

INTERNATIONAL CONFERENCE ON EFFECTIVE NUCLEAR REGULATORY SYSTEMS Facing Safety and Security Challenges

Summary and Conclusions of the Conference by the President Laurence Williams¹

Background to the Conference²

The Member States of the IAEA have been working towards the acceptance of a global safety and security regime based on strong national infrastructure for over 30 years. The first IAEA standards were produced in the mid 1970s. After the accident at Chernobyl, two new Conventions were introduced: the Convention on Early Notification of a Nuclear Accident and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency. In 1991, an international conference on the safety of nuclear power facilities was hosted by the IAEA to develop a comprehensive strategy for the future.

This conference started the process to develop binding legal instruments that resulted in the Convention on Nuclear Safety (CNS). The CNS, which currently has 56 signatories, has been very successful. Since the CNS, the Joint Convention on the Safety of Spent Fuel and the Safety of Radioactive Waste Management (Joint Convention), the Code of Conduct on the Safety and Security of Radioactive Sources, and the Code of Conduct on the Safety of Research Reactors have been introduced to complement the CNS in these areas. Over recent years the structure, format and content of the IAEA standards have been developed further to become the global reference for the delivery of high standards of safety, radiation protection, radioactive waste management and the safe transport of radioactive materials.

Unlike safety, there are no international standards for security. Nuclear safety is about designing and operating facilities and activities to prevent the accidental release of radioactivity into the environment. Security, however, is about the need to protect materials and facilities from theft, misuse, attack or sabotage. In the case of safety, there has been a tendency to be open and transparent but in the case of security there is a tension between transparency and confidentiality needed to prevent the misuse of information for terrorist or criminal purposes. However, the IAEA is currently developing guidance on security issues.

The title of this conference is “Effective Nuclear Regulatory Systems”, therefore the key theme is related to the delivery of “Effective Nuclear Regulation”. It is focused on the important role regulators play in the delivery of safety and security. Effective regulation can be regarded as the delivery of independent and efficient oversight of the nuclear industry and other users of nuclear technology so that Governments and Society can be

¹ Laurence Williams FREng is the Director for Nuclear Safety, Security and the Environment at the UK Nuclear Decommissioning Authority

² 216 participants from 57 countries, 6 organizations and 7 observers participated in the conference. There were also 75 press representatives to cover the conference.

assured that the nuclear activities in their countries are operating at high levels of nuclear safety and security which are consistent with international norms. The Regulatory Body is effective, therefore, when it ensures that an acceptable level of safety is being maintained; when it takes appropriate actions to prevent the degradation of safety, when it take actions to promote safety improvements; when it performs its regulatory functions in a timely and cost effective way and it strives for the continuous improvement of itself, the industry and other users of nuclear technology.

Governments and societies decide if nuclear energy and associated technologies are used for electricity generation, industrial or medical purposes after taking account of the risks and the benefits. Regulators do not make these decisions. Nuclear regulators exist to ensure that nuclear activities are undertaken safely and securely for the protection of the public and the environment. Currently, the nuclear industry and regulatory bodies are facing new challenges:

- the renewed global interest in the use of nuclear energy for electricity generation and, consequently, the likely global expansion of its use;
- the changed security situation and the consequential need for safety and security to be more closely integrated;
- increased global use of radioactive materials and the need to ensure adequate safety and security awareness; and
- the need to maintain focus on the safety and security of existing nuclear facilities in a rapidly changing world.

The IAEA has sponsored many meetings over recent years relating to safety and security issues. However, this conference resulted from a meeting between the Director General of the IAEA Mohamed El Baradei, the Chairman of the US Nuclear Regulatory Commission Nils Diaz, and Deputy Head and then Acting Chairman of Rostekhnadzor Andrey Malyshev. This meeting recognized that other forums in which regulators collaborated were often constrained by time, membership or subject matter and there was a need for regulators to have their own conference to focus on regulatory matters. This meeting was therefore, the first of a kind because it brought together senior nuclear safety, radiation safety and security regulators from around the world to discuss how to improve regulatory effectiveness and hence the improved protection of the public and the users of nuclear and radioactive materials.

Conference Objectives

The objective of the conference was to give senior regulators the opportunity to discuss ways of improving the effectiveness of nuclear safety, radiation safety and security regulation as a whole for the benefit of the global community.

