

FIVE DECADES OF SAFEGUARDS, AND DIRECTIONS FOR THE FUTURE: AN AUSTRALIAN PERSPECTIVE

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This paper presents the personal views of the author and not necessarily those of the Australian Government.

Abstract:

An effective regime against the proliferation of nuclear weapons is essential to international peace and stability. The maintenance of an effective non-proliferation regime depends on credible verification, to provide confidence that non-proliferation commitments are being honoured. Under the Nuclear Non-Proliferation Treaty (NPT) the verification task has been entrusted to the IAEA safeguards system.

Credible safeguards are vital in reinforcing the commitment of NPT Parties to the Treaty. If safeguards were seen as being deficient, confidence in the Treaty would erode, leading to its failure. This places a heavy responsibility on the IAEA – and on Member States whose support is needed by the IAEA.

Safeguards have come a long way from their inception as bilateral inspection arrangements, applied by nuclear suppliers. Following the establishment of the IAEA in 1957, an IAEA inspectorate was developed and bilateral inspections were gradually replaced by IAEA inspections. With the conclusion of the NPT in 1968, IAEA safeguards moved to a position of major international importance. The early focus on “item-specific” safeguards changed to full scope, or “comprehensive”, safeguards, applicable to all the nuclear material in a state.

By the mid-1990s the NPT had become almost universal. Over the same period there was substantial growth in national nuclear programs. The IAEA achieved considerable success developing and implementing a safeguards system able to cope with growing workload and complexity. There was however a serious flaw – an emphasis on declared material and facilities and systematic inspection activities resulted in substantial effort for areas of low proliferation risk, while inadequate attention was given to the problem of undeclared nuclear activities.

The latter has emerged as the major challenge to safeguards – the IAEA is under considerable pressure to establish a credible capability to detect undeclared activities. At the same time it must continue efficiency improvements, to achieve more effective performance from finite resources. Recent events have highlighted that safeguards credibility depends not only on technical capability but on preparedness to take appropriate decisions in case of non-compliance.

This paper outlines the major achievements of the safeguards system, the challenges now faced, and possible developments.

1. INTRODUCTION

Starting with Australia’s major role in the founding of the United Nations after World War II, Australia has been a strong proponent of rules-based approaches to world order. This is reflected especially in our support for regimes against the proliferation of weapons of mass destruction, of which the nuclear non-proliferation regime is of fundamental importance. The centrepiece of this regime is the Nuclear Non-Proliferation Treaty (NPT). A key feature of the NPT is its verification

mechanism, the IAEA safeguards system. As reflected in the adage “trust, but verify”, credible verification has a vital part in reinforcing the commitment of NPT Parties to the objectives of the Treaty.

Through its role in underpinning the NPT, for almost four decades the IAEA has been closely involved in efforts to maintain international peace and security. This has been increasingly recognised by the media and the public, and in 2005 through the award of the Nobel Peace Prize. The “UN nuclear watchdog” has become a household name. Yet this period of increased recognition and attention has coincided with a period of growing challenge to the safeguards system and the non-proliferation regime.

The challenges are both political and technical. At the political level, there have been several cases of non-compliance with treaty obligations, two of which – Iran and the DPRK – remain ongoing. The technical challenges include the spread of proliferation-sensitive technology and the difficulties of detecting undeclared nuclear activities.

The safeguards system involves more than technical verification activities. The credibility of the system – whether the system meets the expectations of states – depends on confidence in two aspects: verification capability, and the outcomes that result from verification findings. Predictability and consistency of safeguards decisions are essential. This is particularly the case since the NPT itself has no mechanism for determining compliance – effectively this entrusted to the IAEA through decisions concerning compliance with safeguards agreements.

A fundamental safeguards objective is, through the risk of detection, to deter proliferation. But deterrence will be ineffectual if proliferators believe that the consequences of detection are low-risk. The IAEA Secretariat and Board must be prepared to identify non-compliance, and the international community must be prepared to take compliance action. The future of the safeguards system, and the NPT itself, depends on how well compliance issues are addressed.

