

# SUMMARY AND CONCLUSIONS OF THE CONFERENCE

## **Report of the Conference President<sup>1</sup>**

**The Honorable Gregory B. Jaczko**

Conference President

Chairman,

United States Nuclear Regulatory Commission,

Washington, D.C.,

United States of America

## BACKGROUND TO THE CONFERENCE

The second international conference on Effective Regulatory Systems was held in Cape Town, South Africa, between 14 and 18 December 2009 as a follow up to the earlier conference on the same subject held in Moscow in 2006. The purpose of this conference was to stress the importance of a strong, effective global nuclear safety and security regime, and the responsibility that all nuclear regulators, operating organizations and vendors have in maintaining it. Conferences like this are a vital part of the global effort for senior nuclear safety and security regulators to review issues important to the global nuclear regulatory community, focused on the important role regulators play in safety and security. A regulatory system is effective when it ensures that a high level of safety, security and safeguards is being maintained by licensees/operating organizations; when it takes appropriate actions to prevent the degradation of safety and security, when it takes actions to promote safety and security improvements; when it performs its regulatory functions in an independent, transparent, timely and efficient way and it strives for the continuous improvement of itself and the industry.

The conference reviewed achievements since the first conference in Moscow and also addressed current and future challenges. Since the 2006 Moscow conference, the nuclear industry and regulatory bodies continue to face challenges: the need to maintain focus on the safety and security of existing nuclear facilities in a rapidly changing world; the renewed and expanding global interest in the use of nuclear energy for electricity generation; the continued importance of maintaining high levels of safety and security for the world's

---

<sup>1</sup> The views and recommendations expressed here are those of the President of the Conference and the participants, and do not necessarily represent those of the IAEA.

## SUMMARY AND CONCLUSIONS OF THE CONFERENCE

operating nuclear power plants; the need for safety and security to be well coordinated; the increased global use of radioactive materials; the need to ensure a strong safety and security culture, and the need to pay due attention to radiation protection and research reactors, which are also challenges for the regulators.

This conference took stock of a three decade long effort by Member States, the IAEA and other international organizations to strengthen the safety and security of the use of nuclear and radioactive materials through strong national infrastructures and consistent international dialogue. This regime has been established as a cooperative mechanism to share principles, norms, rules and decision making procedures to achieve shared goals in nuclear safety and security while preserving and complementing the sovereignty, authority and ultimate responsibilities of States.

### CONFERENCE OBJECTIVES

The objectives of this were to review and assess the effectiveness of the global nuclear safety and security regime, and to propose specific actions to further enhance it in areas such as:

- Establishing and maintaining independent and effective national regulatory systems, given the challenges of:
  - Launching new nuclear power programmes;
  - Undertaking new builds after a long time interval in those countries with existing nuclear power programmes;
  - Addressing the increase in radioactive materials and radiation applications;
- Prioritizing and addressing emerging issues concerning multinational and national responsibility for nuclear safety and security;
- Fostering effective international cooperation among regulators for the sharing of regulatory knowledge, practices and information.

### OPENING SESSION

The Opening Session comprised two parts.

#### **Opening addresses**

The opening addresses outlined the importance of international cooperation among nuclear regulatory bodies for effective nuclear safety and

## SUMMARY AND CONCLUSIONS OF THE CONFERENCE

security regulation at the national and international level. This role is particularly important given the increased interest in nuclear power worldwide, related, in part, to an enhanced focus on climate change. In this context, mature regulatory bodies should consider support for new countries, better control of radioactive sources, and enhancement of international cooperation for the global nuclear safety and security regime, including application of international legal instruments, knowledge networks, safety standards and security guidance. Regulators should also focus on developing an open, transparent process with appropriate mechanisms for interacting with the public. In addition, regulators should take steps to ensure they have sufficient resources to address an increasing volume of work in the coming years.

The presentations highlighted the role and responsibility of governments for global adherence to international instruments relevant to nuclear safety and security, in establishing and maintaining the legal and governmental infrastructure for nuclear safety and security; the role of an effective regulator at national and international levels, the expectations of society and the role of international organizations for assuring an effective global nuclear safety and security regime.

It was emphasized that while safety performance indicators have shown steady improvement over the last two decades, it is necessary to avoid complacency and to continuously improve and strengthen the existing global nuclear safety and security regime so that the use of nuclear technologies can be introduced or expanded in a safe and credible manner to meet the world's needs for human well-being, environmental protection, growth and development. Furthermore, nuclear regulation is a global responsibility, and the conference should be seen as an opportunity to implement concrete proposals for actions.

