

IAEA Board of Governors

Record of the 1229<sup>th</sup> Meeting  
GOV/OR.1229

Strengthening the Agency's activities related to nuclear science, technology and applications: Nuclear Technology Review 2009

# Board of Governors

**GOV/OR.1229**

Issued: April 2009

**Restricted Distribution**

Original: English

---

**For official use only**

## Record of the 1229<sup>th</sup> Meeting

*Held at Headquarters, Vienna, on Tuesday, 3 March 2009, at 10.10 a.m.*

### Contents

Item of the agenda <sup>1</sup>	Paragraphs
3 Strengthening the Agency's activities related to nuclear science, technology and applications: Nuclear Technology Review 2009	1–151

---

<sup>1</sup> GOV/2009/16.



## Attendance

(The list below gives the name of the senior member of each delegation who attended the meeting, as well as that of any other member whose statement is summarized in this record.)

Ms FEROUKHI	Chairperson (Algeria)	
Mr FERUTĂ	Vice-Chairman (Romania)	
Mr SHOOGUFAN	Afghanistan	
Mr THERECKA	Albania	
Mr KHELIFI	Algeria	
Mr CURIA	Argentina	
Mr HUTCHINGS	Australia	
Mr VALLIM GUERREIRO	Brazil	
Mr DIALLO	Burkina Faso	
Ms GERVAIS-VIDRICAIRE	Canada	
Mr LIU Yongde	China	
Ms GOICOCHEA ESTENOZ	Cuba	
Mr STACEY MORENO	Ecuador	
Mr FAWZY	}	Egypt
Mr SIRRY		
Ms KAUPPI	Finland	
Mr CARON	France	
Mr LÜDEKING	Germany	
Mr BAAH-DUODU	Ghana	
Mr KUMAR	India	
Mr ALSHARIA	Iraq	
Mr COGAN	Ireland	
Mr AMANO	}	Japan
Mr NAKANE		
Ms GREIČIUVIENĖ	Lithuania	
Mr ARSHAD	Malaysia	
Mr DÍAZ	Mexico	
Ms MACMILLAN	New Zealand	
Ms LACANLALE	Philippines	
Mr FERUTĂ	}	Romania
Mr NECULĂESCU		
Mr BERDENNIKOV	}	Russian Federation
Ms BELYAEVA		
Mr AL-SAUD	Saudi Arabia	
Mr GUMBI	South Africa	
Mr ROSELLÓ SERRA	Spain	
Mr STEINMANN	Switzerland	
Mr FIDAN	Turkey	
Mr SMITH	United Kingdom of Great Britain and Northern Ireland	
Mr SCHULTE	United States of America	
Mr VEDOVATTI RAFFO	Uruguay	

**Attendance** (continued)

Mr ELBARADEI	Director General
Mr BURKART	Deputy Director General, Department of Nuclear Sciences and Applications
Mr SOKOLOV	Deputy Director General, Department of Nuclear Energy
Mr ANING	Secretary of the Board

**Representatives of the following Member States also attended the meeting:**

Angola, Armenia, Austria, Azerbaijan, Belgium, Bulgaria, Chile, Colombia, Cyprus, Czech Republic, Denmark, Dominican Republic, El Salvador, Holy See, Hungary, Islamic Republic of Iran, Israel, Italy, Jordan, Kenya, Republic of Korea, Kuwait, Kyrgyzstan, Latvia, Lebanon, Libyan Arab Jamahiriya, Luxembourg, Montenegro, Morocco, Netherlands, Nigeria, Norway, Oman, Pakistan, Panama, Peru, Poland, Portugal, Qatar, Senegal, Serbia, Singapore, Slovakia, Sri Lanka, Sweden, Syrian Arab Republic, Tunisia, United Arab Emirates, Yemen.

**Abbreviations used in this record:**

AFRA	African Regional Cooperative Agreement for Research, Development and Training Related to Nuclear Science and Technology
AIDS	acquired immune deficiency syndrome
ARCAL	Cooperation Agreement for the Promotion of Nuclear Science and Technology in Latin America and the Caribbean
CANDU	Canada deuterium-uranium [reactor]
EPR	European pressurized water reactor
FAO	Food and Agriculture Organization of the United Nations
HEU	high-enriched uranium
HIV	human immunodeficiency virus
imPACT	integrated missions of PACT
INPRO	International Project on Innovative Nuclear Reactors and Fuel Cycles
ITER	International Thermonuclear Experimental Reactor
LEU	low-enriched uranium
NEPAD	New Partnership for Africa's Development

**Abbreviations used in this record (continued)**

NPT	Treaty on the Non-Proliferation of Nuclear Weapons
OECD/NEA	Nuclear Energy Agency of the Organisation for Economic Cooperation and Development
OPAL	Open Pool Australian Light Water Reactor
PACT	Programme of Action for Cancer Therapy
PBMR	pebble bed modular reactor
SIT	sterile insect technique
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
WHO	World Health Organization
WMO	World Meteorological Organization



### **3. Strengthening the Agency's activities related to nuclear science, technology and applications: Nuclear Technology Review 2009**

(GOV/2009/3 and Corr. 1, plus related documents available on GovAtom)

1. The CHAIRPERSON noted that the final version of the Nuclear Technology Review 2009, prepared in the light of the discussions in the Board, would be submitted to the forthcoming General Conference as an information document.
2. Mr BURKART (Deputy Director General for Nuclear Sciences and Applications) said the purpose of the Nuclear Technology Review was to inform Member States of significant developments and trends in nuclear science and technology, as recommended in General Conference resolution GC(52)/RES/12 A.
3. With respect to trends in nuclear applications, in particular in the area of development and environmental protection, as the target date for reaching the Millennium Development Goals drew nearer, it became necessary to assess and then to facilitate the use of nuclear technologies to tackle the pressing issues of food insecurity, water scarcity and lack of health care, especially for the rapidly expanding cancer crisis.
4. Nuclear technology could contribute substantially, and often in unique ways, to socio-economic development. It could help to increase the efficiency and productivity of agriculture, promote best practices in the treatment and diagnosis of disease, improve management of water resources and the marine and terrestrial environments, or improve the safety, efficiency and quality of industrial production, while simultaneously helping to promote the use of nuclear energy as a safe, sustainable, and viable alternative for economic development.
5. Seven technical reports, which were to be appended to the printed version of the Nuclear Technology Review, addressed applied nuclear technology topics deemed to be of particular relevance, including developments in plant mutation breeding, quality assurance in dosimetry, use of isotopes for transboundary management of rivers and aquifers, and sustainable climate, land, energy and water strategies. The report on the latter issue had been prepared jointly by the Department of Nuclear Energy and the Department of Nuclear Sciences and Applications and was intended to raise awareness of the need for an integrated approach to energy, land use and water resource planning. Strong trade-offs between energy, food, feed and biofuels required a careful balance between competing demands. Nuclear science and technology had considerable potential for addressing those rapidly evolving challenges.
6. Another topical issue was how the Agency engaged in partnerships to address the needs of Member States. A practical arrangement with the WHO was soon to be signed, creating a joint WHO/IAEA programme on cancer control.
7. Mr SOKOLOV (Deputy Director General for Nuclear Energy), responding to comments made at the Secretariat briefing held on 24 February, said that the Director General's report on the International Status and Prospects of Nuclear Power had been provided as document GC(52)/INF/6 to the last General Conference. Several Member States had suggested that it be published separately for general distribution and that had been done, with a few updates. Hard copies were available, and it was also available electronically on the Agency's website. The 2008 progress report on INPRO was also

available. It gave more comprehensive information on the issue of the complementarity of INPRO and the Generation IV International Forum.

