IAEA/ILO SUPPORT FOR EUROPEAN REGULATORY AUTHORITIES AND OTHER STAKEHOLDERS IN CONTROLLING OCCUPATIONAL EXPOSURE

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INTRODUCTION

The development of international standards in the form of conventions and recommendations is one of the main functions of the International Labour organization (ILO). Conventions and recommendations relevant to occupational radiation protection include Convention No.115 and Recommendation No.114, which deal specifically with the protection of workers against ionizing radiation. The International Atomic Energy Agency (IAEA) is unique among international organizations concerned with radiation protection issues as having a statutory function to "establish or adopt … standards of safety for protection of health and minimization of danger to life and property … and to provide for the application of these standards…".

The purpose of this paper is to describe the support provided by the IAEA and ILO to regulatory authorities and other stakeholders for their control of occupational exposure. The paper will focus on the activities of the two organizations that are leading to adequate control through inspection and self-assessment. This includes the relevant safety standards and provision for the application of such standards through providing further guidance, providing direct safety assistance, promoting education and training, fostering the exchange of safety related information and rendering of safety related services.

SAFETY STANDARDS

The basic requirements for radiation protection against exposure to ionizing radiation of workers are given in the *International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources* (hereafter referred to as the BSS)[1], which are co-sponsored by the IAEA, ILO and several other international organizations. The written style of the BSS is of a regulatory nature so that States may adopt them, at their own discretion, as national regulations. The BSS is available in all IAEA official languages[1].

A set of three Safety Guides concerning the application of the BSS to the control of occupational exposures has been developed in a coordinated fashion and in co-operation with ILO, which co-sponsors them. The English versions were published in 1999, the Russian versions are already available and they will become available in all IAEA official languages. These Guides are also published on CD-ROM together with the BSS [1] and the Safety Fundamentals [2] as an interlinked set of searchable documents, called ORPGUIDE [3].

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[1] Arabic, Chinese, English, France, Russian and Spanish.

- The Safety Guide on *Occupational Radiation Protection* [4] gives general advice on the exposure conditions for which monitoring programmes should be set up in order to assess workers' radiation doses arising from external radiation and from intakes of radionuclides. This Safety Guide addresses the technical and organizational aspects of the control of occupational exposures, in situations of both normal and potential exposure. The intention is to provide an integrated approach to the control of normal and potential exposures due to external and internal irradiation from both artificial and natural sources of radiation.

- The supplementary Safety Guide on the *Assessment of Occupational Exposure Due to External Sources of Radiation* [5] contains guidance on establishing monitoring programmes for external exposure, the appropriate dosimetric techniques to be used for individual and workplace monitoring and the interpretation of results. Particular attention is being paid to the quantities to be measured and the necessary precision and accuracy. Guidance on the type testing and performance testing of dosimeters is given, together with the necessary dosimetric data to carry out this work.

- The second supplementary Guide on *Assessment of Occupational Exposure Due to Intakes of Radionuclides* [6] addresses the assessment of exposure due to intakes of radionuclides in the workplace. It presents the main considerations for monitoring internal exposures both in routine and accident situations, using direct and indirect methods. It also introduces monitoring of levels of radionuclides in the working environment as a basis for assessing intakes. The biokinetic and dosimetric models needed for more specific estimates of doses to individuals, to be used in case of accidents or incidents, or when operations could result in doses approaching regulatory limits, are also presented.

While the recommendations in these three Safety Guides are intended for regulatory authorities, they are also useful to employers, to management bodies and their special advisers and to health and safety committees concerned with the radiation protection of workers.

FURTHER GUIDANCE

In the provision for the application of the standards on occupational radiation protection, the publication of complementary advice on specific topics is published in, for example, the IAEA Safety Reports Series. These publications provide either topic-specific or practice-specific guidance. Whenever relevant these publications are jointly sponsored by the two organizations.

An important example in the context of this workshop is the Safety Report on *Optimization of Radiation Protection in Occupational Exposure* [7], has been published in English, French and Russian and in due course it will be available in all IAEA official languages. The primary target audience for this Safety Report includes those directly responsible for radiation protection in the workplace, for example radiation protection officers (also called health physics managers or health physics officers) and the workers who are being protected, or their representatives, as well as those managers responsible for production or other aspects of an organization, for whom safety should be an integral consideration. This Safety Report should also be useful to regulatory personnel in clarifying how operators can comply with a regulatory requirement for optimization.

