

# Chapter 13

## The “What” and “Who” of Nuclear Safeguards



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The speakers in the previous session have highlighted the history and importance of nuclear safeguards, and, very importantly, the synergies between safeguards and security.

I will begin my comments with a quote from Taro Varojanta, the IAEA Deputy Director General for Safeguards, who spoke last summer at the 50th Anniversary of Los Alamos National Laboratory’s role in safeguards. This is what I consider to be the “What” of safeguards:

...we all agree that deterring the spread of nuclear weapons is one of the top security priorities of the international community, and that IAEA safeguards must and will continue to make an indispensable contribution to this effort. The safeguards mission will remain the same: to detect and deter the diversion of nuclear energy. Nuclear material accountancy and verification in the field remain at the core of this effort.

He then provided the following statistics that capture the IAEA’s activities during 2016. This list illustrates what a very heavy workload the IAEA has; one that has only grown in recent years with no corresponding increase in resources:

- implemented safeguards in 181 states, 129 of which have Additional Protocols
  - this includes over 204,000 significant quantities of nuclear material under safeguards at 1290 nuclear facilities and locations outside of facilities are under safeguards
- IAEA conducted 3007 inspections, including 13,275 verification days in the field
- 1077 samples were collected
- 1057 Non-Destructive Assay systems were deployed
- 1436 cameras were installed.

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If nuclear material accountancy and verification are the “what” of safeguards, then the “who” becomes a very critical question. For there to be confidence in the safeguards system, experts are needed at the facility, national, and IAEA levels to carry out these important tasks.

Certainly, the safeguards mission is supported by a growing array of technologies, many of which are capable of feeding data to directly to national authorities or to the IAEA.

But given the number of kilos of material to safeguard, the expanding numbers of facilities holding that material, the challenges of decommissioning growing numbers of aging nuclear facilities, and the ultimate need for human judgment, I suggest that we look particularly at the question of “who.” How do we as an international community ensure that each facility with a safeguards responsibility fully understands what that entails, has trained and experienced experts who understand and implement that responsibility, and interact with a team of experts at the national level, who, in turn, interact with the IAEA. On top of this we can add what DDG Varojanta called “extraordinary events.” The Joint Comprehensive Plan of Action (JCPOA) could fall under such a category; eventual access to the DPRK would be another.

Facilities, nations, and the IAEA are increasingly challenged to produce enough qualified people to fill the requirements for safeguards experts. The IAEA has documented for years that it is being asked to do more with less. We have all experienced similar situations. In my last position at NNSA, we prioritized based on what actions were legally required—what was captured in a domestic law or fell under an international treaty or agreement.

In the case of safeguards, the requirements at nearly every level meet the test of being legally required: facilities are required by their regulators; regulators have their requirements stipulated by law; and the IAEA safeguards are required by treaty. If there are all of these layers of requirements, should we be very concerned about the future of safeguards expertise?

The IAEA Safeguards Traineeship Programme provides an important channel for building that expertise, focusing particularly on candidates from developing countries and qualifying them for a position as safeguards inspector in the IAEA or in their respective national nuclear organizations. It is an important programme, but it has its PROS and CONS:

PROS:

- Focuses particularly on candidates from developing countries and qualifying them for a position as safeguards inspector in the IAEA or in their respective national nuclear organizations
- Traineeship develops technical skills and competence; gives trainees opportunities to broaden their knowledge of the peaceful nuclear applications.

## CONS:

- Many applicants lack basic qualifications
- Very small throughput compared to need—6–8 every 2 years
- Many successful individuals often take jobs at IAEA or other places and do not return to share their expertise with their home countries.

Countries with larger fuel cycles may already have personnel familiar with State Systems of Accounting and Control (SSAC) who are up to speed and qualify more easily for the traineeship. Unfortunately, if these individuals are successful in the traineeship programme, they often take extended appointments at the IAEA or other places and do not repatriate their newly developed expertise.

Safeguards resources are also being strained by the importance of the JCPOA mission and other special teams—for example, for the DPRK—and will require more dedicated personnel. These special missions often absorb the best and brightest, giving rise to the concern that with so many of the most competent people focused on one or two countries, is enough expertise left for the other 180 countries.

Dedicated country teams also mean that experts are not following the usual pattern of rotating to different teams and sharing experience and ideas with others. Loss of this kind of institutional memory can have a long-lasting impact on the safeguards mission.

In addition, the geographic and gender distribution requirements for the IAEA also present challenges. Diversity is very important for personnel development, especially in an international organization, but safeguards expertise is not the result of a few months of training. For example, an infectious disease epidemiologist once recounted that it takes about 10 years for a qualified life scientist to become a qualified epidemiologist. The expertise, field work, and instincts are something that only come with time. The same could be said in the safeguards field.

When DDG Varajanta was asked recently: what keeps you up at night? He responded: “Not having qualified staff at all levels, not just inspectors, but those who review and analyze the data.”

So what can we do in the future to address this challenge and find a way to help the IAEA and individual countries develop a larger talent pool to fill the current and future safeguards needs?

One idea that I have heard from my European colleagues is to have IAEA Member States—or groups of Member States—with experience and facilities offer a kind of preparatory course for those interested in safeguards. The experience would aim initially at better preparing personnel with facility or national responsibilities, and make them more competitive when applying to the IAEA traineeship programme. The immediate result would be to strengthen national systems, but ultimately such an effort could reinforce the IAEA system.

Some of this is already happening through the network of nuclear centres of excellence—and we will hear about the Japanese experience in the next talk.

In closing, I want to emphasize how important it is for our safeguards experts to be fit for purpose: they must have the training, expertise, and experience necessary.



**Fig. 13.1** IAEA News & Events Source (<https://www.iaea.org/newscenter/news/a-day-in-the-life-of-a-safeguards-inspector>)

And with an aging workforce, we also need to keep in mind that inspecting a nuclear facility also requires days of walking around sometimes vast buildings, climbing ladders, and other similar physical tasks.

I was reminded of this by a slide from an IAEA presentation that outlined what a routine inspection of a nuclear power plant would be (Fig. 13.1).

So when we say that safeguards experts need to be fit for purpose, that may also include being physically fit.

Thank you and I look forward to our discussion.

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