Programme K. RADIATION AND TRANSPORT SAFETY

Rationale: In order to protect people and their environment against the detrimental effects attributed to radiation exposure, as well as to ensure proper levels of safety for radiation sources and of security for radioactive materials, including for the transport of such material, appropriate radiation safety standards have to be established and provisions have to be made for their proper application. Within the United Nations family, the Agency is unique in its statutory functions of establishing radiation safety standards and providing for their application at the request of States (set up in Article III.A.6 of the Statute). The Agency plays a unique role through its capability for assisting States striving for a globally harmonized approach to radiation safety. The Agency is also responsible under its Statute for requiring the observance of health and safety measures with respect to, inter alia, operations under its control or supervision and any Agency projects. A major review during 2001–2002 revealed the need to strengthen the internal arrangements regarding the control of radiation sources and the safety of persons. As early as 1960, the Board of Governors approved health and safety measures (INFCIRC/18), indicating that the Agency's safety standards should be based to the extent possible on the recommendations of the International Commission on Radiological Protection (ICRP). Thus, in 1962 the Board approved the first radiation safety standards and, in 1994, the current International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources (BSS). The BSS are jointly sponsored by FAO, ILO, OECD/NEA, PAHO, WHO and the Agency. (A large corpus of radiation safety standards has also been established, including so-called "Fundamentals", "Requirements" and "Guides".) An early decision of the United Nations Economic and Social Council (ECOSOC) had already entrusted specific radiation safety duties to the Agency in relation to the safe transport of radioactive substances and as a consequence, the Board has — starting in 1961 — approved Regulations for the Safe Transport of Radioactive Material. In addition, several international conventions have placed specific obligations on the Agency in relation to radiation safety, with particular reference to emergencies; these are the Convention on Early Notification of a Nuclear Accident (Early Notification Convention), the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (Assistance Convention) and, to some extent, the Convention on Nuclear Safety.

There is considerable benefit associated with reaching international consensus on the content of radiation safety standards and on how they should be applied. Many States currently lack adequate radiation safety infrastructures and need international support in developing and implementing a national system for radiation safety. The issue of safety — both real and perceived — has become key to the future of nuclear technologies. If the benefits of nuclear power and radiation and isotope techniques are to be realized, it is essential that the highest standards of safety and environmental protection be achieved and maintained worldwide. Against this background, the Agency will pursue Goal B of the Medium Term Strategy, i.e. a comprehensive worldwide safety culture in the nuclear field.

In the development of a global regime of radiation and transport safety, more emphasis will be placed on the establishment of an overall strategic approach to the provision of support to Member States in their development of appropriate infrastructures. This will include integrated safety evaluations, sustainable education and training, a harmonized approach to technical co-operation and assistance, and strengthened information and communication networks. The global approach will also ensure an effective approach towards the implementation of safety standards. In a number of recent resolutions, the General Conference has requested the Secretariat to carry out specific activities on radiation safety — in particular, activities relating to:

— the safety of transport of radioactive material (GC(42)/RES/13, GC(44)/RES/17 GC(45)/RES/10 and GC(46)/RES/9),
— the radiological protection of patients undergoing radiodiagnosis or radiotherapy (GC(43)/RES/12) and the implementation of the recommendations of the International Conference on the Radiological Protection of Patients (held in Málaga in March 2001) (GC(44)RES/11, GC(45)/RES/10, and GC(46)/RES/9),
— international intercomparisons of radiation dose measurements (GC(43)/RES/13 and GC(45)/RES/10),
— education and training in radiation protection and nuclear safety (GC(44)/RES/13, GC(45)/RES/10 and GC(46)RES/9),
— improvement of Member States' emergency response instruments under the Early Notification and Assistance Conventions (GC(44)/RES/16 and GC(45)/RES/10),
— the wider application of the Code of Conduct on the Safety and Security of Radioactive Sources and the implementation of the recommendations of the International Conference of National Regulatory Authorities (held in Buenos Aires in December 2000) and the revised Action Plan for the Safety of Radiation Sources and the Security of Radioactive Materials (GC(43)/RES/10, GC(44)/RES/11, GC(45)/RES/10,GC(44)/RES/13 and GC(46)/RES/9).

The events of 11 September 2001 have highlighted the need for further consideration to be given to the security of radioactive material, security in this context meaning the measures to prevent unauthorized access to, and loss, theft and unauthorized transfer of, radioactive material. Security is essential to avoid radioactive material being lost from control and the consequential accidents and is therefore an important component of safety.

The main beneficiaries of the Agency's radiation safety programme are national authorities dealing with radiation safety issues, and certain international organizations. Derived beneficiaries are workers exposed to radiation, patients undergoing radiodiagnostic and radiotherapeutic procedures, members of the public, and users and operators of facilities involving radiation exposure.

Objective: To achieve global harmonization and raise the levels of protection of people against radiation exposure and of safety and security of radiation sources, and to ensure that the Agency properly discharges its health and safety responsibilities with regard to its own operations.

Outcomes
— International consensus achieved in Agency radiation safety standards. — Corrective action taken — by Member States which requested Agency services and received training — on targeted strengthening of their radiation safety infrastructure.
Performance Indicators
— Availability to Member States of radiation safety standards. — Availability in Member States of qualified personnel. — Percentage of Agency recommendations implemented.

Specific criteria for prioritization:

— First priority is given to establishing standards and servicing conventions.
— Second priority is given to the application of standards.
— Third priority is given to strengthening information exchange.