Keynote Addresses

Chairman Nils Diaz of the US Nuclear Regulatory Commission gave a keynote speech on Safety and Security Challenges. He noted that Regulation is done for the well-being of people for the common good with full consideration of national interests and international law.

Deputy Head of Rostekhnadzor Andrey Malyshev also gave a keynote speech. He noted that safety and security was mandatory for the use of nuclear energy for peaceful purposes. He reported that major achievements had been achieved in nuclear safety in nuclear safety regulation in the Russian Federation, including the implementation of effective control and supervision in the field of nuclear energy. He concluded that the world community should prepare global answers to the global challenges.

Independence & Regulatory Effectiveness

This session focused on the key elements needed to deliver effective nuclear safety and security regulation so that Government can be assured that nuclear energy and associated technologies can be used safely, that Society can have confidence and trust in the regulator and that the nuclear industry can be assured that it is being regulated competently and fairly,

The Conference noted that nuclear safety and security regulators have a vital role to play in providing their Government and the public with the assurance they need in relation to the adequacy of the safety and security of the nuclear industry.

The Conference noted that nuclear safety and security Regulatory Bodies need to be effective to meet the expectations of Government, Society and Industry.

The Conference noted that the independence of the Regulatory Body from those organizations with responsibility for the promotion of the use of nuclear energy was essential for effective regulation. It was recognized that the independence of the Regulatory Body needs to be both “de facto” and “de jure”. The Conference noted that the requirements for independence were adequately set out in the IAEA Standard GS-G-1-1, (Organization and staffing of the regulatory body for nuclear facilities).

The Conference noted the independence of the Regulatory Body was clearer to the public when there was transparency in regulatory decision making and clear understanding of to whom the Regulatory Body was accountable.

The Conference noted that to be effective Regulatory Bodies needed to be adequately resourced. This was essential to ensure that the Regulatory Body could recruit and retain the numbers of competent staff they need to fulfill their responsibilities.

The Conference noted the value of Regulatory Bodies benchmarking their activities and regulatory requirements with the IAEA Standards.

The Conference noted the use of regulatory management systems based on sound quality management practices have played an important part in delivering effective nuclear safety and security regulation. Effective regulators also had continuous improvement programmes to maintain and develop their regulatory processes.

The Conference noted the importance of stakeholder engagement to effective regulation. It was important for Regulatory Bodies to develop and implement strategies for engagement with their stakeholders in order that trust in their competence, integrity and impartiality can be established. This was regarded as being important because, even though some stakeholders may not always agree with a decision, if there is trust they will accept the integrity of the decision making process.

The Conference noted the important role the Nuclear Safety Convention has played in the development of effective nuclear safety regulation. There was agreement that the information given in the CNS review meetings should be used to benchmark and improve regulatory effectiveness. The initiative taken after the third CNS meeting was seen as an important contribution improving the effectiveness of nuclear safety regulation by enabling the sharing of good regulatory practices.

The Conference noted the importance of Leadership to the delivery of effective nuclear safety and security regulation. It was noted that good Regulatory Bodies have management leadership programmes to develop leadership skills and succession management.

The Conference noted the importance of Technical Support Organizations (TSO) for the regulatory bodies of some countries to supplement, enhance and maintain their technical competence.

Regulatory Safety Challenges

This session identified some of the key nuclear safety and radiation protection challenges and the discussed how effective nuclear regulatory systems will meet these challenges.

The conference noted that new radiation and nuclear technologies are often introduced inter alia, for safety improvement, plant efficiency or for new diagnostic or therapeutic medical practices, thus posing challenges to Regulatory Bodies.

The Conference noted that to meet these challenges Regulatory Bodies have to review such technologies to assess and confirm their safety and reduce subjectivity in their regulatory decision before consenting for their use. In many cases this resulted in adapting or preparing new regulations, developing new licensing requirements and adjusting their regulatory processes. A particular example was the work being done by South Africa's Regulator to license the Pebble Bed Modular Reactor (PBMR).

The Conference recognized that regulators who put emphasis on regulatory research, performed by the Regulatory Bodies themselves or their technical support organizations, have improved their technical competence and regulatory effectiveness. However, it was recognized that care had to be taken to ensure the Regulatory Bodies did not do the work for the operators.

