Strengthening the Nuclear Non-Proliferation Regime

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SUMMARY. Although the nuclear non-proliferation regime has enjoyed considerable success, today the regime has never been under greater threat. Three states have challenged the objectives of the NPT, and there is a technology challenge—the spread of centrifuge enrichment technology and know-how. A major issue confronting the international community is, how to deal with a determined proliferator?

Despite this gloomy scenario, however, the non-proliferation regime has considerable strengths—many of which can be developed further. The regime comprises complex interacting and mutually reinforcing elements. At its centre is the NPT—with IAEA safeguards as the Treaty's verification mechanism. Important complementary elements include: restraint in the supply and the acquisition of sensitive technologies; multilateral regimes such as the CTBT and proposed FMCT; various regional and bilateral regimes; the range of security and arms control arrangements outside the nuclear area (including other WMD regimes); and the development of proliferation-resistant technologies. Especially important are political incentives and sanctions in support of non-proliferation objectives. This paper outlines some of the key issues facing the non-proliferation regime.

1. INTRODUCTION

The Nuclear Non-Proliferation Treaty (NPT) is the keystone of the international nuclear non-proliferation regime. Despite current concerns, the NPT has been an outstanding success. In the 1960s, before the NPT was negotiated, it was widely assumed that nuclear proliferation was inevitable and there would be some 25 nuclear armed states by the 1990s. This has not happened. Instead there continue to be five recognised nuclear-weapon states (US, Russia, UK, France, and China), and in addition three "nuclear-capable" states which have remained outside the non-proliferation regime (India, Israel and Pakistan)—and now there is the DPRK which has claimed to have nuclear weapons.

In spite of the overall success that it has enjoyed so far, however, today the non-proliferation regime has never been under greater threat. Three states within the NPT—Iraq, DPRK and Iran—have presented major challenges to the objectives of the Treaty. In addition, there is a technology challenge—the spread of centrifuge enrichment technology and know-how.

2. MAJOR CHALLENGES

Iraq exploited weaknesses inherent in the classical safeguards system to conceal its proliferation efforts prior to the first Gulf War. The response to this has been the development of strengthened safeguards, including the Model Additional Protocol. While the threat from Iraq has now been resolved, many of the weaknesses revealed by Iraq remain for those states that have not concluded Additional Protocols—and this includes all the states of current proliferation concern.

DPRK has a clandestine enrichment program, has announced withdrawal from the NPT, has claimed to have nuclear weapons, and has threatened to supply fissile material to others.

Iran There is widespread concern about Iran's development of uranium enrichment and heavy water production, with plans for a large heavy water-moderated research reactor. These activities give Iran an incipient nuclear weapon capability. During the first half of 2003 the IAEA found a number of breaches of Iran's safeguards agreement, and as at the time of writing this paper (mid September 2003) investigations were ongoing. Iran's persistent refusal to conclude an Additional Protocol has only reinforced suspicions about its intentions.

Centrifuge enrichment All three of these states have (or in the case of Iraq, had) centrifuge enrichment programs. A number of other states are suspected of having an interest in clandestine centrifuge enrichment programs. Because of the inherent characteristics of centrifuge enrichment—including relatively small physical size, relative absence of physical indicators—centrifuge enrichment presents major challenges: how to effectively safeguard declared facilities, how to detect undeclared facilities, and how to limit the further spread of this technology.
Dealing with proliferators The greatest single challenge currently facing the international community is how to deal with determined proliferators. In particular, how do we deal with proliferators: (a) with undeclared centrifuge enrichment, or (b) with declared enrichment facilities operated under safeguards, but which provide the capability for rapid break-out from non-proliferation commitments.

3. EXPECTATIONS FROM SAFEGUARDS—WHAT CAN SAFEGUARDS DELIVER?

In any critique of safeguards, it is essential to have a realistic appreciation of what safeguards can achieve. Many of the criticisms of safeguards are more properly directed at failings in national intelligence, and failings in the political incentives and sanctions underlying the non-proliferation regime.

Safeguards serve a vital confidence-building role—by assisting states which recognise it is in their own interest to demonstrate to their neighbours and the international community that they are honouring their treaty commitments, and by enabling them to gain assurance that others are doing likewise. Thus safeguards operate in a political environment, giving expression to political undertakings as well as legal commitments.

Clearly safeguards must be credible. This requires that they be technically sound, but credibility ultimately involves political as much as technical judgements. Maintaining and enhancing credibility is a complex matter and will be the underlying theme of safeguards development for some time.