8. Several questions had been asked about how the topics and some of the details in the Review were chosen. There were four basic criteria. First, things that seemed likely to be most interesting and informative to a broad international readership, including but not limited to the Board of Governors, were included. Second, the focus was on events in the preceding year. Third, items were included that deserved emphasis because of significant recent trends. For example, the section on economics in the preceding year had been very short, but in 2008 there had been much more variation in cost estimates for nuclear power plants, so that section was longer in the current document. Given the growing interest in nuclear power in developing countries, information that could be of special interest to them, but also to others, had been elaborated on, both in the main document and in the additional information on GovAtom. Fourth, since the additional material on GovAtom provided more depth but could address only a few topics each year, an attempt was made to rotate among topics and to make sure that those of continuing importance, like desalination or small reactors, were revisited regularly.

9. He thanked those who had provided comments either directly or at the briefing, looked forward to those that would be provided at the current series of meetings, and requested that any additional comments be sent to the Secretariat by 1 May 2009, in time for the necessary updates to be included in the final version.

10. Mr CURIA (Argentina), speaking on behalf of the Group of 77 and China, said that, while no new reactors had been connected to the grid in 2008, ten construction starts had occurred in that year compared to eight in 2007. Existing power plants, including those in developing countries, had established a remarkable operational safety and security record, indicating the significant contribution nuclear energy could make in the future energy mix, especially in developing countries where the need for industrialization and growth would continue to increase considerably.

11. The Secretariat was to be commended for helping interested Member States to analyse energy options and prepare for the introduction of nuclear power or uranium production. There was a significant increase in the number of approved technical cooperation projects on the analysis of energy options, uranium exploration and mining, and the introduction of nuclear power in the project cycle starting in 2009. For the Agency's technical cooperation activities to be effective and successful, they had to respond to the needs and priorities of recipient Member States.

12. The Group welcomed the launching of a new service providing integrated advice to countries considering the introduction of nuclear power and noted with satisfaction that, in 2007 and 2008, such missions had taken place in a number of developing countries.

13. The Secretariat had provided useful guidance documents on the launching of nuclear power programmes. However, those documents should not be considered the only reference for Member States embarking on a nuclear power programme. They were not binding and should not be used to restrict technical cooperation activities or interfere in the technical work of the Secretariat. The nuclear policies of any Member State evolved to suit its social, legal and economic specificities. Hence, the harmonization and standardization of nuclear policies should not be meant or perceived as a requirement for the introduction of uniform nuclear policies in each and every Member State planning to launch or expand its nuclear power programme.

14. The Group was encouraged by the future projections for global growth in nuclear power, especially within the framework of the global efforts to reduce carbon emissions and to tackle the challenges of climate change.

15. With regard to the fuel cycle, in order to support the sharing of educational resources, promote technical educational opportunities and identify some common challenges the Secretariat should study the feasibility of establishing an IAEA resource library of references, programs, tools and pooled resources. The role of the Agency as the leading vehicle for promoting the transfer and development of technology and knowledge related to all peaceful nuclear applications, including nuclear power and the nuclear fuel cycle, had to be maintained.

16. The work done by the Agency in identifying the policies required at national and international level for human resources development and availability in the field of nuclear science and technology was crucial.

17. The Group recognized the importance of public acceptance of nuclear energy and noted that the report referred to a generally high level of public acceptance of nuclear power in developing countries where surveys had been carried out.

18. In view of the growing reliance on evolutionary reactor designs, the Secretariat should periodically assess and update the pros and cons of each type of reactor design and the different generations to assist countries that were embarking on nuclear power programmes in choosing the optimal technology. The Agency's INPRO project had completed an extensive manual on methods to assess innovative nuclear energy systems. Studies had used those methods to identify priority areas for further research and development. The Group was looking forward to receiving the report on common user considerations by developing countries for future nuclear power plants.

19. At the 22nd IAEA Fusion Energy Conference, over 500 scientific papers had been presented and a cooperation agreement had been signed between the Agency and the ITER International Fusion Energy Organization. The agreement was designed to facilitate interactions between ITER parties and other Agency Member States interested in fusion research. The Group was looking forward to analysing the results of the exchange of information on the activities of ITER and a thorough analysis of fusion's contribution to future nuclear power scenarios, including its safety and security.

20. With rising expectations for nuclear power and a new generation of fission reactors, the Agency should pursue its efforts to meet the need for new and updated fission and capture cross-section data for actinides, the need to reduce uncertainties and the need for data for spent fuel recycling.

21. The Group was highly concerned over the problems posed by the unavailability of the few large ageing reactors used for isotope production and the effects of such problems on the continuity of radioisotope supplies (molybdenum-99 in particular) for vital medical and industrial applications. The Secretariat should undertake a detailed study of frameworks that could strengthen international cooperation and national capabilities to ensure the availability of radioisotope supplies, including by enhancing utilization of reactors in developing countries for isotope production.

22. The Group attached great importance to the role of nuclear and related technologies in improving livestock productivity and supported the Agency's efforts in that area and in enhancing the use of isotopes to help developing countries gain better access to export markets for their livestock products. The Secretariat should provide a thorough assessment of the main obstacles and challenges the Agency's work faced in that area.

23. The Group commended the efforts to evaluate X-ray radiation as an alternative to gamma radiation in the area of insect pest control and was encouraged by the preliminary results. However, it was a matter of great concern that, even for such an important activity, difficulties were being encountered in obtaining and shipping isotopic irradiators. The Group therefore urged the Secretariat to increase its efforts to tackle the obstacles to the supply and shipping of isotopic irradiators, including denials of shipment.

24. The Group highly appreciated the major contribution of isotopic techniques in managing and mitigating the risks associated with the use of agrochemicals in agricultural production, especially given the need for increased productivity to respond to the current global food crisis. Isotopic techniques played an important role in promoting international trade by helping identify the origin of agricultural products where such procedures were required.

25. The Group commended the Agency's work in the area of boosting production of various food crops and enhanced mutation induction.

26. The Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture had been providing Member States, and in particular least developed countries, with concrete benefits in the fields of crop enhancement, pest control and food and environmental protection, which had a clear and tangible impact on the welfare and economic development of Member States. The Group called for the retention and strengthening of the Joint FAO/IAEA Division in order to enhance its continuing efforts in support of Member States.

27. Turning to the area of human health, he said that the Group took note with satisfaction of the reported activities related to finding synergies between nuclear medicine imaging and the pharmaceutical industry. It concurred with the finding that innovative approaches to the development of new pharmaceuticals were of key importance and welcomed the reported developments in the area of applying nuclear techniques to support nutrition.

28. The Group further welcomed and supported the Agency's work and international cooperation initiatives related to enhancing water resources management. Given the increased variability and vulnerability of river flows, and as development drove the need for greater renewable and non-renewable energy production, the Group noted with interest that water for energy would also be an important consideration in water resources planning, which made the work of the Agency in that area more important.

29. Responses to increased demand for freshwater resources would most likely include a greater future dependence on already stressed groundwater resources. The Agency had a great role to play in that regard, especially in improving groundwater assessment. The Group welcomed the collaboration between the Agency's water resources programme and other organizations to collect, collate and visualize hydrogeological and groundwater information on a global scale.

30. Mr UGOKWE (Nigeria)\*, speaking on behalf of the African Group, expressed appreciation for the Agency's activities which supported and complemented research and development with the aim of transferring technology to developing countries and he stressed the importance of the Agency's role in accelerating the socio-economic development of developing countries through the transfer of nuclear technologies to meet the Millennium Development Goals.