A document, which is directly related to the topic of this workshop is the IAEA Working Material on *Self-assessment of Occupational Radiation Protection in Nuclear Power Plants*, issued in English and Russian. It provides guidance on self-assessment of occupational

radiation protection in nuclear power plants (NPPs), describing the development, implementation and maintenance of the self-assessment process; and in addition incorporating practical examples of self-assessment processes. The structure and a substantial part of the general guidance in this Working Material follows the previously published IAEA-TECDOC on *Self-assessment of operational safety for nuclear power plants*, introducing references to occupational radiation protection as necessary. The document describes self-assessment as: "…a structured, objective and visible process whereby individuals, groups and management within an operating organization evaluate the effectiveness of their own protection and safety against predetermined performance expectations. A self-assessment programme or self-assessment loop is only complete when the corrective actions have been implemented and their adequacy confirmed."

The Working Material identifies the following benefits to be gained from an effective self-assessment programme:

- It maintains a continuous assessment of occupational radiation protection throughout the whole of the organization; this allows improvements to be made on the basis of up-to-date factual knowledge and the objectives to be achieved.

- Staff awareness of the self-assessment process can result in a better understanding of the performance expectations and can broaden staff knowledge, the objectives to be achieved, and ways of achieving them. Training of staff in the self-assessment processes can also result in enhancement of their individual skills.

- A strong commitment to the self-assessment process can motivate staff to seek improvements in occupational radiation protection performance. The involvement of individuals in examining the effectiveness of activities for which they are responsible, or in which they are involved, can help them to understand the need for improvement, and should lead them to identify improvement actions, thus encouraging problem solving at the working level. This will assist in developing a greater sense of ownership and openness in which staff feel confident in bringing problems forward and in suggesting improvements.

- The self-assessment process is a major factor in reaching the overall performance expectations and maintaining and enhancing radiation protection.

- Although the primary beneficiary of strong self-assessments will be the plant and operating organization, the results of the self-assessments could be used, for example, to increase the confidence of the regulator in the safe operation of an installation. Such considerations may influence the form of assessment and the type and detail of the results.

- Self-assessment can help to improve communication and working relationships across all levels of the organization.

TECHNIAL CO-OPERATION or THE MODEL PROJECTS

The original - interregional - Model Project (INT/9/143) was launched in 1994. It was succeeded by five regional Model Projects (one each for Africa, East Asia, Europe, Latin America and West Asia) in 1997. In 1999, a visible progress had been achieved in upgrading radiation protection infrastructure in all 52 Member States participating in these projects,

especially in relation to the establishment of legislation and regulations, a regulatory authority and a system of notification, authorization, inspection and enforcement.

By mid-2000, it was evident that the achievements made in upgrading radiation protection infrastructure — although significant — were still not sufficient in many countries. Moreover, it had become clear that there were a number of Member States, not participating in the Model Project, in which improvements to the existing radiation protection infrastructure were highly desirable. The Agency consequently proposed two new Model Projects for each region and it was decided to continue this project for two more TC cycles from 2001-2004. The intention was that the infrastructure to be established or upgraded to a level commensurate with the extent of the radiation practices in a given country, should comply with the requirements of the International Basic Safety Standards (BSS) and the safety guide on Legal Governmental Infrastructure for Nuclear, Radiation, Radioactive Waste and Transport Safety (GS-R-1, Vienna, 2000).

Implementation relied on new approaches characterized by the following features: a) proactive role of the Secretariat in identifying countries' needs and shortcomings with respect to compliance with the BSS; b) national commitment clearly specifying the obligation of the country towards the implementation of the project; c) standard packages aimed at responding to a country's specific needs; d) stricter Conditions for Assistance under technical co-operation projects involving radiation sources; e) RaSIA11 missions focused on the assessment of the effectiveness of the national regulatory infrastructure for radiation safety including the safety and security of radioactive sources in a State against the well-established and recognized international standards and best practices; and f) Quantitative Performance Indicators tied to BSS requirements and, hence, to all milestones (which, for the next TC cycle, are being redefined into thematic safety areas reflecting recent developments), allowing a more precise assessment of whether the radiation protection infrastructure of a Member State meets the principal BSS requirements.