The Conference noted the difficulty nuclear regulators face in the regulation of radiation exposure to patients for medical purposes. The conference stressed the importance of involvement of stakeholders and co-operation with professional societies in general and the medical profession in particular, for optimizing the radiation exposure to patients.

The Conference noted that the application of quality management to radiation practices in the medical field, similar to that used in nuclear energy use and other modern industries, would be an advantage.

The Conference recognized that the non-binding status of the Code of Conduct on the Safety of Research Reactors and its informal mechanisms for implementation could be an advantage in allowing for a graded approach to the different types of research

reactors, their status and the safety issues they face. The Conference supported the development of IAEA safety standards for research reactors but noted that it was important for the Regulatory Bodies responsible for safety and security regulation of research reactors to be independent of those responsible for operating them or promoting their use. The Conference welcomed the proposal for periodic meetings to consider the application of the Code of Conduct.

Regulatory Security Challenges

This session looked at how the regulation of nuclear security could be made more effective in the light of the challenges from the changed international security situation.

The Conference recognized that nuclear security threats exist and protection measures to counter such threats needed to be robust and regulatory Bodies played an important role in ensuring this.

The Conference noted the different manner in which nuclear safety and nuclear security regulation have developed. It was noted that to be effective nuclear safety and nuclear security regulation could not be carried out independently and there were many good examples where safety and security regulation was carried out within a single Regulatory Body.

The Conference noted that safety and security professionals needed to work together to ensure that nuclear facilities were adequately protected from attack or sabotage and nuclear and radioactive materials were, taking account of the risk, secure to prevent theft or misuse.

The Conference noted that great progress in the enhancement of nuclear security and control of radioactive material has been achieved worldwide over the past few years but more needed to be done.

The Conference noted the work the IAEA was doing to develop comprehensive guidance documents on nuclear and radiation security.

The Conference noted important synergies among measures adopted for nuclear safety, security and non-proliferation. Measures addressing concerns in one of these areas can make a significant contribution toward enhancing protections in the other areas.

Enhanced International Regulatory Cooperation

This session of the conference addressed the need for international cooperation to enhance the effectiveness of safety and security regulation. The Conference noted the extremely wide range of cooperative activities contributing to enhanced regulatory efficiency and effectiveness for nuclear safety and security being conducted under a variety of multilateral, regional and bilateral arrangements.

The Conference noted the promulgation of international instruments of both a binding and non-binding legal character in areas of regulatory interest, including: nuclear reactor safety; safe management of nuclear waste and spent fuel; assistance and early

notification of nuclear accidents; physical protection of nuclear and other radioactive materials and associated facilities; non-proliferation safeguards verification; research reactors; radioactive sources; export and import of nuclear materials and combating nuclear terrorism.

The Conference noted the development of standards and guidance documents covering the most important aspects of nuclear safety and security, primarily under the aegis of the IAEA. In some States the Standards were directly incorporated into national legal and regulatory frameworks, in other States the Standards were used as a basis for developing national laws and regulations in a manner consistent with international best practice.

The Conference noted the conduct of periodic review meetings under relevant conventions and topical meetings to address specific issues relevant to nuclear regulation.

The Conference noted increasing use of international assessment and peer review missions by the IAEA and other bodies to assist States in areas of regulatory concern, including nuclear security and physical protection, radiation protection, regulatory efficiency and effectiveness.

The Conference noted the extensive programs of technical cooperation and assistance on nuclear safety and security issues conducted by the IAEA, OECD/NEA and bilaterally.

The Conference recognized the establishment and broader use of information networks and databases to enable regulatory bodies to have prompt access to the most current developments in areas of interest.

The Conference noted the special initiatives to address specific nuclear safety and security issues, including disposition of materials from weapons programs, establishment of multilateral nuclear fuel cycle and supply arrangements, multilateral design review and decommissioning of nuclear facilities.

The Conference noted a variety of initiatives to make better use of the IAEA standards in implementing effective national safety and security regulation, in particular through the Western European Nuclear Regulators Association (WENRA) and the IAEA's Integrated Regulatory Review Services (IRRS).

The Conference noted the continuing valuable work of nuclear safety committees maintained by the OECD/Nuclear Energy Agency in the areas of improving regulatory efficiency, nuclear regulatory decision making, and the uses of operating experience and other areas of regulatory interest.

