

The Year in Review

Approaching its fiftieth year, the International Atomic Energy Agency continues to be the global focal point for cooperation in the use of nuclear energy for peace and development. Recognition of its contributions in these areas found its most prominent expression in the award by the Norwegian Nobel Committee in October of the Nobel Peace Prize for 2005 to the Agency and its Director General, Mohamed ElBaradei.

For the Agency to continue to make a meaningful contribution to socioeconomic development, nuclear safety and security, and non-proliferation and arms control, it must remain responsive to the changing needs and goals of its Member States. These needs and priorities were taken into account in the preparation of the *Medium Term Strategy 2006–2011*, which was presented to the Board of Governors in March. This new strategy continues to emphasize the importance of quality management to ensure efficiency and effectiveness in all Agency activities.

During 2005, the Agency continued its work under the three pillars of its mandate — *technology*, *safety* and *verification*. Specifically, the focus was on: facilitating the development and transfer of peaceful nuclear technologies; maintaining and expanding a global nuclear safety regime as well as strengthening the security of nuclear and radiological material and facilities; and preventing the proliferation of nuclear weapons. This chapter reviews some of the major global developments in these areas during the year from the perspective of the Agency.

Technology

The Agency's work under the technology pillar for the peaceful applications of nuclear science and technology contributes to the socioeconomic development of its Member States. Its wide ranging activities under both its regular budget and technical cooperation programme include providing scientific and technological support in the fields of nuclear power, the nuclear fuel cycle, food production, human health, water resources, marine and terrestrial environmental management, and industrial applications.

Nuclear power: Status and trends

For nuclear energy, 2005 was a year of rising expectations, driven by: nuclear power's performance record; the growing need for energy around the world coupled with rising oil and natural gas prices; environmental constraints on the use of fossil fuels; concerns about energy supply security in a number of countries; and expansion plans for nuclear power in some States. In March, high level representatives of 74 governments, including 25 representatives at the ministerial level, gathered in Paris at a conference organized by the Agency to consider the future role of nuclear power. According to the final statement of the President of the Conference, the vast majority of participants affirmed that "nuclear power can make a major contribution to meeting energy needs and sustaining the world's development in the 21st century, for a large number of both developed and developing countries."

The Agency maintains comprehensive databases tracking the status of nuclear power reactors around the world through their construction, operation, shutdown and decommissioning. At the end of 2005, there were 443 power reactors operating worldwide, accounting for about 16% of world electricity production and keeping pace with the steady growth in the global electricity market. Twenty-six nuclear power plants were under construction, the majority (15) being in Asia. Four new plants were connected to the grid during the year: two in Japan and one each in India and the Republic of Korea. One laid-up plant was reconnected in Canada. Overall, there was a net increase in capacity of 2300 MW(e) in 2005, taking into account new nuclear power plants connected to the grid and plant retirements. Licence renewals for nuclear power plants also played an important role in 2005, notably in the Netherlands, the Russian Federation, Sweden, the United Kingdom and the USA.

Although expectations for nuclear power are rising, a recent global public opinion survey commissioned by the Agency — which polled 18 000 people in 18 countries (Fig. 1) — revealed substantial differences of opinion across countries.

Energy assessments and technology transfer

The availability of energy is central to improving the standard of living in developing countries.



FIG. 1. Results of a global public opinion poll on nuclear power commissioned by the Agency. (Source: *Global Public Opinion on Nuclear Issues and the IAEA: Final Report from 18 Countries, 2005.*)

One of the contributions of the Agency to energy development is its efforts to build Member State capacities for national energy analysis and planning, taking into account economic, environmental and social implications. Its energy planning tools are now used in more than 109 countries around the world. In addition, local experts have been trained to analyse national options for meeting energy demand. In 2005 alone, 272 energy professionals from 51 countries were trained. Analytical studies to complement the Agency's training programmes included reviews of energy supply security in the Baltic States, energy system requirements in India and Mexico, the cost effectiveness of nuclear power for the mitigation of climate change and reducing emissions of greenhouse gases, the contribution of nuclear technologies to economic growth in the Republic of Korea, and the economic impact of early closure of nuclear plants in Bulgaria.

