Safety and Security
Working together for a responsible nuclear development.

Denis FLORY

International Atomic Energy Agency
Deputy Director General
Nuclear Safety and Security

1. Introduction

In 2003, I remember writing a paper for a workshop of the European Safeguards Research and Development Association (ESARDA) with the following title:

Safeguards and Security
A challenge for the future?

This was from the perspective of an expert working in the frame of a TSO (Technical Support Organisation) active in Safeguards and in Security, as well as in safety. But Safety did not seem to be the issue at this time. Or more precisely, from my point of view, the issue of relations between safety and security did not seem so much of a challenge conceptually speaking.

Today, seven years later and just a few weeks as an IAEA staff member, dwelling at the ninth floor of building B overseeing the Danube, supported by a Department whose name is precisely Department on Nuclear Safety and Security, I have come to a different point of view.

2. Background

But let us first start with the background of this year 2010.
Sixty five countries have declared they were considering developing the use of nuclear energy. Among the "old timers" of nuclear energy, those who had decided to phase out nuclear energy are considering phasing out the phasing out, those who had stopped all development consider or have started new developments, and those who had carried on, become more mature and consequently intend to become global actors in the development of nuclear energy.

For all this to happen in the real world, some things need to be taken care of: hardware, financing, workforce.
Hardware or nuclear technology is proposed by an increasing number of vendors old and new, with a wide spectrum of power output and technologies.

Financing is a difficult subject which I do not master; I shall stay silent.

Workforce means recruiting, educating, training. Many countries have recently launched education and training programmes, the Agency is active in this field; some vendors have created their own training facilities.

I said "for all this to happen in the real world" now I shall add "to happen in the real world in a sustainable, responsible way, guaranteeing the benefits for society". And this is where safety, security, and the guarantee for non-proliferation become crucial elements of a nuclear programme. Safety, Security and Safeguards have been for a large part my daily concern for ten of the last fifteen years at a national level, they are to be my direct daily concern (at least Safety and Security), with a global view for the foreseeable future.

3. A view from the ninth floor

Let us now turn to the hard facts I found on my desk on 30th August when I took the office of DDG-NS at the International Atomic Energy Agency.

I discovered the existence of a process: a joint task force gathering representatives from the Advisory Group on Nuclear Security – Adsec- and the Commission on Safety Standards – CSS.

I also discovered the latest report by the International nuclear safety group (INSAG-24), with the following title: “The interface between safety and security at nuclear power plants”, freshly published this August.

In total honesty I should also add that part of the road map I was given by Director General Amano included a particular attention to the relations between Safety and Security in the wake of the nuclear security summit in Washington.

To better understand this relationship, to identify today’s starting point, and to pave the way to the future, I felt the need to go back to basics, and to review some key elements of Safety and Security.

4. Some key elements in Safety and Security

4.1. Safety

One of the “recent” founding events for nuclear safety, is undoubtedly the Chernobyl accident. It is particularly so for the IAEA which decided to create a Department for nuclear safety in the aftermath of 1986 (true, not immediately…). Chernobyl was the starting point for three safety-related international Conventions, it accelerated the spread of the founding principles underlying the constitution of independent safety regulators, and it highlighted the need for a strong scientific basis for safety.

Already before Chernobyl, but even more so today, it is a well accepted and documented fact that Safety is about the protection of the public and society against accidental release of radioactivity.

Nuclear Safety knows two major actors: the Competent Authority, and the Licensee. A third actor: the Safety Expert in support to the Authority is also an integral part of nuclear safety (see for example the conference in Tokyo on the role of TSOs this month). In a "somewhat summarised" process, the licensee provides a safety case, the safety expert assesses the file based on sound scientific and technical knowledge, and gives advice to the authority, who decides to accept the licensee's case, have it amended, or to reject it.

As concerns the Agency, safety standards have a long history, their development follows well established processes and rules, continuously improved, under the wise supervision of four committees and a Commission.

4.2. Security

For Nuclear Security the active history probably started in the early 90s, with the end of the Soviet Union. Hints about weak security at nuclear facilities made the headlines, back in August 1994, when elements of illicit trafficking of Nuclear Material were discovered in Germany, coming from the East. These trafficking events, as well as the numerous ones entered later in the database created by the IAEA, point not only to the weaknesses of the security systems, but also to the deficiencies of the concerned SSACs.

As concerns international instruments, the founding stone is the CPPNM, adopted in March 1980. Concerns about the security of Nuclear Material had been addressed earlier through the first recommendations for the Physical Protection of nuclear material in 1972, regularly reviewed since that time.

Later, though there was nothing Nuclear in the terrorist attacks on September 11, 2001, they violently shook the Nuclear Security Community around the world.

The relevance of the traditional elements of detection, delay and response were questioned, the protection against theft of Nuclear Material came as second to sabotage, and the security of radioactive materials became an issue.

The perceived risks to be fought shifted. The main thrust of nuclear security was formerly oriented against the possession by a sub national group of enough nuclear material to build a crude nuclear explosive device. The destructive possibilities of such a device, or simply the associated power for blackmail, combined with the non applicability of nuclear deterrence usually associated with the possession by States, were at the core of Physical Protection systems designed in the 70s through the 90s.