The task of safeguards is not prevention as such, except in so far as risk of discovery may act as a deterrent to a would-be proliferators—the IAEA is not an international policeman. Rather, safeguards serve an essential political objective by exercising a positive influence on the behaviour of states. Safeguards do this by:

- providing assurance to reinforce non-proliferation commitments; and
- deterring non-compliance through the risk of timely detection.

That being said, however, safeguards make a major contribution towards prevention, by:

- raising the level of difficulty for the would-be proliferator to proceed undetected—hopefully dissuading the proliferator from the attempt; and
- providing the international community with timely warning—and the opportunity to intervene—through detection of proliferation programs.

Detection of undeclared nuclear activities

The IAEA has over 40 years experience verifying declared nuclear activities. The current safeguards system provides a high degree of assurance about declared activities—the principal issue here is how to reduce routine safeguards operations while maintaining the necessary detection capability. What this means in practice—how to determine the appropriate detection capability and the level of safeguards effort to achieve this—is one of the principal themes of current safeguards development.

The greatest single challenge—of critical importance to the credibility of the safeguards system—is to effectively address the issue of undeclared nuclear activities. It is vital that the IAEA is able to present authoritative conclusions about the absence of such activities in a state. If the IAEA is not able to provide clear conclusions, states may act on unsupported suspicions about the perceived proliferation activities of others. Such a situation would be detrimental to the non-proliferation regime.

How realistic is it to expect the IAEA to be able to detect undeclared nuclear activities? This is a much less definitive goal than the verification of declared material, and the level of assurance which can be provided will be less certain. The difficulties encountered in Iraq in the 1990s, where there was a very intrusive verification regime following the Gulf War, show this is not an easy task.

On the other hand, compared with individual states, the IAEA has considerable advantages to build on in pursuing this task. In addition to its expertise, the IAEA will have comprehensive information bases, extensive access rights (the ability to “get under the roof”), and increasingly sophisticated verification methods. However, there are limits to what the IAEA can achieve alone. States have more extensive resources and specialised capabilities—effective action to counter undeclared activities requires a partnership between states and the IAEA, in which states make available information obtained through national means, including intelligence activities.

In contrast to the quantitative nature of “classical” safeguards, dealing with declared nuclear material and activities, efforts directed towards the detection of undeclared activities will be largely qualitative. New and improved verification techniques—including environmental analysis and satellite imagery—are important, but a major focus is the collection and analysis of information. By definition this is going beyond the categories of information used in the “classical” system—a key issue is how far this can be broadened, and how to ensure that broadening the information base does not adversely affect the integrity of safeguards operations and conclusions.
4. PROGRESS WITH THE STRENGTHENED SAFEGUARDS SYSTEM

By far the most significant development in the safeguards system is the increasing acceptance and application of the Additional Protocol, under which the IAEA is given the authority to fully implement strengthened safeguards. Already, it can be seen that routine safeguards implementation has substantially moved beyond the basic comprehensive safeguards agreement—INFCIRC/153—alone.

Additional Protocols (APs) have now been ratified or signed by three-quarters of states with comprehensive safeguards agreements (CSAs) that have significant nuclear activities—clear recognition that the combination of INFCIRC/153 and the AP represents the contemporary standard for comprehensive safeguards. At the time of writing this paper, 23 CSA states with significant nuclear activities have ratified APs—and this number will increase by 13 when EU members bring their APs into effect, expected before the end of 2003. When this happens, 60% or more of CSA states with significant nuclear activities will have APs in force—and at least 70% of all nuclear facilities subject to comprehensive safeguards will be in states with APs in force.

Thus, while for some time the IAEA will be implementing safeguards in some states based on INFCIRC/153 alone, those states will be a steadily reducing minority, both in terms of number of states and number of facilities.

It is of concern that 17 CSA states have yet to sign APs—while some of these are preparing to do so, there are others that have no such intention, and some of these are states whose non-proliferation commitment is suspect.

As indicated above, currently three variations of comprehensive safeguards are being implemented, depending on whether the state has brought an AP into force, and whether the state has qualified for integrated safeguards:

- safeguards under INFCIRC/153 alone;
- safeguards under both INFCIRC/153 and the AP;
- integrated safeguards (IS)—the optimum combination of measures under INFCIRC/153 and the AP.

The numbers of CSA states with significant nuclear activities in each group are indicated in the following table. These figures show only those states that have currently ratified or signed APs, it does not take into account that by the end of 2003 others now in the “no AP group” may also have signed, or that further states additional to the EU may have ratified—i.e. the change shown for end 2003 represents only the expected ratifications of the 13 EU CSA states.