Innovation

National research on innovative and advanced reactor designs continues for all reactor categories – water cooled, gas cooled, liquid metal cooled and hybrid systems. Complementing national initiatives are two major international efforts to promote innovation – the Generation IV International Forum (GIF) and the Agency's International Project on Innovative Nuclear Reactors and Fuel Cycles (INPRO).

In 2005, members of GIF signed a Framework Agreement on International Collaboration in Research and Development on six types of reactor systems that were previously selected. The membership of INPRO grew to 24 with the addition in 2005 of Ukraine and the USA.¹ The INPRO methodology is currently being used by Argentina,

¹ The 24 members of INPRO are: Argentina, Armenia, Brazil, Bulgaria, Canada, Chile, China, Czech Republic, France, Germany, India, Indonesia, Netherlands, Morocco, Republic of Korea, Pakistan, Russian Federation, South Africa, Spain, Switzerland, Turkey, Ukraine, USA and the European Commission.

China, France, India, the Republic of Korea and the Russian Federation to assess innovative nuclear energy systems and identify the most suitable areas for collaborative development.

Uranium resources and supply

Uranium prices, which generally declined through the 1980s and fluctuated during the 1990s, began to rise in 2001 and increased by over 350% between 2001 and 2005 (Fig. 2).

The 2005 edition of the joint IAEA–OECD/NEA 'Red Book' on uranium resources, production and demand continues to foresee a mixed medium term outlook for the uranium market. Particularly important is uncertainty regarding the continued availability of secondary supply sources, such as civil and military stockpiles, spent fuel reprocessing and the re-enrichment of depleted uranium.

The consensus at an Agency symposium on 'Uranium Production and Raw Materials for the Nuclear Fuel Cycle', held in June in Vienna, was that uranium resources were adequate to fuel the projected expansion of nuclear power. However, it was emphasized that additional investment was needed to ensure that uranium mining and milling activities would be able to meet the anticipated expansion in global nuclear power generation.

In addition to cataloguing resources and trends in the Red Book, the Agency also published guides on environmental impacts and site rehabilitation for uranium mines. It also provided training and expertise to a number of Member States on uranium exploration.

Decommissioning of nuclear facilities

The issue of the decommissioning of nuclear reactors is assuming increasing importance in many States. In this connection, the Agency provides guidance on when to choose decommissioning over licence renewal, and on the decommissioning process itself, in addition to encouraging the exchange of best practices among Member States. Seventy-nine (18%) of the 443 reactors operating at the end of 2005 had been in operation for more

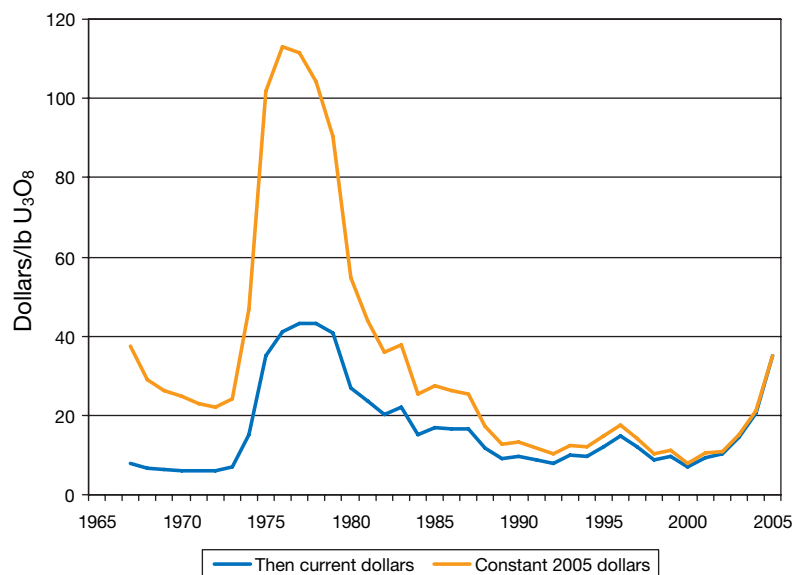


FIG. 2. Uranium prices, 1967–2005.

than 30 years, while a further 63 reactors (14%) had been in operation for more than 25 years. There are two basic decommissioning options — immediate dismantling and long term safe enclosure followed by dismantling. In 2005, decommissioning of the Trojan and Maine Yankee nuclear power plants in the USA was completed, and both sites were released for unrestricted public use. Thus, by the end of 2005, eight power plants around the world had been completely decommissioned, with their sites released for unconditional use. Seventeen power plants have been partially dismantled and safely enclosed, 31 are being dismantled prior to eventual site release, and 30 nuclear power plants are undergoing minimum dismantling prior to long term enclosure.