The progress made towards milestone 2 (Table 3) can be summarized as follows: more than 80% of the participating countries had established a system for individual monitoring, covering workers at least at the higher exposure risk; more than 60% had the capability of or access to calibration of radiation monitoring instruments; more than 60% had operational workplace monitoring in place; nearly 80% had a central dose record system, at least for external occupational exposures; and more than 60% had a national strategy and programme for capacity building in the field of radiation and waste safety, however, in some instances, although such a programme was formally in place, significant national activities had been carried out on an ad hoc basis.

EDUCATION AND TRAINING

Education and training is a major component of the IAEA's current programme for establishing and/or strengthening radiation and waste safety infrastructures in its Member States. The IAEA, with guidance from its Education and Training Steering Committee, is strengthening its strategic approach to education and training in radiation and waste safety by (a) further promoting the "train the trainers" approach as a means of achieving national and regional sustainability in the field of education and training; and (b) continuing to help Member States to organize Postgraduate Educational Courses in Radiation Protection and the Safety of Radiation Sources (PGECs) leading to a diploma in radiation safety using the existing and future TC programmes.

The IAEA will produce a document with guidelines for conducting appraisals of the status of education and training in radiation safety and security in Member States, in order to help ensure high quality and compliance with IAEA standards, and prepare, in all its official languages, training packages for radiation protection officers, especially those working in medicine and industry (it will encourage Member States, where necessary, to translate these packages into their local languages). The IAEA will launch a training programme designed to produce regulatory inspectors at the national level qualified to carry out inspections of national regulatory authorities in the area of radioactive source safety and security.

RADIATION SAFETY APPRAISALS

Support for inspection and self-assessment is also given through the various appraisal services that the IAEA provides. Safety services, or appraisals, are provided at the request of Member States as a means for applying the Safety Standards. Hence, the scope of the services, or appraisals, is directly related to the areas addressed by the Safety Standards. Two appraisals are directly related to the subject of the workshop, namely the Occupational Radiation Protection Appraisal (ORPAS) and the Radiation Safety Infrastructure Appraisal (RaSIA).

ORPAS

ORPAS provides an opportunity for a Member State to have its occupational radiation protection programme independently assessed and evaluated. An independent assessment is often useful to maintain or enhance the effectiveness of the programme and to identify in an objective and unbiased manner the areas where improvements may be required.

A secondary benefit is that an independent appraisal allows information on best practices from the host country to be made available to other Member States.

The occupational radiation protection appraisal service is an assessment conducted by international experts selected for their experience in such reviews, for their knowledge of international guidance and best practices, and for their ability to recognise and understand the strengths of different national systems and arrangements. The experts are selected in consultation with ILO. Although the Appraisal is based on international guidelines and best practices, it is not prescriptive nor is it rigid: it takes into account the practical context in the host country and emphasises the positive features of “how things are done” in that country.

The purpose of the assessment is to check the regulatory and practical implementation of occupational radiation protection arrangements. In other words, the review tries to answer the question “are arrangements adequate and will they work?” given the national context in which they are applied. An appraisal also aims at identifying specific strengths and best practices that can be shared with other Member States. Finally, an appraisal provides a basis for determining where improvements may be required and for recommending actions to make such improvements.

In support of the purpose, the key objectives of the appraisal are to:

- provide the host country with an objective assessment of the provisions for occupational radiation protection.

- identify the strengths in the host country which are unique and worthy of bringing to the attention of others.

- promote the use of self-assessment by the host country.
- identify areas where performance should be improved to meet international standards.
- make recommendations on actions to be taken to achieve such improvements

RaSIA

RaSIA is a new, integrated safety appraisal system based on:

- the experience gained through more than 60 appraisals (Peer Reviews) carried out by the IAEA by the end of 2003
- the new requirements introduced in the Code of Conduct on the Safety and Security of Radioactive Sources [ref] as well as on those related to the categorization and security of radioactive sources

The objective of RaSIA is to assess the effectiveness of the national regulatory infrastructure for radiation safety including the safety and security of radioactive sources in a State as measured against well established and recognized international standards and best practices.

