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Safeguards and Non-Proliferation: Current Challenges and the Implications for Australia

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SUMMARY The expansion of nuclear programs raises the issue of how to ensure this does not increase the risk of nuclear weapons proliferation. The non-proliferation regime - based on the NPT and its verification mechanism, the IAEA safeguards system - has been developed to provide assurance that nuclear programs are exclusively peaceful. Although to date the non-proliferation regime has been remarkably successful, in recent years it has come under serious challenge. Nuclear proliferation is emerging as one of the major issues facing the international community.

Addressing technical and institutional aspects of the non-proliferation regime - especially safeguards, but also complementary measures such as export controls, proliferation-resistant technology, and an international framework on sensitive technology – is important. But proliferation is a political problem, and ultimately the success of the non-proliferation regime depends on political resolve to uphold compliance, using incentives and if necessary sanctions.

These issues are vitally important to Australia's future. Being a major uranium supplier has strengthened Australia's influence in non-proliferation and safeguards developments.

1. INTRODUCTION

Nuclear energy currently provides over one sixth of the world's electricity, making a significant contribution to reducing emissions of carbon dioxide and other greenhouse gases. Realisation of the impact of fossil fuels on the climate and the environment, as well as the rising costs of hydrocarbons, is leading to renewed interest in nuclear energy. Nuclear is expected to have an important place in meeting global energy needs this century.

Australia's uranium holdings – around 30% of the world's mid-cost recoverable reserves – are an internationally strategic resource which can only grow in significance. We are currently the world's second-largest uranium producer – just behind Canada. By exporting uranium we fulfil the commitment in the Nuclear Non-Proliferation Treaty (NPT) for Parties to cooperate in the development of nuclear energy for peaceful purposes. Australia's position as a leading uranium supplier gives us influence to promote non-proliferation and to contribute to the development of International Atomic Energy Agency (IAEA) safeguards.

The prospective expansion of nuclear programs raises an issue of fundamental importance - how to ensure this does not increase the risk of nuclear weapons proliferation. The non-proliferation regime - and its verification mechanism, the IAEA safeguards system - has been developed to provide assurance that nuclear programs are exclusively peaceful. To date the non-proliferation regime has been remarkably successful, but in recent years it has come under serious challenge. Nuclear proliferation is emerging as one of the major issues facing the international community.

Here, it must be pointed out that nuclear energy in itself does not present a proliferation problem. But nuclear energy requires fissile material, and the technologies used to produce fissile material for reactor fuel - uranium enrichment and reprocessing (plutonium separation) - can also be used to produce fissile material for nuclear weapons. Ensuring an effective non-proliferation regime comes down to ensuring effective control over these proliferation-sensitive technologies. This involves both technical and political issues.

At the centre of the non-proliferation regime is the NPT. Recent and ongoing violations of the NPT, particularly the cases of North Korea and Iran, as well as the failure of the 2005 NPT Review Conference to agree to any final declaration, have led some to question whether the NPT may be reaching the end of its useful life. Other factors prompting this perception include the frequent charges that the nuclear-weapon states have not lived up to their disarmament obligations, and the assertions by Iran and its supporters that the NPT guarantees the right of any country to establish the entire nuclear fuel cycle, including enrichment and reprocessing.

Are the critics right, is the NPT in trouble? And what are the implications, particularly with the prospect of more countries - including in Australia's region - deciding in favour of nuclear energy?

2. AN EFFECTIVE NON-PROLIFERATION REGIME BENEFITS ALL STATES

In considering the present state of the NPT and its future prospects, it is worth recalling the context in which the Treaty was developed. In the 1960s it was thought the proliferation of nuclear weapons was inevitable, and it was predicted there would be some 25 to 30 nuclear-armed states before the end of the 20th century. Since its conclusion in 1968, the NPT has helped to establish conditions under which proliferation, while not stopped, has been substantially slowed. Today, in addition to the five nuclear-armed states that existed then - the US, Russia, the UK, France and China - there are only four that have or are believed to have nuclear weapons: the three non-NPT parties - India, Israel and Pakistan - and North Korea.