Spent fuel and waste management

The long term management and disposal of spent nuclear fuel remains a challenge for the nuclear power industry. Indeed, any global expansion of nuclear power will be dependent on public perceptions of the safety of radioactive waste management.

The Agency helps build capacity in geological disposal through its Network of Centres of Excellence on Training and Demonstration of Disposal Technologies in Underground Research Facilities. Sweden recently joined the network's core group of donor countries, which includes Belgium, Canada, Switzerland, the United Kingdom and the USA. Finland, Sweden and the USA are furthest along in developing geological repositories for their spent nuclear fuel.

Regarding the disposal of low and intermediate level radioactive waste, noteworthy developments took place during the year in Belgium, Hungary and the Republic of Korea. In Belgium, two communities voted to become candidate sites for a national low level waste (LLW) repository. In Hungary, residents of Bataapati voted to host the country's final repository for LLW and intermediate level waste (ILW), which was subsequently approved by the Hungarian Parliament. And in the Republic of Korea, Gyeongju offered to host the site for the first national LLW and ILW repository. The Gyeongju siting process was reviewed positively in 2005 by the Agency under its Waste Management Assessment and Technical Review Programme. All of these proposed sites should be licensed and operational within the next decade.

Conversion of research reactors

The Agency has been involved for more than twenty years in reducing the amount of high enriched uranium in civilian use. In 2005, the number of requests for Agency assistance in relation to the conversion of research reactors from using high enriched uranium to low enriched uranium fuel increased considerably, with technical cooperation projects in Bulgaria, Kazakhstan, the Libyan Arab Jamahiriya, Portugal, Romania, Ukraine and Uzbekistan. In addition, a project for the production and qualification of low enriched fuel elements for the conversion of Chilean research reactors was completed, allowing the continued conversion of the La Reina research reactor.

Fusion technology

In June, international efforts in developing fusion technology took a significant step forward with the signing of a joint declaration — by China, the European Union, Japan, the Republic of Korea, the Russian Federation and the USA — to build the International Thermonuclear Experimental Reactor (ITER) in Cadarache, France. This declaration signalled a new stage — the scientific and engineering demonstration of fusion technology for power production. India subsequently became the seventh member of ITER. In December, the ITER Joint Work Site in Cadarache was formally inaugurated.

Nuclear knowledge management

The management of nuclear knowledge has emerged as a growing challenge in recent years. In particular, the ageing of the work force in many areas of nuclear applications is becoming a matter for serious concern for a number of Member States. In these countries new technical staff must be recruited to replace retirees. A new generation of nuclear scientists and engineers is also needed in countries planning to expand the use of nuclear power and non-power applications.

Agency support includes service missions, such as a joint mission with WANO in 2005 to acquire and preserve a range of undocumented information at the Krško nuclear plant in Slovenia. And the first Summer Institute of the World Nuclear University was held in Idaho Falls, USA, in July and August 2005 with the support of the Agency. Courses for the 75 students from 33 countries covered such topics as world energy demand and supply, nuclear technology for sustainable development, nuclear law, radiation protection, waste management and non-proliferation.

One of the Agency's initiatives to preserve and maintain nuclear knowledge is the International Nuclear Information System (INIS), which has been expanding at a record pace. Over 100 000 bibliographic records and more than 250 000 electronic full text documents were added to INIS in 2005 alone. Students at 273 universities now have free access to the INIS database, and the system has grown to nearly 1 million authorized users.

In December 2005, the Agency established *Nucleus*, an information gateway, or 'portal', to provide one common access point for individuals in government, industry, the scientific community and members of the public to the Agency's nuclear knowledge and information resources.

Applications of nuclear science and technology

Promoting better health for children

Out of every ten children born in developing countries, one will die before his/her fifth birthday. This tragic statistic reflects the vulnerability of infants and young children to poor nutrition and calls for urgent actions to reduce this mortality rate.

