

TOWARDS AN INTERNATIONAL REGIME ON RADIATION & NUCLEAR SAFETY

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The 1990s have seen the *de facto* emergence of what might be called an “*international regime on nuclear and radiation safety*”. It may be construed to encompass three key elements: legally binding international undertakings among States; globally agreed international safety standards; and provisions for facilitating the application of those standards.

While nuclear and radiation safety are national responsibilities, governments have long been interested in formulating harmonized approaches to radiation and nuclear safety. A principal mechanism for achieving harmonization has been the establishment of internationally agreed safety standards and the promotion of their global application.

The development of nuclear and radiation safety standards is a statutory function of the IAEA, which is unique in the United Nations system. The IAEA Statute expressly authorizes the Agency “to establish standards of safety” and “to provide for the application of these standards”.

As the following articles and supplement in this edition of the *IAEA Bulletin* point out, facilitating international conventions; developing safety standards; and providing mechanisms for their application are high priorities for the IAEA.

■ **Binding Conventions.** In recent years, legally binding international conventions have

come to play a crucial role in improving nuclear, radiation, and waste safety. They include conventions on early notification and assistance in case of accidents, and the recently adopted conventions on nuclear safety and on spent fuel and waste safety.

The IAEA assists this process by facilitating agreements among Parties and providing a range of functions to the Parties once they agree on the undertakings. These functions include acting as Secretariat to meetings of Contracting Parties, maintaining records of national points of contact, and rendering services to State Parties upon request. (See article, page 21.)

■ **Safety Standards.** By 1998, the IAEA in cooperation with its Member States had developed and issued more than 200 standards of safety in the Agency’s *Safety Series* publications. They cover the fields of nuclear safety and radiation safety, including radioactive waste safety, and radioactive material transport safety.

Dozens of documents in these fields currently are in stages of review, revision, and preparation. They cover safety policies, requirements, and recommendations that are issued under a new hierarchical structure in a new IAEA Safety Standards Series of publications. All of the documents also are developed under a new uniform review and preparation process that

has been set up. This process involves five recently established advisory bodies, having harmonized terms of reference and composed of experts appointed by IAEA Member States. (See article, page 5.)

The IAEA safety standards are substantiated by findings on radiation levels and effects estimated by the United Nations Scientific Committee on the Effects of Atomic Radiation. They are primarily based on recommendations of the International Commission on Radiological Protection (ICRP), a non-governmental scientific organization founded in 1928, and the International Nuclear Safety Advisory Group (INSAG), an independent group of experts founded in 1985 which, under IAEA auspices, elaborates nuclear safety principles.

■ **Applying the Standards.** Regarding the provisions for the application of safety standards, the IAEA has extensive ongoing programmes. They include activities for: providing direct safety-related assistance to Member States; fostering the international exchange of safety-related information; promoting education and training in safety areas; rendering a wide range of safety-related services (including radiological assessments) to requesting States; and,

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coordinating safety-related research and development projects.

Technical cooperation activities include a Model Project on “Upgrading Radiation and Waste Safety Infrastructure” involving 52 IAEA Member States. Participating countries are working together with the Agency to address deficiencies and achieve an adequate system for the regulatory control of radiation sources.

Additional activities include an extrabudgetary programme on the safety of WWER and RBMK nuclear power plants to enhance assistance to countries of Eastern Europe and the former Soviet Union; and a regional project to improve radiation protection at these same reactors.

The IAEA operates jointly with the OECD Nuclear Energy Agency (NEA) an Incident Reporting System for the exchange of information on safety significant events, and a similar service has been set up covering research reactors. In the area of radiation safety, the IAEA provides a route for non-OECD member countries to take part in an NEA/IAEA Information System on Occupational Exposure. The IAEA also implements more than twenty coordinated research projects on particular aspects of nuclear, radiation, and waste safety, and organizes at least one major conference each year to foster information exchange in these matters.

But the more challenging IAEA activity for promoting the application of its Safety Standards is the provision of a large number of integrated safety review services. These

include a wide range of nuclear safety services for operational nuclear installations, as well as assessments of radiological conditions and accidents.

HISTORICAL PERSPECTIVES

The IAEA's safety programme is rooted in the late 1950s. Already in 1959, two years after the IAEA's creation, the United Nations Economic and Social Council asked the IAEA to establish recommendations for the safe transport of radioactive material. By March 1960, the first international measures for radiation protection and safety had been drawn up and were approved by the IAEA Board of Governors. The *Regulations for the Safe Transport of Radioactive Material* were established and first issued in 1961 (the latest revised edition was published in 1996).

The Board first approved Basic Safety Standards (BSS) for radiation protection in June 1962 (three revised editions have been issued since then, in 1967, 1982, and 1996).