No state would want a return to the situation of the 1960s. All states have a strong interest in maintaining an effective non-proliferation regime. Paradoxically, this is the case even for the nuclear weapon aspirants; they imagine they would be joining a select group of nuclear-armed states. Their perceived advantage would be negated - indeed they would be much worse off - if their proliferation simply prompted their neighbours to do likewise.

The perception that nuclear deterrence has been effective - a perception supported by the fact that to date there has been no nuclear war - has led some to imagine that nuclear weapons are a source of strategic stability, and that states with nuclear weapons are under constraints to act responsibly. This is an optimistic reading of history - in fact we know that the US and the former Soviet Union came close to nuclear war on a number of occasions, and there have been grave concerns about the prospect of nuclear war between India and Pakistan. There can be no doubt that the greater the number of states with nuclear weapons, the more likely these are to be used, whether deliberately or through miscalculation and mistake - or through terrorism.

While it is clear that all states have a strong interest in the non-proliferation regime, it is equally clear that not all appreciate this. One of the great foreign policy challenges is to refocus the minds of policy makers on the security benefits of the NPT and the common interest in increasing the Treaty's effectiveness.

3. HAS THE NPT BEEN EFFECTIVE, AND HOW?

The NPT's success in slowing proliferation can be attributed to the combination of the political commitment by most states to the objective of non-proliferation, and a technical mechanism – IAEA safeguards - for verifying that this commitment is being honoured. If there was no verification, or if verification was ineffective, the objectives of the Treaty would be undermined over time. At worst, NPT Parties could produce nuclear weapons and stockpile them for rapid deployment. At best, NPT Parties would become “virtual” weapons states, establishing fissile material production capabilities - uranium enrichment plants, or reprocessing plants together with suitable reactors - enabling them to produce nuclear weapons within months. Either situation would lead to an unstable and dangerous security environment. Instead, for the great majority of NPT Parties, their non-proliferation commitment has been reinforced by the assurance provided by IAEA safeguards that other Parties are similarly honouring this commitment.

IAEA safeguards are not the only measure underpinning the Treaty. Important elements complementing the NPT and IAEA safeguards include:

- export controls for proliferation-sensitive technologies, such as those recommended by the 44-nation Nuclear Suppliers Group;
- national controls over nuclear materials and technologies - now mandated by UN Security Council Resolution 1540 which requires all states to criminalise the proliferation of weapons of mass destruction (WMD), apply strict export controls and secure sensitive materials;
- restraint by states in the acquisition of proliferation-sensitive technologies;
- other multilateral regimes such as the CTBT (Comprehensive Nuclear-Test-Ban Treaty) and the proposed FMCT (Fissile Material Cut-off Treaty);
- regional and bilateral regimes;
- security and arms control arrangements outside the nuclear area, including other regimes dealing with WMD, notably the recently-developed, 60+ nation, Proliferation Security Initiative; and
- the development of proliferation-resistant fuel cycle technologies.

Especially important are political incentives and sanctions in support of non-proliferation objectives - the resolve of the international community to take effective action to encourage and if necessary enforce compliance.

What is the NPT “bargain”, and why do many parties feel that the bargain has not been maintained?

The common description of the NPT is that it is a “two-way bargain” between the nuclear-weapon states (NWS) who commit to nuclear disarmament and the non-nuclear-weapon states (NNWS) who undertake not to seek nuclear weapons. This is simplistic; the NPT is rather more complex than that. For a start, it is a *three-way* bargain - the commitment by the NNWS not to seek nuclear weapons is given not only to the NWS, but very importantly, to fellow NNWS. It is essential to the security of NNWS that they do not find themselves facing nuclear threats from other NNWS.

Regarding nuclear disarmament, critics overlook two points. First, in fact substantial arms reductions have been made by the major NWS - the US and Russia - who have reduced deployed warhead numbers from 10,000 each in 1991 to 6,000 each in 2002, and are proceeding to levels of between 1,700 and 2,200 by 2012. Clearly there is more to be done, but it is not helpful to ignore

that considerable progress has already been made. Second, the disarmament commitment in the NPT (Article VI) places nuclear disarmament into the context of a commitment by all NPT Parties to work towards a treaty on general and complete disarmament under international control. Thus the NPT recognises the link between nuclear disarmament and other weapon types. There are limits to how far nuclear disarmament can proceed if there is a threat of proliferation of other WMD or, especially, a threat of further proliferation of nuclear weapons. An effective nuclear non-proliferation regime is an essential condition for nuclear disarmament.