The Agency's contribution to this goal takes the form of technical guidance and assistance to Member States in the use of stable (i.e. non-radioactive) isotope techniques as part of nutrition intervention programmes to combat under-nutrition of children. Currently, the Agency supports nutrition projects focusing on infants and young children in several African Member States. In Ghana and Madagascar, it is assisting in the evaluation of nutrition interventions and the introduction of complementary foods. In Burkina Faso, it is focusing on nutrition supplementation for children affected by malaria.

These efforts have been further strengthened by the creation of the "IAEA Nobel Cancer and Nutrition Fund" (Nobel Fund) for cancer and nutrition related fellowships in the developing world, as well as the Agency's increasing cooperation with WHO. The aim of the Nobel Fund is to expand human resources capacity and skills in developing regions of the world — through the granting of fellowships and through training courses beyond the scope of regular Agency activities in these areas — in cancer management, radiation oncology and nutrition. Some of these activities will be carried out under the Agency's Programme of Action for Cancer Therapy (PACT).

Strengthening global analytical capabilities

The radiological assessment of areas that might be affected by radioactive releases, including accidental discharges, is vital for developing appropriate remediation strategies. In this regard, the Analytical Laboratories for the Measurement of Environmental Radioactivity (ALMERA) — a global network of expert laboratories to provide worldwide radiological emergency assistance coverage — continued to grow in 2005. With the addition of 31 laboratories, the network now comprises 104 members from 66 countries.

Using mutation induction to produce better food crops

Over 25 new and improved varieties of staple food crops — including eight new varieties of rice in Vietnam, as well as wheat and millet — were released in 2005. This brings the total number of

Programme of Action for Cancer Therapy

Cancer is the second most common cause of death worldwide after cardiovascular disease. Over seven million people died of cancer in 2005, and close to eleven million new cancer cases were diagnosed, according to the WHO. More than 70% of cancer deaths now occur in low and middle income countries – the very countries least able to address this growing burden. Cancer related deaths are projected to increase to more than nine million people annually by 2015.

The Agency spends about \$12 million each year through its technical cooperation programme for improving cancer treatment in the developing world. To enhance and expand these efforts, it formally established the Programme of Action for Cancer Therapy (PACT). The immediate goals are to build partnerships with interested parties working in the area of cancer control and to acquire funds from a range of traditional and non-traditional donors. In addition, the Nobel Fund will also be utilized to help developing countries deal with the dramatic rise in cancer.

PACT is establishing a “Cancer Control Alliance” with WHO, the International Agency for Research on Cancer, the International Union against Cancer, the US National Cancer Institute and the American Cancer Society. The aim is to develop and implement comprehensive cancer control programmes in Member States with funding attracted by the Alliance.

varieties released in Member States, using the technique of mutation induction by radiation, to 2300. A mutant rice variety introduced earlier in Vietnam with high quality and tolerance to salinity became the key rice variety for export in 2005, accounting for 28% of the one million hectares export rice area in the Mekong Delta.

Maintaining freedom from rinderpest

Agency cooperation with the Global Rinderpest Eradication Programme in annual serological surveillance continued in 2005, helping to achieve and maintain rinderpest-free status in a number of African countries. The tests used in surveillance involve nuclear related methods and technology involving radioisotopes for differential diagnosis. Mongolia and Yemen used surveillance guidelines for the last stages of their rinderpest eradication campaigns and for the subsequent submission of dossiers for recognition of freedom from this disease by the Office International des Epizooties (OIE). Such recognition means that vaccination has ceased, saving millions of dollars every year for affected Member States.

Managing scarce water resources

A crucial factor in improving living standards around the world is access to safe drinking water – a basic necessity that is unavailable to more than one sixth of the world’s population. The transfer of isotope and related nuclear techniques through the Agency’s technical cooperation programme has enabled Member States to substantially expand their capacity to map underground aquifers, detect and control pollution, and monitor the safety of dams.

In 2005, for the first time, the Global Environment Facility and UNDP provided funds (\$1 million) for an initiative that, in parallel with an Agency regional technical cooperation project, will assist Chad, Egypt, the Libyan Arab Jamahiriya and Sudan in improving their management of the Nubian Sandstone Aquifer – one of the world’s largest underground sources of water.