### *Keynote Panel: Addressing Needs and Challenges in Global Nuclear Safety and Security. What are the Priorities?*

The Keynote Panel presented and debated policy and technical issues in nuclear safety and security that benefit from international cooperation between governments, regulatory bodies and international organizations. The panellists addressed the following points:

- An effective regulatory programme is a prerequisite to any nuclear programme. Regulatory programmes, including adequate capacity building mechanisms, are essential components of the national safety and security infrastructure.

## SUMMARY AND CONCLUSIONS OF THE CONFERENCE

- The more globalized and dynamically changing world involves new technologies and shifts in the working environment. This requires new strategies for regulators and harmonization of regulatory approaches, where appropriate.
- Competence of the regulatory body staff is essential. Competence needs to be developed and maintained through effective capacity building, including education and training programmes.
- Sharing of experiences and lessons learned among regulatory bodies for effective nuclear regulatory systems are very valuable. Regulatory peer reviews, knowledge networks and review meetings of international instruments are highly effective tools for promoting the sharing of experience and mutual learning.
- Ageing of plants need to be considered from the beginning in the development or expansion of nuclear power programmes.
- Knowledge networking to share experience and lessons learned and to build a common safety and security culture are key elements for capacity building and safety and security infrastructure. The Asian Nuclear Safety Network, the Ibero American Network for Regulators (FORO) and the recently created forum of nuclear regulatory bodies in Africa were mentioned as examples.
- Current regional and international cooperation efforts contribute to safety and security improvements; however, better coordination would enhance their effectiveness. In this context, the vital role of the IAEA was emphasized.
- Regulators and operating organizations should share and learn from operating experiences and seek to identify and use best practices for the improvement of their regulatory systems.

### TOPICAL ISSUE 1: EMERGING REGULATORY CHALLENGES

This session addressed the challenges associated with regulating new and existing nuclear power programmes and radiation applications. This includes maintaining a high level of safety and security in existing nuclear power programmes, launching new nuclear power programmes; undertaking new reactor builds after a long time gap in the countries with existing nuclear power programmes; establishing national strategies for waste management and decommissioning; regulating medical activities and the mining industry; and addressing the threat of nuclear and radiological terrorism, and strengthening related assessment and response activities. The conference noted the following points:

## SUMMARY AND CONCLUSIONS OF THE CONFERENCE

- The need for regulators and operating organizations to avoid complacency, to strive for continuous improvement, to share operating experiences and use best practices.
- The importance of having a sufficient number of well trained and experienced regulators and the potential need for additional IAEA safety standards and security guidance on training issues.
- The important role of regional and international organizations in maintaining and ensuring the global nuclear safety and security regime. Safety and security both involve a broad group of stakeholders, such as regulators, operating organizations, vendors, non-governmental organizations (NGOs), law enforcement agencies, etc.
- Regional approaches are important and are needed to bring together regulators and other organizations to share and facilitate mutual learning. The new Forum of African Regulatory Bodies was raised as a good example.
- More countries are considering safety and security in a more coordinated, synergistic and integrated manner, when appropriate.
- The need for international organizations and associations to work together to foster harmonization of approaches to safety and security, operations, regulations, and training.
- The need to address the challenges related to the changing nuclear power environment, the evolving security situation and the growing numbers of countries interested in nuclear power and new builds.
- The need for countries embarking on nuclear power to become party to and effectively implement international instruments related to nuclear safety and security, and to develop national legal frameworks and clear regulatory direction and guidance.
- The need for effective transparency with respect to the public.
- The need to utilize both technical and human measures to ensure safety. The discussion focused on the management of these measures and the need for increasing technical measures in the design of new reactors.
- That waste management and decommissioning of facilities remain important challenges for existing nuclear power programmes and that countries embarking on new nuclear power programmes should consider these issues at the very beginning of their national planning process.
- The importance of regulating the mining industry, in particular in developing countries for sustainable protection of workers, population and the environment.
- The importance of regulating medical facilities to prevent accidents and unnecessary exposure of patients and workers, while allowing for effective patient diagnosis and treatment procedures.

## SUMMARY AND CONCLUSIONS OF THE CONFERENCE

- The importance of openness and transparency of regulatory programmes through IAEA safety and security peer reviews, such as Integrated Regulatory Review Service (IRRS) missions and advisory services to build public confidence in national regulatory programmes.
- The importance of a robust safety infrastructure and proper consideration of ageing of existing facilities in the current context of countries embarking on nuclear power or expanded nuclear programmes.

