Preparing for Future Verification Challenges

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Identifying the Right Skills and Expertise for the Challenges of the 21st Century:
Where to Find Them? How to Retain Them?

Remarks by Pierre Goldschmidt

Safeguards Challenges of the 21st Century

The anticipated expansion of nuclear energy worldwide during the first half of the 21st century will raise considerable challenges, not only for the nuclear industry but for IAEA Member States and the Secretariat in particular in the areas of nuclear safety, safeguards, and security.

During this period, it is also expected that the IAEA will play a significant role in assisting states in the verification of their nuclear disarmament commitments, which will require highly specialized technical skills and the use of new sophisticated equipments.

1. Nuclear Expansion

The expansion of nuclear energy will not be limited to large nuclear power plants (NPPs) for electricity production, but will include new types of reactors and additional fuel-cycle facilities such as conversion and fabrication plants (including for MOX fuel), enrichment facilities (including based on the laser process), as well as reprocessing, spent fuel storage and conditioning plants. The verification of these facilities will significantly increase inspection efforts in the field and state evaluation work at IAEA headquarters. As an example, if the IAEA were tasked to verify a large reprocessing plant in India (as it does in Japan), that alone could require an increase of 5 to 10 percent of its present inspection effort in the field.

Since nuclear expansion will take place to a significant extent in countries which have so far no significant nuclear activities and expertise, the IAEA Secretariat will have to invest more time and effort to assist countries establishing State Systems of Accounting for and Control of Nuclear Material which are technically competent and provided with adequate authority, resources, and independence. This is essential for the implementation of efficient and effective safeguards verifications.

Among the many new challenges that the Department of Safeguards will have to face in the future is establishing a credible approach for safeguarding nuclear propulsion reactors, including in submarines belonging to non-nuclear-weapon states. Considering such developments in Brazil, this is not a theoretical prospect.

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2 In particular if inspectors were to work in two or three shifts in situ.
2. Nuclear Disarmament

PMDA

Although the IAEA’s primary role is the verification of the non-proliferation commitments of States under the NPT, its Statute (under Article III.A.5) provides for a possible role in assisting states in the verification of nuclear disarmament. One recent example is the Protocol, signed on April 13, 2010 by the United States and Russia, amending the “Plutonium Management and Disposition Agreement” (PMDA) originally signed in 2000. Under this agreement, each country has pledged to get rid of no less than 34 tons of weapons-grade plutonium withdrawn from their respective nuclear weapons programs.

It is essential to convince the international community that the 68 tons of plutonium declared as no longer required for military purposes (enough for the fabrication of some 17,000 warheads) will “remain permanently outside of military programs.” This can be best achieved by placing the plutonium under IAEA monitoring. The PMDA provides for the possibility of IAEA verification and calls for consultations “at an early date” with the IAEA to work out verification arrangements.

The PMDA contains no mechanism to ascertain that the weapons-grade plutonium delivered under the agreement actually originates from “pits and clean metal.” This could be done if the IAEA is allowed to use at the conversion stage the technical tools which were developed under the Trilateral Initiative (launched in September 1996 by the United States, Russia, and the IAEA) in order to implement a new IAEA verification system for weapons-origin fissile material removed from defense programs.

The Trilateral Initiative sought to bring under IAEA monitoring classified items containing plutonium of weapons-origin specified as having been released from defense programs possibly including nuclear warhead components and pits. The initiative also sought to ensure that these items would be permanently safeguarded, unlike material submitted to IAEA monitoring under existing voluntary agreements.

DPRK

If the DPRK were to return to the NPT and agree to dismantle its nuclear weapons program, one should expect that the IAEA will contribute significantly to the corresponding verification activities as it did when South Africa decided to give up its nuclear arsenal and weapons capability.

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3 The United States was willing to submit pits for verification, but Russia decided it would melt its pits into 2 kg balls before submitting the material (containing plutonium with classified isotopic composition but not classified shapes) for U.S. or IAEA verification. See Global Fissile Material Report 2008, p. 72, available at: http://www.fissilematerials.org/ipfm/site_down/gfmr08.pdf

Verifying the FMCT

Although an agreement on (and entry into force of) a Fissile Material Cut-off Treaty (FMCT) is still a distant possibility, it could have a major impact on the IAEA, which should logically be tasked to verify compliance.

Human Skills and Expertise: Where to Find? How to Retain Them?

As illustrated by aforementioned tasks and as emphasized by Mohamed ElBaradei, it is obvious that “safeguards inspectors will increasingly need not only to be knowledgeable about traditional and advanced fuel cycles and plant operations, but also to possess sophisticated analytical skills in the detection of early signs of weapons development.”