Recent technological developments – resulting in easier and cheaper means for measuring isotopes in hydrological samples – combined with partnerships with other agencies and international programmes have allowed the Agency to assist a greater number of Member States in managing their water resources. One example was in Bangladesh, where a joint IAEA–World Bank isotope investigation led to an alternative source of water, eliminating the need for a water treatment system and saving millions of dollars in capital and system operation costs.

Safety and Security

Safety: Status and trends

The operational safety performance of nuclear power plants remained high throughout the world in 2005. Radiation doses to workers and members of the public from the operation of these plants were well below regulatory limits. Personal injury accidents and incidents were among the lowest in industry. There were no accidents that resulted in the release of radiation that could adversely impact the environment. Nuclear power plants in different parts of the world successfully coped with the disruption caused by natural disasters. The Agency continued

its efforts to ensure that nuclear safety remained at high levels, and to guard against complacency by the industry and governmental authorities.

Research reactors also maintained a good record of safe operation during the year. However, in many cases, resources are not available to adequately deal with potential safety challenges. This concern applies to both the operators and regulatory bodies responsible for research reactor safety.

Key occupational radiation protection performance indicators once again showed improvement in 2005. Most Member States now have in place some form of individual and workplace monitoring programmes for occupationally exposed workers. Rapid advances in and the increasing application of medical techniques using radiation continue to challenge radiation protection specialists, both in terms of protecting personnel performing the techniques and patients undergoing treatment. Many Member States, as well as manufacturers and suppliers, are increasingly proactive in their approaches to radioactive source safety. However, serious incidents involving the safety and security of medical and industrial sources continue to occur, emphasizing the need to continue to work to promote the application of safety standards.

The good safety record for the transport of radioactive material was maintained in 2005. Work continued on the issue of ensuring shipments of radioactive material intended for use in medical diagnosis and treatment, as well as on improving communication among governments on the transport of radioactive materials.

The Agency is responding to all of these issues through its extensive range of safety services, by helping to strengthen the global nuclear safety regime — including the provision of assistance for the implementation of international legal instruments and regulatory infrastructures — and by facilitating the exchange between Member States of best practices and lessons learned.

Safety services

Integrated and customized safety services and safety reviews are provided by the Agency at the request of Member States as a means to facilitate the application of the Agency's safety standards and increase the level of nuclear, radiation, transport and waste safety. In 2005, the Agency conducted more than 120 safety review missions to Member States, covering topics as varied as nuclear power plant operational safety, radiation source safety and security, nuclear and radiation safety infrastructure,

and transport safety. The Agency also organized four international conferences and a number of training courses, seminars and workshops addressing all aspects of nuclear safety and security. The focus of training continues to be on training the trainers, and a number of new training packages have been developed and made available to Member States.

Strengthening international legal instruments

International safety related legal instruments are essential to establishing and maintaining high levels of safety around the world. The Agency has continued its efforts to promote adherence by States to these instruments.

The competent authorities identified under the Convention on Early Notification of a Nuclear Accident (Notification Convention) and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (the Assistance Convention) met in Vienna in July to review progress and approve proposals relating to strategies for enhancing international assistance and international communication. They also agreed on a proposal for enhancing the existing drill and exercise schedule.

To meet its responsibilities under these conventions, the Agency established an Emergency Response Centre in 1986. Based on the experience gained, an expanded Incident and Emergency Centre (IEC) was set up in 2005. The IEC serves as the focal point for States to report emergencies and other events. It also facilitates the exchange of information between States on preparedness and response, and reporting of nuclear security incidents. In view of the Agency's obligations under the Early Notification and Assistance Conventions, the IEC will need to be upgraded with state of the art equipment that is also compatible with equivalent facilities in Member States and other international organizations

With India's ratification of the Convention on Nuclear Safety (CNS) in 2005, all countries in the world with operating nuclear power plants are now Contracting Parties to the CNS. In April, the Contracting Parties met in Vienna for their 3rd Review Meeting. The participants conducted a peer review of national reports submitted in accordance with the terms of the CNS. They also issued a summary report identifying good practices and progress made.

By the end of 2005, 79 countries had expressed their support for the Code of Conduct on the Safety and Security of Radioactive Sources. The Agency

held a meeting in Vienna in December for States to share experience in implementing the supplementary guidance on the import and export of radioactive sources.