Today, even if we must not forget this risk, it is also seen in conjunction with the risk of voluntary release of radioactivity, either through the theft of radioactive material followed by its dispersal, using explosives in a Radiation Dispersal Device, or through the sabotage of a nuclear facility. Potential casualties may be at a lesser level (and they would clearly be so for a RDD), but consequences on democracy, on the organisation of Society, would also be immense. This recognition of the risk of sabotage makes somewhat more clear also, today, that the objective of nuclear security is not so much protecting Objects, than protecting the public against radiation risks.

These considerations are nearly identical to those relevant for Nuclear Safety, and indeed, 1998 saw a proposal by a State for an amended CPPNM, closely resembling the Convention on Nuclear Safety.

However, what 9/11 told us is that there is no such measure of risk as a probability in Security matters. Before 9/11, I do not know that any Physical Protection regime had even considered a massive suicidal attack, through the use of a commercial aircraft, even as a 10^{-8} probability. In Nuclear Safety, external events such as earthquakes, flooding, even if unpredictable, have a time history, they follow the laws of physics, and the imperfect knowledge of these laws can be partially compensated by probability laws.

Another specific feature, readily seen in the main security events, is that whether successful or not, intelligence services are a main actor of nuclear security. In the illicit trafficking cases, their role in detecting (initiating?) the illegal acts, is certainly very strong. In terrorist attacks, their long term work in listening, following, infiltrating, is at the basis of detecting possible attacks. It is also at the basis of the prevention, through informing on the current level of threat, against which to benchmark the security level.

As a consequence, in the case of Nuclear Security the spread of major actors is more complex than for Safety, they come from broader horizons. You must consider Security experts (a variation of the Safety experts), the special services involved in assessing the threat, the so-called response force to oppose violent aggressors, and also a new key actor: the State. The potential aggressor is unfortunately also to be considered.

A common actor for both Security and Safety, and a key actor too, is the personnel of the Nuclear Facility, who is asked to develop a Safety Culture, enshrined in the Convention on Nuclear Safety, and at the same time a Security Culture, now recognised as being a fundamental element of nuclear security.

As concerns the Agency, the structure of what is today the Department for nuclear safety and security followed this evolution. The office of nuclear security was born inside Safeguards when the principal concern was the theft of nuclear material, then moved towards Safety with the shift of concerns.
The process for developing guidelines (should I say standards?) started also recently, and is still very much on a learning curve. The creation of a Committee for reviewing the documents produced by the Agency, decided, has still to be implemented. Its composition should take stock of the experience accumulated in safety, but also of the specifities identified above.

5. Bottom-up or top-down?!

Let us now try to forget one moment the issues of structure, history etc. and look from two different perspectives: that of the industry (designer, operator) and that of a “newcomer country”.

In a bottom up approach, for the industry, the case seems clear enough. A designer of a nuclear facility is interested in designing an object which includes from an early stage elements which shall render its product attractive, answering the concerns of the client. Whether a private company or a State, this client has today to address the protection of the public against accidents, but against security risks as well. Addressing both at the same time, at the design stage, and in the limits fixed by the State (the Design basis threat), is an obvious path, as has been researched by INSAG for NPPs. The operators have no other choice than to address both: it is their recognised responsibility. In their search for best practices, WINS can have a very positive influence on the responsible operation of nuclear facilities.

A newcomer often starts with a blank page for nuclear security and nuclear safety. It is then the responsibility of the international community, most often through the IAEA, to show the most effective path to build the regulatory framework to answer the legitimate safety and security expectations of the public. To answer these expectations, the IAEA should develop a guidance capability on the most effective way to organise and federate the various actors of security.

A focal point for federating security actors at State level should be the licensing process of the facility, in its entirety. This is certainly an effective way to focus the creation of the legal framework; this is certainly an effective and efficient way to assess the capability of the design to answer security and safety requirements; this is also a great opportunity to inform the public and Society in a dispassionate way of the responsible approach taken to protect human health against all risks: natural, technogenic or malicious.

6. Transparency vs. Confidentiality

This raises the issue of confidentiality, often quoted as an essential limitation to closer links between safety and security. It is true that in Nuclear Safety, transparency is an obligation, while in Nuclear Security, it is often an offence. But today's thoughts about "society's chosen level of protection" embedded in precautionary approaches clearly ask for some level of information of the public. A complex subject…. which I shall keep for another day.

7. To conclude

Back to where I began, my view today of relations between safety and security is no longer that which I had in 2003.
It is certainly an issue today, in terms of the effectiveness of protecting the public, society and the environment, …with the best value for money;
It is certainly an issue, in terms of guiding different systems, from different historical backgrounds, towards the same goal, without losing respective qualities of both systems;
It is an issue today in terms of finding the right structure to federate very diverse security actors around the protection of the public through protection of a nuclear facility.

But the developments that happened these last years during my life in Moscow, away from safety and security, confirm my conviction that it is not a conceptual challenge, but one which may be solved in a very pragmatic way, and which I hope I shall not pass on to my successor!!

Thank you for your attention.