Against this backdrop, the IAEA faces an incipient crisis in staffing. Much needs to be done to ensure that the IAEA is able to attract and retain top quality professionals required to carry out its multiple missions particularly in highly technical specialties that are also in demand in the private sector.

We all know how easy it is to identify the weaknesses of the way the IAEA Secretariat is functioning and to make recommendations on possible corrective actions, but how difficult it is difficult to implement them in practice.

For over two decades, nuclear energy has been so unpopular and its future so bleak that fewer and fewer students have opted for nuclear engineering studies. This resulted to a large extent in the disappearance of university programs offering such courses. Now that many Western states are reconsidering there nuclear phase-out policies and an increasing number of countries are envisaging the construction of their first NPPs, the current demand for qualified nuclear scientists, engineers, and technicians cannot be satisfied by universities and other high education institutions. Major NPP vendors and operators have therefore established their own internal nuclear education and training courses to meet their needs. There is, nevertheless, a clear competition to attract the most talented young graduates.

For the IAEA Department of Safeguards the difficulty to recruit experienced inspectors and safeguards specialists, including open source and satellite imagery analysts, is compounded by the fact that those skills are not readily available in the professional market and that not all of them are prepared to work abroad. Additionally, for young nuclear engineers to become a safeguards inspector or specialist and work for five or more years for the IAEA has generally not been seen by the nuclear industry as a very useful experience, thus making it more difficult to find a high-level job in their home country after departing from the Agency.

This may change in the future. As has been highlighted by the European Nuclear Society High Scientific Council, “as a manifestation of their strong commitment to non-proliferation, it is important for the nuclear industry to pay special attention to and promote proliferation-resistant designs and to take safeguards requirements into account at the design stage.”

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Moreover, the impressive IAEA Safeguards Departmental Training Programme for 2010 demonstrates how much the Department is investing in training its own staff (with the active support programs of many Member States). The sophisticated skills acquired while working at the Department of Safeguards should be a great asset for its staff to find key jobs back home either at the national level (e.g., improving the effectiveness of State Systems of Accounting for and Control of nuclear material) or in the nuclear industry.

As has been underlined in 2010 by the Agency’s Auditor\(^7\), in order to better attract and retain the needed specialists, it is necessary to reconsider both the IAEA’s so-called “rotation policy” of offering only three-year initial contracts (which may be extended to five or seven years, and only in limited cases for longer periods) and the Agency’s salary structure.

I have recommended some seven years ago that the IAEA be allowed to offer any new staff the choice between the present contract system and the possibility to sign a contract similar to those offered in the private sector. In a nutshell, this would consist, after a one-year probation period, to offer a long-term contract (of undefined duration) with the understanding that the Agency would have the right to terminate the contract at any time as long as it provides a well-defined prior notice period and compensations at a level commensurate with the duration the staff has worked for the Agency. This would have the double advantage of allowing the Agency to retain those specialists who are performing well and have the possibility to dismiss those who are underperforming.\(^8\)

It is also well known that other organizations such as the Euratom Safeguards Agency as well as European and North American research centers and national laboratories are paying their staff more than their IAEA counterparts.

In such cases, Member States should give the Director General flexibility to offer competitive terms to specially qualified and indispensable personnel, and well defined exemptions should therefore be sought, if needed, from the regulations of the UN Common System.

It has also been underlined that “Poor succession planning and rigid retirement and rotation policies significantly undermine the ability of the IAEA to attract and retain expertise in mission-critical areas including nuclear fuel cycle technologies, information analysis and environmental sample analysis.”\(^9\) Solutions exist\(^10\) but this topic would bring us beyond what can be discussed within the timeframe of this presentation.

Let me conclude by saying that the biggest problem faced when trying to improve the present system is overcoming the almost universal resistance to change. Necessary changes and improvements will only occur if they are fully supported by the Director General, top management and concerned staff and, last but not least, by IAEA Member States.

\(^7\) The Agency’s Accounts for 2009, Audit Opinion (§§ 152-163), July 2010, GC(54)/3.
\(^8\) Unless the situation has changed over the last five years, it is incredibly cumbersome and time consuming, if not impossible, to dismiss poorly performing staff with long-term contracts at the IAEA.
\(^10\) For instance, the Department of Safeguards could have access to a network of outside experts in the fuel cycle or weaponization technology available at short notice and for short duration missions, e.g. to accompany IAEA inspectors in the field or support analysts at IAEA headquarters.