### TOPICAL ISSUE 2: REGULATORY INDEPENDENCE AND EFFECTIVENESS

This session continued discussions on key elements and attributes of effective regulatory independence and proposed means by which effective independence of national regulators could be advanced. The session also focused on issues related to establishing, maintaining, measuring and continuously improving regulatory effectiveness, openness and transparency, stakeholder involvement and self-assessment peer review missions, competence and knowledge management. The conference noted the following points:

- Independence of the regulatory body is important for all regulators. The understanding and interpretation of regulatory independence has evolved since the introduction of the Convention on Nuclear Safety. An updated definition is needed that takes into account the need for independence from undue political and economic influences; sufficient human and financial resources, staff competence, and availability of in-house or external technical support organizations, transparency and international cooperation. It was also emphasized that independence does not imply isolation.
- International interest in strengthening independence was demonstrated with examples such as improvements to the IAEA safety standards, in particular GS-R-1 revisions, the new European Directive on Nuclear Safety, and the interest of some regulators to involve foreign senior regulators or technical support organizations (TSOs) for advice in making their own decisions.
- Independence of the regulatory body is particularly important when difficult regulatory decisions need to be made such as in the case of the fragile production of radioisotopes in research reactors for medical applications.
- Improving regulatory effectiveness is also connected with the leadership needed to achieve a high level of safety. Leadership is necessary to provide transparent, open and effective communications to licensees to maintain their focus on safety.

## SUMMARY AND CONCLUSIONS OF THE CONFERENCE

- Regulatory approaches are different from country to country; however, the overarching safety objectives to protect people, society and environment are common. Harmonization of regulatory approaches will contribute to improve common understanding.
- In regulatory decision making, regulators need to constantly balance many factors. These factors include safety, security, safeguards and public accountability.
- Openness and transparency are fundamental elements to achieve stakeholder confidence. However, there are needs to protect certain sensitive and classified information. Nevertheless, the policy and criteria for protection of such information should be properly communicated to stakeholders.
- Regulators must be fully responsible for their own judgments and decisions, even when based on TSO work. They should be able to analyse and make use of the work done by TSO in support of their regulatory activities. Further discussions regarding the role of TSOs and the support they provide to regulatory bodies will take place during an international conference in Tokyo, Japan, in October 2010.

### TOPICAL ISSUE 3: IMPACT OF MULTINATIONAL ACTIVITIES ON THE NATIONAL RESPONSIBILITY FOR NUCLEAR SAFETY AND SECURITY

This session addressed regulatory oversight of multinational activities, interface between nuclear safety and nuclear security, safety and security culture, industry challenges in working in a multinational environment, production and international distribution of radioactive sources and medical isotopes and the European Union nuclear safety directive as a legal framework to strengthen national responsibilities for nuclear safety. The conference noted the following points:

- In recent years, national regulators have started an active co-operation at the bilateral, multinational and international level by regulatory forums, senior regulators meetings and the implementation of IAEA IRRS missions, to respond to the challenges coming from the globalization of the nuclear business, the new comers and to the expected nuclear new build in many countries.
- International cooperation and coordination activities and mechanisms are essential. Regulators should continue working together to harmonize requirements and approaches between countries. Regulators should consider establishing dedicated forums to exchange information on safety

## SUMMARY AND CONCLUSIONS OF THE CONFERENCE

and radiation control matters. Global and regional networks should be established and maintained, where possible, to include regulators, operating organizations, vendors and other stakeholders.

- Human factors are essential in maintaining a high level of nuclear safety and security worldwide. Regulators should consider promoting continuous improvements to reach and maintain the highest levels of safety and security culture.
- Consistent and comprehensive bases and rationales for regulatory decisions are necessary. Transparency of the regulatory process and good communication with stakeholders is of vital importance to help their understanding of the situation. IAEA safety standards can be used to support regulatory decisions.
- The transfer of knowledge and experience from countries with mature regulators to those embarking nuclear power is essential. It is necessary that the new entrants develop their own strategy and plans for building their regulatory body and for gaining the necessary knowledge to develop their capacity. Coordination and cooperation activities from the IAEA and bilateral or multilateral support are vitally important, but they cannot replace the responsibility of the regulatory body of the country embarking on nuclear power.