The other part of the NPT “bargain” now gaining greater attention is the right to benefit from nuclear energy, which Iran and its supporters are interpreting as a right to develop the entire fuel cycle. This is a misreading of the NPT. The NPT (Article IV) speaks of the right of all parties to use *nuclear energy* for peaceful purposes. This was never intended to mean development of *any* nuclear technology.

Nuclear energy as such - the use of reactors to generate electricity - does not present a proliferation risk. It has long been recognised, however, that the spread of technologies for producing fissile material - enrichment and reprocessing - could threaten non-proliferation objectives. When the NPT was negotiated it was envisaged that the NWS would provide enrichment and reprocessing services for the NNWS. In fact this has happened - US, Russian, French and UK entities are the leading suppliers of fuel cycle services, on a commercial basis, to the world’s civil nuclear industry. Further, in terms of the NPT itself the right to use of nuclear energy is not unqualified, but is subject to the other provisions of the Treaty - including the commitment against seeking nuclear weapons and the commitment to place all nuclear material under IAEA safeguards. It is disturbing that the state most vociferous about this “right” – Iran - has been selective in its observance of NPT provisions. It is even more disturbing that many governments have been taken in by Iran’s manipulation of this issue, despite Iran’s track record of NPT violations.

Ultimately, the NPT is a treaty on **non-proliferation**, not technology acquisition. Since the NPT does not elaborate on the means of access to the benefits of nuclear science and technology, however, it is now apparent there is a need to develop an international framework to deal with the issues involved.

Do proliferation challenges show that the NPT is breaking down?

The NPT cannot “prevent” proliferation, any more than national laws can prevent crime. The NPT establishes a standard of behaviour, together with an objective mechanism - IAEA safeguards - for identifying non-compliance, and a process for dealing with non-compliance.

Obviously it is a serious concern that some NNWS have attempted to pursue nuclear weapons, but this does not demonstrate a failure of the NPT. It is precisely because of the possibility of non-compliance that the Treaty includes a verification mechanism. The purpose of verification is two-fold: to provide a means for NPT Parties to demonstrate their compliance; and to detect non-compliance. In this respect, international law is little different to domestic law - when a crime is committed no-one calls for the scrapping of the criminal law on the basis that it is not working, but rather, for more effective law enforcement.

In fact, the issue of whether proliferation efforts show the NPT is not working is quite complex, requiring careful analysis. Important questions include:

- has there been a failure of verification? and/or
- has there been an inadequate response by the international community when verification has identified non-compliance?

An essential verification objective is to ensure the risk of detection is sufficiently high to deter a would-be proliferator. If the risk of detection is low, the deterrence factor - and the credibility of the verification system - will suffer accordingly. Perhaps the most serious technical challenge that has emerged to IAEA safeguards is the detection of **undeclared** nuclear activities, especially centrifuge enrichment plants. The recent cases of Iran (which had engaged in undeclared nuclear activities for almost 20 years) and Libya (which was able to buy a centrifuge plant off the shelf, as well as a nuclear weapon design, through the AQ Khan nuclear trafficking network) shows the need for improvements across the board in detection methodology and information-sharing, as well as in national controls over manufacture and trade in sensitive technologies.

Deterrence has two aspects: the risk of detection and the risk of enforcement action. Risk of detection will hold no fears if the proliferator is confident there will be little or no consequences. This is an issue of fundamental importance for the NPT - if proliferators find they can violate the Treaty with impunity the Treaty really will be in trouble. A two-stage process applies: first, non-compliance is to be determined by the IAEA Board of Governors; and second, a non-compliance case is to be reported to the Security Council.

It is of serious concern that both stages of making compliance decisions have become politicised. For example, in 1993 when the IAEA first reported North Korea to the Security Council for non-compliance, and in 2003 when North Korea announced withdrawal from the NPT, the Council was deadlocked over the need to take action. The mechanism of the Six-Party Talks was established outside the Council to attempt to resolve the North Korean nuclear problem by negotiation. Negotiation is an essential aspect of resolving international disputes, but to have the Security Council itself step aside from its responsibilities sets a worrying precedent.

