide that such weapons are likely to be a permanent and potent feature of the twenty-first century international order. Such judgments could fuel a new 'wave' of nuclear proliferation. Previous 'waves' occurred in the 1960s and 1980s, and now there's almost a cottage industry of speculation about the proximity of a future nuclear tipping point. A previous ASPI report has argued that just such a tipping point might occur in both the Middle East and in Asia, because strategic balances are shifting in those areas.[15] The nuclear order can only reflect the geopolitical order of the day.

Some might believe that nuclear weapons now represent an antiquated military technology—a technology made redundant by smart, precision-guided munitions and cyber warfare. But the patterns of diffusion of previous civilian technologies give little reason to be confident that we have passed the proliferation zenith in regard to nuclear weapons. David Edgerton's book *The shock of the old* is a powerful reminder of just how durable old technologies can be.[16] In a world where we are obsessed with technological innovation, it's wrong to think that new gadgets dominate in terms of use. Bicycles still outsell cars around the world, and neither could be called a new technology. So in the civilian space, the take-up rate of 'old' technologies is high.

Still, we do know that it typically takes longer now for a proliferating nation to build the bomb than it took for the first five nuclear-weapons states to do so. The US, Russia, UK, France and China all took between three and eight years from program initiation to the testing of a bomb. For Israel, India, Pakistan, South Africa and North Korea, that time gap varied between nine and fifteen years.[17] Some—like Libya and Iraq—never succeeded, for various reasons. In part, of course, the explanation touches upon state capacities: superpowers and great powers have the resources to proliferate more rapidly should they decide to do so, and the

history of proliferation has been one where superpower and great power proliferators have given way first to regional proliferators, and thence to weak, roguish proliferators.[18] But the lengthening timeline might also show that international barriers to proliferation—technical as well as political—are having some effect. Unlike bicycles, the bomb is not getting *that* much easier to make.

The NPT Review Conference

So, with the demons of proliferation still not tamed, international attention will be focused on the outcomes of this year's NPT Review Conference (NPTRC) in May. When delegates assemble in New York, keeping the architecture of nuclear restraint solid and whole will be a top priority. It is possible, with the Americans now recommitted to a rebirth of the arms control project, that the conference will actually make progress on enhancing the NPT's effectiveness—though even a small number of unhelpful states can slow any such initiatives for the one month necessary for the conference to run its course.

The 1995 conference successfully concluded an indefinite extension of the treaty—a major outcome, but achieved when nuclear arms control was probably at its zenith. The 2000 conference defined thirteen 'practical steps' towards disarmament, most of which proved not to be strategic priorities in the difficult days after 9/11. The 2005 conference ended in rancour and name-calling. This year's conference faces a special challenge: an increasing fragmentation of opinion across much of the nonproliferation agenda. And that means much-needed reform of the NPT itself—now a forty-year old agreement—faces an uphill struggle.

That's a problem. As one critic has noted:

> If we think of the NPT as a dam holding back nuclear proliferation, then the spread of nuclear capacity is like water collecting behind the dam. That tide can only rise, increasing the pressure. The world's safety ultimately depends not on the number of nations that want to build nuclear weapons but cannot, but on the number that can but do not.[19]

If the NPT really is the 'dam' holding back proliferation, we are probably entering an age of troubles. Its wording is often lax, its enforcement provisions weak and its actual record of preventing proliferation only mixed. As one recent assessment concluded, 'widespread adherence to the NPT alone will not suffice to counter fears of nuclear weapons proliferation.'[20] The key problem might well be, as Michael Krepon has observed, that the NPT is simply an ageing structure, in need of major overhaul:

> The Nonproliferation Treaty was designed for an earlier era, before the advent of a single dominant military power, underground networks of nuclear commerce, and terrorist cells seeking nuclear weapons and fissile materials. The Nonproliferation Treaty was far sturdier in a bipolar world when the superpowers could impose discipline when they agreed with each other.[21]