### TOPICAL ISSUE 4: INTERNATIONAL SAFETY AND SECURITY COOPERATION

This session addressed the application of the IAEA safety standards, security guidance and operational experience; the use of global and regional knowledge networks; experience with legally binding and non-binding international instruments; international regulatory feedback systems; lessons learned from national IRRS missions; and integration of safety supervision across different types of legacy sites in all stages of remediation. The conference noted the following points:

- There is a need to strengthen regional and global regulatory forums and networks to improve regional cooperation and knowledge management, to share the results of regulatory self-assessments and peer reviews, and to disseminate lessons learned to create better opportunities for improving the regulatory performance. Regional networks have been successfully established in Asia, Europe, Ibero-America and Africa to strengthen the global nuclear safety and security regime.

## SUMMARY AND CONCLUSIONS OF THE CONFERENCE

- There is an extensive use of IAEA safety standards by regulators to develop and update their regulatory system to achieve and maintain a high level of safety. Adapting and adopting IAEA safety standards in accordance with national arrangements are becoming a more common practice.
- Feedback from the application of IAEA safety standards by regulators and industry is important for amendments and necessary updates. The time for developing and updating standards should be in proper relation to the review cycle of standards. The updating of standards should give due consideration to consequences for countries using such standards for their national legal systems as well as for operators.
- Significant progress has been made in the past years on developing and enhancing regional regulatory networks. Web site portals for global networking are being developed including the Convention on Nuclear Safety web site.
- Regulatory portals and thematic regulatory networks, such as the Regulatory Network (RegNet), are considered to be useful tools for international regulatory cooperation. These tools are also useful in support of IAEA peer reviews and advisory services.
- Binding and non-binding international instruments are increasingly being adopted to help States harmonize their national approaches and gain insights on how to address common issues. Significant issues regarding the interpretation and application of these instruments should continue to be routinely assessed to improve the effectiveness of the review meeting process. Also the incentive ‘peer review’ approach embodied in the instruments should continue to be developed to encourage effective implementation by States Parties.
- For many States, particularly those embarking on new nuclear programmes, assistance from States with established programmes and greater resources will be necessary to help ensure global safety and security.
- The IRRS programme is a unique worldwide opportunity for continuous improvement and harmonization of the regulatory systems through a structured self-assessment and peer review process. IRRS missions provide benefits at the national, regional and international level, as well as to those participating in them.
- International cooperation and support from IAEA needs to include regulatory supervision of decommissioning and license termination so as to avoid the creation of new legacy sites. Regulatory experience from countries that are already meeting nuclear legacy site challenges can support this international effort. Regulatory authorities from countries are exercising supervision over existing nuclear legacy sites are encouraged to

## SUMMARY AND CONCLUSIONS OF THE CONFERENCE

share and gain advantage from international cooperation activities on this issue.

### CLOSING SESSION

The Closing Session comprised two parts:

#### **Panel Discussion — Actions to Enhance the Global Nuclear Safety and Security Regime**

This Closing Panel Discussion was based on the results and conclusions of the various sessions and was the capstone of the week's activities. The discussion also addressed the challenges identified during the conference to develop the convergent views on actions for enhancing the effectiveness of the global nuclear safety and security regime.

The main expectations of the Conference can be summarized as follows:

- (1) The Regulatory Cooperation and Coordination Initiative for the safe introduction and expansion of nuclear power programmes;
- (2) Long term management of radioactive sources from cradle to grave;
- (3) Capacity building and human resource development;
- (4) Regulatory effectiveness and independence;
- (5) Safety and security synergy and coordination;
- (6) Regulatory supervision of legacy sites and remediation.

### SUMMARY AND CONCLUSIONS OF THE CONFERENCE

The second part of the concluding session was the presentation by the President of the Conference of the summary and conclusions of the Conference including visions, strategies and actions for the future as well as issues for consideration by governments, regulatory bodies and international organizations.

The conference concluded that the following issues and actions should be addressed by the relevant stakeholders.

#### **Issues for consideration by governments**

- Governments should ensure that national regulatory bodies have sufficient financial and human resources to establish staffing plans and training programmes to effectively discharge their functions and responsibilities.