Subprogramme K.1. National and Global Infrastructure Enhancement for Radiation and Transport Safety

Rationale: A suite of relevant safety standards has been developed over many years; these standards need to be kept up to date with developments in technical knowledge and approaches to safety and any gaps need to be filled. Furthermore, full and proper implementation of the safety standards requires that the necessary national regulatory infrastructure exists in a State, in particular that a regulatory authority has been established by the government to regulate the introduction and conduct of any practice involving sources of radiation. However, many Member States lack the necessary expertise to establish and operate an effective regulatory programme, and require substantial support for the development of their regulatory infrastructure, in particular during the preparation of their regulations and development of their systems of control. The importance of the Agency's role in supporting the development of national infrastructures was highlighted in General Conference Resolutions GC(44)/RES/11, GC(44)/RES/17, GC(45)/RES/10 and GC(46)/RES/9. An effective means of providing such support is the provision of the Agency's appraisal services to regulatory authorities for radiation safety. Such services are also valuable for those Member States assumed to have effective regulatory programmes to ensure that they are comprehensive and up to date. In this subprogramme, emphasis is therefore also placed on the establishment of an integrated approach to the provision of support to Member States in their development of appropriate infrastructures, which includes the use of integrated safety evaluations.

A further emphasis will be placed on sustainable education and training programmes; such programmes being seen as fundamental to any safety infrastructure. This view is supported by Resolutions GC(XXXVI)/RES/584 (1992), GC(43)/RES/10 (1999), GC(44)/RES/13 (2000), GC(45)/RES/10.C (2001), and GC(46)RES/9, by which, the Agency was requested, inter alia, to arrange and intensify postgraduate educational and specialized training courses in appropriate official languages of the Agency and to develop, in a systematic way, syllabuses and training material for specific target groups and specific uses of radiation sources and radioactive materials. In 2001, the Agency prepared a strategic plan for education and training aimed at having by 2010 sustainable education and training programmes in its Member States. This strategic plan was endorsed by General Conference Resolution GC(45)/RES/10.C.

Objective:

— To strengthen national regulatory infrastructures by establishing internationally accepted policies, standards and essential regulatory instruments for radiation and transport safety and appraising their implementation in requesting States.
— To provide for a co-ordinated, consistent and harmonized approach to the application of the safety standards through integrated safety evaluations, and sustainable education and training.

Outcomes
— International consensus achieved on Agency radiation and transport safety standards. — Globally harmonized regulatory infrastructures for radiation and transport safety. — Corrective action taken by Member States which requested Agency services/appraisals and integrated safety evaluations. — Implementation of Agency recommendations developed through peer review missions and use of knowledge gained through training.
Performance Indicators
— Development and availability of safety standards in accordance with the time schedules foreseen by RASSC and TRANSSC. — Number of integrated safety evaluation missions undertaken and the percentage of their related recommendations implemented. — Availability in Member States of qualified personnel and of Agency standardized education and training packages

Programme changes and trends: This subprogramme focuses on the Agency's role in establishing safety standards and facilitating their implementation through the establishment of the necessary national regulatory infrastructure and regulatory authorities. It further develops activities carried out within the 2002–2003 subprogramme on Radiation Safety Standards and Provisions for their Application, and integrates it with the equivalent activities from the transport area to ensure a harmonized and consistent approach to regulatory issues.

Resource changes and trends: The proposed resources for Subprogramme K.1 amount to $992 000 in 2004, reflecting an increase in the budget of $42 000, or 4.4%, compared with 2003. Due to the substantial restructuring of subprogrammes K.1 and K.2, it is difficult to present an accurate comparison with the previous budget cycle. Bearing this in mind, the increase in 2004 can be attributed to the allocation of staff that reflects the current level of effort needed in these areas to carry out the activities.

Financial resources (2003 prices)

K.1.	2003	2004	2005
Reg. budg.	950 000	992 000	994 000

Recurrent project K.1.01: Reviewing and approving the radiation and transport safety standards

Main outputs: Reports from RASSC and TRANSSC meetings advising on the Agency's draft manuscripts for standards, and on activities in the areas of radiation protection and safety of radiation sources and the safe transport of radioactive material will be published. Information reports will be made available on the application of the standards and experience from their application, to assist in the revision of the standards, including the BSS.

Ranking: 1 ex aequo

Recurrent project K.1.02: Strengthening national regulatory infrastructures and promoting Integrated Safety Evaluations

Main outputs: Packages for training regulatory staff will be developed and disseminated to national regulatory authorities and regional centres as well as to other national bodies involved in the establishment and operation of national regulatory programmes such as the police, or customs officers. Methodologies and tools for the appraisal of the regulatory programme will be established in Member States. Reports of international peer review teams will be prepared at the request of Member States. A manual on all the integrated safety evaluation available on radiation and waste safety will be published. An annual summary report on all integrated safety evaluation missions rendered to Member States and feedback on implementation of the recommendations resulting from the integrated safety evaluation missions will be made available.

Ranking: 11 ex æquo

Recurrent project K.1.03: Implementing a strategy for sustainable education and training in radiation and transport safety

Main outputs: Updated and validated training packages will be available as well as an annual programme. An annual summary report on the implementation of education and training events and feedback from centres and institutions hosting them will be prepared.

Ranking: 11 ex æquo

Recurrent project K.1.04: Fostering harmonized international approaches to radiation and transport safety

Main outputs: Reports from IACRS meetings and co-sponsored documents will be published.

Ranking: 1 ex aequo

Subprogramme K.2. Information and Communication Networks for Radiation and Transport Safety

Rationale: This subprogramme is concerned with establishing and maintaining the appropriate mechanisms for an overall integrated approach for the provision of technical assistance to Member States, based on the Agency's safety standards and tailored to the specific needs of those States identified by Country Radiation and Waste Safety

Profiles and addressed through specific Country Radiation and Waste Safety Action Plans. These define the real needs and facilitate, in a consistent and harmonized manner, the provision of targeted support to a particular Member State.

The Agency will provide safety related information on radiation and transport safety to different audiences, with the aim of raising awareness of society on safety issues and addressing concerns of the general public in these areas.

Objective: To raise awareness and understanding of technical advisers, policy makers and the general public of radiation and transport safety issues and ensure an effective support to Member States in these fields.