With the Iranian case, even at the first stage of the non-compliance finding process, the IAEA Board of Governors has been divided along political lines on what should have been a largely technical decision based on examination of facts. Now that a non-compliance finding has been made, a Board decision is still required on the timing and the content of the report to the Security Council, and it is uncertain what will happen when the case gets to the Security Council. It is absolutely essential that the Security Council - especially the five Permanent Members - unite in the interest of upholding the non-proliferation regime. If narrow national political or economic priorities predominate, the non-proliferation regime will be seriously weakened.

4. MEETING THE CHALLENGES TO THE NPT

The greatest challenge for the non-proliferation regime is the weakening of **political support** for the NPT itself. This can be seen in the most recent NPT Review Conference held in May 2005, which failed to agree to any final document, notwithstanding that proliferation is widely seen as one of the most serious issues in contemporary international affairs.

In most cases this loss of support is not occurring deliberately, but rather appears to be the result of neglect, or lack of appreciation of the national security benefits of an effective non-proliferation regime. Many developing countries seem to regard proliferation as a "North/South" issue which is important only to the developed "North" - and therefore can readily be used as a bargaining chip in other political arguments. It is difficult to understand this perspective, since existing proliferation cases have emerged from the ranks of developing countries. The consequences of the wider spread of nuclear weapons will be just as serious, if not more so, for developing countries as for the "North".

For many countries the focus of their interest in the NPT now seems to be almost exclusively disarmament and technology acquisition. The non-proliferation core of the Treaty has receded in

importance. As noted earlier, disarmament will not progress further in a world where proliferation is becoming an increasing problem. For those who genuinely wish to encourage further disarmament, the best contribution they can make is to support the non-proliferation aspects of the Treaty. An important objective for NPT supporters should be to impress on governments generally the major security benefits of the Treaty for all countries, and to try to achieve a more considered approach by national representatives in international fora such as the IAEA, the UN and future NPT Review Conferences.

Two other critical challenges are the further spread of proliferation-sensitive technologies, and the need to strengthen the IAEA's detection capabilities for undeclared nuclear activities. And overarching all at the political level is the need for the members of the Security Council to accept their responsibilities and take compliance action where this is required.

5. CONTROLLING PROLIFERATION-SENSITIVE TECHNOLOGY

From the outset of the nuclear era – well before the development of the NPT – it was recognised that an effective non-proliferation regime required a limit to the countries that have enrichment and reprocessing capabilities. Today, in the light of recent developments, the need to limit the spread of sensitive technology is assuming increasing urgency.

At the institutional level, an international framework is needed that balances: (a) the right to benefit from nuclear energy; and (b) the right to protect national and international security through reducing the risk of proliferation. Such a framework might include:

- criteria for assessing the acceptability of proposed sensitive projects – e.g. the non-proliferation/safeguards credentials of the state concerned; whether there is a clear economic/energy rationale for the project; whether the state is located in a region of tension;
- a more rigorous safeguards regime for states with sensitive facilities;
- internationally guaranteed supply assurances to ensure reliable access to reactor fuel for states that forgo national enrichment and reprocessing capabilities; and
- perhaps, multination arrangements for the establishment and operation of sensitive facilities.

Also needed are technical measures – the development of proliferation-resistant technologies, including in the future a nuclear fuel cycle that does not require enrichment and currently-established reprocessing technologies.

A particular danger is the pursuit of sensitive technologies by states in regions of tension – Iran's situation. This is inherently destabilising for regional and international security. If neighbouring states are concerned about suspect nuclear programs, they are likely to seek similar capabilities, prompting “virtual” arms races – not only negating the advantage sought by the initiating state, but exacerbating the dangers to the security of that state. The appropriate model for regions of tension is the 1991 Joint Declaration on the Denuclearisation of the Korean Peninsula, in which South and North Korea forswore enrichment and reprocessing. Although subsequently broken, this Declaration remains the right principle to follow.