Krepon believes, moreover, that the basic design of the nonproliferation edifice has been compromised, principally by the attempts of the Bush Administration to design a 'second floor' for the building (with an emphasis on counterproliferation, and stopping 'bad actors' from getting the bomb) while rejecting the basic design approach of the 'first floor' (a set of rules and norms that applied to all nuclear-weapons states and included a ban on further nuclear testing). 'The entire structure became wobbly... The Bush administration's...war of choice to prevent nuclear proliferation in Iraq accelerated nuclear programs in North Korea and Iran, which, in turn, accelerated nuclear hedging strategies elsewhere.'[22]

Krepon's assessment possibly loads the blame for the current situation too heavily on Washington's shoulders. If US primacy starts to slip in the world in coming decades, the architectural ageing of the nonproliferation structure seems more likely to quicken than to slow—a sign that more players will have to bring more to the table if the structure is to be salvaged in the future. But he is certainly correct that the nonproliferation effort has become dangerously fractured since the mid-1990s. And it is not clear that any easy remedy is available.

Some critics say the fastest way to bolster the structural integrity of the NPT is for the nuclear-weapons states to disarm. For the reasons presented above, that option is not immediately appealing. It would cast us into an unknown and uncertain strategic future. It wouldn't solve a number of challenges that now confront the nonproliferation regime. And it wouldn't help, for example, with the rising tide of nuclear latency—the set of nuclear skills, materials and possible weapons systems—that now exists around the globe.

Recent analyses of the NPT have suggested a number of ways that the treaty might be improved.[23] Those include, for example, defining more clearly what it means for non-nuclear signatories to forgo the 'manufacture' of nuclear weapons under Article 2. The definition is loose enough now to encourage nuclear hedging whereby signatories can, if they choose, perform a range of weapons-related work without actually 'manufacturing' a bomb. They include, too, extending the commitment already undertaken (in Article 1) by the treaty's nuclear-weapons states not to transfer nuclear weapons or the relevant technologies to other states into a commitment by all signatories not to assist any other state or non-state group to develop nuclear weapons.

Similarly, encouraging universal adherence to the International Atomic Energy Agency's (IAEA's) Additional Protocol, creating international fuel banks, and making the 'inalienable' right of non-nuclear weapon signatories to all the technologies of the full nuclear fuel cycle conditional on actual NPT compliance behaviour would all have the effect of making more difficult the task of any would-be proliferator. Some analysts even argue that Article 10 of the treaty—the article that permits withdrawal in extraordinary circumstances—ought to be changed to prevent any signatory from ever withdrawing. Obama, recall, seemed to suggest a variation of that proposal in his Prague speech, when he suggested there should be 'real and immediate consequences' for those attempting to leave the treaty without cause.

What the treaty also needs is better teeth and eyesight. Enforcement mechanisms are sadly lacking—the responsibility more of the UN Security Council than of the treaty members themselves. Further, the IAEA's record is poor in providing early warning of clandestine nuclear activities. It failed to detect undeclared plutonium separation by Romania in 1985, undeclared enrichment activities by Iraq prior to the Gulf War in 1991, South Korea's enrichment and reprocessing experiments dating back to the 1980s, Iran's undeclared enrichment activities before 2003, and Syria's commenced construction of an undeclared reactor.[24]

But is there a political consensus amongst NPT signatories to head down that path? Spoilers exist within the treaty as well as without. The last three determined nuclear proliferators, Iraq, Iran and North Korea, have all been members of the NPT. A number of countries within the treaty might well anticipate a necessary strategy of nuclear hedging as a possible part of their own future strategic trajectory. And few countries are likely to support changes that might stop them exercising a sovereign right of withdrawal—after all, the treaty reflects strategic choices largely made at the end

of the 1960s, and some might anticipate wanting to revisit those choices in changed geopolitical circumstances.