Outcomes
— Harmonized approaches to technical support to Member States. — Effective communication of information on issues in radiation and transport safety.
Performance Indicators
— Increased availability of updated Country Radiation and Waste Safety Profiles and relevant Action Plans. — Availability to Member States of information on issues in radiation and transport safety.

Programme changes and trends: Emphasis will be placed on ensuring that assistance provided for the application of safety standards is based on identified Member States needs and priorities. In addition, more emphasis will be put on the production of communication packages for different audiences.

Resource changes and trends: The proposed resources for Subprogramme K.2 amount to $277 000 in 2004, reflecting a decrease in the budget of $16 000, or 5.5%, compared with 2003. Due to the substantial restructuring of subprogrammes K.1 and K.2, it is difficult to present an accurate comparison with the previous budget cycle.

Financial resources (2003 prices)

K.2.	2003	2004	2005
Reg. budg.	293 000	277 000	277 000

Recurrent project K.2.01: Maintaining information and harmonizing support to Member States in radiation and transport safety

Main outputs: The main outputs expected from the project are: (a) Country Radiation and Waste Safety Profiles and Country Radiation and Waste Safety Action Plans for Member Sates receiving Agency assistance; and (b) harmonized and regularly updated technical support packages that would be used to strengthen national radiation and transport safety infrastructures.

Ranking: 11 ex aequo

Recurrent project K.2.02: Communicating radiation and transport safety issues

Main outputs: This project will result in the development of folders and fact sheets, web sites, and videos on topical issues in radiation and transport safety.

Ranking: 25

Subprogramme K.3. Application of Safety Standards to the Agency's own Operations

Rationale: The Agency has a statutory responsibility for radiation protection and the safety of staff members, individuals under contract, experts, trainees and visitors and any other persons who may be exposed to radioactive material or other sources of ionizing radiation due to activities conducted by the Agency or under its supervision or control, including transport. The Agency's Radiation Protection Rules and Procedures (RPR&P) were derived from the requirements of the Agency's safety standards, in particular, the International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources (BSS). They are currently being revised to bring them into line with all of the requirements of the Agency's safety standards and new organizational arrangements and safety requirements are expected to be in place in 2004.

Under the current Rules and Procedures, the Division Directors have direct responsibility for the radiation safety of their staff. The technical support required by Division Directors in respect of radiation protection and safety is provided under this subprogramme. The work involves provision of occupational monitoring services, training, safety audits, and advice on the design of installations and operational radiation control programmes including monitoring and the use of protective devices. The BSS require these services to be provided under an adequate quality assurance programme, and this will be incorporated within a quality management system (QMS) which is being established.

Separate from these support functions, the Agency also needs to exercise a form of regulatory control over its own activities. This is necessary in order to achieve consistency with its safety standards. This regulatory control function comprises the establishment and maintenance of an inventory of the radiation sources held by the Agency, the operation of a system of notification and authorization for the use of radiation sources and inspection of the locations where radiation sources are kept or used to verify compliance with the Agency's rules and procedures. These will form part of the new arrangements.

The Radiation Protection Committee (RPC) is a body appointed by, and reporting to, the Director General. The RPC, inter alia, provides the Director General with advice or recommendations on the adequacy of the rules and procedures for protection and safety. The RPC also reviews the reports from the Radiation Health and Safety Officer and makes recommendations as appropriate.

Objective: To ensure a high level of radiation protection for the Agency's own operations and for all operations making use of materials, services, equipment, facilities and information made available by the Agency, including technical co-operation projects.

Outcome
— Compliance with the RPR&P on health and safety measures applied in the Agency's own operations and projects involving occupationally exposed workers under the responsibility of the Agency.
Performance Indicators
— Absence of breaches of the RPR&P and corrective actions implemented. — Number of trained staff.

Programme changes and trends: Pursuant to a review of the RPR&P in 1999 and 2002, the need for further strengthening of the control on the safety and security of radiation sources has been recognized. In particular, an effective internal regulatory function is being established and should be fully operational during 2004–2005.

The provision of services, training and advice is an on-going activity, although subject to continuous improvement. In particular, there is an international trend toward accreditation and certification of technical services based on the existence and implementation of a quality management system. The Agency has a QMS implemented for its radiation protection services and will seek formal certification of its monitoring services from an appropriate accrediting organization by 2005–2006.

Resource changes and trends: The proposed resources for Subprogramme K.3 amount to $321 000 in 2004, reflecting an increase in the budget of $15 000, or 4.9%, compared with 2003. The small increase is due to the introduction of the new project K.3.01 (Appraising compliance with and maintaining review of the RPR&P), for which the resources were distributed throughout Programme K in previous cycles.

Financial resources (2003 prices)

K.3.	2003	2004	2005
Reg. budg.	306 000	321 000	321 000

Recurrent project K.3.01: Appraising compliance with and maintaining review of the Agency's Radiation Protection Rules and Procedures

Main outputs: Minutes of RPC meetings, authorizations for the use of radiation sources for Agency activities, inspection reports and an inventory of radiation sources will be prepared.

Ranking: 1 ex aequo

Project K.3.02: Operating the Agency's radiation protection monitoring laboratories and providing radiation protection services

Main outputs: This project will result in: individual dose assessment reports, QMS procedures for technical services, reports on operational radiation protection programmes, reports to the RPC on the status of radiation protection in the Agency's operations, and training courses for staff.

Duration: 2004–2006

Ranking: 1 ex aequo

Subprogramme K.4. Occupational Radiation Protection

Rationale: The radiation protection of workers has an international dimension as it is addressed in a number of international conventions and also affects migrant workers. The Agency's statutory functions include the establishment and provisions for application of safety standards for "labour conditions". In 1994, in approving the BSS, the Board established basic requirements for occupational radiation protection. As a follow-up, detailed occupational radiation protection guidance is being prepared. Both the Convention on Nuclear Safety and the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, as well as the ILO Convention 115, establish occupational radiation protection obligations to States Parties. ILO relies on the Agency for — and collaborates with it in — establishing and applying occupational radiation safety standards and disseminating information on occupational exposure to radiation.