Chernobyl Forum

In 2005, the Chernobyl Forum² completed its work and agreed on the findings of two technical reports, one on the environmental consequences of the Chernobyl accident and the other on its health effects. These, as well as the digest report including socio-economic impacts, were presented at a conference entitled 'Chernobyl: Looking Back to Go Forwards', which was organized by the Agency on behalf of the Forum in Vienna in September 2005. The reports concluded that while the accident had significant environmental, public health and socioeconomic impacts, the mitigation measures taken by the authorities — including evacuation of people from the most contaminated areas — substantially reduced radiation exposures and the radiation related health impacts of the accident. Since 1986, radiation levels in the environment have declined several hundred-fold because of natural processes and countermeasures. Therefore, the majority of the "contaminated" territories are now safe for settlement and economic activity.

In addition to assessing consequences of the Chernobyl accident, the Forum also made recommendations for future activities. The major challenge now is to effectively deal with the socioeconomic consequences of the accident, but certain monitoring, remediation and research activities in the health and environmental fields will need to continue. An additional priority, after the construction of the "New Safe Confinement" structure over the destroyed Unit 4, is the decommissioning of the reactor as well as the gradual remediation of the Chernobyl Exclusion Zone.

Nuclear security

The security of nuclear and other radioactive material and associated technologies has taken on heightened significance in recent years. In the

process, it has become necessary to re-evaluate the risks of terrorism in all its forms. International cooperation has become the hallmark of these security efforts. Such cooperation is also essential for efforts to build regional and global networks for combating transnational threats.

The Convention on the Physical Protection of Nuclear Material (CPPNM) was substantially strengthened during the year at a conference where States Parties agreed to amend the CPPNM to also protect nuclear facilities and material in peaceful domestic use, storage and transport. The Amendment to the CPPNM adopted at the conference also provide for expanded cooperation between States in locating and recovering stolen or smuggled nuclear material, mitigating any radiological consequences of sabotage, and preventing and combating related offences.

The United Nations General Assembly adopted the International Convention for the Suppression of Acts of Nuclear Terrorism ('Nuclear Terrorism Convention') in April 2005. The Convention details offences relating to unlawful and intentional possession and use of radioactive material or a radioactive device, and use or damage of nuclear facilities. It also requires "States Parties to make every effort to adopt appropriate measures to ensure the protection of radioactive material, taking into account relevant recommendations and functions of the International Atomic Energy Agency". By the end of 2005, 97 States had signed the Convention.

Despite the increased level of attention given to the security of nuclear and other radioactive material and associated facilities since 2001, many countries still lack the programmes and the resources to effectively respond to the threat of nuclear and radiological terrorism. The efforts of the Agency to help Member States increase their nuclear security continued in 2005 on multiple fronts. More than 25 nuclear security missions and 18 nuclear security training events were conducted in States during the year. Also, the implementation of the Plan of Activities to Protect Against Nuclear Terrorism, approved by the Board of Governors in 2002, was completed, resulting in: better trained staff in States; improved radiation monitoring capabilities at border crossings; the recovery of nearly 70 radioactive sources; and an overall improvement in the preparedness of States in addressing the risk of malicious acts involving nuclear and other radioactive material. In September, the Board of Governors approved a new Nuclear Security Plan for implementation between 2006 and 2009.

² The Chernobyl Forum was set up in 2003 by the Agency in cooperation with FAO, OCHA, UNDP, UNEP, UNSCEAR, WHO and the World Bank, as well as representatives of Belarus, the Russian Federation and Ukraine.