The need for proliferation-resistant technologies is highlighted by the likelihood that **plutonium recycle** will become widely established in the future. Plutonium recycle using fast neutron reactors can improve the efficiency of uranium utilisation by a factor of some 50-60. Fast neutron reactors also offer substantial waste management advantages, through transmutation of actinides and long-

lived fission products. However, plutonium recycle based on the traditional “fast breeder” reactor concept, in which high-fissile plutonium is produced in a “blanket” and separated through reprocessing, would present major proliferation risks.

Attention is now being given to fast neutron reactor concepts, such as the Russian BREST reactor, in which plutonium with isotopes suited for weapons use is never produced, and spent fuel undergoes simplified reprocessing in which plutonium is never separated from uranium, actinides and most fission products. If fuel cycle concepts of this kind are established, uranium enrichment and current reprocessing technology will be phased out. So the challenge to contain the spread of enrichment and reprocessing, while acute, may also be finite. Meanwhile, development of criteria for assessing the acceptability of new enrichment and reprocessing projects might include an assessment of how much additional enrichment/reprocessing capacity is actually required globally over next 20-30 years. This is likely to show that the justification for new projects is limited.

6. STRENGTHENING THE SAFEGUARDS SYSTEM

This involves technical and political aspects. At the technical level is the need to improve **detection** methods. At the political level, there is the need to extend the IAEA’s authority to require information and physical **access**, through universalisation of the Additional Protocol.

Detection capability goes to the heart of safeguards effectiveness, and the very future of the non-proliferation regime. The major technical challenge faced by the safeguards system is the need to ensure credible verification – to provide confidence that safeguards are effective to detect both misuse of declared facilities and the existence of undeclared facilities. The latter aspect has been highlighted by the illicit spread of centrifuge enrichment technology. The ongoing program to strengthen the safeguards system is focusing particularly on developing capabilities for detection of undeclared nuclear activities.

Central to these strengthening efforts is the effective use of information – involving collection and analysis of information that can enhance the IAEA’s knowledge and understanding of nuclear programs – and providing more extensive rights of access to nuclear and nuclear-related locations, including for the resolution of questions arising from information analysis. Areas of development include:

- detection methods for undeclared activities – including environmental sampling/analysis, and satellite imagery;
- safeguards procedures – particularly greater use of unpredictability in inspections (e.g. through unannounced or short-notice inspections);
- the state level approach – tailoring safeguards implementation to state-specific circumstances – moving from the uniformity of traditional safeguards, and basing safeguards intensity on expert judgment taking account of all relevant circumstances.

Underpinning the program to strengthen safeguards is the **Additional Protocol** – a legal instrument complementary to safeguards agreements, which establishes the IAEA’s rights to specified information and access. Eight years after the IAEA Board of Governors agreed the text of the Additional Protocol, in 1997, the uptake of protocols remains disappointing – to date, not quite 60% of NPT Parties have ratified or signed an Additional Protocol. In terms of actual safeguards implementation, however, the situation is much more positive. Additional Protocols have now been ratified or signed by over 85% – 54 out of 63 – of those NNWS NPT Parties with significant nuclear activities, i.e. those states where safeguards are actively applied. It is of concern that 9 NPT Parties with significant nuclear activities have yet to sign a protocol.

Some of the “hold-outs” argue that the Additional Protocol is not mandatory. Such arguments miss the point in two important respects. First, the combination of a comprehensive safeguards agreement and an Additional Protocol is now firmly established in practice as the contemporary standard for NPT safeguards. Second, they reflect a narrow perception of safeguards – that safeguards are an imposition from outside, a derogation of sovereignty. Actually safeguards are a valuable tool that states can use to advantage, to build confidence – to help them assure others of their peaceful intent.

Every state – even those of questionable non-proliferation commitment – benefits from a safeguards system that is as effective as possible, and the additional protocol is an essential component of this.

7. AUSTRALIAN INVOLVEMENT

Australia exports uranium only under stringent safeguards conditions, given effect through a network of bilateral safeguards agreements. This is a long established and bipartisan position - safeguards are not an optional requirement of Australian policy, as some appear to be suggesting. Australia exports uranium for electricity production through 19 bilateral safeguards agreements covering 36 countries. Currently Australia supplies around 14% of the world’s uranium requirements – this equates to around 2% of total world electricity production.