As the capabilities to proliferate grow around the world with technological diffusion and globalisation, how are we to ensure that nuclear weapons end up only in the hands of those who can handle them responsibly? Putting it in the language of the playground, how do we ensure that nuclear weapons are available only to those who can 'play nice with the other kids'? If nuclear proliferation cannot be halted by diplomatic effort, how are we to ensure that only 'good guys' get the bomb? Thomas Reed and Danny Stillman, in their book *The Nuclear Express*, consider the option of stopping potential proliferators by force—as Israel did when it bombed Iraq's Osirak reactor in 1981. They conclude that the option is only a treatment and not a cure. Like chemotherapy and dialysis, you have to keep up the effort. 'Such attacks would have to be repeated every decade, as the victim's bitterness grows.'[25]

Nuclear security

If the themes of US re-engagement with arms control, and preparing for the NPT Review Conference track over predominantly old ground, the issues of nuclear security are an important new element of the twenty-first century arms control agenda. Obama's call to strengthen security over existing nuclear materials, and use the next four years the better to lock down vulnerable nuclear materials, is especially timely. Indeed, taking into account the special worries about nuclear terrorism in both this and coming decades, enhanced nuclear security arrangements probably offer the biggest gains in global and regional security for the lowest investments.

What needs to be done? Lots. It is probably best to set the standard to which we aspire by quoting the words of an authority in this field:

> A world with a high degree of 'nuclear security' would be one in which all states possessing nuclear materials know to a high level of precision how much nuclear material they have, what form it is in, where it is located, and whether it is adequately secured from theft or loss on a continuous, near-real-time basis. It would also be a world where all states had effective, enforceable laws criminalizing the unauthorized possession or trafficking of nuclear materials as well as possessing effective export and border controls to prevent illegal transfer of nuclear materials or the technologies and knowledge necessary for their production. This is not the world we inhabit today.[26]

The world falls short of that standard in many ways. We don't even know how much fissile material currently exists in the world, for example. An unclassified estimate in 2005 suggested there might be about 1.9 million kilograms of highly enriched uranium and 1.83 million kilograms of plutonium worldwide in more than fifty countries.[27] (About 1.4 million kilograms of that plutonium occurs in unreprocessed spent reactor fuel.)

Indeed, we know little about nuclear security arrangements in general. And that's because nuclear security is primarily a state-based responsibility and not an international one. As Doyle notes, 'there are no legally binding requirements for maintaining high levels of security, nor is there any multinational authority that inspects and evaluates the effectiveness of nuclear safeguards in each state … The result is that nuclear materials are protected with varying degrees of effectiveness by countries around the world, and very little is known about the specific security measures that are taken by some states.'[28] We do know that thefts of nuclear materials do occur—albeit usually in pretty small quantities—and that such thefts are not always even reported in timely fashion to international authorities.

The IAEA oversights civil nuclear programs. But its primary role is to ensure that materials in those programs do not slip across to covert weapons programs. Most fissile materials—almost 95% according to some figures—are not under international safeguards. That doesn't mean the rest is stored insecurely: nuclear-weapons states usually take good care of their fissile materials. But the sort of world that many people believe we are moving towards—a world where deadly nuclear materials are increasingly, typically under international control—is certainly not just around the corner.

Within states' military programs, the details of nuclear materials and their handling remain largely classified. But it would be wrong to assume that security issues do not arise because of the strictness of control arrangements. And it would also be wrong to assume that nuclear security problems are to be found only in places like Pakistan. Even in relation to the US arsenal, two incidents in recent years—the unauthorised nuclear munitions transfer between Minot and Barksdale air force base, and the mis-shipment of sensitive missile parts to Taiwan—show that control mechanisms sometimes fail.

So, the scope for strengthening nuclear security arrangements is good. Indeed, some scientists claim that we are already engaged in a process of defining a new discipline—nuclear security science—which draws upon the existing disciplines of nuclear physics, engineering, chemistry, metallurgy and materials science, risk assessment, computer modelling and simulation, and detector development.[29] Included with that new discipline are the tools that might enable the world to strengthen current safeguards, prevent nuclear terrorism, detect undeclared nuclear activities, monitor the shipment of nuclear materials and confirm the elimination of nuclear-weapons programs. The question, of course, is only in part whether suitable technologies exist to achieve those goals; it is also a question of whether such technologies can properly be brought to bear on the nuclear security problems the current world poses. For example, can we build patterns of monitoring cooperation at key choke points?