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<td>153 alone — no AP</td>
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<td>153 alone — AP signed</td>
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<td>153 plus AP in force</td>
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Clearly the level of assurance from safeguards will be highest in the case of states with IS. An increasing level of assurance will also be possible in the case of states where the AP is being implemented satisfactorily, but where qualification for IS is impending. As for those states that have not signed APs (or sign but unreasonably delay ratification), the question whether INFCIRC/153 alone can be accepted as providing adequate assurance can be expected to receive increasing attention.

Integrated safeguards

An essential aspect of strengthened safeguards is the development of the concept of integrated safeguards, that is, the optimum combination of safeguards measures available under both INFCIRC/153 and the AP which achieves maximum effectiveness and efficiency within available resources.

The rationale behind IS is that implementation of INFCIRC/153 and the AP together will result in a substantial degree of redundancy, because certain acquisition paths will be covered by measures under both—or put another way, AP activities will contribute to increased effectiveness of safeguards overall. Accordingly, the intensity of some safeguards activities under INFCIRC/153 can be reduced while maintaining an appropriate level of effectiveness.

5. FURTHER STRENGTHENING STEPS

Some ideas for further strengthening the safeguards regime are outlined as follows.

Enhancing the IAEA’s technical capabilities

The detection of undeclared nuclear activities presents a considerable challenge. It is important for all states in a position to do so to assist the IAEA in developing the necessary capabilities and skills. Because of the inherent characteristics of centrifuge enrichment—including relatively small physical size, relative absence of physical indicators—detection presents major challenges: how to effectively safeguard declared facilities, how to detect undeclared facilities, and how to limit the further spread of this technology.

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Increased sharing of information:

**National information** The preparedness of states to share information with the IAEA is essential to an effective safeguards system. There are limits to what can be realistically expected of the IAEA, without the assistance of states, in the detection of undeclared nuclear activities. States need to contribute through the sharing of unclassified information and analyses, the sharing (under appropriate protection) of information from national intelligence sources, and assisting the IAEA in developing necessary information collection and analysis skills. Much has been done in these areas, but there is plenty of opportunity to do more.

**Information-sharing with other verification agencies and secretariats** Information-sharing can be improved, both within nuclear-related areas, such as the NSG (Nuclear Suppliers Group), the Zangger Committee, and the CTBT (Comprehensive Test-Ban Treaty), and also with other WMD [1] areas, such as the CWC (Chemical Weapons Convention) and the MTCR (Missile Technology Control Regime).

The NSG is a particularly important area to look at. Patterns of acquisition of dual-use items would serve as a useful indicator of possible proliferation efforts. Yet currently there is little or no sharing between NSG members of information on exports of dual-use items (apart from denial notifications), and there is no arrangement for the sharing of such information with the IAEA. In the case of items specially designed/prepared for nuclear use, the Additional Protocol requires the reporting of transfers to the IAEA—here, it might be asked whether there is scope for suppliers to voluntarily bring this into general application ahead of AP ratifications.

As to the relevance of other WMD regimes, experience shows that a state pursuing one form of WMD is likely to be interested in others, as well as in suitable delivery systems. Often these states have used the same research institutions and front companies across different WMD areas. Thus knowledge of procurement efforts in other areas may be very useful for the IAEA, and *vice versa*.

**Constraints on the spread of proliferation-sensitive technology**

The proliferation of nuclear weapons is in no-one's interest. Governments must be persuaded that the short-term commercial advantage of assisting nuclear programs in states of proliferation concern are more than offset by the long-term risks to themselves as well as others.

There is a need not only to ensure that NSG members' export controls are as effective as possible, but to try to secure the cooperation of states outside the NSG to apply similar controls. Iraq had been able to obtain centrifuge components and other sensitive nuclear items through illegal supply from European sources. Since then European export controls have been substantially improved, and tougher laws introduced against complicity in WMD programs. A worrying development is, according to media reports, an apparent Pakistan link in the centrifuge programs of the DPRK and Iran. Now, there must be concerns about whether Iran's enrichment technology will spread, illegally or otherwise—and the DPRK has indicated a willingness to trade in fissile material. Hence, a number of governments have formed the Proliferation Security Initiative to cooperate to counter WMD-related transfers.

The conclusion of an Additional Protocol should be seen as a basic condition for nuclear supply. But this in itself is not sufficient—Australia for one urges constraint in supply and acquisition of sensitive technology in regions of tension. The confidence that safeguards are intended to provide will be undermined if there is concern that states, in the guise of safeguarded “civil” programs, are developing “virtual” nuclear weapons capabilities. Here, an issue that needs to be addressed is the assertion that the NPT gives states an unlimited right to pursue any nuclear technology. This is discussed further below.