31. The Group noted with keen interest the growing demand for nuclear energy on a global scale, including in developing countries, to address future challenges related to sustainable development. It noted with satisfaction that the number of approved technical cooperation projects on analysing energy options had increased from 29 to 41 for the cycle starting in 2009.

32. The introduction by the Agency of a new service providing integrated advice to Member States considering the introduction of nuclear power was a welcome move. During the preceding two years, ten such missions had taken place in developing countries, including Egypt, Nigeria and Sudan.

33. The expansion of nuclear power and its attractiveness could be partly attributed to its excellent safety record and its advantages in terms of economics, security of supply and environmental requirements. The Group supported all the activities carried out by the Agency with the aim of

promoting nuclear knowledge and providing guidance, especially through the publication of documents and information in that field.

34. There was growing interest in INPRO, which aimed at exploring new approaches to developing and deploying innovative nuclear energy systems. INPRO had completed a manual on methods to assess innovative nuclear energy systems and was intending to publish a report on common user considerations by developing countries for future nuclear power plants. The Group was looking forward to receiving the latest publications soon.

35. The African Group shared the concerns expressed in paragraph 60 of the report regarding the possible shortage of people with the skills needed in the nuclear power industry. It appreciated the Agency's activities related to training courses, fellowships and scientific visits for developing countries in general, and African countries in particular.

36. The Group re-emphasized the importance it attached to research reactor activities and, particularly, to the production of radioisotopes and development of human resources. It supported the Agency's efforts to address the projected decrease in research reactors through the promotion of international cooperation and the establishment of regional networks. It would appreciate more details on such networks and on their advantages to help in upgrading existing facilities, developing new facilities and improving access for countries without research reactors.

37. The Group took note of recent developments in nuclear applications in the areas of food and agriculture and appreciated the progress achieved in the use of nuclear techniques to improve animal productivity and health. It commended the Agency for its efforts to eradicate the tsetse fly in Ethiopia, South Africa, Mozambique and Senegal. It also took note with satisfaction of the latest developments in the field of crop improvement, which was of high importance for the socio-economic development of African populations.

38. The Agency should continue its efforts to develop techniques aimed at boosting the production of various food crops. Many regions in Africa were adversely affected by land degradation, climatic variations and frequent droughts. The development of such techniques would reduce vulnerability to food shortages and boost the incomes of poor farmers living in semi-arid areas. The Group took note with interest of the efforts made by the Secretariat in water resources management.

39. The Group noted the recent developments in food quality and safety, involving the adoption of traceability as a way to control food contaminants and improve food safety. It encouraged the Agency to test the feasibility of such techniques in developing countries where the food crisis was more severe and had a serious impact on the daily life of populations.

40. Human health was an area of the utmost importance for African countries. The Group welcomed the efforts being made to find synergies between nuclear medicine and the pharmaceutical industry for the treatment of diseases. Finally, the Group encouraged the Agency in its efforts to find a link between the pharmaceutical industry and nuclear medicine imaging for the benefit of patient treatment. It wished to be kept abreast of that issue, which undoubtedly would further the Agency's contribution to the fight against cancer.

41. Mr CURIA (Argentina) said, with reference to uranium resources and production, that all countries with an interest in uranium mining should have corresponding remediation programmes approved by their competent authorities. With respect to conversion, enrichment and fuel fabrication, particularly uranium enrichment, his country's National Atomic Energy Commission had intensified its activities with a view to recovering the technological capacity that it had developed in the 1980s in gaseous diffusion technology.

42. Turning to human resources development, he said that the National Atomic Energy Commission in Argentina operated five university-level institutes dedicated to various applications of nuclear energy. Those institutes had been placed at the disposal of the Agency and its Member States, particularly Spanish-speaking and Latin American Member States. In 2008, the Balseiro Institute had been officially recognized as an IAEA regional collaboration centre for the training of human resources in nuclear technology and applications. Also in 2008, Argentina had provided a total of 83 man-months of training in connection with Agency fellowships and scientific visits in such topics as nuclear medicine, radioactive waste management, engineering, medical physics, isotope hydrology, environmental studies, radiochemistry and radiopharmacology. At national level, training had been provided for 297 people at Argentina's university-level institutes; 91 professionals had received degrees or postgraduate qualifications in science and engineering, and 143 people had completed other types of training courses in various applications.

43. In the field of advanced fission, Argentina continued to view INPRO as a useful forum for cooperation among Member States of the Agency that were interested in innovations in the nuclear power field. His country supported the project through the provision of cost-free experts and extrabudgetary contributions, and participated actively in it.

44. Argentina welcomed the success of the 22nd IAEA Fusion Conference and, in particular, the signing of a cooperation agreement between the Agency and the ITER International Fusion Energy Organization to facilitate interaction between ITER parties and other Agency Member States interested in fusion research. It likewise welcomed the development of a research network for users of small fusion devices in which the Agency participated, promoting international collaboration. The Agency might consider setting up a Latin American network to facilitate exchange of the relevant expertise.

45. Argentina noted with satisfaction that the Agency fostered international cooperation in the field of accelerators in order to enhance educational opportunities in developing countries using existing expertise and facilities. It would be useful for the Agency to set up a programme for exchange of information on accelerator-driven subcritical reactor systems.

46. Argentina would join other Latin American countries in an ARCAL project aimed at sustainably increasing the use of research reactors in the region through the creation of networks, exchange of experience, conservation of knowledge and training of human resources.

47. The last Argentine reactor to be converted to low-enriched fuel had been the RA-6 reactor used by the Balseiro Institute. Its conversion and modernization were now complete and it had recently been brought to the point of criticality in its new configuration using low-enriched uranium silicide fuels, the first Argentine reactor to do so.

48. His country had developed uranium-molybdenum fuels that were being irradiated in a high-flux reactor as part of the qualification process under a technical cooperation project with the Agency. In addition, it had developed an original roll bonding process using zircaloy plates to fabricate monolithic uranium-molybdenum fuel.

49. In the field of radiation oncology, the Nuclear Diagnosis Centre in Buenos Aires was now fully functional and steps were being taken to upgrade oncological diagnostic equipment at the Mendoza Nuclear Medicine Teaching Hospital and the Buenos Aires Clinical Hospital Nuclear Medicine Centre.

50. Turning to the environment, he said that the National Atomic Energy Commission was drawing on its experience of nuclear applications and collaborating actively with public and private, domestic and foreign organizations in the performance of environmental measurements of water, soil and air

using both nuclear and non-nuclear methods. At regional level, it was taking an active part in studies of aquifers and rivers and was collaborating with various provinces in the country to determine arsenic levels in potable water.

51. The Nuclear Diagnosis Centre had begun to produce the radiopharmaceutical fluorodeoxyglucose, not only for its own needs but also to meet demand in other nuclear diagnostic centres in Argentina. The National Atomic Energy Commission was producing lutetium-177 for labelling therapeutic compounds. Finally, in the late 1990s, the National Atomic Energy Commission had successfully developed the technology for molybdenum-99 production using LEU targets, the viability of which had recently been confirmed in a study carried out by the National Academy of Sciences in the United States. The technology had been in routine use in Argentina since 2002 and had been marketed to several countries. Negotiations were also under way with other interested countries.