## SUMMARY AND CONCLUSIONS OF THE CONFERENCE

- Countries should contribute to global and regional networks and knowledge sharing mechanisms such as the global nuclear safety and security network (GNSSN) and RegNet. The IAEA will report the status of participation for these portals in its annual report.
- Countries embarking on nuclear power should become party to and effectively implement relevant international nuclear safety and security instruments. IAEA safety standards and security guidance are important tools to assist these countries in developing their national regulatory infrastructure for nuclear safety and security.
- Countries building new nuclear facilities should consider waste management and decommissioning of facilities from the very beginning of any national plans for new nuclear programmes.
- The concept of independence and transparency of the regulatory body should be further developed at the next review meeting of the Contracting Parties of the Convention on Nuclear Safety in 2011 to reach a common understanding and to agree on new definitions. The concept should not only address effective separation of regulatory functions from promotional functions and protection against undue influences but also ensure a balanced approach taking all aspects relevant for regulatory decision making into account.
- Countries embarking on nuclear power should develop their own strategy and plans for building their regulatory body and for gaining the necessary knowledge and develop their capacity building, using IAEA support and bilateral or multilateral support.
- Countries should consider that high demand for IRRS missions worldwide requires significant IAEA resources. Countries should recognize that the success of safety reviews depends on the participation of the best senior experts from Member States. Countries should make all necessary efforts to involve their best regulators in these reviews.
- Countries should work bilaterally and multilaterally with the IAEA and other international organizations to identify and promulgate nuclear security best practices through workshops and guidelines.

### **Issues for consideration by regulatory bodies**

- Regulatory bodies should establish means and measures that are appropriate for their national programmes to prevent complacency and to foster continuous improvement of safety and security practices (e.g. safety day, regular dialogue between regulators, operating organizations and other relevant stakeholders).

## SUMMARY AND CONCLUSIONS OF THE CONFERENCE

- Regulators should establish dedicated forums to exchange information on safety and radiation control matters.
- Regulatory bodies should further strengthen transparency with respect to the public.
- Regulatory bodies should exercise their leadership to keep all stakeholders focused on meeting the safety and security objectives and to promote a strong safety and security culture, with particular emphasis on human factors.
- Regulatory bodies should further harmonize their regulatory approaches and requirements, with due consideration of national arrangements and national safety policies to improve understanding, minimize regulatory uncertainties, and facilitate regulatory decision making processes.
- Regulatory Bodies should acquire and maintain the necessary competence and knowledge to ensure their own decision making capabilities and independence from any advice from TSOs they may receive. This topic should be discussed in the technical support organization conference in Tokyo in October 2010.
- Regulatory bodies should continue their active co-operation to respond to the challenges coming from the internationalization of the nuclear business and to the expected nuclear new build in many countries, e.g. through cooperation in the Multinational Design Evaluation Programme.
- Regulators need to find new and effective approaches to address the changing environment affecting nuclear issues.
- Regulators should contribute to an international inventory of so-called ‘orphan research reactors’ worldwide, in order to minimize safety, security and non-proliferation risks.

### **Issues for future international cooperation**

- The IAEA, other international organizations and Member States should enhance the coordination and cooperation in human resources development and education and training.
- All national and international organizations responsible for safety and security should strengthen synergies and coordination.
- Governments and regulatory bodies should harmonize approaches to safety, security, operations, regulations and training. International organizations and associations, such as the IAEA, the European Union, WHO, OECD/Nuclear Energy Agency, ICPO–Interpol, World Customs Organization, World Association of Nuclear Operators, World Institute for Nuclear Security, World Nuclear Association, vendors and operating organizations can help in this effort.

## SUMMARY AND CONCLUSIONS OF THE CONFERENCE

- The IAEA should work with WHO to better define respective roles and responsibilities of the nuclear safety regulator and the authorities in charge of the safety of medical devices.
- The IAEA and Member States should strengthen regional regulatory forums and networks to share regional cooperation, knowledge management, self-assessments of the regulatory system and international lessons learned to create better opportunities for improving the regulatory performance.
- The IAEA should publish safety standards and security guidelines in an appropriate time frame and should try to keep the standards and guides as stable as possible.
- Guidance on developing regulatory standards for legacy sites should be developed. The IAEA and Member States should develop and strengthen the platform for sharing experience and information on regulatory challenges at legacy sites. This topic should be addressed within the framework of the international Forum for Regulatory Supervision of Legacy Sites.

### **Issues for consideration by stakeholders**

- Operating organizations, regulators and associations should establish better methods for sharing experience feedback. Actions should be taken to use experience feedback to enhance safety and security by implementing improvements from lessons learned.
- Countries, international organizations and regulators should keep in mind that while new builds represent a significant challenge, due attention must be paid to existing nuclear power plants, radiation control and research reactors.

### CONCLUSION

The Conference thanked the Government of South Africa for hosting this 2nd International Conference on Effective Nuclear Regulatory Systems. It requested the IAEA, together with the other international organizations, to implement the action items for international cooperation resulting from this conference. The Conference valued this forum and agreed that the head regulators should meet again within three years to review the progress arising from the findings of this conference.