2. EVOLUTION OF THE “TRADITIONAL” SAFEGUARDS SYSTEM

The prominent role that the IAEA now has in the international peace and security architecture took some time to evolve. The precursor of the IAEA safeguards system was the bilateral inspection arrangements developed in the early years of the nuclear industry. These inspections were conducted by nuclear suppliers and were “item-specific”, i.e. they applied only to the particular item supplied. Following the establishment of the IAEA in 1957, an IAEA inspectorate was developed and bilateral inspection activities were gradually replaced by IAEA inspections.

A fundamental change in IAEA safeguards was introduced by the NPT, concluded in 1968. The NPT introduced a commitment by non-nuclear-weapon states (NNWS) to accept IAEA safeguards on **all** their holdings of nuclear material, existing and future, not only on supplied nuclear items. Thus the basis of IAEA safeguards changed from being “item-specific” to being “full scope” (today termed “comprehensive” safeguards).

This change in emphasis had far-reaching consequences, though perhaps the implications were not fully appreciated at the time. The responsibility of applying full scope safeguards carries with it the responsibility to verify the absence of undeclared nuclear materials and activities. However, the “traditional” NPT safeguards system was primarily focused on verifying **declared** nuclear materials and activities, applying similar procedures to those developed for item-specific safeguards. It was generally assumed that development of fuel cycle capabilities independent of declared facilities would be beyond the resources of most states, and in any event would be readily detectable, and therefore if

proliferation occurred it was most likely to involve diversion of nuclear material from declared facilities. As the discoveries made about Iraq's clandestine enrichment program in the early 1990s demonstrated, these were not well-founded assumptions.

For IAEA safeguards, the period until the mid-1990s was one of major growth and consolidation. There was substantial growth in nuclear power programs, and in the number of states with nuclear research activities. At the same time, membership of the NPT – hence the number of states under comprehensive safeguards – grew steadily. By the 1995 NPT Review and Extension Conference the Treaty had become almost universal. The Agency had considerable success developing and implementing a safeguards system that appeared able to deal with growing workload and complexity.

There was however a serious flaw – the emphasis on **declared** material and facilities and systematic inspection activities resulted in substantial safeguards effort going to areas of low proliferation risk. The practice of uniformity, and determination of safeguards effort on a facility-by-facility basis, led to the situation that in the 1990s some 60% of total safeguards effort was being allocated in just three states – Canada, Germany and Japan – based on the size and complexity of their fuel cycles and the quantities of nuclear material they held. But the safeguards violations that subsequently came to light showed that the actual risk of proliferation lay elsewhere, in states which under a uniform approach received few inspections. Inadequate attention was being given to the problem of undeclared nuclear activities. The dangers of this became apparent in Iraq – and we now know that during this period Iran had also embarked on a clandestine nuclear program.

3. STRENGTHENING THE SAFEGUARDS SYSTEM

The discoveries in Iraq led to a wholesale re-appraisal of how safeguards are designed and applied, a process that is very much ongoing today. This started with “Programme 93+2”, and led to the establishment of the additional protocol, together with a major program of technical development.

The program to strengthen safeguards is focusing particularly on establishing the technical capabilities and legal authority necessary for detection of undeclared nuclear activities. Central to these 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.

Underpinning the program to strengthen safeguards is the additional protocol (AP) – a legal instrument complementary to safeguards agreements, which establishes the Agency's rights to more extensive information and physical access. The Model Additional Protocol was agreed by the Board of Governors in 1997. Of the 64 NNWS NPT Parties with significant nuclear activities, today 45 have APs in force and 12 have signed APs or had APs approved by the Board – an uptake of almost 90% of such states. The combination of a comprehensive safeguards agreement and an AP now represents the contemporary standard for NPT safeguards. It is of serious concern however that (at the time of writing) 7 NNWS NPT Parties with significant nuclear activities have yet to adopt the AP – in addition Iran, which was applying the AP on a “provisional” basis, has now “suspended” its cooperation under the AP.