**Mr Ferută (Romania), Vice-Chairman, took the Chair.**

52. Mr ARSHAD (Malaysia) said that his country was actively reviewing its national energy mix and was greatly encouraged by the level of assistance provided by the Secretariat to Member States that had expressed an interest in starting nuclear power programmes. Malaysia appreciated the new service introduced by the Agency to provide integrated advice to countries in that position and noted with interest the new guidance documents on the evaluation of the Status of national nuclear infrastructure development and financing of new nuclear power plants.

53. The Agency should play the leading role in providing expert advice and ensuring the transfer of technology in all areas of peaceful nuclear applications, including the nuclear fuel cycle.

54. In view of the increased demand for skilled nuclear workers, there was a more pressing need for the Agency to address the needs of Member States, and developing countries in particular, for capacity building in nuclear-related fields. The Agency should allocate sufficient resources for education and training in core nuclear technologies to Member States that were embarking on nuclear power programmes for the first time.

55. His country welcomed the INPRO initiative to conduct surveys of developing countries, including Malaysia, in order to identify the common user criteria for the development of nuclear power plants and it looked forward to the publication of the report on that subject.

56. Energy and technology were essential drivers of socio-economic development, and developing countries needed to build competencies in technologies that would boost their economies and help them achieve sustainable development. Economic development would, in turn, facilitate the achievement of the Millennium Development Goals. Technological competence and capabilities in radiation processing, non-destructive techniques, and accelerator and research reactor applications in all peaceful uses of nuclear energy were crucial to development. The Agency's programmes should therefore be tailored to meet the urgent needs of Member States seeking assistance and support in developing their national capacities in those areas.

57. The Agency was well placed to foster collaboration with Member States to ensure the wider application of targeted therapy and imaging techniques in nuclear medicine. Malaysia appreciated the Agency's support in the country's national projects for the establishment of a multi-purpose national cyclotron facility and the expansion of nuclear medicine services and it looked forward to future collaboration and capacity-building activities in those areas.

58. The persistent problems relating to denials of shipment and the procurement of isotopic irradiators and radioactive material were cause for concern, since they had a devastating impact on critical healthcare applications in developing Member States at a time when supplies of medical radionuclides were already becoming scarce. It was also a matter of concern that the majority of

facilities producing molybdenum-99 were located in developed countries and were due for maintenance shutdowns. There was an urgent need for expansion of reactor irradiation facilities and an increase in the number of facilities producing technetium-99m. The Agency should provide assistance and advice to developing Member States that were considering upgrading their reactors for the purpose of producing medical radionuclides. Malaysia also called on the Agency and all Member States to help resolve the issue of denials of shipment.

59. Mr LÜDEKING (Germany) noted with interest that the projections for the future growth of nuclear power had been revised upwards. However, the Secretariat rightly pointed out that the consequences of the financial crisis had not been taken into account in those projections. The future development of nuclear energy depended on many factors: not only its potential risks and benefits, but also financial considerations, licensing procedures, infrastructure, and the availability of qualified staff.

60. The primary prerequisite for the use of nuclear energy was to ensure the highest nuclear safety standards. The Nuclear Technology Review noted in that regard that the gap between the best and worst performers was still large. It was vital to improve that situation. His country encouraged the Secretariat to continue to assist Member States by providing technical and legal input.

61. With the increase in uranium mining activities, environmental issues became increasingly important. His Government had extensive experience in that area because, for many years following Germany's reunification, it had had to deal with the legacy of environmental damage resulting from mining in the eastern part of the country. The Agency had an important role to play in ensuring that best practices were applied.

62. Regarding nuclear waste management, the construction of an underground repository for the disposal of low- and intermediate-level radioactive waste at the former Konrad iron mine in the state of Lower Saxony was on schedule and operation was due to begin in 2014.

63. The Nuclear Technology Review rightly stressed the need for qualified staff and human resources development. In the light of the OECD/NEA report on the difficulty of sustaining nuclear competence and knowledge, his country saw strengthening of education and training in that area as important and supported the Agency's efforts in that field.

64. Germany welcomed the two new hadron-therapy centres in Heidelberg and Pavia which, apart from addressing the very important area of human health, also provided another example of international scientific and medical cooperation.

65. Turning to the area of nuclear applications in food, agriculture, human health and the environment, he reiterated Germany's appreciation and support for the valuable activities conducted by the Agency in that field, and in particular for the Marine Information System (MARIS) which improved data for decision-making purposes while demonstrating to external users and the general public that the Agency's activities contributed to common goals such as environmental protection.

66. Ms GERVAIS-VIDRICAIRE (Canada) said that her country was particularly interested in the section of the document on power applications since Canada was a supplier of nuclear technology, and because the Agency was experiencing an increased interest in nuclear power among Member States. The promotion of nuclear energy was part of the Agency's statutory mandate and the organization should play a vital role in the increasing use of nuclear power. In that connection, she congratulated the Agency on the technical meeting and workshop on evaluation methodology for national nuclear infrastructure development, which had been co-sponsored by the Government of Canada. The event had brought together a significant number of vendor and recipient Member States to discuss the implementation of nuclear power programmes and it deserved to be highlighted in the report before

the Board. Canada was also pleased to have hosted the 2008 World Nuclear University Summer Institute in Ottawa.

67. Given the increasing global focus on environmental protection, the Agency should continue to play an active role in the United Nations Commission on Sustainable Development and in other climate change fora, since nuclear power did not generate greenhouse gases. Canada welcomed increased reliance on nuclear energy and looked forward to working with the Agency to arrive at a better understanding of future climate and environmental trends and their implications.

68. She welcomed the fact that Member States continued to collaborate on future nuclear energy systems through INPRO and noted that Canada was contributing to three INPRO projects.

69. The Canadian Nuclear Safety Commission had recently completed the first phase of its design review of Atomic Energy of Canada Limited's advanced CANDU reactor (ACR-1000). That was an important milestone since it confirmed that the design of the reactor complied with Canadian regulations.

70. Turning to non-power nuclear applications, she said that the many important developments and nuclear techniques related to food, agriculture, water management, human health and the environment provided plenty of opportunities for collaboration between the Agency and other major stakeholders in those fields. The benefits of such nuclear techniques were directly related to the mandates of such agencies such as the WHO, UNDP, FAO, WMO and UNEP. She asked the Secretariat to highlight in sections E to H of the report the various partnerships and cooperation arrangements that the Agency maintained with other organizations in order to give Member States a clear indication of the extent to which the One United Nations concept permeated the Agency's work. Research into and development of nuclear techniques was only one aspect of attempts to solve the myriad problems currently faced by both developing and developed Member States.

71. Mr NAKANE (Japan) said that nuclear power contributed to meeting rapidly expanding energy demands and, when used appropriately, it played an important role in achieving sustainable development. At a time when an increasing number of Member States were beginning to consider the introduction or expansion of nuclear power, Japan appreciated the Agency's efforts to assist them in developing nuclear power infrastructure and it had actively supported the Agency's activities in that regard by providing the Organization with experts and additional budgetary contributions.

72. His country attached the utmost importance to safety, security and safeguards in connection with the introduction of nuclear power and it recognized that those three elements provided a sound basis for international transparency and confidence in the sustainable use of nuclear energy. Following the announcement of the international initiative on nuclear energy infrastructure based on those three elements at the G8 summit held in Toyako, Hokkaido, in 2008 in cooperation with the Agency, Japan had been implementing projects to support countries that were introducing nuclear power programmes. For half a century, throughout its nuclear power development, Japan had always been aware of the crucial significance of safety, security and safeguards. Since it was common knowledge that a nuclear accident could cause severe damage within a country and beyond its borders, nuclear safety helped promote public acceptance for nuclear power. Transparency-related activities in the field of non-proliferation, such as the conclusion of safeguards agreements and additional protocols, helped to foster and maintain the mutual trust and international cooperation that were necessary throughout the introduction of nuclear power, particularly in the current climate where the threat of nuclear and radiological terrorism remained real. Safety, security and safeguards were significant aspects of the core infrastructure for nuclear power development and the Agency could play a pivotal role in promoting the peaceful use of nuclear energy through the establishment and improvement of

infrastructure that incorporated nuclear safety, security and safeguards along with other essential elements. Japan had supported and would continue to support the Agency actively in that field.

