

RADIATION SAFETY STANDARDS DOCUMENTING INTERNATIONAL PROGRESS

BY ALEJANDRO V. BILBAO ALFONSO AND ANTHONY D. WRIXON

Development of radiation safety standards is a statutory function of the IAEA and 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". The work encompasses high-priority activities of the IAEA.

The IAEA Board of Governors first approved Basic Safety Standards for radiation protection in June 1962. Three revised editions have been issued since then, in 1967, 1982 and 1996. The latest edition -- entitled the *Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources* (the BSS), is the product of extensive global cooperation. Based closely on the recommendations of the International Commission on Radiological Protection (ICRP), the standards are sponsored by five other organizations -- the Food and Agriculture Organization (FAO) of the United Nations, International Labour Organization (ILO), Nuclear Energy Agency (NEA) of the Organization for Economic

Cooperation and Development, Pan American Health Organization (PAHO) and World Health Organization (WHO).

The BSS 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.

THE RASS PROGRAMME

Documents in the IAEA's Safety Standards Series known as RASS (Radiation Safety Standards) are a set of regulatory-style publications that reflects an international consensus on the principles of radiation protection and safety and their application through regulation. While many of the RASS documents are intended for use by developing

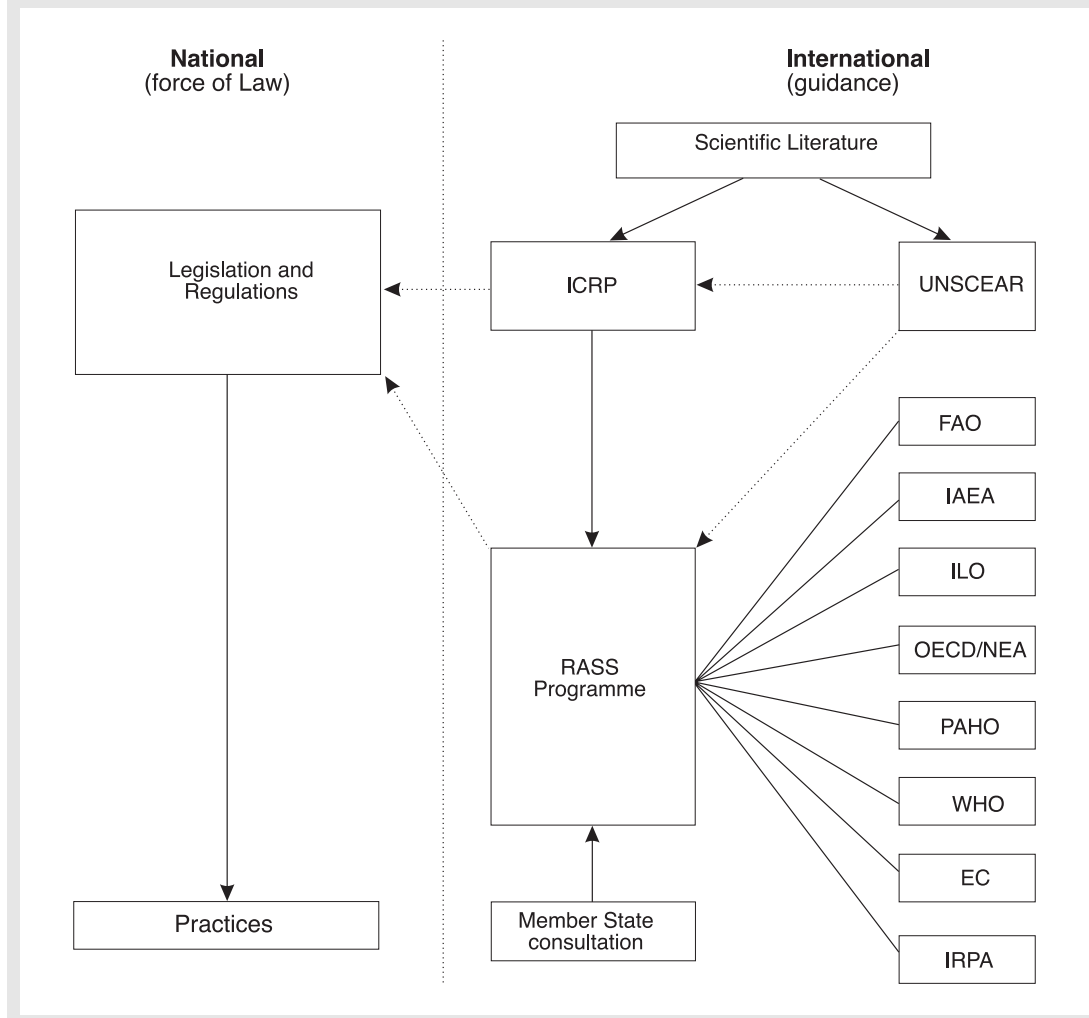
countries, the entire series should serve as helpful guidance on the international state-of-the-art for all IAEA Member States. Its framework illustrates the connections with international organizations and the potential link to national legislation and regulations. (See figure, page 29.)