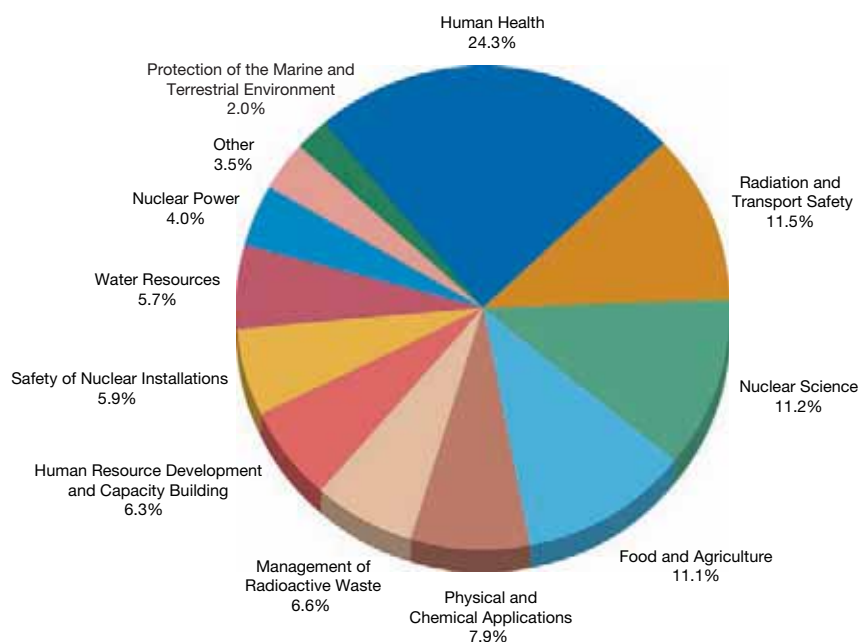


FIG. 3. Technical cooperation disbursements by Agency programme in 2005.

Technology Transfer and Cooperation

The technical cooperation programme is key to fulfilling the Agency's mandate "to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world". Under this programme, the Agency transfers nuclear science and technology to developing Member States, primarily through the provision of training, expert advice and equipment. The aim is to build, strengthen and maintain capacity in States for using nuclear technology in a safe, secure and sustainable manner. The areas of focus in 2005 were: human health, human resource development, radiation and transport safety, food and agriculture, nuclear science, physical and chemical applications, water resources, and management of radioactive waste (Fig. 3).

The programme is funded by voluntary contributions to the Technical Cooperation Fund, extrabudgetary contributions, cost sharing and contributions in kind. All of these resources are applied directly to development projects. In 2005, \$73.6 million were disbursed in over 100 countries; 104 training courses were arranged for 1574 participants; 2433 expert missions were organized, 1011 fellowships were offered, 425 scientific visits were arranged, and \$33 million worth of equipment and supplies were disbursed.

Verification

The Agency's activities in the area of verification are at the centre of efforts to curb nuclear proliferation. Agency safeguards agreements are in force in 156 States, comprising comprehensive safeguards agreements (CSAs) in 148 non-nuclear-weapon States party to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), voluntary offer safeguards in five NPT nuclear-weapon States, and item specific safeguards in three States not party to the NPT. In all, approximately 900 nuclear facilities in some 70 countries are subject to Agency inspections.

For the year 2005, the Agency concluded that for the 156 States with safeguards agreements, declared nuclear material, facilities or other items or material to which safeguards were applied remained in peaceful activities, with the exception of the Democratic People's Republic of Korea where no verification activities have taken place since 2003 and for which no safeguards conclusions could be drawn. In 24 of these States with both CSAs and additional protocols in force or being otherwise applied, the Agency found no indication of the diversion of declared nuclear material from peaceful activities and no indication of undeclared nuclear material and activities, and concluded, on this basis, that for those States, all nuclear material remained in peaceful activities. The Agency continued its

efforts to verify the correctness and completeness of the declarations for one State that had been found to have been previously engaged in undeclared nuclear activities, which the Board, in 2005, found to constitute non-compliance. The Agency's *Safeguards Statement*, as well as the *Background to the Safeguards Statement* and *Executive Summary*, are available on the CD-ROM attached to the inside back cover of this report, and also on the Agency's public web site at <http://www.iaea.org/OurWork/SV/Safeguards/index.html>.

The Agency cannot draw any safeguards conclusion in respect of 36 non-nuclear-weapon States party to the NPT that do not have CSAs in force.

Strengthening the safeguards system

Safeguards agreements and additional protocols

Safeguards agreements and the measures contained in the Model Additional Protocol to Safeguards Agreements, approved by the Board of Governors in May 1997, provide the essential elements of a significantly strengthened Agency safeguards system. The implementation of CSAs and additional protocols provides the basis upon which the Agency is able to provide credible assurance regarding the non-diversion of declared nuclear material and the absence of undeclared nuclear material and activities for a State as a whole. The Secretariat continues to promote and facilitate wider adherence to the safeguards system, bearing in mind the importance of achieving the universal application of that system consistent with the respective safeguards undertakings of States.