Nuclear opponents argue that Australia should not export uranium because this adds to proliferation risk – either through the risk of diversion from peaceful programs, or through a “knock-on” effect, that the availability of Australian uranium somehow frees up other uranium for military use.

These arguments reflect a belief that uranium is a scarce commodity. In fact, uranium is a very common mineral – every country has some indigenous uranium. Australia has the benefit of geological mechanisms that have concentrated uranium into commercially attractive deposits – this gives us a natural advantage in supplying the market for uranium for electricity production. However, for a country determined to obtain uranium regardless of cost, uranium can be recovered from sub-economic deposits, from other minerals such as phosphates, even from seawater.

The issue of nuclear weapon proliferation cannot be avoided by not exporting uranium. The risk of proliferation does not come from nuclear power – and it is notable that those countries pursuing proliferation programs have not had nuclear power. It is simply not true, as some anti-nuclear activists have claimed, that Australian uranium has been diverted or gone missing. Countries pursuing proliferation programs are unlikely to divert safeguarded uranium as this would lead to exposure of their activities. Rather, the problem lies with undeclared enrichment and reprocessing capability, and undeclared uranium.

Successive Australian Governments have recognised the reality, that nuclear power has an important place in the overall energy mix of many countries, and have worked constructively in support of effective non-proliferation arrangements. Australia’s position as a major uranium exporter gives us the standing to pursue these issues effectively, e.g. through our membership of the IAEA Board of Governors and in other fora, such as the Nuclear Suppliers Group, and SAGSI – the IAEA’s Standing Advisory Group on Safeguards Implementation – of which I am the current chair.

Australia played a prominent role in the negotiation of the Additional Protocol strengthening IAEA safeguards, and we were the first to sign and ratify an Additional Protocol. This instrument is now recognised as the contemporary safeguards standard. At the NPT Review Conference in May this year Mr Downer, the Minister for Foreign Affairs, announced that Australia would take the lead in making the Additional Protocol a pre-condition for the supply of uranium to NNWS. This further

strengthens the stringent conditions for supply of Australian uranium and underscores the Government's commitment to practical measures to counter the proliferation threat.

Australia is actively engaged in the Asian region in promoting safeguards and security of nuclear materials and facilities, through bilateral ties and a regional outreach program. We are also involved in informal discussions on developing closer regional collaboration in these areas. This work will become even more important if a number of regional countries proceed with nuclear power programs.

8. CONCLUSIONS

A strong and effective non-proliferation regime - underpinned by a credible safeguards system - is essential to the future of nuclear energy. All states share a common interest in ensuring that the expansion of nuclear programs does not result in new proliferation problems.

In the 1990s, revelations about undeclared nuclear activities in Iraq prompted action to address technical weaknesses in the safeguards system - work which is showing good results but remains ongoing. Current developments in Iran however show that technical responses are not enough. There is also a need for action to address the major political issues shaping the context in which safeguards operate.

Proliferation is a political problem, and ultimately can be dealt with effectively only at the political level. We must seek a better understanding of why some states - fortunately only a handful - seek to proliferate, and how they can be persuaded to change course. This involves a difficult process of negotiation - as seen with the Six-Party Talks aimed at resolving the North Korean nuclear situation, and the talks between European Union members and Iran. Measures addressing technical aspects - especially IAEA safeguards, but also complementary measures such as export controls, development of proliferation-resistant technology, and development of an international framework on sensitive technology - make a vital contribution. But the success of the non-proliferation regime depends on political judgments about confidence and trust - and ultimately on political resolve to uphold compliance, using incentives and if necessary sanctions.

As a middle-level power Australia is a strong supporter of rules-based approaches to world order, such as the NPT, IAEA safeguards, and other elements of the non-proliferation regime. Australia has a significant influence in non-proliferation affairs, an influence reinforced by our standing as a major uranium supplier. The importance we place on an effective non-proliferation regime can only increase as further nuclear energy programs are established in our region. Consequently, we will continue our active role in non-proliferation and safeguards development, at the regional as well as the international level.