According to estimates by UNSCEAR, over 80% of the annual collective dose to workers worldwide derives from occupational exposure in workplaces with elevated levels of natural radiation, a source that has not been fully considered in existing guidance. The average annual effective dose per worker is significantly higher in those workplaces than in workplaces with human-made radiation.

A prerequisite for the application of the principle of optimization of occupational radiation protection is the appropriate and updated data and information exchange on methods for dose reduction. An important tool available to Member States in this area is the Information System on Occupational Exposure (ISOE) operated jointly by the Agency and OECD/NEA. In order to improve the information exchange for facilities other than nuclear power plants, regional networks for the optimization of occupational radiation protection are to be established. Through the use of Internet and co-operation with the ILO and organized labour in Member States, information can reach a greater number of occupationally exposed workers.

Pursuant to General Conference Resolution GC(43)/RES/13, the Secretariat is organizing interregional and regional intercomparison exercises for monitoring purposes with a view to helping Member States to comply with dose limitation requirements and to harmonizing the use of internationally agreed quantities and assessment methods recommended in Agency standards. In order to provide for networking and exchange of information, it is recommended that a directory of radiation protection laboratories and services in Member States be developed.

One of the aspects contributing to the harmonization and good performance of operational services for radiation monitoring and protection, as required in I.32 of the BSS, is the establishment of a QMS covering the main considerations that should be addressed by any organization according to well known principles and practices for the fulfillment of its legislative mandate. There is an international trend toward accreditation and certification of technical services based on the existence and implementation of a quality management system.

The Agency offers support to Member States in the application of standards, e.g. by providing occupational radiation protection appraisal services, which at the same time promote self-assessment in this area.

GC(46)/RES/9 urged the Secretariat to develop an action plan based on the recommendations of the Conference on Occupational Radiation Protection, held in August 2002.

Objective:

— To ensure the global harmonization and optimization of occupational radiation protection in situations of occupational exposures due to external radiation and intakes of radionuclides from both artificial and natural sources of radiation.
— To gain international acceptance of the use of radiological quantities and their measurement techniques, including the creation of a network of competent technical services in radiation safety among Member States.

Outcomes
— International consensus achieved on and implementation of quality management system. — Actions taken by facilities and regulatory authorities in Member States to apply the principle of optimization of protection in occupational exposure and to strengthen the occupational radiation protection infrastructure in targeted areas. — Action taken by Member States to apply radiological quantities recommended by the Agency for verification of compliance.
Performance Indicators
— Mechanism in place for targeted provision of guidance and assistance for the strengthening of occupational radiation protection infrastructures in Member States. — Mechanism in place to encourage Member States to apply the radiological quantities recommended by the Agency for verification of compliance with the dose limits by the determination of at least three dosimetric quantities.

Programme changes and trends: This is a continuation of Subprogramme K.3 Occupational Radiation Protection (2002–2003), with a new emphasis on the development of criteria for the protection of workers against exposure from natural sources of radiation, including naturally occurring radioactive materials (NORMs).

Resource changes and trends: The proposed resources for Subprogramm K.4 amount to $532 000 in 2004, reflecting a decrease in the budget of $23 000, or 4.1%, compared with 2003.

Financial resources (2003 prices)

K.4.	2003	2004	2005
Reg. budg.	555 000	532 000	536 000

Project K.4.01: Harmonizing radiation protection requirements in the workplace

Main outputs: Practical guidance on occupational radiation protection and guidance for decision aiding on probability of causation of health effects attributable to occupational exposure will be issued. An Action Plan will be implemented, based on recommendations by the Conference on Occupational Radiation Protection (2002). Collected and processed personnel occupational exposure data from parties to ISOE will continue to be made available. ISOE information sheets and annual reports will be issued. Regional networks on the optimization of occupational radiation protection will be established, exchanging information mainly on occupational exposure in installations other than nuclear power plants. Work plans for facilities needing support, identified through the use of a feedback mechanism, will be developed in co-operation with ILO.

Duration: 2004–2006

Ranking: 1 ex aequo

Project K.4.02: Developing criteria for the protection of workers against exposure from natural sources of radiation (including naturally occurring radioactive materials (NORMs))

Main outputs: Safety related publications (other than standards) on occupational radiation protection in workplaces with high levels of exposure to natural radiation will be published. Networks for information exchange will be established to improve the optimization of radiation protection for workers occupationally exposed to high levels of natural radiation. Work plans will be made available for facilities needing support, identified through the use of a feedback mechanism developed in co-operation with ILO.

Duration: 2004–2006

Ranking: 11 ex aequo

Project K.4.03: Intercomparing occupational radiation protection monitoring measurements and standardizing radiation protection quantities and units

Main outputs: Results from intercomparison exercises will be disseminated. An Agency service for verifying measurement capabilities regarding operational quantities in Member States will be established. A safety guide on QMS in technical services will be ready for distribution.

Unfunded activities/means of implementation: Development and maintenance of directories with information on internal and external dosimetry laboratories in Member States; intercomparison exercise on determination of the quantity activity of radionuclides in human breath; and advisory services for implementing quality management systems in technical services.

Duration: 2004–2006

Ranking: 11 ex aequo

Subprogramme K.5. Radiological Protection of Patients

Rationale: The use of ionizing radiation in medicine is extensive and is increasing at a fast pace because of the substantial benefits for patients in diagnosis and therapy. Worldwide, about 2000 million diagnostic X ray examinations and 32 million nuclear medicine procedures are carried out annually and there are about 10 million new cancer patients each year, 40–50% of which receive radiotherapy.