73. His country recognized the importance of nuclear science and technology applications in sustainable development. Nuclear science and technology contributed to addressing a wide range of global issues such as energy, greenhouse gases, climate change, cancer control, environment and poverty, notably through the provision of clean water and achievement of food security through the use of radiation and radioactive isotopes. Japan supported the role of the Agency in those areas as well as its efforts to promote nuclear science and technology.

74. Mr. STEINMANN (Switzerland) said that matters addressed in the report, particularly those relating to the economic aspects of nuclear energy and public acceptance, overlapped with the mandates of a number of professional, political and industrial organizations. His country wondered whether the Agency should collaborate more closely with the OECD/NEA on those issues, just as those two agencies cooperated in the field of uranium resources.

75. Mr LIU Yongde (China), noting that nuclear power had continued to develop steadily in 2008, said that Asia accounted for a significant proportion of that increase. His country hoped the Agency would intensify its efforts to develop nuclear energy worldwide and provide more specific assistance to those countries introducing nuclear power programmes.

76. Nuclear technology applications played an important part in promoting sustainable development in Member States, particularly in developing countries. In 2008, the Agency had conducted a wide range of activities on the application of nuclear technologies in food and agriculture, human health, environment and water resources management, and it had achieved positive results in such areas as animal disease control and water and soil management. However, it was unfortunate that a number of economic and technical factors had prevented certain advanced technologies from being used more widely in developing countries. There was urgent need to increase the supply of radioisotopes for medical purposes and China hoped that the Agency would step up its activities in technical cooperation and technology transfer in order to improve the standard of living and the level of socio-economic development in developing Member States.

77. 2008 had been a year of relatively rapid development in the history of nuclear power construction in China. His country was seriously considering revising its medium- and long-term energy targets in order to meet the demands of its booming economy. In order to address the challenges posed by rapid nuclear power development, China was working to enhance its nuclear power infrastructure, nuclear safety regulation and human resources development, and was constantly expanding its cooperation with the Agency and other Member States.

78. China was prepared to share with other Member States its experience of nuclear power development and international cooperation in the field of nuclear energy. It would be hosting the International Ministerial Conference on Nuclear Energy in the 21st Century in April in Beijing. His Government attached great importance to the event and senior officials in nuclear energy from other countries were invited to avail themselves of the opportunity to discuss the sustainable development of nuclear energy.

79. Ms BELYAEVA (Russian Federation) said that promoting the peaceful uses of nuclear energy, including the development of innovative nuclear technologies and nuclear power infrastructure, and the maintenance and strengthening of nuclear knowledge, should remain priority areas for the Agency.

80. The development of innovative, safe, proliferation-resistant nuclear power systems was an important element in the development of nuclear power. INPRO promoted the development of competence in the field of innovative nuclear power systems and helped Member States coordinate

their cooperation projects in that field. The Russian Government had taken the decision to provide multi-year support for INPRO for the period 2008–2012. Her country noted with satisfaction the results of the meeting of the INPRO Steering Committee in February at which the importance of further improving and applying the INPRO methodology had been noted, including within the framework of the Agency's regular activities to assist countries planning to introduce nuclear power for the first time or to develop it further.

81. Armenia and Ukraine had taken the decision to join the Russian Federation and Kazakhstan as partners in the International Uranium Enrichment Centre (IUEC) in Angarsk. The formalities would be finalized shortly.

82. The Russian Federation attached great importance to the widespread application of nuclear energy and nuclear techniques in the areas of health protection, food and agriculture.

83. Ms LACANLALE (Philippines) expressed appreciation for the assistance the Agency provided to Member States in analysing energy options and in preparing them for the introduction of nuclear power. She welcomed the new service providing integrated advice to such countries. One such technical mission had visited the Philippines in 2008 to look into the condition of its Bataan nuclear power plant and to provide recommendations on the actions needed for the launching of a nuclear power programme in the country. Public acceptance had been of critical importance for the Philippines' decision to embark upon a nuclear power programme and her country recognized the usefulness of public opinion surveys as a tool for gauging public sentiment and as a valuable source of information on issues and concerns that needed to be addressed in developing a public awareness-raising programme.

84. The Philippines shared the concerns over possible shortages of people with the requisite skills and supported the Agency's efforts in identifying the required policies for human resources development and availability in nuclear science and technology. At national level, her country had mapped out a preliminary human resources development programme that called for a gradual build-up of expertise in all aspects of nuclear power, focusing on university students and government agency specialists, and on the introduction of nuclear engineering in university curricula. It looked forward to the Agency's assistance in developing that programme.

85. She commended the Agency's work on the application of nuclear technologies in food and agriculture, human health, environment and water resources, in all of which areas her country had benefited from the Agency's technical cooperation programme.

86. The use of irradiation technology for phytosanitary treatment of mangoes had helped the Philippines to gain access to export markets for that product. The country had also developed drought-tolerant soybean mutants and was continuing mutation breeding work on cashew, mangosteen, mung bean, rice and ornamental plants.

87. The Philippines strongly commended the Agency's work on quantitative imaging and internal dosimetry for nuclear medicine and radiation oncology applications. Within the framework of the Forum for Nuclear Cooperation in Asia project on radiation oncology, it had developed the best protocols for treating cancer patients. It looked forward to further developments in technologies for cancer prevention, detection and therapy, especially ones that were less costly and allowed more people — and particularly the poor — to have greater access to them.

88. Her country welcomed the finalization of the joint WHO/IAEA programme on cancer control and remained interested in being part of the network of regional training centres for cancer radiotherapy and in receiving an imPACT mission in the near future. In 2006, the Philippines had joined the call to secure initial funding for PACT. It noted that the programme continued to rely

largely on extrabudgetary resources to finance its projects, and monetary and in-kind donations from partner institutes and private foundations and cooperations. While public-private partnerships would continue to be of key importance in enabling PACT to implement its programmes, she urged Member States to give serious consideration to allocating sufficient and assured funding for PACT.

89. The Philippines supported the Agency's enhanced role in assessing the distribution and renewability of groundwater resources and, in 2008, her country had opened an environmental isotope centre which would help develop its capability in assessing its water resources with a view to judicious development, management and protection.

90. Finally, the Philippine Nuclear Research Institute had been granted a patent for a hydrogel dressing that could be applied on wounds, burns and bedsores and was considerably cheaper than imported dressings.

91. Mr VALLIM GUERREIRO (Brazil) noted that the Nuclear Technology Review 2009 did not take, and could not have taken into account the impact of the global financial crisis on plans to develop nuclear energy. The uncertainty and instability that characterized the global economic outlook made it impossible to determine how the projected slowdown would have an impact on what had, until recently, been called the nuclear renaissance. Nevertheless, the document provided a number of important facts that helped illustrate the current trends in nuclear power generation. One was that in 2008 no nuclear power reactor had been connected to an electricity grid, yet at the same time there had been an increase in the number of new nuclear power plant construction projects and additional licences being sought to that end. Furthermore, over 50 countries which did not have nuclear power plants had approached the Agency to seek assistance in planning possible nuclear energy programmes. The Agency should be prepared to respond to demands from Member States and to meet the challenges that lay ahead with the flexibility and ingenuity it had demonstrated throughout its history.

