Input of ESARDA to SET draft Issues Paper No.10, 'Nuclear'

Introduction

ESARDA is an association of European organisations[1] formed to advance and harmonise research and development in the area of safeguards. It also provides a forum for the exchange of information and ideas between nuclear facility operators, safeguards authorities and persons engaged in research and development. ESARDA was formed in 1969 with the purpose of facilitating collaboration in R&D in the field of safeguards and in the application of such R&D to the safeguarding of source and special fissile materials.

In 2010, ESARDA launched a Reflection Group, inter alia to assess: the international and European context and trends in nuclear non-proliferation and safeguards, security and disarmament verification areas; their impact on ESARDA's research and development activities; and whether further actions and activities were needed in order to meet ESARDA members' needs at European and international level. This Input Paper to SET draft Issues Paper No.10, 'Nuclear', provides a summary of the ESARDA President's understanding of the consensus view of the ESARDA 2010 Reflection Group as recently reviewed and discussed between the Parties of ESARDA.

Issues Considered by the ESARDA Reflection Group

Over the last fifteen years, important developments in the field of global security have impacted upon international safeguards, nuclear non-proliferation, nuclear security and nuclear disarmament verification. At the same time, the concept of a nuclear "renaissance" took root with an expansion in ambitions for the civil use of nuclear energy and nuclear fuel cycles, both within the EU and worldwide, including new actors and a wider diffusion of nuclear materials and technologies.

Various events over the period included DPRK nuclear tests and Iran's nuclear programme developments; the entry into force of Integrated Safeguards in all EU Member States; the 2010 and 2015 NPT Review conferences; and a new IAEA Director General. One of the most important issues was the evolution in IAEA safeguards and their impact on Euratom safeguards. The "Integrated Safeguards State Level Approach" introduced by the Model Additional Protocol resulted in an extended framework and approach. IAEA safeguards are currently further evolving under the so-called "State Level Concept", which will result in State Level Approaches in all States that have a safeguards agreement with the IAEA.

Conclusions on the absence of undeclared activities in a State need to take into account not only the "classical" accountancy of nuclear material at facility and State level, but also the coherence of a broader set of indicators, including satellite imagery analyses, environmental sampling and trade data.

[1] The Parties to ESARDA are: AREVA, ATI, CEA, CNCAN, EDF, ENEA, ETC, DG JRC, FZJ, HAEA, EK, IRSN, MINETUR, NNL, NRG, NRI Rez, PAA, SCK/CEN, Sellafield, Springfields Fuels, SSM, STUK, SUJB, UKAEA, University of Hamburg, University of Liege, University of Uppsala, URENCO, VATESI and WKK.

This approach, which seeks to utilize all safeguards-relevant information, is supported by a system of short-notice, unannounced inspections and complementary accesses aimed at a more efficient and "objective-based" implementation of safeguards.

The DPRK nuclear tests, as well as the prolonged debate on the Iranian nuclear programme, showed the ever-increasing threat of nuclear proliferation. In this context it became clear that, much more than nuclear material illicit trafficking, the key element assisting these new programmes was and is the spread of dual use technology.

The European context has also strongly changed since 2003 with (inter alia): establishment of the European security policy and the European Strategy against WMD (2003); development of the European Union Common Foreign & Security Policy; and the entry into force of the Lisbon Treaty, bringing a new organisation and a new scope in particular with the introduction of a Permanent President of the EU beside the Rotating Presidency by Member States, and the creation of the new European External Action Service, chaired by the High Representative of the European Union for Foreign Affairs.

The EU confirmed its desire to strengthen the NPT as the cornerstone of the international nuclear non-proliferation regime, favouring a balanced approach between its three pillars: non-proliferation, disarmament and peaceful uses of nuclear energy.

Assistance and verification activities within a scenario of expanding nuclear energy will have to cope with the zero-growth budget of the IAEA, and with the retirement of many experienced inspectors. The latter fact may raise some concern but, at the same time, offers the IAEA the opportunity to move towards the new objective-based approach by recruiting staff with different competences, including investigative and analytical skills in addition to traditional accountancy skills. Notwithstanding, of course, that traditional measurements remain the basis of a verification system.

Analysis of the situation within Europe showed that most of the open issues and alternatives relate to the back-end of the nuclear fuel cycle. Reprocessing is still the main option pursued by France. Most Member States have chosen to put their nuclear waste in long-term dry or wet storage before final disposal. The most serious problems remain with high-level waste, where there is no clear strategy. Only Finland and Sweden have selected final disposal sites and started construction and commissioning activities.

New reactor concepts are developed within the Generation IV Forum and the IAEA's INPRO project, bringing about new fuel cycle facility types and materials. Besides considerations of proliferation resistance, the so-called Safeguards by Design approach was launched by the IAEA in 2008 and fully supported by many Member States.

Conclusions drawn from the ESARDA Reflection Group

The requirements of safeguards should be considered an integral part of the planning within a nuclear "renaissance", including the continued requirements for verification within so-called "Proliferation-Resistant" technologies:

- "Safeguards by Design" activities should be promoted to support the IAEA and Member States in the development of safeguards concepts for new facilities.

Measures within both nuclear safeguards and nuclear security aim to prevent harmful effects from the malevolent use of nuclear materials. There are technical synergies between prevention, detection and response actions in security and safeguards, but also differences that need to be taken into account: e.g. the level of accuracy and reliability needed by radiation detection equipment, or the timeliness of surveillance activities.

- A technical interface should be created between nuclear security and safeguards.

High-Performance Trace Analysis/environmental analysis and so-called nuclear forensics have experienced significant developments in recent years, which now support safeguards conclusions.

- The technical convergence of nuclear safeguards, nuclear forensics and nuclear security should be emphasised by developing methodologies that serve all three purposes.

Export control is a barrier to the diffusion of dual use items and technologies.

- The diversity and synergies between actors associated or contributing to export control, ranging from suppliers to regulators, R&D and education, as well as international organisations (IAEA and EURATOM), should be exploited to strengthen the appreciation of safeguards requirements amongst suppliers.

Remote monitoring, and development of Non-Destructive Analysis (NDA) and Containment/Surveillance (C/S) used remotely, with an appropriate degree of authentication, are activities recommended by EURATOM and IAEA.

- Technical synergies between the application of remote monitoring techniques within safeguards, security and safety, should be exploited to the extent possible.

Risks associated with cyber-security have increased since 2010 and there is a need to work in this area.

- The ESARDA Reflection Group recommends that the safeguards community increase their appreciation of cyber-security topics.

Finally, education and training, in particular a wider appreciation of safeguards within the nuclear industry and suppliers, will remain an important priority.

- Training should address potential customers in the safeguards/security community, including policy makers.

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