According to UNSCEAR, diagnostic medical applications of ionizing radiation represent by far the largest human-made source of ionizing radiation exposure and a 10% increase in the number of X ray examinations is indicated in the latest 2000 UNSCEAR report compared to the previous one finalized in 1993. Furthermore, relatively high doses are encountered in computed tomography (CT) examinations. Faster image acquisition facilitates head to pelvic CT examination, and CT fluoroscopy. These examinations together with the more recent use of CT for health screening are adding to patient dose. Considerable scope for dose reduction in conventional radiology without loss of diagnostic information was pointed out in Publications 34 and 60 of the ICRP. Furthermore, there is a significant potential with digital radiology, which is increasingly being used, for higher doses than necessary to be given to patients.

Moreover, during the last decade, a number of radiation injuries have been reported in interventional procedures using X rays and a number of accidental exposures with severe or even fatal consequences was reported from radiotherapy.

Aware of these facts, the 43rd General Conference requested the Secretariat to organize an international meeting for the purpose of exchanging information and developing recommendations on the radiological protection of patients. This led to the organization of the Conference on the Radiological Protection of Patients in Málaga, Spain, from 25 to 30 March 2001, the findings of which were submitted to the Board and the General Conference. As a result, the Secretariat was requested to formulate an Action Plan for future international work relating to the radiological protection of patients.

This subprogramme essentially consists of the activities of the Action Plan on the Radiological Protection of Patients (GC(46)/RES/9). Its focus is on the establishment of appropriate safety standards and provision for their application and involves: (i) the reduction of doses in diagnostic use of radiation, while keeping the necessary diagnostic information, with special emphasis being given to interventional and digital radiology and to CT; (ii) the prevention of accidental exposure in therapeutic uses of radiation, while delivering the necessary dose to the target organs; and (iii) the optimization of radiation protection during nuclear medicine procedures. The Action Plan has been developed in co-operation with the relevant United Nations organizations and professional bodies, and co-operation with these organizations and bodies is expected to continue during the implementation of the plan. The beneficiaries of the subprogramme are the patients undergoing diagnostic or therapeutic procedures worldwide.

Objective: To establish a high level of radiation protection and safety of patients.

Outcomes
— Reduction of doses in conventional radiology, digital radiology and CT. — Reduction in the number of injuries in interventional radiology. — Reduction in the likelihood of accidental exposure in radiotherapy. — Reduction in misadministrations in nuclear medicine.
Performance Indicator
— Percentage of recommendations implemented by those States requesting reviews and other services for the implementation of safety standards, new techniques and procedures.

Programme changes and trends: The period 2004–2005 will focus on the implementation in Member States of methodologies for surveys of patient doses and image quality, and appraisal of arrangements for patient protection and the provision of training, making use of information obtained from research by Member States finalized in 2002–2003 cycle. In addition, there will be an expansion of training programmes covering, inter alia, digital radiology and distance learning.

The programme of work reflects the actions specified in the Action Plan on the Radiological Protection of Patients and regroups the tasks in different projects by subject area (conventional radiology, interventional procedures using X rays, digital radiology and CT, radiotherapy and nuclear medicine).

Resource changes and trends: The proposed resources for Subprogramme K.5 remain essentially unchanged in 2004–2005 compared with 2003.

Financial resources (2003 prices)

K.5.	2003	2004	2005
Reg. budg.	549 000	540 000	531 000

Recurrent project K.5.01: Avoiding unnecessary radiation exposures to patients undergoing interventional procedures using X ray imaging

Main outputs: Two TECDOCs on dose reduction and guidance levels, training material for professionals involved in the procedures, a number of persons trained with this material (mainly future trainers), and a web site for information exchange on patient protection will be developed. Guidance material on displaying and recording patient dose data will be prepared for the manufacturers.

Ranking: 11 ex aequo

Recurrent project K.5.02: Optimizing the radiation protection of patients undergoing radiodiagnostic procedures (including conventional and digital radiology and computed tomography)

Main outputs: Information and guidance documents on managing patient dose in CT will be developed as a result of a co-ordinated research project. Specific training packages on the transition from conventional to digital imaging will be made available.

Unfunded activities/means of implementation: Dissemination of information through the Internet regarding protection of the patient, increased awareness of high dose CT procedures, and the use of paediatric CT protocols; CRP on avoidance of unnecessary dose to patients while transitioning from analogue to digital radiology.

Ranking: 11 ex aequo

Recurrent project K.5.03: Optimizing the radiation protection for medical exposures in nuclear medicine and preventing the misadministration of radioactive substances

Main outputs: The main outputs will be: updated database with information on misadministration of radiopharmaceuticals, training material and organization of regional and national training courses for target group.

Unfunded activities/means of implementation: Development of guidance on the discharge of patients with radioactive material; and dissemination of information related to the protection of the patient.

Ranking: 11 ex aequo

Recurrent project K.5.04: Preventing accidental exposures to patients undergoing radiotherapeutic procedures

Main outputs: This project will result in: an updated database of accidental exposures of patients; reports on lessons to be learnt and actions to be taken to prevent future accidents; training courses for target groups such as radiation oncologists, medical physicists, technologists and radiation protection officers; and support to Member States in the implementation of the BSS related to the radiological protection of patients.

Unfunded activities/means of implementation: Development of guidance on the safety aspects of donation of radiotherapy equipment.

Ranking: 11 ex aequo

Subprogramme K.6. Control of Radiation Sources

Rationale: The Agency has established international requirements for the safety of radiation sources in the BSS. These include requirements for preventing breaches in the security of sources, so that control is not relinquished. Moreover, for a number of years, it has been collecting data on radiological accidents, including accidents caused by breaches in security, and has published reports drawing lessons from the more severe accidents. This has helped raise international awareness regarding the need for an increase in the level of safety of radiation sources, including the element of security. The International Conference on the Safety of Radiation Sources and Security of Radioactive Material, held in Dijon, France, in September 1998 was the first international effort for fostering information exchange on the safety and security of radioactive material, and contributed substantially to raising international awareness of the matter.