This appraisal covers the two main components of the regulatory regime i.e. legislative and statutory framework, and activities of the regulatory body, each comprising respectively the following elements:

- Legislative and statutory framework: legislation, regulations, regulatory body establishment and independence, regulatory body funding, regulatory body staffing and training, co-ordination and co-operation at the national level and international co-operation.
- Activities of the regulatory body: notification and inventory of radiation sources, authorization, safety and security of radioactive sources, inspection, enforcement, information dissemination, and quality management.

FUTURE ACTIVITIES

An increasingly important means used by the IAEA for fostering information exchange is the organization of international conferences, mostly in co-operation with other international organizations. In 2002, the first International Conference on Occupational Radiation Protection was held in the ILO Headquarters in Geneva, convened jointly by the IAEA and ILO, co-sponsored by the European Commission and held in co-operation with several other international organization and associations. The findings and recommendations of the Conference formed the basis for an Action Plan for Occupational Radiation Protection, approved by the IAEA Board of Governors in September 2003. The findings and recommendations conclude, for example, that here should be more and better involvement of stakeholders[2] - including workers, employers, regulators and professionals - in arriving at occupational radiation protection decisions and in their implementation in the workplace. In some cases, stakeholders, especially workers, may require training and assistance so as to be able to play the role that corresponds to their importance. The Action Plan therefore contains,

[2] The word “stakeholder” is used to mean all parties interested in occupational radiation protection.

for example, an action to provide occupationally exposed workers with the basic awareness and understanding to enable them to play the role that corresponds the their importance as stakeholders.

In September 2003, the International Conference on National Infrastructures for Radiation Safety (Rabat Conference) was held in Rabat, Morocco. This conference provided an opportunity to review the overall situation with respect to the development of radiation safety and security infrastructures both in IAEA Member States and in countries that are not IAEA Member States. It highlighted the need for complete, effective and sustainable radiation safety and security infrastructures and the progress made through the Model Projects, although recognized the need for adjustments to the Model Projects to promote effective and sustainable national regulatory infrastructures for the control of radiation sources in line with requirements of the BSS and the Code of Conduct.

Both these conferences identified promotion of information exchange as a highly effective means of improving radiation protection in general. The Rabat conference stated: *"Overwhelmingly, networking was recognized by participants as a very effective instrument for enhancing the sharing of knowledge and experience - a key to the prevention of accidents and to implementation of the ALARA concept. Networking can facilitate the transition from dependence to self-sufficiency and sustainability, so it should be promoted and become an integral part of international co-operation"*.

A new IAEA Regional TC-project on *Practical Implementation of the Principle of Optimization of Radiation Protection through Networking* is expected to be launched in 2005. The main objective of the project is to support the development of a sustainable regional network within the geographical region of interest, i.e. within Central and Eastern Europe and the Mediterranean and where further progress towards achieving the compliance with the BSS is a priority. The target organizations are national regulatory authorities, licensees, registrants, technical support organization and other stakeholders dealing with the implementation of the ALARA (as low as reasonably achievable) principle. The project plan has been developed in close co-operation with representatives of the European ALARA Network also taking into account the experiences gained with the existing Central and Eastern European ALARA Network.

CONCLUSIONS

IAEA and ILO are co-operating to provide regulatory authorities and other stakeholders support for their control of occupational exposure. This includes the development of relevant safety standards and provision for the application of such standards through providing further guidance, providing direct safety assistance, promoting education and training, fostering the exchange of safety related information and rendering of safety related services.

Future technical cooperation projects to promote effective and sustained national regulatory infrastructures for the control of radiation sources will focus on key elements such as encouraging Member States to engage in periodic appraisals and self-assessments, strengthening the education and training of regulatory staff; and encouraging stakeholder involvement, networking and information exchange. By expanding technical regional cooperation, self-reliance and networking, and further promoting the "train-the-trainer" approach, the success and sustainability of infrastructures for the control of occupational exposure to radiation sources should be greatly enhanced.

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