

Staying Ahead of the game

by Olli J. Heinonen

the world's nuclear regime is being tested like never before

The nuclear non-proliferation regime today faces a number of challenges. Not all would agree that the system is “in crisis”, but we can confidently say that the regime is certainly being tested. It goes without saying that the reported nuclear test by DPRK in October 2006 has not made the situation easier. So we should begin to find innovative solutions to overcome vulnerabilities or the international nuclear safeguards regime will become obsolete.

The Treaty on the Non-Proliferation of Nuclear Weapons (NPT) was ratified more than 30 years ago. Since then the world has undergone rapid social, political and economic changes, which have resulted in a changed non-proliferation landscape. Developments in the three pillars of the NPT—disarmament, technology transfer and verification—have not necessarily been even.

The IAEA has a role to play, in particular, in the latter two pillars. Although one might argue that there has been slow progress with regards to disarmament, it is my belief that we should continue to improve nuclear verification methods and techniques to keep up with the changing non-proliferation landscape. If we fail to do so, we might not only impact international safeguards, but also the future prospects of peaceful nuclear applications.

During the last two decades we have seen three major developments related to nuclear non-proliferation:

- › the increased dissemination of nuclear technology and nuclear “know-how”, particularly in light of renewed interest in nuclear power;
- › a renewed drive on the part of a few States to acquire technology suitable for nuclear weapons purpose;

- › the emergence of clandestine procurement networks.

Under the NPT regime, there is nothing illegal about any State having enrichment or reprocessing technology. However, we ought to ensure that nuclear material and infrastructure is not used for illicit and non-peaceful purposes. Better control of access to nuclear fuel cycle technology is being explored through initiatives such as multinational approaches for enrichment and reprocessing.

We cannot address detection of clandestine efforts to acquire nuclear weapons, as well as operations of clandestine nuclear procurement networks through discrete initiatives. To address these issues, the IAEA requires global support in effective nuclear verification. We also need to be able to tap into the latest verification technology.

Access to Nuclear Fuel Cycle Technology

In recent years, many countries have gained sophisticated engineering and industrial capacity, which is necessary for development and should be welcomed. However, at the same time, nuclear technology has diversified, making it harder to track illegal or clandestine global procurement and sales. Electronic communication has made it easier to transmit component designs and other information. And many types of sensitive equipment and materials are classified as “dual use”— meaning that they could have both nuclear and non-nuclear applications — making it harder to maintain export controls.

A relatively small number of countries have mastered part or all of the nuclear fuel cycle, that would enable them to

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enrich uranium, produce fuel for power and research reactors, and reprocess spent fuel for re-cycling and waste disposal.

More countries are gaining this expertise, which gives rise to concerns regarding the resulting margin of security. The acquisition of high-enriched uranium or separated plutonium is generally considered to be one of the most difficult steps towards making a nuclear weapon. By having access to nuclear material, or the capability to produce such material, a country has passed this step. Therefore, if a country with a nuclear fuel cycle to produce enriched uranium or plutonium were to decide to break away from its non-proliferation commitments, nuclear weapons capability could be within reach in a relatively short time.

Consequently, the IAEA and others have been exploring options for how the most sensitive aspects of the nuclear fuel cycle—uranium enrichment and plutonium separation—might be better implemented. The overall concept would be to move towards multinational arrangements for these types of operations. This would not happen all at once; as currently envisioned, it would progress through series of phases:

- ❶ First, by establishing mechanisms that would assure the supply of fuel for nuclear power plants;
- ❷ Second, by developing, as needed, similar assurances for the acquisition of nuclear power reactors;
- ❸ Third, by facilitating the conversion of enrichment and reprocessing facilities from national to multilateral operations, and by encouraging countries to limit future enrichment and reprocessing to multilateral operations.

The importance of assurance of supply is that by providing reliable access to reactors and fuel at competitive market prices, the justification is removed for new countries to

develop their own front end fuel cycle capabilities. But this means that the mechanism to assure supply must be reliable and credible in order to ensure that whichever country needs nuclear fuel or reactor technology will get it, provided that certain non-proliferation criteria have been met.