Whilst there are many causes of radiological accidents, these can frequently be traced to deficiencies in safety, often combined with a lack of awareness of basic radiation protection concepts, including appropriate control measures. Accidents involving radiation sources have been responsible for workers and members of the public being exposed to high levels of radiation, resulting in severe radiation burns, loss of limbs and, in some cases, death. Some radiological accidents involving uncontrolled or 'orphan' sources have resulted in contamination of the environment, costing governments millions of dollars in cleanup costs and litigation fees. Intense media interest associated with such accidents has led, in some instances, to loss of confidence in governments being able to properly control radiation sources.

There is a clear need for proper management of radiation sources. The Agency's statutory functions, in relation to radiation safety, place it in a unique position to assist States in meeting this objective.

As a direct result of the Dijon Conference, the Agency developed an 'Action Plan on the Safety of Radiation Sources and Security of Radioactive Materials', that was subsequently approved by the Board of Governors and endorsed by the General Conference (Attachment 2 to GOV/1999/46–GC(43)/10). As a result of this Action Plan, an International Conference for National Regulatory Authorities with Competence in the Safety of Radiation Sources and the Security of Radioactive Materials, was convened in Buenos Aires, Argentina, in December 2000, and this led to the development of a 'Revised Action Plan for the Safety and Security of Radiation Sources', which was approved by the Board of Governors on 10 September 2001 — and endorsed by the General Conference (attachment to GOV/2001/29–GC(45)/12, and GC(46)/RES/9). The subprogramme essentially consists of activities designed to implement the actions envisaged in this document.

Following the events of 11 September 2001, additional activities in the area of security in relation to terrorism were proposed by the Secretariat and approved by the Board in March 2002. These activities are programmatically addressed in Programme M, and will be integrated with the revised Action Plan.

Objective:

— To improve the safety and security of sources of radiation commensurate with the risks that they pose while not hindering their beneficial use.
— To improve the security of those radioactive sources that are amenable to malevolent acts while not hindering their legal use.

Outcomes
— Improved safe use and control of significant radiation sources, especially in States where previous weaknesses have been identified. — Improved public confidence that radiation sources can be used safely and securely. — International consensus on standards for the safety of radiation sources and security of radioactive materials.
Performance Indicators
— Extent to which States implement the Code of Conduct on the Safety and Security of Radioactive Sources (or equivalent international undertaking). — Extent to which States adopt Agency standards, other publications and training materials that relate to the safety and security of radiation sources. — Extent to which States request Agency services that relate to the safety and security of radiation sources.

Programme changes and trends: This subprogramme is largely a continuation of work arising from the Revised Action Plan for the Safety and Security of Radiation Sources. The shorter term measures in this Revised Action Plan have been completed. Increased global concern over the threats from the malevolent use of radioactive material has prompted efforts to be increased on the control of radioactive materials as an essential element of ensuring safety of the public and workers.

Resource changes and trends: The proposed resources for the Subprogramme K.6 amount to $801 000 in 2004, reflecting an increase in the budget of $217 000, or 37.2%, compared with 2003. This increase is the result of a significant strengthening of efforts on the control of radiation sources. Activities have also been strengthened through the use of extrabudgetary funds.

Financial resources (2003 prices)

K.6.	2003	2004	2005
Reg. budg.	584 000	801 000	815 000

Recurrent project K.6.01: Enhancing safety of radiation sources

Main outputs: Training modules will be developed covering the safe design and use of radiation sources used in industry and medicine. A Safety Guide on quality management systems for users of major industrial radiation sources will be published. Safety Reports that provide practice specific model regulatory guidance for the safe use of major radiation sources will be issued. Reports of appraisal services to assess the safe use of radiation sources provided to Member States on request will be made available. A web based information exchange service focusing on topical issues relating to the safety of sources will be established. An international reporting system of unusual events with radiation sources (RADEV) will be operational and the reports will be made available.

Ranking: 1 ex aequo

Recurrent project K.6.02: Strengthening the regulatory control of radiation sources

Main outputs: A categorization of radioactive sources will be established and kept under review such that the requirements for safety and security can be appropriately graded. Undertakings by States committed to the institution of specific control measures for the higher categories of radioactive sources identified in the categorization will be sought. The requirements for the control of radioactive sources currently established in relevant standards will be reviewed and revised as appropriate. An appraisal service aimed at checking compliance with international requirements on the control of radioactive sources will be established. Regulators will be trained to develop national strategies for detecting, locating and managing orphan sources as a result of having attended regional workshops on the subject. Criteria for the prioritization of assistance to States based on available resources will be developed. National strategy action plans for States with the highest priority need, developed as the result of assistance missions to those States, will be made available. Reports of missions to Member States requesting assistance in regaining control over orphan sources will be published. The project on locating, recovering and securing orphan radioactive sources in the Newly Independent States, which resulted from the recent initiative between the Government of the Russian Federation (through Minatom), the Government of the United States of America (through the US Department of Energy) and the Agency, will be managed and brought to a conclusion.

Ranking: 11 ex aequo

Subprogramme K.7. Safety of the Transport of Radioactive Material

Rationale: The use of radioactive materials necessitates their transport in the public domain. With the events of 11 September 2001, concerns have expanded beyond conventional radiation safety to the security necessary to prevent access of radioactive material in transport to terrorists. Thus, actions must be taken and maintained to ensure both safety and security during all phases of transport, i.e. during packaging, consigning, loading, carriage, storage in transit and unloading. The proper regulatory control of these activities at the domestic and international level is critical.

Beginning in 1961 as a result of a request by ECOSOC, and within the Agency's statutory function, the Board of Governors has, periodically, adopted Regulations for the Safe Transport of Radioactive Material (the Transport Regulations). The Transport Regulations have been developed in consultation and collaboration with Member State competent authorities and the UN modal transport organizations and are recognized as the international authoritative standards for both the national and the international transport of radioactive material.