92. With reference to the cooperation between the Agency and ITER, Brazil had noted with appreciation that, at the last meeting of the International Fusion Research Council, a proposal had been put forward to open the ITER physics database to researchers from Agency Member States that were not parties to the ITER initiative. Another important proposal emanating from that meeting had been for the establishment of a fellowship programme for training of researchers from developing countries in projects related to ITER through the International Centre for Theoretical Physics.

93. Turning to security of supplies of molybdenum-99, he noted that shortages had caused market instability that had more than doubled the price of that important radioisotope in a very short period, jeopardizing medical procedures based on radiodiagnosis in his own and a number of other countries. In order to minimize the effects of the shortage, the Agency should initiate actions with a view to removing unnecessary impediments to the distribution of radioisotopes used in medicine.

94. The Agency should consider establishing a database similar to the Power Reactor Information System containing information on the status of facility decommissioning projects that were expected to generate a significant amount of waste.

95. The application of nuclear technology for non-power-related purposes was also of the utmost importance for the promotion of economic development and human health and well-being. Brazil was appreciative of the Agency's efforts to assist Member States in fully utilizing the benefits of nuclear technology in such fields as medicine, agriculture and industry.

96. Mr ROSELLÓ SERRA (Spain) said special attention should be given to the situation of countries aspiring to introduce nuclear power for the first time, and in particular to the establishment of a range of infrastructures and of independent regulatory bodies, strengthening of nuclear security, safeguards compliance and accession to relevant international legal instruments.

97. The Spanish Government had embarked on a study of the country's energy needs up to the year 2030 with a view to developing a long-term energy policy. Spain considered that INPRO could be a suitable tool to help Member States make the necessary decisions regarding the most suitable combination of energy sources for their sustainable development.

98. His country welcomed the fact that an application had been made for a permit for construction of the International Thermonuclear Experimental Reactor in Cadarache, France, and appreciated the Agency's role in promoting that project.

99. Equally, Spain welcomed the Agency's efforts to develop the SIT, in which work its own authorities had cooperated actively. It also attached importance to the activities relating to protection of the marine and terrestrial environment, food production and agriculture, improving livestock productivity, therapeutic and diagnostic applications in nuclear medicine, and the use of nuclear technology in seawater desalination and water resources management.

100. He highlighted the importance of nuclear medicine in the PACT initiative. Through that programme, the Agency could help developing countries address the problem of the rising incidence of cancer.

101. Finally, he thanked the Deputy Director General for Nuclear Sciences and Applications for participating in the high-level meeting on food security held in Madrid in January 2009 by the Secretary-General of the United Nations and the Prime Minister of Spain. The Spanish Government supported the Agency's efforts to maintain the highest level of synergy with the FAO.

102. Mr SCHULTE (United States of America), welcoming the fact that, in April 2009, China would be hosting the International Ministerial Conference on Nuclear Energy in the 21st Century, said that the United States believed that the benefits of nuclear technology should be available to developed and developing countries alike, as long as the highest standards of safety, security and non-proliferation were met. Nuclear technology could make a major contribution to the growth of developing economies and his country supported the Agency's crucial role in promoting nuclear technology in a manner that advanced the achievement of the Millennium Development Goals. The United States would work with other interested governments to meet the growing demand for nuclear power without contributing to proliferation.

103. The United States appreciated the positive contributions the Agency was making to the responsible development of nuclear power worldwide, in line with successive resolutions of the General Conference. The Agency's activities in identifying the infrastructure requirements for countries newly considering nuclear power were of particular importance and, in that connection, the United States had supported meetings and publications to implement the guidance document entitled *Milestones in the Development of a National Infrastructure for Nuclear Power* (NG-G-3.1), and other infrastructure development activities, through extrabudgetary contributions for programme activities and technical cooperation projects.

104. His country's support for the Agency's activities on the development of nuclear power was an important complement to activities on the non-power applications of nuclear technology described in the Nuclear Technology Review. His country was proud of its long-term support for a wide variety of non-power technical cooperation projects, such as the development and application of the SIT. Another successful example of technical cooperation had been the use of nuclear technology in the development of nutritional therapies for combating HIV/AIDS, heart disease and diabetes, which had contributed to a better understanding of the role of nutrition in growth and development from conception to adolescence.

105. The United States took note of document GOV/2009/3 but reserved the right to make additional comments on it in writing.

106. Ms KAUPPI (Finland) said that the Nuclear Technology Review 2009 reflected the changing attitude towards nuclear power following a long period of stagnation. In the face of accelerating climate change, many Member States were considering nuclear power as an option for electricity production, and that clearly had an impact on the emphasis of the Agency's activities and should be taken into account in programme and budget planning. According to the report, there was a growing demand for Agency support in analysing energy options and in preparing for the introduction of nuclear power and/or uranium production. Finland welcomed the introduction of a new service providing integrated advice to countries considering the introduction of nuclear power. In the new situation, the highest priority should be given to the further development of safety-related activities. The Agency could provide valuable support to Member States in their efforts to develop strong nuclear safety regulatory frameworks. A new systematic programme might be needed to ensure that the Agency had the capability and resources to respond to the needs and requests of Member States in that area.

107. In the energy strategy adopted recently by the Government of Finland, additional nuclear power was mentioned as one option in the envisaged future energy mix. Four nuclear power reactors were currently in operation and a fifth was under construction and expected to be in operation in 2012. Three companies had applied for approval to build new nuclear power plant units. The environmental impact assessments for all three proposed projects were complete and a decision was expected in 2010. Work was under way on the underground final disposal facility at the Olkiluoto nuclear power plant site, which was expected to be operational by 2020. She noted with satisfaction that the application of safeguards to the repository had been agreed with the Agency. Implementation of safeguards in a new type of facility was a challenge at both national and international level. The company in charge of the final disposal project was required to implement safeguards from the start of excavation until the closure of the site. The first inspection mission was expected to take place during 2009.

108. Mr AL-SAUD (Saudi Arabia) stressed the importance of the work being done to disseminate nuclear science and technology in the areas of power applications, fission and nuclear data, and various key uses in food and agriculture, human health, environment and water resources. His country noted the intensified efforts to exchange relevant knowledge between States for global socio-economic development, giving due consideration to the needs of the developing States. Support was being given to States in such areas as: assistance and guidance in use of the nuclear option to generate electricity, and reduction of the impact of the global credit crisis on plans to construct new nuclear reactors and subsequently connect them to the grid; operation of underground repositories for low- and intermediate-level radioactive waste, which should help promote public acceptance of nuclear energy; meeting the growing demand for radioisotope sources used in medicine and industry; expansion of the use of nuclear imaging in medicine through, inter alia, the development of new radiopharmaceuticals; improved nutrition and prevention of the development of chronic diseases; dissemination of the use of nuclear techniques in food and agriculture to strengthen livestock production, prevent the transboundary spread of animal diseases such as avian influenza, and trace the origin of food contaminants; and, finally, expansion of the use of radiotracer tools for measuring the impact of climate change and for freshwater management through the identification of water in rock strata.