A number of governments, industry groups and other organizations have been offering ideas and initiatives on how to facilitate progress with the assurance of supply. These ideas were further discussed at a “Special Event” of the IAEA General Conference in Vienna in September 2006. Based on those presentations, a road map is being prepared for approval by the IAEA Board of Governors.

Supporting Nuclear Verification

It is evident that optimizing the effectiveness of nuclear verification can only be achieved with the necessary support.

One key to the effectiveness of verification is the extent of access that IAEA inspectors are given to information and locations. This access is governed by the legal agreements concluded between individual countries and the IAEA. In today’s security environment, inspections that only verify what a country has declared under a comprehensive safeguards agreement are not likely to be considered effective enough, in terms of the degree of assurance they provide.

On the other hand, the expanded access provided by the additional protocol to safeguards agreements has, in recent years, clearly proven its worth. The additional protocol enables Agency verification efforts to focus not only on what has been declared, but also on possible undeclared activities. It was agreed upon in 1997, as a development that grew out of the case of Iraq’s nuclear weapons programme in the early 1990s.

The main problem with the additional protocol is that it has not been universally applied. As of 31 January 2007 only 78 states had additional protocols in force. This limited number falls well short of the goal.

The IAEA’s verification efforts will not be regarded as “fully effective” as long as its inspection rights remain uneven from country to country. For the nuclear non-proliferation regime to be regarded as credible, it seems clear that comprehensive safeguards agreements together with the additional protocol must become the universal standard for how nuclear non-proliferation commitments are verified.

As a side note, I should point out that both safeguards agreements and additional protocols are focused principally on nuclear material and activities. Therefore, the IAEA’s legal authority to investigate possible parallel weaponization activity is limited, unless there is some nexus linking the activity to nuclear material.

It is also important to consider that another core reason for verification is to build confidence. In recent years, we have seen that there are cases where proliferation concerns have created a confidence deficit, where even the access rights of the additional protocol may not be sufficient. In such cases, additional “transparency measures” should be made available if called for.

A Challenging Way Forward

In the context of the changed non-proliferation landscape, the IAEA must continuously ask: as we look to the future, what can be done to assure ourselves and our Member States that the IAEA, as the international nuclear verification organization, will be “staying ahead of the game”? With the global reach of our responsibilities, and the continuous need to sift through vast amounts of information, how can we be sure that we are looking in all the right places? And how do we prioritize, using our limited resources to the best advantage?

- To enhance environmental sample analysis capabilities;
- To enhance the IAEA’s satellite imagery acquisition and analysis capabilities;
- To broaden and intensify information collection and analysis capabilities;
- To maintain an efficient and secure safeguards information infrastructure.

By entrusting to an impartial, independent IAEA inspectorate the task of verifying the peaceful use of nuclear technology, the international community has taken an important step towards improving the transparency of nuclear activities and thereby indicated its strong support for international peace and security. We take this responsibility seriously as we face a future with new and changing challenges.

As we explore application of multinational approaches, assurances of fuel supply, strengthening universal stand-



Verification measures are also confidence building measures. Here, samples of nuclear material await further analysis at the IAEA’s Clean Laboratory for Safeguards in Seibersdorf, Austria. Photo: D.Calma/IAEA

Our objective is to provide credible assurances to the international community that States are honoring their safeguards obligations. In order to do so we have identified several key priorities:

- To implement new Safeguards approaches for new challenges, new facility types and new operating conditions;
- To optimize safeguards equipment and technology development to further improve present detection capability, among other goals;
- To pursue research and development on novel technologies for the detection of undeclared activities;

ards for the application of safeguards, and utilizing the latest available verification technologies, we look to the international community for support in the continued evolution of nuclear verification. The continuous support of IAEA Member States is vital to ensure that atoms are used only for peace.

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