Safety of Nuclear Installations

Objective

To enhance the global nuclear safety regime and to ensure the highest levels of safety throughout the total lifetime of all types of nuclear installations in Member States by ensuring the availability of a consistent, needs-based and up to date set of safety standards, and assistance in their applications; to enable Member States seeking to embark on nuclear power production programmes to develop appropriate safety infrastructures through the availability of Agency guidance, assistance and networking; to enable Member States to build improved competence frameworks for the safety of nuclear installations and to enhance their capabilities for capacity building as the foundation for strong safety infrastructure.

The first version of a document on *Strategies and Processes for the Establishment of the IAEA Safety Standards (SPESS)* was completed. It implements the safety standards roadmap, providing an improved structure and format for Safety Requirements and serving as a reference for Safety Guides.

Regulatory Safety Services

The Agency continued to reinforce and strengthen regulatory safety by facilitating international peer reviews of Member State regulatory bodies. In 2010, full scope Integrated Regulatory Review Service (IRRS) missions were carried out in China, the Islamic Republic of Iran and the USA, with a follow-up mission in Ukraine. The Ukraine mission identified several demonstrable improvements that were a direct result of incorporating lessons learned from the previous mission conducted in 2008.

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A 'Self-Assessment Tool' was developed to facilitate the regular evaluation by Member States of their regulatory infrastructure for nuclear and radiation safety, using the Agency's safety standards as a basis. The tool was released to Member States in 2010.

Nuclear Safety Infrastructure for Countries Embarking on Nuclear Power Programmes

Substantial efforts were made in 2010 to assist countries embarking on new nuclear power programmes. Efforts to build nuclear safety infrastructures and to strengthen regulatory systems were the primary areas of focus in Member States; training, sharing knowledge and experience, networking, and publishing Safety Guides were some of the ways the Agency assisted in this undertaking.

In 2010, the Agency launched the Regulatory Cooperation Forum (RCF) to further promote international coordination and collaboration between mature regulatory bodies and the regulatory bodies of Member States considering a nuclear power programme for the first time. The Forum was convened in June 2010.

Key training activities included the 'Basic Professional Training Course on Nuclear Safety', and courses on regulatory control and on training the trainers. These courses were held regionally and were tailored to fit the needs of each area. For example, courses were held in Bangladesh (in cooperation with the Asian Nuclear Safety Network), the Islamic Republic of Iran, Nigeria and the Syrian Arab Republic. In addition, new multimedia video presentations were produced to enhance the public visibility of the Agency's safety activities. Video presentations on siting, probabilistic safety assessments (PSAs) and the safety standards were posted on the web. Finally, the Agency launched a web page containing all nuclear safety and security training resources (*http://www-ns.iaea.org/training/default.asp?s=9&l=78*).

A Safety Guide on the *Licensing Process for Nuclear Installations* (IAEA Safety Standards Series No. SSG-12) was published in 2010. In December, a workshop was held on establishing a safety infrastructure for a nuclear power programme at the Argonne National Laboratory, USA. A training

resources and services web page on this topic was also set up for those countries embarking on new nuclear power programmes.

One of the training tools offered by the Agency is the Systematic Assessment of Regulatory Competence Needs (SARCoN). The SARCoN guidelines are intended to help analyse the training and development needs of regulatory bodies. In 2010, the guidelines were updated and were applied in Belarus, Morocco and Nigeria.

Operational Safety Services

The Agency's Operational Safety Review Team (OSART) programme provides advice, on request, on selected operational aspects and on the safe management of nuclear power plants. In 2010, four OSART missions were undertaken to Belgium, France, Slovakia and Sweden. Six OSART follow-up missions — to France, Japan, the Russian Federation, Sweden, Ukraine and the USA — and a follow-up Peer Review of Operational Safety Performance Experience (PROSPER) mission to the United Kingdom demonstrated successful resolution of issues identified during earlier missions. New review areas for long term operation and for the transition from operation to decommissioning were requested by plants for missions to Armenia and Slovakia, respectively. In addition, additional review areas for the application of PSAs and accident management were made available to customize the scope of the reviews. One follow-up review mission focusing on the Safety Aspects of Long Term Operation of Water Moderated Reactors peer review service was conducted in the Republic of Korea.