In 2005, the Agency continued its activities to encourage and facilitate wider adherence to the strengthened nuclear safeguards system. Agency outreach events were arranged in New York and Rabat, and three States organized national seminars on additional protocols. Significant progress was made during the year in terms of the conclusion of CSAs and additional protocols. Seventeen States signed additional protocols and eight States signed CSAs during the year. In 2005, CSAs entered into force for four States and additional protocols for nine States. The number of States that have yet to bring their CSAs into force, in accordance with their obligations under the NPT, decreased from 40 to 36 by the end of 2005. The number of States with additional protocols in force increased from 62 to 71 by the end of the year, and two States voluntarily agreed to implement such protocols pending their entry into force.

Integrated safeguards

The Agency continued to move towards a more flexible and effective approach to safeguards implementation, taking into account all aspects of a State's nuclear activities. Integrated safeguards — the optimum combination of all safeguards measures available to the Agency under CSAs and additional protocols — were implemented in nine States in 2005 and approved for another two States. At a meeting to discuss progress on integrated safeguards, States with wide experience of integrated safeguards implementation were able to share their experience with other States for which implementation was due to begin in 2005 or 2006. The Agency continued its efforts to improve the effectiveness and efficiency of safeguards implementation through the introduction of a comprehensive quality management system.

Small quantities protocols

The Board of Governors, recalling its conclusion that the small quantities protocol (SQP) to safeguards agreements in its present form constituted a weakness of the safeguards system, decided in September 2005 to retain SQPs as part of the Agency's safeguards system, but subject to modification of the standard text to provide for the submission of initial reports on nuclear material and notification as soon as a decision has been taken to construct or authorize construction of a nuclear facility, and allow for Agency inspections. The Board also decided that SQPs should no longer be made available to a State with a planned or existing nuclear facility. In addition, the Board requested the Secretariat to assist States with SQPs, including non-members of the Agency, to establish and maintain their State systems of accounting for and control of nuclear material. At the end of 2005, the Secretariat conveyed the Board's decision to States with SQPs with a view to giving effect to the modification of their SQPs. One country signed an SQP based on the modified standard text in 2005.

New approaches to the nuclear fuel cycle

In February, a group of experts appointed — in their individual capacity — by the Director General, released a report on multilateral approaches to the civilian nuclear fuel cycle (MNAs).³ The report cited

³ *Multilateral Approaches to the Nuclear Fuel Cycle: Expert Group Report submitted to the Director General of the International Atomic Energy Agency, INFCIRC/640, IAEA, Vienna (2005).*

five approaches to strengthen controls over sensitive nuclear technologies of proliferation concern — uranium enrichment and plutonium separation. The expert group reviewed the various aspects of the fuel cycle, identified a number of options for MNAs deserving further consideration and noted a number of pros and cons for each of the options. The group recommended that attention be given by Member States, by the Agency itself, by the nuclear industry and by other nuclear organizations, to multilateral nuclear approaches. Several Member States welcomed the report and encouraged the Agency to take the next steps towards the implementation of its recommendations, as appropriate. In July, the Agency supported an international conference in Moscow, organized by the Russian Federal Atomic Energy Agency, to consider multilateral approaches to the nuclear fuel cycle. The Director General actively pursued efforts to promote the acceptance of MNAs.

Agency Outreach Efforts

Global developments — particularly in the areas of verification and non-proliferation — as well as its own efforts to raise public awareness have transformed the Agency's visibility and public image

over the last few years (Fig. 4). In addition, the award of the 2005 Nobel Peace Prize to the Agency greatly increased media interest and attention. The heightened public awareness and interest in the Agency's work was evidenced by nine million hits per month being recorded to its web site (<http://www.iaea.org>) in 2005 — a factor of ten higher than in 2001.

Conclusion

In his Nobel Lecture on 10 December 2005, the Director General stated that the “Nobel Peace Prize is a powerful message for us — to endure in our efforts to work for security and development”. There continues to be a range of challenges facing the Agency and its Member States. These include: the problem of energy shortages in developing countries; exploring acceptable waste management strategies; improving human health and food production; enhancing water resources management; raising the level of global nuclear safety and security; and strengthening the international safeguards and non-proliferation and arms control regime. It is clear that these challenges can only be met through the continuing active partnership of Member States and the Agency. ■



FIG. 4. Public and media attention on the Agency has been heightened by various verification and non-proliferation issues.