109. Mr ALSHARIA (Iraq) said that there had been a great increase in the demand for nuclear technology in most Member States, especially developing countries, the majority of which lacked resources and experience in the field. There had been considerable development of human resources and capacity building. However, the increased demand for energy and the increased use of nuclear applications meant that greater innovation had to be demonstrated in the development of new

technologies that were less costly. Private sector initiatives were to be encouraged, as long as they were consistent with Agency standards. He thanked those who supported PACT, and those countries that had contributed to Iraq's cancer therapy programme, such as the United States, Japan and India, and he expressed the hope that other countries would contribute to the programme in order to ensure its success.

110. He also expressed the hope that 2009 would see the lifting of restrictions imposed upon Iraq under various United Nations Security Council resolutions which had deprived it of its right to develop its nuclear programme for peaceful purposes, particularly in light of Security Council resolution 1859 (2008) and developments in the country as a whole.

111. Mr BAAH-DUODU (Ghana) said that his country had expressed interest in the introduction of a nuclear power programme in order to ensure a reliable supply of electricity for socio-economic development and to help meet the Millennium Development Goals. A national technical cooperation project to assess the role of nuclear power in future options for electricity generation was due to start in 2009. Stakeholder institutions involved in energy generation and planning would participate in an IAEA workshop on milestones for nuclear power infrastructure development. As a member of the Global Nuclear Energy Partnership, Ghana intended to seek assistance for feasibility studies to establish the framework for the development of a nuclear power programme and policy.

112. His country recognized the importance of human resources in meeting the growing need for nuclear technology. In order to support its education and training programmes, it planned to establish an accelerator facility for use by postgraduate students and researchers. It was grateful to the Agency for fostering international cooperation with the Government of South Africa in order to train some of Ghana's scientists and engineers, and for arranging fellowship training in a laboratory in Italy. More than 80% of the civil engineering work on the facility was complete and efforts were continuing to obtain funds for the main equipment.

113. Ghana noted with satisfaction the Agency's efforts to develop X-ray irradiation for insect sterilization as an alternative to gamma irradiation. The results had been the same for three different insect species. Such a development would permit expansion of the use of the SIT in many developing countries, including in Africa.

114. His country attached great importance to the Agency's work on the use of nuclear and isotopic techniques to improve food quality and safety, for crop improvement and for sustainable land and water management. It took note of the Agency's many important achievements relating to food security.

115. Ghana acknowledged the increasing need to develop nuclear medicine and the use of radiopharmaceuticals to address health problems associated with cancer and cardiovascular diseases, which were on the increase in developing countries. It commended the Agency on initiating the regional project on strengthening and expanding radiopharmacy services in Africa, and the project on sustaining clinical nuclear medicine techniques in the management of diseases, including coronary artery diseases. In its view, the latter project, which was of great importance for the early diagnosis of diseases, should commence in 2009 instead of 2011.

116. Mr GUMBI (South Africa) thanked the Secretariat for prevailing upon the FAO not to withdraw from its collaboration with the Agency under the Joint FAO/IAEA Division and noted with satisfaction the imminent signing by the Agency and WHO of an agreement for a new joint programme on cancer control. South Africa welcomed the Agency's continued interaction with the African Union and encouraged the organization to strengthen its cooperation with NEPAD with the aim of aligning its African projects with that initiative. It also encouraged the Agency to plan projects for the continent in cooperation with the African Regional Economic Communities. The Agency's

activities related to nuclear science, technology and applications would help Africa achieve some of the Millennium Development Goals.

117. Knowledge maintenance and competence building in nuclear sciences were of high priority, in particular in developing countries and in the African region. One promising way to build such competence could be through the establishment of an accelerator facility and its use for nuclear education and training and for hands-on experience in related applications. To that end, South Africa was now offering an MSc course in accelerator and nuclear science with a view to facilitating utilization of existing expertise and facilities to benefit potential regional partners. Ghana and Nigeria had already benefited from that initiative.

118. In the field of technology and applications, South Africa had made progress towards manufacturing fuel for its PBMR project. In close partnership with the Agency, it was making effective use of nuclear technology and applications to promote its socio-economic development. The Agency's technical assistance programme and AFRA continued to play a relevant role in that regard.

119. The Nuclear Energy Corporation of South Africa, the world's third largest supplier of medical isotopes selling isotopes to more than 50 countries, shared the Agency's concern regarding disruptions in the supply of the radioisotope molybdenum-99 in 2008, which had caused delays in patient services in nuclear medicine centres around the world. He encouraged the Agency to look into the vulnerability of the isotope supply chain.

120. Ms MACMILLAN (New Zealand) said that her country supported the Agency's work related to food quality and safety, crop improvement, sustainable land and water management, pest control, water resources and access to fresh water, and environmental management and human health. It welcomed the Secretariat's efforts to develop national capacity in Member States and promote regional and international cooperation in those areas. Urgent action was needed on a global scale and progress on those issues would make a considerable difference and, eventually, benefit many millions of people.

121. New Zealand had recently made a contribution of 40 000 New Zealand dollars to PACT for 2009, having already made four annual contributions to the programme, which testified to the importance New Zealand attached to that issue and its ongoing commitment to assisting the Agency in that very important area.

122. Nuclear non-proliferation, safety and waste management should be an integral part of any consideration of nuclear power. Any discussion of nuclear power as an option had to be balanced and take into account the safety and security risks associated with nuclear power generation alongside any potential benefits.

123. Mr SIRRY (Egypt) commended the Agency for its efforts to strengthen the role of nuclear technology in promoting development and improving living standards. The positive developments outlined in the report bore witness to nuclear energy's promising future role in generating electricity, especially in developing countries, as well as in such fields as human health, food and agriculture, water resources and environment. Egypt commended the Secretariat for stepping up its activities and projects devoted to the needs of developing countries in connection with design, construction and expansion of nuclear power plants. Efforts need to be made to address problems related to shortages of funding for technical cooperation activities and the adverse impact of the voluntary nature of such funding. He stressed that the Secretariat's guidance documents on the construction of nuclear power plants were not binding, since it was up to States to establish their policies and legislation, which were predicated on their own economic and social conditions.

124. His country supported the Agency's efforts in the areas of human health, food and agriculture, water resources management and environment, and it cooperated with it at both national and regional level. Given the growing need for water resources as an energy source, the Agency's work in the field of water resources management was highly important.

125. Egypt also attached importance to the Agency's role in promoting access to the benefits of nuclear applications, including radioisotopes, in the fields of human health, pharmaceuticals and pest and disease control. Detailed information was needed on the Secretariat's efforts to cope with the shortage of radioisotopes and to overcome obstacles to their shipment, while improving the operation of research reactors in developing countries so that the latter could produce their own radioisotopes.

126. Mr DÍAZ (Mexico) said that his country attached special importance to the Agency's activities related to the application of nuclear technology, which helped address urgent problems in developing countries. As noted in the Nuclear Technology Review, water resources management, food security, human health, environmental protection and use of radioisotopes and radiation were all areas where nuclear and isotopic techniques were making valuable contributions to socio-economic development around the world. Hence the need to strengthen the Agency's activities in that field, the technical cooperation programme being one of the main instruments for transferring the benefits of the application of nuclear techniques to developing countries.

127. With regard to section A.4.3 of the report, on human resources development, Mexico, like other countries, was concerned about possible shortages of people with the skills needed by the nuclear power industry, and it was closely monitoring efforts by the Agency and the OECD/NEA in that regard. Domestically, it was taking measures to foster greater involvement of younger generations in the nuclear field.

128. Turning to section A.4.4, on public acceptance of nuclear energy, he stressed the importance of public opinion as a crucial factor in the development of nuclear energy and the importance of Agency support in that regard.

129. In connection with section H, on water resources, he underscored the importance of Agency and international efforts to address the problem of shortages of drinking water and improve water resources management.