Outlook

The global nuclear landscape is cluttered and disorganised. Some say we're at a crossroads now where we have to choose between a dangerous nuclear world and a less-dangerous non-nuclear world. That might actually be an optimistic misrepresentation of the crossroads: we're certainly at a crossroads between a more dangerous and a less dangerous nuclear world, but it is less clear that any sign at the cross-roads offers us a quick path to a secure, non-nuclear world.

So, where ought we to head with arms control? Well, Australia benefits most from arms control measures that enhance strategic stability and improve crisis management. At their core, good arms control proposals are built upon one important assumption: that well-designed cooperative mechanisms can enhance security even between adversaries. Confidence building and trust building are therefore key ingredients of arms control. So, first, we should favour arms control proposals that build substantive patterns of cooperation. We want to avoid rushing to the conclusion that smaller numbers of nuclear weapons are always better. And we would want to avoid advocating arms control proposals that ask nuclear-weapons states to do things that don't make strategic sense.

Second, we want to clarify the agreements we have now, and to make them more relevant to the evolving nuclear landscape. In a world of growing nuclear latency, we would ideally like to see some form of arms control agreement that addresses the issue of increasing numbers of states gathering just below the nuclear-weapon threshold. It

is not easy, though, to see how that can be done. Even if we can clarify what the word 'manufacture' means in Article 2 of the NPT, how would we monitor compliance? And in a world where Asian nuclear relationships are becoming more prominent, we would benefit from having a particular focus on arms control mechanisms that work to improve stability and confidence building amongst asymmetric nuclear powers.

Third, Australia would like to see stronger mechanisms for controlling nuclear proliferation. The particular cases of North Korean and Iranian proliferation might—if uncontained—prove to be the straws that break the camel's back in terms of nuclear tipping points. The international community needs to find better enforcement mechanisms to avoid a looming crisis in proliferation. Historically, the international community has proven comparatively tolerant of proliferation: indeed, Mitchell Reiss once compared the world community's reactions to the emergence of another nuclear proliferator to those of a terminally ill patient given news of his condition. Patients, and their families, slide through five distinct stages of denial, anger, bargaining, depression, and eventual acceptance.[30] If we are to wean the international community off a similar trajectory on nuclear proliferation, much more attention will have to be directed at the first three stages—and to using denial, anger and bargaining to achieve some measure of roll-back. Just how far is the international community willing to go to stop determined proliferators, and avoid our habitual slide from opposition to acquiescence?

Fourth, we need to concentrate on safety and security issues. This is the issue that will be at the core of President Obama's Nuclear Security Summit in April. In an age when the contours of warfare are shifting to reflect the greater empowerment (through technological diffusion and globalisation) of small groups and individuals, and when nuclear technologies are spreading, we need to worry much more about the safety and security of nuclear materials than we have done in the past. Australia might well have a role to play in building support for the patterns of international cooperation needed to underpin enhanced nuclear security arrangements. It should certainly be willing to spend money to enhance nuclear security both within Australia and across the dominant transport vectors into Australia.

Endnotes

1 Strategic Posture Review Commission (2009) *America's strategic posture: the final report of the Congressional Commission on the strategic posture of the United States* (Washington: USIP), p. xv.

2 Winston Churchill (2005 edition) *The world crisis, 1911-1918* (New York: Free Press) pp. 3–4.

3 See, for example, Kalevi Holsti (1996) *The state, war, and the state of war* (Cambridge: Cambridge University Press), pp. 32–36.

4 See David Bell (2007) *The first total war: Napoleon's Europe and the birth of warfare as we know it* (New York: Houghton Mifflin).