The present overall structural plan for RASS documents comprises about 20 publications in preparation. It is hoped to have a consistent and coherent suite of RASS publications completed by the year 2000. (See box, page 30.)

Safety Fundamentals. The underlying principles for radiation protection and safety are set out in the *Safety Fundamentals: Radiation Protection and the Safety of Radiation Sources* (Safety Series 120; 1996). This document explains the approaches to radiation protection and safety for persons in senior political or regulatory positions, as well as for persons who make decisions relating to the uses of

Mr. Bilbao is a staff member of the IAEA Division of Radiation and Waste Safety and Mr. Wrixon is Head of the Division's Radiation Safety Section.

**DEVELOPMENT OF RADIATION SAFETY STANDARDS:
Achieving International Consensus in Regulatory Form**



radiation in medicine, industry, agriculture and other areas.

Safety Requirements. There is currently only one document in this category, namely, the BSS (Safety Series 115; 1996), which establish basic requirements for radiation protection and safety, specify obligations and responsibilities and set out the requirements for application to practices and in intervention situations.

A second Safety Requirements document is currently being developed to provide for a harmonized

approach across all areas of nuclear, radiation, radioactive waste and transport safety in the field of emergency preparedness and response. It is being co-sponsored by the FAO, NEA, and WHO.

Safety Guides. A number of Safety Guides have been or are being developed to support and interpret the requirements set out in the BSS, specifically those relating to the safety of radiation sources and the security of radioactive materials. A new Safety Guide is being developed to assist Member States in establishing

national regulatory infrastructures appropriate to the requirements of the BSS and to their level of radiation usage, making extensive use of the Agency's technical document on the organization and implementation of a national regulatory infrastructure governing protection against ionizing radiation and the safety of radiation sources (TECDOC-1067, published in February 1999). The Preamble to the BSS clearly indicates that the requirements are based on the presumption that a national

DOCUMENTS IN THE IAEA'S RADIATION SAFETY STANDARD SERIES

SAFETY FUNDAMENTALS

Radiation Protection and the Safety of Radiation Sources (SS-120, 1996)

SAFETY REQUIREMENTS

International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources (SS-115, 1996)

Requirements on Preparedness and Response for Nuclear and Radiological Emergencies (NS-43)

SAFETY GUIDES

GENERAL	PRACTICES			INTERVENTIONS	
	OCCUPATIONAL	PUBLIC	MEDICAL	CHRONIC	EMERGENCIES
<i>Operational Radiation Protection: A Guide to Optimization</i> (SS-101, 1990)	<i>Assessment of Occupational Exposure due to External Sources of Radiation</i> (NS-12)	<i>Consumer Products Containing Radioactive Substances</i> (NS-31)	<i>Radiation Protection in Medical Exposures</i> (NS-22)	<i>Control of Chronic Exposure</i> (NS-51)	<i>Criteria for Use in Planning Response to Nuclear and Radiological Emergencies</i> (NS-44, revision of SS-109)
<i>Radiation Safety of Gamma and Electron Irradiation Facilities</i> (SS-107, 1992)	<i>Radiation Protection of Workers in the Mining and Processing of Raw Materials</i> (NS-17, revision of SS-26)				<i>Preparedness for Nuclear and Radiological Emergencies</i> (NS-105, revision of SS-50-SG-G6, SS-50-SG-06 and SS-98)
<i>Application of the Radiological Concepts of Exclusion, Exemption and Clearance</i> (NS-33, revision of SS-89)	<i>Occupational Radiation Protection</i> (NS-69)				
<i>Preventing, Detecting and Responding to Illicit Trafficking in Radioactive Materials</i> (NS-61)	<i>Assessment of Occupational Exposure due to Intakes of Radionuclides</i> (NS-85)				
<i>Establishing a National Regulatory Infrastructure for Radiation Safety</i> (NS-67)					
<i>Building Competence in Radiation Protection and for the Safe Use of Radiation Sources</i> (NS-73)					
<i>Quality Assurance in Radiation Safety</i> (NS-113)					
<i>Safety of Radiation Sources</i> (NS-114)					
	Note: Documents in italic bold have been published in the IAEA's Safety Series (SS). Those only in <i>italic</i> are being developed.				

infrastructure is in place enabling the Government to discharge its responsibilities for radiation protection and safety. However, experience has shown that in many countries this presumption is not valid and it is for that reason that this Safety Guide is seen as being of paramount importance.