4. CHALLENGES TO THE SAFEGUARDS SYSTEM

The technical challenges include the spread of proliferation-sensitive technology – particularly the sale of centrifuge technology and even nuclear weapon designs through illicit networks – and the

difficulties of detecting undeclared nuclear activities, which need not be industrial-scale to pose a proliferation threat.

Undeclared nuclear activities were involved with each of the five cases of safeguards non-compliance that have been reported by the IAEA Board of Governors to the Security Council – Iraq (1991), Romania (1992), DPRK (1993, and again in 2003), Libya (2004) and Iran (2006). Two of these cases – Iran and DPRK – remain ongoing. Iran in particular is defying the international community, and currently it is uncertain whether the international community has the will and the ability to take effective compliance action. Failure to satisfactorily resolve this situation will inevitably lead to regional proliferation pressures and a serious weakening of the NPT.

It may be unfair to the safeguards system to point out that Iran's clandestine nuclear activities went undetected for some 20 years – unfair because detection techniques, especially for centrifuge enrichment operations, remain under development; because the Agency needs the access rights provided by the additional protocol, which Iran has refused to observe; and because national intelligence agencies also failed to detect these activities – but this situation is not reassuring, and illustrates very well the challenges facing the Agency. It continues to be a major concern that we do not know the full extent of Iran's nuclear activities.

What do these developments mean for the IAEA safeguards system? Realistically, can the Agency provide credible assurance that states do not have undeclared nuclear programs? This question goes to the heart of ongoing confidence in – and therefore commitment to – the NPT. A judgment about the performance of the safeguards system involves complex issues – it is essential to have a clear understanding of what the system can and cannot deliver, and to identify effective steps to address deficiencies.

The Agency has decades of experience verifying non-diversion from declared nuclear activities, and conclusions in this regard can be reached with a high degree of confidence. Conclusions on the absence of undeclared nuclear activities, on the other hand, are necessarily qualitative, and safeguards may need to be complemented by confidence-building measures, particularly measures to enhance transparency. As will be discussed, **transparency** is likely to assume increasing importance in the non-proliferation regime.

5. NEW DIRECTIONS FOR SAFEGUARDS DEVELOPMENT

As discussed, the establishment of an effective capability to detect undeclared nuclear activities has emerged as the major technical challenge to safeguards. At the same time the Agency is required to continue efficiency improvements, to achieve more effective performance from finite resources. Addressing the resources problem is not simply a question of increasing the safeguards budget, but also calls for a fundamental review of safeguards approaches and methods, to ensure the safeguards system is well-focused and cost-efficient. With the help of Member States (e.g. through Safeguards Support Programs and SAGSI), the Agency is making substantial progress in the redesign of the safeguards system.

Perhaps the most important single innovation in safeguards development is the introduction of the state-level approach (SLA). Safeguards are moving from the old uniform approach to one of differentiation, designing safeguards implementation to take account of state-specific factors, such as the acquisition paths available to individual states. The SLA meets effectiveness objectives, better focusing and prioritising the application of safeguards resources, and in so doing also addresses cost-efficiency objectives. The challenge here is to be able to optimise the opportunities for flexibility

provided by the SLA without introducing weaknesses in safeguards effectiveness. The development of the SLA, together with corresponding changes to ways of evaluating safeguards performance and reporting safeguards results, is a major undertaking, and will be a work in progress for some time.

Along with these fundamental changes in safeguards approaches, it has been necessary to develop a new range of verification methods and technologies. Although these techniques can be considered “technical” in nature, decisions on which measures should be applied and the intensity of their application – how much is “enough” to meet safeguards objectives – involve qualitative judgment. It is essential that the Agency’s conclusions on the absence of undeclared nuclear material/activities are **credible**. The international community must be confident that where the Agency does not find indicators of safeguards breaches this does not simply reflect inadequate or ineffective verification effort.