The Conference took note of the initiative to establish a Multinational Design Approval Process to enhance the clarity, predictability and transparency of the regulatory review of designs for new nuclear power facilities. This process could contribute to more effective regulatory approaches to safety and security issues arising from license applications for new installations in a number of countries.

The Conference noted the increasing development of information and knowledge management networks to enhance the regulation of nuclear safety and security. In particular, the new Asian Nuclear Safety Network provides a potentially useful model of one approach for enhanced sharing of relevant information on regulatory issues among and between States having common interests.

The Conference noted the value of international cooperation in enhancing nuclear safety and security worldwide. It was, however, noted that the dense calendar of international nuclear-related activities, meetings, conferences and workshops raises issues of priorities for all Regulatory Bodies, especially the smaller ones with limited personnel and resources.

Regulatory Effectiveness from Operators' viewpoint

This session provided an opportunity for two eminent representatives of the nuclear industry to comment on regulatory effectiveness from the operators' perspective.

The Conference noted the Industry view that nuclear safety is a prerequisite for sustainable development and that the industry needs effective nuclear safety and security regulation.

The Conference noted the Industry view that the Regulatory Body needed to be independent from both operators and politics. The Regulatory Body needed to have effective communication with all its stakeholders and command the confidence and respect of the public.

The Conference noted the industry view that regulatory credibility is essential and the Regulatory Body needs to have a broad range of skills and experience so that it can understand the technology it is regulating.

The Conference noted the industry's desire for international regulatory consistency especially in relation to the global use of nuclear reactors for electricity generation.

The Conference noted the Industry view that Regulatory Effectiveness should be given the same rigorous review and attention as that required of the Industry.

Safety and Security Outlook: Global Visions and Commitments for the Future

A concluding panel of senior regulators addressed a question posed by the Conference President; namely, "What would you do to improve the regulation of nuclear safety and security?". The following are some of the significant points raised during the discussion:

- Although costly in terms of time and effort, international relationships in the regulatory field are an essential means of moving forward. Regulatory Bodies should actively encourage the exchange of staff to share knowledge and experience.
- This Conference represents the kind of dedicated forum, rather than marginal meetings at other events, can have a major impact on nuclear regulation and should be regularized.

- The inter-related elements of accountability and communications are key to successful regulation. They should be identified at all interfaces and levels of interaction between regulators, operators and other stake-holders.
- Nuclear safety regulation has both technical and political aspects. State regulation of nuclear activities and practices requires that nuclear safety and security issues receive attention at the highest political level in States using nuclear technology.
- Attention is needed by regulators in all States to the essential functions of standard-setting, licensing, inspection and enforcement.
- IAEA standards documents are extremely valuable to guide national regulatory activities. However, they need to be continually updated to reflect new developments.
- Cooperation at the Regional level is of great value and regulators should meet to discuss regional cooperation every 2 to 3 years,

At the national level, nuclear regulators need to address continual improvement and quality management and to avoid complacency. Sharing of experience and training of a new generation of regulators is needed in view of the retirement of many experienced personnel. On the international level, partnerships of nuclear regulators and harmonization of legal and regulatory regimes need to be pursued.

Issues for Consideration by Governments

- Governments should continue to maintain and develop a robust regulatory framework to ensure the safety and security of both the nuclear industry and radioactive sources so that the public and workers are protected from the harmful effects of ionizing radiation.
- Governments should ensure that the Regulatory Body is independent from those who are responsible for the promotion of the use of nuclear energy and those who are opposed to the use of nuclear energy, to ensure that regulatory decisions are free from influences that may conflict with safety.
- Governments should ensure that the Regulatory Body is competent and has the necessary resources to fulfill its mission in relation to independent oversight and assurance to ensure public and environmental protection.
- Governments should actively consider the CNS, the Joint Convention on the Safety of Spent Fuel and Waste Management, the Convention on the Physical Protection of Nuclear Material (and 2005 Amendment); and the Convention on Suppression of Acts of Nuclear Terrorism and consider participating in review and other meeting to share good practice and implement lessons learned.
- Governments should also support the voluntary commitment to the Code of Conduct on the Safety and Security of Radioactive Sources and the associated guides, and the Code of Conduct on Research Reactors.
- Governments should encourage their Regulatory Bodies to liaise with Regulatory Bodies of other countries and with international organizations to promote regional and international co-operation and the exchange of regulatory information and experience feedback.