The principles for exemption are dealt with in an existing Safety Guide (Safety Series 89; 1988), but it needs to be revised. Its scope also needs to be extended to cover the concept of exclusion. Both

concepts are fundamental components of the BSS. In the concept of the safety of radiation sources, consideration is being given to defining the principles under which the person responsible for a source can be exempted from the requirement to undertake a thorough safety assessment.

Optimization of protection is one of the principal requirements for radiation protection in the BSS, and general techniques for its application are described in the existing Safety Guide (Safety

Series 101, 1990). This Safety Guide will be revised to bring it up to date with the current thinking on the application of the principles. Among other things, it will cover the important topic of management of radiation exposure in the workplace, including matters relevant to the safety of radiation sources.

As part of the programme to combat illicit trafficking in radioactive materials, a new Safety Guide on Prevention, Detection and Response to Illicit Trafficking in Radioactive Materials has been

developed. This is being co-sponsored by the World Customs Organization (WCO) and International Criminal Police Organization (INTERPOL). A set of supporting technical manuals is planned which will contain information on materials typically involved in illicit trafficking, on prevention, detection and response and on training for customs and police officers.

Training is a very important component of the Agency's current programme. As well as providing a range of courses throughout the world and support activities for training programmes within Member States, the Agency has a programme of preparing appropriate guidance material. A new Safety Guide has been drafted on Building Competence in Radiation Protection and the Safe Use of Radiation Sources which provides guidance for the regulatory authorities for the establishment of training and qualification requirements and a strategy for building competence.

A new Safety Guide is also being produced to elaborate on the requirements in the BSS related to the safety of sources and includes the revision of an existing Safety Report (Safety Series 104; 1990) on potential exposures.

A set of three Safety Guides covering general aspects of the control of occupational exposures has been developed and will be published in 1999. One outlines the elements which are needed to form the basis for an effective worker protection programme. It is supplemented by two other

SAFETY STANDARDS PROGRAMME

For a fuller report on the IAEA's Safety Standards Programme in the context of international issues, including a listing of publications on radiation, nuclear, waste, and transport safety, see the *IAEA Bulletin* edition of June 1998 (Vol. 40, No. 2).

Articles describe the Agency's process for preparing, reviewing, revising, and publishing safety standards, and review other aspects of the global nuclear and radiation safety framework.



Safety Guides which are providing specific guidance required for the accurate assessment of external and internal occupational exposures respectively. They are co-sponsored by the ILO. It is intended to publish these three Safety Guides together with the BSS and Safety Series 120 on diskette as an interlinked set of searchable documents (the BSS are already available in this form).

General guidance on occupational exposure is being supplemented by a specific new Safety Guide based on the existing one (Safety Series 26; 1983). The purpose is to provide an integrated approach to the control of exposures due to external and internal irradiation from artificial and natural sources of radiation in facilities dealing with mining and processing of raw materials. It is co-sponsored by the ILO.

The safety of consumer products containing radioactive materials is the subject of another new Safety Guide. Though already developed, it is now under further consideration to ensure that it is consistent with the

new guidance that will be eventually developed on exemption and exclusion.

A new Safety Guide also has been developed to supplement and expand on the BSS requirements for radiation protection in the medical exposure of patients. It is being co-sponsored by both PAHO and WHO, and should be sent soon to Member States for comment.

Another new Safety Guide covering all aspects of planning for emergency response will include the revision of the existing Safety Guide (Safety Series 109; 1994) which was developed in parallel with the BSS, and will incorporate and replace a number of other existing guidance (Safety Series 55 and 91; 1988 and 1989 respectively), including some in the nuclear safety series. A separate new Safety Guide will deal with the preparedness for nuclear and radiological emergencies. It will incorporate the revision of the Safety Guides (Safety Series 50-SG-G6, 50-SG-06, and 98; 1982, 1982 and 1989 respectively). It is intended to be co-sponsored by the NEA, WHO, and, as expected, the ILO. □