Given the particular problems posed by centrifuge enrichment technology—increasing availability, ease of concealment (including through clandestine replication of safeguarded facilities)—the time has come for a careful look at a program of action in this area in support of non-proliferation. This could encompass not only enhanced export controls and enhanced verification/detection capabilities, but also development of political responses—such as assurance of nuclear fuel supply as a means of diminishing the incentive to develop indigenous enrichment capabilities, maybe even the establishment of multi-nation enrichment arrangements.

**Promotion of proliferation-resistant fuel cycle technologies**

This is forward-looking—there are obvious advantages if it is possible to develop technologies that minimize opportunities for production or separation of weapons-useable materials. Such concepts have been discussed in detail elsewhere, e.g. ASNO's paper “Towards a Proliferation-Resistant Nuclear Fuel Cycle”[2].

**Complementary regimes**

For a discussion of how other regimes—such as the CTBT, the proposed FMCT [3], regional and bilateral regimes, arrangements covering nuclear weapons dismantlement and irreversibility—see
ASNO's paper "Nuclear Non-Proliferation: the Role of Complementary Regimes"[4].

6. NPT ISSUES

Current proliferation challenges raise important questions for the NPT, which require further analysis and reflection by governments, namely:

Limits to the pursuit of nuclear technology

The NPT refers to the "inalienable right ... to use nuclear energy"[5]. However, this right is not absolute. It should be recognised that all "rights" carry corresponding duties—pursuit of this right must be in conformity with the non-proliferation commitments of the Treaty, and must not prejudice the objectives of the Treaty. Australia firmly believes that the spread of proliferation-sensitive technologies—enrichment and reprocessing—should be limited, and that such capabilities should not be pursued in regions of tension, where there is the danger of "virtual" arms races and break-out from the NPT.

Can states evade their non-proliferation commitments by withdrawing from the NPT?

The NPT, with 188 Parties, has become almost universal: only three states, India, Israel and Pakistan, remain outside it—and the DPRK has announced withdrawal, though the validity of this has not been determined.

The non-proliferation norm can be seen to represent customary international law—it can be argued that even the three non-Parties are obliged not to assist any proliferation efforts by other states (and as Parties, all other states are obligated not to seek such assistance). It follows that there should be zero tolerance of additional states attempting to develop nuclear weapons— the non-proliferation commitment of NPT Parties, even if they purport to withdraw from the Treaty, must be inviolate.

7. CONCLUSIONS

The non-proliferation regime comprises complex interacting and mutually reinforcing elements. Some of these are multilateral, others are based on national action. This was recognised in the G8 WMD Declaration from the Evian Summit in June 2003, which included:

"We have a range of tools available to tackle this threat: international treaty regimes; inspection mechanisms such as those of the International Atomic Energy Agency (IAEA) and Organization for the Prohibition of Chemical Weapons; initiatives to eliminate WMD stocks such as the G8 Global Partnership; national and internationally-co-ordinated export controls; international co-operation and diplomatic efforts; and if necessary other measures in accordance with international law. ... While all of these instruments are necessary, none is sufficient by itself."

Verification is essential to the effective operation of the non-proliferation regime—safeguards reinforce norms of behaviour, increase the difficulties confronting the proliferator (by constraining the use of declared facilities), and provide a mechanism for identifying non-compliance.

Of course there is scope for further improvements in the safeguards system—what is needed is a partnership between states and the IAEA, building on what is already in place. The strengths of IAEA safeguards include regular access to the state (in which measures such as environmental sampling can be carried out, as well as general observation—the inspector's "nose"), a strong body of expertise in verification/investigation techniques, and impartiality — important to international confidence-building and to securing support for enforcement action.

Detecting undeclared nuclear activities will always be difficult—especially centrifuge enrichment, a common factor in current problem cases. Safeguards techniques are improving substantially, but national intelligence will continue to have a major role. Compared with national intelligence, however, the IAEA has considerable advantages—specialised detection skills, and especially the ability of inspectors to get "under the roof at places of interest. The best results will come from close collaboration.

Clearly there is a need for greater focus on the areas of highest proliferation potential. This may be contentious—but it is important to promote a positive appreciation by states that safeguards are not an imposition, but a means of enhancing their own national security. Universalisation of the Additional Protocol is an essential part of rationalising safeguards effort—this warrants full support by all governments.

It should be a matter of the highest priority for the international community to ensure there is no increase in the number of nuclear-armed states. Indeed, in 1992 the Security Council declared that:

"The proliferation of all weapons of mass destruction constitutes a threat to international peace and security"[6].

Ultimately, the effectiveness of safeguards, and the non-proliferation regime as a whole, depends on the preparedness of governments to take enforcement action to uphold compliance.

References

1. Weapons of mass destruction—nuclear, chemical and biological.
2. INMM 2000 Annual Meeting.
5. NPT Article IV.1.