5 Colin Gray (1992) *House of cards: why arms control must fail* (Ithaca: Cornell University Press).

6 Jonathan Schell (2000) 'The folly of arms control', *Foreign Affairs*, 79,5: 22–46.

7 Darryl Kimball (2010) 'Obama's big nuclear test', *Arms Control Today*, January–February issue.

8 Dennis Gormley (2007) 'Silent retreat', *The Nonproliferation Review*, 14, 2: 183–206, p. 183.

9 Christopher Chyba and JD Crouch (2009) 'Understanding the US nuclear weapons policy debate', *The Washington Quarterly*, 32,3: 21–36.

10 See, for example, Michael Gerson (2009) 'Conventional deterrence in the second nuclear age', *Parameters*, Autumn issue, pp.32–48.

11 Thomas Schelling (2009) 'A world without nuclear weapons?', *Daedalus*, 138, 4: 124–129.

12 Report of the International Commission on Nuclear Non-proliferation and Disarmament (2009) *Eliminating nuclear threats: a practical agenda for global policymakers* (Canberra: Paragon), pp. 172–3.

13 Thomas Reed and Danny Stillman (2009) *The nuclear express: a political history of the bomb and its proliferation* (Minneapolis, MN: Zenith Press), p. 237.

14 Reed and Stillman, *The nuclear express*, pp. 241–2.

15 Rod Lyon (2009) *A delicate issue: Asia's nuclear future* (Canberra: ASPI).

16 David Edgerton (2006) *The shock of the old: technology and global history since 1900* (London: Profile Books).

17 See the table in Lewis Dunn (2009) 'The NPT: assessing the past, building the future', *Nonproliferation Review*, 16, 2: 143–172, p. 156.

18 Robert O'Neill (2000) 'The weapons of the underdog' in John Baylis and Robert O'Neill (eds.) *Alternative nuclear futures: the role of nuclear weapons in the post-Cold War world* (Oxford: Oxford University Press) pp. 191–208.

19 Jonathan Schell (2000) 'The folly of arms control', p. 28.

20 Lewis Dunn (2009) 'The NPT: assessing the past, building the future', p. 150.

21 Michael Krepon (2009) *Better safe than sorry: the ironies of living with the bomb* (Stanford, CA: Stanford University Press), p. 3.

22 Michael Krepon, *Better safe than sorry*, p. 7.

23 See, for example, the detailed suggestions offered by Lewis Dunn (2009) 'The NPT: assessing the past, building the future', *Nonproliferation Review*, 16, 2: 143–172.

24 Lewis Dunn (2009) 'The NPT', p. 154.

25 Thomas Reed and Danny Stillman (2009) *The nuclear express: a political history of the bomb and its proliferation* (Minneapolis MN: Zenith Press) p. 146.

26 James Doyle (2009) 'Introduction', in James Doyle (ed) *Nuclear safeguards, security and nonproliferation: achieving security with technology and policy* (Burlington, MA: Elsevier), p. 4.

27 David Albright (2005) *Global stocks of nuclear explosive materials: Summary tables and charts* (Washington, DC: Institute for Science and International Security), 12 July.

28 James Doyle (2009) p. 5.

29 James Doyle (2009) p. 1.

30 Mitchell Reiss (1995) *Bridled ambition: why countries constrain their nuclear capabilities* (Washington DC: Woodrow Wilson Center Press), p. 321.

About the Author

Dr Rod Lyon is the Program Director, Strategy and International, with ASPI. Rod was previously a Senior Lecturer in International Relations at the University of Queensland where he taught courses on conflict, international security, and civil–military relations. His research interests focus on a range of problems associated with global security, nuclear strategy and Australian security. He has authored a number of ASPI publications including the STRATEGY reports *Alliance Unleashed: Australia and the US in a new strategic age*, *The eagle in a turbulent world: US and its global role* and *A delicate issue: Asia's nuclear future* and the SPECIAL REPORT *Australia's strategic fundamentals*.

ASPI
Tel +61 2 6270 5100
Fax + 61 2 6273 9566
Email enquiries@aspi.org.au
Web www.aspi.org.au