Operating Experience

In 2010, the Incident Reporting System was renamed the International Reporting System for Operating Experience (IRS) to reflect its expanded scope and the use of operating experience feedback. The IRS is operated jointly by the Agency and the OECD/NEA to collect information from around the world on safety significant unusual events in nuclear power plants. The information is analysed and fed back to operators to prevent similar occurrences at other plants. The database currently has more than 3650 reports. During the year, recommendations raised in events reported to the IRS database were reviewed to confirm that lessons learned from significant events have been, or will be, covered in the Agency's safety standards.

Enhancing the Safety of Research Reactors and Fuel Cycle Facilities

The Agency continued its efforts to encourage Member States to apply the Code of Conduct on the Safety of Research Reactors, together with the IAEA safety standards. In this regard, the Agency held four regional meetings on application of the Code of Conduct in Africa, Asia, Europe and Latin America. Two technical meetings were also conducted to implement the Code of Conduct with regard to the safety of core management and fuel conversion, and the safety of experiments.

Workshops were held on regulatory supervision, safety culture, operational radiation protection, ageing management, synergy between safety and security, and use of a graded approach in the application of safety requirements. In addition, a Safety Guide on *Ageing Management for Research Reactors* (IAEA Safety Standards Series No. SSG-10) was published.

The Agency seeks to enhance the operational safety of research reactors and fuel cycle facilities through the Fuel Incident Notification and Analysis System (FINAS) (*http://www-ns.iaea.org/tech-areas/fuel-cycle-safety/finas-home.asp*). FINAS is operated by the Agency in cooperation with the OECD/NEA and currently has 18 participating Member States. It also offers the Safety Evaluation During Operation of Fuel Cycle Facilities (SEDO) Safety Review Service. A follow-up SEDO mission was conducted to a fuel fabrication facility in Brazil; it was concluded that satisfactory progress had been achieved in addressing all of the SEDO mission recommendations.

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Safety Assessment Services

In 2010, the Agency established the Global Safety Assessment Network (G-SAN) (*http://san.iaea.org/*) to support international efforts to harmonize nuclear safety. The network links experts around the world and facilitates collaboration on safety assessment,

particularly in expanding and developing nuclear programmes. A number of activities were carried out in 2010, including 75 consultants meetings, expert missions and training seminars to support the transfer of knowledge to both regulators and operators in Bulgaria and Romania.

The Agency continued to develop the Safety Assessment Education and Training (SAET) Programme, which is now part of G-SAN. Workshops on deterministic and probabilistic safety assessment as well as risk informed decision making were organized in Croatia and Italy. In addition, a web conference function (Webinar) was commissioned in 2010 for conducting distance learning courses under the auspices of the SAET Programme.

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The Agency's International Probabilistic Safety Assessment Review Team (IPSART) provides a peer review service to strengthen PSAs for safety related decision making during plant design and operation, particularly since development of a PSA is a requirement for nuclear power plants in most countries. An IPSART and follow-up IPSART mission were conducted to review the PSA of the Borssele plant in the Netherlands and the new Belene nuclear power plant in Bulgaria.

International Seismic Safety Centre

The scope of the Agency's International Seismic Safety Centre (ISSC) encompasses site selection and evaluation of nuclear installations, including external (natural and human induced) events and environmental impact topics. In 2010, one Safety Guide on Seismic Hazards in Site Evaluation of Nuclear Installations (IAEA Safety Standards Series No. SSG-9) was published and two Safety Guides on volcanic hazard assessments and meteorological and hydrological hazard assessments were completed. Extrabudgetary projects on seismic and tsunami hazards were also completed.

Progress was made in the development of the External Events Notification System, in cooperation with the US Nuclear Regulatory Commission, the US Geological Survey and the US National Oceanic and Atmospheric Administration. This included the incorporation of new tools, the implementation of related databases and the coordination of emergency response to external events with the Agency's Incident and Emergency Centre.

Through the ISSC, the Agency coordinated the assimilation of experience from the 2004 Indian Ocean tsunami and the 2007 Niigataken-Chuetsu-oki (NCO) earthquake and assisted in the development of tsunami assessment simulations and the installation of warning systems in India, the Republic of Korea and Pakistan. The NCO earthquake records continue to be used to calibrate seismic methods to assist Member States with future earthquake evaluations.