- Governments should encourage the integration of security and safety regulation in areas where safety and security overlap, such as the physical protection of nuclear facilities and the protection, storage and use of radioactive sources.

Issues for Consideration by the Regulatory Bodies

- Regulatory Bodies should adopt regulatory management systems based upon good quality management practices and implement continuous improvement programmes,
- Regulatory Bodies should actively engage with their stakeholders to demonstrate that they are open and transparent in their processes and to build confidence in their regulatory decision making processes.
- Regulatory Bodies should have technical expertise available to perform tasks and to undertake regulatory research or award contracts for research and development projects to deal, inter alia, with new technologies and sustain high level of competence.
- Regulatory Bodies should establish and maintain co-operation with Regional, sub-Regional and international partners and professional societies to promote exchange of information and share experience feedback.
- Regulatory Bodies should consider how IAEA safety standards can make an even more significant contribution to improving the efficiency and effectiveness of national regulatory activities.
- Regulatory Bodies should look at what the IAEA services can do to strengthen their effectiveness.
- Regulatory Bodies should ensure that safety and security professionals work together in areas where safety and security interests overlap.
- Regulatory Bodies should work with industry to develop an appropriate culture to address both nuclear safety and security.
- Regulatory Bodies should make more use of the IAEA Nuclear Security Advisory Services for benchmarking and enhancing national systems for nuclear security.

Issues for Future International Cooperation

- The IAEA should strengthen its Standards in relation to leadership in Regulatory Bodies, regulatory management systems, resource evaluation and stakeholder engagement;

- The IAEA and OECD/NEA should improve the system for fostering international cooperation in the field of regulatory effectiveness and the sharing of good nuclear safety and security regulatory practices.
- The IAEA should further develop the IRRS process to promote its value to Member States and Regulatory Bodies to improve effectiveness and share good practice;
- The IAEA should finalize development of the Nuclear Security Series guidance documents, covering prevention, detection and response to malicious acts with participation of national regulatory bodies and put the documents through the same rigorous quality process offered by the Commission on Safety Standards for nuclear safety documents
- The IAEA should consult Member States on the need for the development of model nuclear security law and regulations to assist regulatory bodies in Member States in drafting national laws and regulations.
- The IAEA should develop its programmes to assist Member States in human resource development by organizing training courses in radiation protection, waste safety, nuclear safety and security training courses at international, regional, sub-regional and national level.
- The IAEA should consult Member States on the need to expand the scope of Illicit trafficking data base to include security incidents / breaches.
- The IAEA should increase its cooperation with other international organizations dealing with problems of terrorism or regulating other industries that require high level of safety and security.
- International organisations should consider how their activities can be coordinated to enable the most effective participation by the regulators, recognising their limited time, personnel and resources.

Conclusions of the Conference

The Conference thanked the Government of the Russian Federation for taking the initiative to host this important conference, in partnership with the IAEA, in its Presidency of the G8.

The Conference concluded that the delivery of effective nuclear safety and security regulation is vital for the safe and secure use of nuclear energy and associated technologies both now and in the future and is an essential prerequisite for the achievement of global energy security and global sustainable development.

Regulators work for the benefit of Society and therefore they play a vital role. To be effective they must be independent and free to make regulatory decisions solely in relation to need to maintain safety and security, without pressure from those who are responsible for the promotion of the use of nuclear energy and associated technologies, or those who are opposed to its use.

Regulators must be competent and have adequate resources to deliver their mission, which is to ensure the protection of the public and the environment, and to assure Government and the public that their nuclear industry is safe. The safety and security of nuclear facilities and nuclear and radioactive materials requires effective coordination of safety and security regulation.

The Conference reiterated the importance of continued and improved international cooperation to develop comprehensive international standards for safety and guidance for security. The Conference also stressed the importance of wider participation and fuller implementation of the international instruments such as Conventions and Codes of Conduct. Continued international cooperation to promote good nuclear safety and security practices was seen as being essential for the delivery of effective regulation and the continuous improvement of the Regulatory Bodies.

The Conference noted the value that would be obtained from conveying IAEA standards to the regulatory design review and safety goals of new reactors.

The Conference valued this forum and agreed that the Head Regulators should meet again within 3 years to review progress arising from the findings of this Conference and identify new emerging regulatory challenges.