Transparency is likely to become increasingly important, both as an integral part of the safeguards system and as a complement to the system. Transparency involves a number of aspects, including: transparency of the state to the Agency; transparency of states to each other; and transparency of the Agency itself.

Conclusions about the absence of undeclared nuclear activities are of necessity less definitive, less certain, than conclusions based on verification of declarations. Relatively, there may be less confidence in a more qualitative conclusion, but confidence can be reinforced by availability of additional information supporting the conclusion. There are many potential transparency mechanisms, including:

- wider publication by states of information on their nuclear programs;
- conduct of research and operational programs on a collaborative basis amongst states;
- broader privatisation and globalisation of nuclear activities, and establishment of multilateral fuel cycle centres; and
- conduct of collaborative safeguards activities on a bilateral or regional basis.

In particular, bilateral or regional safeguards arrangements could play an important role, complementing IAEA safeguards, in circumstances where states are looking for additional confidence-building measures – ABACC¹ is a valuable precedent here.

Enhanced cooperation with and transparency towards the IAEA will be particularly important. Strengthened safeguards bring new requirements for states in terms of information, access and cooperation. It is no longer sufficient for a state to meet only its minimum legal commitments to the Agency (although that is always a good start!) – rather, states need to cooperate with the Agency to the standard necessary to maintain the confidence of the international community. This includes showing full transparency to the Agency, particularly where there are issues of compliance or confidence-building to be resolved. A particular challenge to the Agency will be developing a sufficiently rigorous method of testing transparency and drawing appropriate conclusions – failure to cooperate may be obvious, but where the state appears to be cooperating it will be important to avoid being misled, not to draw broader conclusions than are actually warranted.

Transparency is also important for the safeguards system itself. To be most effective in its confidence-building function, a verification system must have an appropriate degree of transparency. To have confidence in the conclusions reached, states must have sufficient knowledge of how the system works, including verification methods, performance standards, quality assurance and decision-making

1. Argentine-Brazilian Agency for Accounting and Control of Nuclear Materials.

processes. The Agency is devoting considerable effort to these matters. One mechanism that might be looked at here is external review – just as there is an external auditor for budgetary performance, there may be a role for an external auditor for safeguards performance.

A related issue is the extent to which information available to the safeguards system should be shared with states. A notable aspect of traditional safeguards is **confidentiality** – information held on a state is maintained within the Agency and not shared with others. The CWC – a newer treaty than the NPT – establishes a different approach. States' declarations are made available to all Parties. Other states thus have the opportunity to cross-check information declared against information available to them, e.g. through their own analysis, research, or national technical means. This helps identify discrepancies in information that might require investigation, and helps establish the credibility of the verification agency's operations. This is a direction the safeguards system might usefully take. Obviously there are difficult issues, such as maintaining confidentiality of sensitive information, and avoiding warning a state of investigations in progress – but a more transparent system, where greater information is available on states' nuclear activities, the IAEA's activities, its conclusions and the basis for these, would have important confidence-building benefits.

Compliance issues Recent events have highlighted that safeguards credibility depends not only on technical capability but on preparedness to take appropriate decisions in case of non-compliance. Inevitably political as well as technical considerations come into play in dealing with non-compliance. It is essential however to avoid confusion between technical and political dimensions. Non-compliance as such involves technical judgments, and a non-compliance finding should be based primarily on technical grounds.

Political factors will come to the fore in efforts to resolve the situation after a non-compliance finding has been reached. The distinction between technical and political aspects is reflected in the IAEA Statute, which requires non-compliance findings to be reported to the Security Council. The Statute also requires the Agency to notify the Security Council of matters arising that are within the Council's competence, i.e. matters pertaining to international peace and security². This is a clear indication that political decisions are the responsibility of the Security Council.

In the Iranian case, concern about the consequences of a non-compliance finding – e.g. whether Iran would cease cooperation with the Agency, or even withdraw from the NPT, and whether in any event the Security Council could agree on a response – led to what amounted to plea-bargaining within the Board of Governors, under which a non-compliance finding was withheld for three years while efforts were made to negotiate a solution.