The Basic Safety Standards. The latest edition of the BSS, entitled the *International Basic Safety Standards for Protection Against Ionizing Radiation and for the Safety of Radiation Sources*, is the product of extensive global cooperation. The BSS are jointly established together with five other organizations, including the International Labour Organization and the World Health Organization. They are among global organizations that have produced radiation protection codes and guides in support of the BSS in their respective spheres of activity.

The BSS and the Transport Regulations are the basis for national regulations in a large number of countries and are reflected in the regulatory documents of the major international bodies. Since their adoption, there is greater emphasis in many countries on reviewing and revising the relevant national regulations.

Over the years, the IAEA has developed and published families of radiation safety requirements and guides. Many of them now are being reviewed and revised so they are consistent with the latest edition of the BSS. A leading document in the field of radiation safety is the publication entitled *Radiation Protection and the Safety of Radiation Sources*, which covers areas of radiation protection, radiation safety, and transport safety. It was issued as a “Safety Fundamentals”, or policy-level, document. (See articles, pages 10 and 18.)

Nuclear Safety Standards. As nuclear power expanded globally, the need for a comprehensive set of nuclear power plant safety standards emerged. The IAEA's Nuclear Safety Standards (NUSS) programme resulted in the development of a set of more than 60 standards (codes and supporting guides) dealing with the principal aspects of nuclear power plant safety, from siting through to operation. The NUSS documents also have become the basis for a number of national laws and regulations. A leading document in this field is the *Safety of Nuclear Installations*, which was issued as a “Safety Fundamentals” document and formed the technical basis for the Convention on Nuclear

Safety, which entered into force in 1996. (See article, page 12.)

Radioactive Waste Safety Standards. The first Safety Standards in this field were issued within a few years of the IAEA's creation. By the 1970s, a formal mechanism to review and supervise the production of safety standards on waste disposal had been established. By then, public concern over radioactive waste issues had increased and, as a means of demonstrating that there were already well-established methods for managing wastes safely, the IAEA created a high-profile document series called the "Radioactive Waste Safety Standards". The leading document, *The Principles of Radioactive Waste Management*, was issued in 1995. It formed the technical basis for the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, which States adopted in 1997. Efforts now are focused on formulating harmonized standards in the area of radioactive waste safety, with the next years seeing the completion of the planned set of documents. (See article, page 14.)

Steps Toward an International Safety Culture. Within the past decade, the IAEA set into motion a comprehensive review and strengthening of its safety programme. This ongoing process has been, and continues to be, influenced by interrelated challenges. They are bound by the fact that safety is a dynamic, not static, concept which must remain in step with scientific and technical developments. In that context,

standards taken alone or viewed in isolation are not enough to ensure achievement of higher levels of safety. It is important that safety standards are kept up-to-date and put into effect at the working level as part of an integrated approach and commitment to maintaining an international "safety culture". (See article, page 27.)

UPCOMING CHALLENGES

As the main components of the international nuclear and radiation safety regime evolve, the IAEA's activities related to the preparation and application of safety standards may assume added dimensions. A number of major challenges and issues lie ahead. (See article, page 31, for a fuller description of these issues.)

They include:

- **Protection of the public in situations involving persistent (chronic) exposure to radiation.** In particular, this concerns protection of people living in areas with high natural background radiation or with radioactive residues, e.g. from weapon testing or radiation accidents;
- **Regulation of low doses of radiation.** This includes the development of criteria for:
 - exclusion (of radiation exposures which are not amenable to control) from radiation protection regulations;
 - exemption (of small radiation sources) from regulatory systems of notification and control;
 - exemption (of situations of low radiation doses) from intervention for reducing exposure.
- **Strengthening the regulatory control of radiation sources and**

radioactive material. This issue includes:

- quantitative criteria for ensuring the safety of radiation sources;
 - mechanisms for keeping the security of radioactive materials.
 - **Transport (including trans-boundary movement) of radioactive material.** In particular, this includes:
 - providing assurance that States are bound to the IAEA transport regulations; and
 - peer review compliance with the regulations.
 - **Consolidation of international criteria for the safe disposal of long-lived radioactive waste.**
 - **Management of safety at nuclear installations, including safety culture approaches.**
 - **Influence on radiation and nuclear safety of the growing economic deregulation of markets.**
 - **Improving communication of nuclear, radiation and waste safety issues.**
 - **Radiation protection of patients undergoing radiodiagnosis and radiotherapy.**
 - **Radiation protection of workers subject to relatively high exposure from natural sources.**
 - **International approaches to radiation and nuclear emergencies, including response and assistance.**
- These issues and challenges are influencing the Agency's safety activities, including its safety standards programme. It will be important to achieve international consensus on key issues in years ahead, and to clearly define priorities for future cooperative work. The continued support and involvement of governments and national and international organizations are instrumental to this process. □