The Agency has established a continuing review process of its Transport Regulations in response to General Conference Resolution GC(44)/RES/17 and later resolutions including, inter alia, GC(45)/RES/10 and GC(46)/RES/9. These resolutions have resulted, in part, from heightened concern among members of the public regarding the transport of radioactive material.

The Agency undertakes development of safety standards and associated safety guidance, and assists Member States in their use, all with a view to enhancing Member State capabilities and infrastructure in both the safety and security of radioactive material during transport. The Agency provides services to Member States including appraisals of compliance with the Transport Regulations (TranSAS missions). The appraisals, coupled with training, assist States in advancing their knowledge of and strengthening their implementation of the Regulations (TranSAS missions). The Agency also provides a significant amount of data and information, and has available communication tools, to facilitate the understanding of the Transport Regulations by users, governmental officials and the general public. The Agency is preparing to have available a broadened scope methodology for assessing the adequacy of the Regulations as they are applied in international regulatory documents and by State regulators, consignors and carriers; and to provide a broadened effort in the area of marine transport of radioactive material.

In addition to the continued review and revision of the Transport Regulations and provision for their application, this subprogramme will be concerned with the development and implementation of requirements for security in the transport of radioactive material, including nuclear material (cf. GC(46)/RES/9). It is also concerned with: enhancing the ability of States to regulate the transport of radioactive material in a safe and secure manner using internationally recognized methodologies; enhancing the ability of the Agency to communicate with States' regulators, and with consignors and carriers; providing a methodology for assessing the adequacy of the Transport Regulations as they are applied worldwide; ensuring the timely and accurate implementation of the Agency's Transport Regulations into the UN Model Regulations and the international air, sea and land (road, rail and inland waterway) modal regulatory documents; and improving the safe and secure marine transport of radioactive material.

Objective: To promote the safe transport of radioactive material.

Outcomes
— Broad acceptance of the Transport Regulations and enhanced consistency between the modal transport regulations and the Transport Regulations. — Improved security of radioactive material in transport commensurate with the risk. — Improvements in national regulatory control through the wide use by Member States of TranSAS. — Enhanced knowledge regarding the safety and security of marine transport of radioactive material.
Performance Indicators
— Number of Member States implementing the Transport Regulations. — International consensus on requirements for security in the transport of radioactive material.

Programme changes and trends: A major focus will be the maintenance of the Agency's Transport Regulations and facilitating their incorporation into the various modal regulations. Close liaison will be maintained with the other United Nations bodies in the development and revision of these modal regulations in order to facilitate a harmonized approach to transport safety. In addition, for the first time, the Agency will develop standardized requirements for security in transport of radioactive material, and will undertake training and appraisal of the application of these requirements by States. It is also expected that the demand for the appraisal of Member State implementation of the Transport Regulations will increase.

Resource changes and trends: The proposed resources for Subprogramme K.7 amount to $805 000 in 2004, reflecting an increase in the budget of $116 000, or 16.8% compared with 2003. Additional funds have been allocated to this subprogramme to strengthen efforts in reviewing and revising the Regulations for the Safe Transport of Radioactive Material, and for their application. Additional human resources are necessary to meet the expectations of Member States in this area.

Financial resources (2003 prices)

K.7.	2003	2004	2005
Reg. budg.	689 000	805 000	805 000

Recurrent project K.7.01: Reviewing the international regulations for the safe transport of radioactive material and supporting the development of regulatory guidance

Main outputs: The revised transport regulations, either as a new edition or as an amended edition, will be published in 2005. A TECDOC on security in transport of radioactive material, and a safety guide on the requirements for a radiation protection programme in transport providing formalized guidance will be published. The recommendations of the 2003 Conference on the Safety of Transport of Radioactive Material will be implemented as appropriate. Updated annual assessments of Member State application of the Transport Regulations will be made available on the web site and to the General Conference.

Ranking: 1 ex aequo

Recurrent project K.7.02: Incorporating regulations for the safe transport of radioactive material into modal regulatory requirements

Main outputs: Documents describing changes to the Transport Regulations and reports of the Interagency Co-ordination Meetings communicated to the relevant UN and non-UN international dangerous goods transport organizations will be issued. The annual report of cross-mapping between the international dangerous goods transport regulatory documents and the Transport Regulations will be issued.

Unfunded activities/means of implementation: Inputs to the UN transport regulatory bodies' dangerous goods meetings on the safety of the transport of radioactive material.

Ranking: 11 ex aequo

Recurrent project K.7.03: Appraising national compliance with the international regulations for the safe transport of radioactive material

Main outputs: Transport Safety Appraisal (TranSAS) reports providing documented independent expert appraisal of Member State implementation of the Transport Regulations will be made available. Appraisal reports of Member State application of requirements for security in transport of radioactive material will be issued. Multi-level training course

materials, and courses for carriers and emergency responders reflecting the latest version of the Transport Regulations, will be published.

Ranking: 11 ex aequo

Project K.7.04: Evaluating risk in the maritime transport of radioactive materials

Main outputs: Documentation will be made available elaborating issues in the marine transport of radioactive material and identifying areas where further attention may be needed. A report of a multi-topic workshop assessing the marine transport of radioactive material will be published.

Unfunded activities/means of implementation: Guidance and training in the use of the INTERTRAN II code to perform marine transport risk assessment studies.

Duration: 2004–2006

Ranking: 11 ex aequo

Subprogramme K.8. Preparedness for and Response to Nuclear or Radiological Emergencies

Rationale: Radiological emergencies of various types continue to occur — often accidents with orphan sources. In addition, the possibility of a severe nuclear accident that could result in a transboundary radioactive release requiring protective actions in several countries, although extremely unlikely, can never be ruled out. This includes not only the low probability accidents in commercial nuclear power plants and other facilities of the peaceful nuclear fuel cycle, but also possible re-entry of nuclear powered satellites. Emergency situations could also arise as a result of malicious intent to use radioactive material for criminal purposes.