At the time this may have seemed a pragmatic response to a very difficult situation, but the mixing of technical and political considerations risked severe damage to the integrity and credibility of the IAEA's processes. Not only did the delay in the non-compliance finding embolden Iran, but it even led some to argue that non-compliance had ceased to be non-compliance with the passage of time – in effect, that a clandestine program became legitimate once it had been discovered and investigated. This was never a valid argument in the Iranian case, since to this day we do not know the full extent of Iran's clandestine nuclear program, but the fact such arguments were advanced shows the need not to delay a non-compliance finding once the facts are sufficient to warrant this. The Iran case cannot be considered a good precedent for the handling of any future case.

2. Article III.B.4.

Predictability and consistency are important to any rules-based process – to this end the Board of Governors itself should not be beyond transparency, the application of guidelines to assist the Board in making compliance decisions would help ensure confidence in those decisions.

6. CONCLUSIONS

IAEA safeguards have provided a unique model of treaty compliance verification, with a rigorous process for identifying non-compliance. However, as safeguards become more **qualitative** – reflecting the nature of contemporary safeguards challenges – compliance issues are becoming more complex. We are in a period of transition, from the apparent “certainty” of the traditional safeguards processes, to a more judgment-based approach, based on broader information and likely to be less absolute in its outcomes.

The apparent certainty of traditional safeguards was misleading, and led to an expectation by some of an unrealistically high evidentiary standard. In fact, “proof” of non-compliance is unlikely to ever be forthcoming – it can be assumed that a state about to be caught red-handed will refuse inspectors access rather than cooperate in the discovery of irrefutable proof of non-compliance.

The less-certain world of qualitative safeguards was anticipated in INFCIRC/153, when it established an alternative route for reporting apparent non-compliance to the Security Council. The IAEA Statute³ provides for non-compliance to be reported to the Council – but, as discussed, not all non-compliance will be easy to determine. So it is that INFCIRC/153⁴ refers to diversion to nuclear weapons or to **purposes unknown**. Further, INFCIRC/153 provides for the Agency to report to the Security Council if it is **unable to verify** that there has been no diversion to nuclear weapons⁵. It is sufficient for the Agency to show that diversion – removal of nuclear material from safeguards or discovery of undeclared nuclear material – has occurred and the purpose of the diversion is not known – and that diversion to nuclear weapons is plausible in the circumstances (e.g. having regard to the nature and quantity of the material involved).

Accordingly, the phrase “purposes unknown” will assume greater significance. Also likely to assume greater importance is the Statute’s requirement, not used until recently in the Iranian case, for the Agency to notify the Security Council of questions arising that are within the competence of the Council. This could apply to uncertain compliance issues, or concerns about future non-compliance, or simply the destabilising effect that the development of sensitive nuclear technology could have in a region of tension.

The fact that safeguards are becoming more qualitative – or at least, that there is increasing recognition that safeguards involve a substantial qualitative element – does not mean that safeguards judgments will become less technical and more political. On the contrary, the Agency’s value to the international community is its ability to report facts and impartial technical analysis. It is essential to the Agency’s credibility that safeguards reporting and decisions continue to be based on objective technical grounds. Ensuring this in a more qualitative environment requires greater clarity of thought about the safeguards mission, and greater transparency in the processes involved.

The nuclear non-proliferation regime is a rules-based system in which verification plays a fundamental role. The Agency’s safeguards system provides an essential service in the form of an impartial mechanism for demonstrating compliance. How well it continues to do so in the future depends on

3. Article XII.C.

4. Paragraph 28.

5. Paragraph 19.

how successfully the Agency itself, and the international community as a whole, address challenges such as those outlined here. It is essential for the safeguards system to have the necessary technical competence and integrity of process. It is in the interest of all parties to contribute constructively towards achieving these objectives.