Adequate preparation to respond to nuclear or radiological emergencies is not universal. Without standard procedures and a common understanding, the protective actions taken may differ considerably from country to country, and it may be difficult for countries to interpret and use each other's data. This may lead to confusion and public mistrust and hamper recovery operations, with possibly severe socioeconomic and political consequences.

The international regime for dealing with and planning for nuclear or radiological emergencies is currently based on the following international conventions: the Convention on Nuclear Safety; the Convention on Early Notification of a Nuclear Accident (Early Notification Convention); and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (Assistance Convention). The last two conventions place specific obligations on the Agency. In order to fulfil these obligations the Agency must be prepared for any nuclear or radiological emergency that has the potential to threaten the health of the public, property or the environment. Moreover, the last two conventions place obligations on the Agency as regards assisting Member States and parties to the conventions with the development, strengthening and harmonization of response arrangements. Also, the Agency has statutory functions regarding the establishment of standards of safety, which include standards regarding response to and preparedness for nuclear and radiological emergencies. In 1994, in approving the BSS, the Board established basic requirements for interventions in emergency exposure situations, and, in 2002, the Board approved safety requirements for preparedness and response for a nuclear or radiological emergency. The Agency provides for the application of such standards on request by States, and is therefore centrally placed to facilitate the development of preparedness for emergency situations. Furthermore, the General Conference, in GC(44)/RES/16 and GC(46)/RES/9, encouraged Member States to implement instruments for improving their response to nuclear and radiological emergencies, and in addition encouraged them to participate actively in the process of strengthening international, national and regional capabilities for responding to nuclear and radiological emergencies and to make those capabilities more consistent and coherent.

This subprogramme is therefore concerned with the completion of the development of safety standards relating to preparedness for and response to radiological accidents or nuclear emergencies, and technical manuals and training materials in support of the Agency's work to provide for the application of those standards. It is also concerned with the fulfillment of the Agency's obligations contained in the above Conventions.

Objective: To have in place appropriate global capabilities, consistent with internationally accepted approaches, and effective international arrangements and systems for continuous improvement, for responding to nuclear and radiological emergencies.

Outcomes
— Acceptance and use of Agency safety standards for preparedness and response to nuclear and radiological emergencies. — Timely response in the provision of appropriate assistance and prompt information available following a nuclear or radiological emergency.
Performance Indicator
— Number of Member States with emergency response arrangements commensurate with their needs.

Programme changes and trends: The First Meeting of Competent Authorities identified under the Early Notification and Assistance Conventions made

recommendations for the Secretariat relating to international emergency information exchange and communication, and the provision of emergency assistance. In addition, the Emergency Response Arrangements of the Agency have been reviewed and it was found that enhancements are needed, including developing an Agency capability to respond to terrorist related emergencies, and for addressing this element in the associated guidance, training material and services offered.

Resource changes and trends: Resources essentially remain constant. No major change is foreseen for 2005.

Financial resources (2003 prices)

K.8.	2003	2004	2005
Reg. budg.	992 000	990 000	979 000

Project K.8.01: Enhancing international requirements and strengthening national planning for preparedness for, and response to, nuclear and radiological emergencies

Main outputs: Two safety guides will be produced addressing the establishment and maintenance of arrangements for emergency response, and the criteria for planning and responding to a nuclear or radiological emergency, including those arising from the malicious use of radioactive material. Relevant manuals, having been updated to take into account feedback from use will be re-issued. Certified experts and lecturers will be contacted. Standard training material will be issued in relevant Agency languages to support training provided by States. The system for performing Emergency Preparedness Review missions will be continuously improved. Reports of EPREV missions will be provided.

Unfunded activities/means of implementation: Tools and methodologies for improvement of response to emergencies, including revision of the INTERRAS computer code, and updated training material on the basis of experience gained during emergency exercises.

Duration: 2004–2005

Ranking: 1 ex aequo

Recurrent project K.8.02: Strengthening and operating the Agency's Emergency Response Centre, including liaising with national competent authorities and relevant international organizations

Main outputs: The emergency response arrangements will be improved so as to serve as a model in certain aspects in the international community. The arrangements of the Agency to respond to a threat of or an actual event involving malicious use of nuclear or radioactive material will be enhanced. Recommendations from the meeting of the competent authorities in 2005 will be made available.

Unfunded activities/means of implementation: Emergency exercises, including a large scale joint international emergency exercise; enhancement of the Emergency Response Centre (ERC) and associated operational systems, and further development of the Emergency Response Network of standby emergency teams in Member States; and a meeting of the competent authorities identified under the Early Notification and Assistance Conventions.

Ranking: 1 ex aequo

Recurrent project K.8.03: Responding to nuclear or radiological emergencies, including requests by States and Parties to the Early Notification and Assistance Conventions

Main outputs: Reports of the actions taken in response to nuclear or radiological emergencies, including those arising from criminal or terrorist use of radioactive materials, will be published.

Unfunded activities/means of implementation: Additional staffing resources required for the implementation of the project.

Ranking: 1 ex aequo

Recurrent project K.8.04: Evaluating retrospectively nuclear accidents and radiological emergencies, and responses to them

Main outputs: A short report of critical lessons identified will be made available on a protected web site and distributed to Competent Authorities. Detailed publications on certain emergencies with particular new features identifying lessons to be learnt will be issued. A publication on long term follow-up of medical treatment of victims of past accidents will be issued. Formal methodology for the assessment of accidents will be established.

Unfunded activities/means of implementation: Reports on significant radiation emergencies; joint IAEA/WHO meeting to identify lessons learnt in the treatment and follow-up of victims of past radiation emergencies.

Ranking: 11 ex aequo