130. Mexico noted with interest the increased international demand for radioisotopes and radiation sources owing to their use in medicine and industry, and the corresponding expansion of regional centres for the production of clinical radiotracers to meet the needs of positron emission tomography imaging.

131. Mr NECULĂESCU (Romania) said that nuclear power was a clean and sustainable energy source which could help address many of the world's most pressing concerns. Romania had made nuclear power part of its energy mix and its national energy strategy envisaged a doubling of the share of nuclear power in that mix over the coming years. Two additional units at the Cernavoda nuclear power plant were expected to be complete by 2014–2015. Thus, nuclear power was expected to account for around 35% of total power production by 2015. Other projects were also envisaged.

132. Romania appreciated and encouraged the Agency's efforts to promote education and training in order to preserve and enhance nuclear knowledge. One important sector in that regard continued to be nuclear applications and techniques in medicine for the diagnosis and treatment of cancer.

133. His country was confident that the use of the nuclear energy in the safest and most secure way possible could make a substantial contribution to human well-being. It counted on the Agency's expertise in the field and on its networking capacity to help achieve that goal.

134. Mr CARON (France) said that the Nuclear Technology Review confirmed the favourable prospects for the development of nuclear energy and showed the great expectations the Agency's Member States had, as they sought to make use of that energy source or to increase their capacity. He noted in particular the significant increase in the number of projects in the new technical cooperation cycle related to nuclear power applications, and the establishment of a new advisory service for Member States planning to introduce nuclear power in their energy mix. His country welcomed those developments and supported the Agency's efforts in that area.

135. France had long ago taken the decision to rely on nuclear energy to meet a large part of its electricity needs. Its policy aimed to ensure a high level of energy independence while limiting CO<sub>2</sub> emissions. The announcement by the President of France regarding the construction of a second EPR-type reactor at Penly, the first project of that type having been implemented at Flamanville, demonstrated the continuing validity of that choice.

136. His country wished to help other States desiring to use nuclear energy for sustainable development to benefit from its expertise, provided they complied with their non-proliferation commitments and pursued their peaceful activities in good faith. To that end, the French authorities, in close cooperation with the Agency, intended to harmonize bilateral and multilateral assistance as far as possible.

137. The development of the nuclear industry had to be seen within a long-term knowledge and competence management context. The French nuclear power programme, which had been launched more than 30 years previously, was based on a system for developing and maintaining competence that was geared to the needs of the country's nuclear sector. Based on its experience, France supported the Agency in its efforts to define a global approach for countries that wished to introduce nuclear power, in particular by helping them to put in place a national strategy and devise targeted training programmes.

138. France would be sending high-level representation to the International Ministerial Conference on Nuclear Energy in the 21st Century to be held in Beijing in April, which was a follow-up to the conference held in Paris in March 2005.

139. His country was participating actively in the international discussions on multilateral approaches to the fuel cycle which, in its opinion, should go hand in hand with the development of nuclear power worldwide, and should help ensure compliance with non-proliferation requirements. Under the French presidency, the Council of the European Union had decided, on 8 December 2008, to contribute €25 million to set up a fuel bank under Agency auspices, subject to a decision by the Board. That initiative was part of efforts to meet the aspirations of all countries wishing to launch nuclear programmes in conformity with the rights acknowledged in Article IV of the NPT, to which rights France was firmly committed. It did not rule out other initiatives aimed at strengthening the high level of security already provided by the nuclear fuel market.

140. France currently chaired the Generation IV International Forum and would be hosting a symposium in Paris on 9 and 10 September to mark the Forum's tenth anniversary. It also participated in the INPRO project and welcomed the coordination between INPRO and the Forum. It intended to step up its involvement in that initiative and would be making an extrabudgetary contribution in addition to its in-kind contribution in the current year in order to promote participation by developing countries.

141. The shortage of molybdenum-99 that had arisen in Europe in autumn 2008 had revealed the fragile nature of the medical isotope production chain, which was based on a small number of ageing research reactors. In order to enhance security of supply of medical isotopes in the short term, operators should be encouraged to improve their coordination, notably with regard to reactor

maintenance planning. The objective was to ensure continuous production. However, the problems with delays or denials of shipment would also have to be examined and resolved. France, with its Osiris reactor, produced about 12% of the radioisotopes needed for medical applications in Europe. When the Jules Horowitz reactor (RJH) was operationalized, which should be around 2014, that figure should rise to 25%.

142. In the interests of identifying long-term solutions, France was ready to participate in international discussions to assess the level of global demand for medical isotopes in the coming decades and, if necessary, agree on an economic model to meet it.

143. In the area of fusion, the preparatory work on the ITER reactor site was moving ahead rapidly. France was pleased that, on 13 October 2008, the Agency had signed a cooperation agreement with the organization responsible for the ITER project, which should facilitate exchange of information and shared training of scientists from the two organizations in both plasma physics and nuclear fusion safety.

144. The Agency and Member States were conducting many projects aimed at implementing nuclear techniques in such crucial areas as human health, food and agriculture, and management of natural resources. Aware as it was of the extent of needs in those areas, and in the conviction that research, science and innovation were fundamental preconditions for development, France was pursuing its cooperation with the Agency to support its efforts. In addition to its financial support for technical cooperation projects, his country was cooperating with the Agency on combating cancer in developing countries, was mobilizing its experts for specific initiatives and was working closely with the Agency and six countries in Africa and the Caribbean to optimize coordination of activities in those countries.

145. It also supported the Agency's efforts to meet the needs of Member States in applying the SIT. The agreement in principle concluded between the Institute of Research for Development and the Agency during the 2008 General Conference constituted an important step in promoting synergy between the two bodies in various scientific fields, such as combating disease-transmitting mosquitoes, soil erosion and water management. Cooperation between the Agency and other national and international development partners should be encouraged.

146. Mr HUTCHINGS (Australia) noted that a number of supporting documents had been released late and his delegation had not had time to review them fully ahead of the Board. Hence, it reserved the right to make additional comments in writing.

147. The Nuclear Technology Review gave a balanced overview of the status of nuclear power worldwide, including updated projections for future growth drawn from the report on the International Status and Prospects of Nuclear Power recently distributed by the Agency (GOV/INF/2008/10). He noted that that document had originally been intended as an annex to the Nuclear Technology Review. As it no longer had that linkage, it would be beneficial to include a specific reference to it in the Review. The report included data which demonstrated the continuing high level of safety in the nuclear power sector. The section on public acceptability was helpful and provided insights into the impact of safety performance on public acceptance.

148. Australia welcomed the Agency's continued cooperation with the OECD/NEA on the assessment of uranium resources and the publication of the latest version of the 'Red Book' (*Uranium 2007: Resources, Production and Demand*). It noted that that publication indicated that the projected life of known uranium resources was over 80 years at current consumption rates, considerably more than the 30–50 years for many other important commodities. However, it also noted that projected increases in demand for uranium would require additional mining capacity to be developed, and Australia strongly supported the Agency's role in helping new entrants who approached the Agency for assistance in that area.

149. Paragraph 98 of the Nuclear Technology Review referred to the vital role of research reactors in the production of radioisotopes for medical applications. Paragraphs 156 – 159 reported on challenges that had been experienced over the preceding year with respect to security of supply of molybdenum-99. Supply problems had been largely associated with unplanned outages at major production reactors, all of which were more than 40 years old. As noted in the Review, significant new capacity was about to come on line at the OPAL reactor and associated facilities operated by the Australian Nuclear Science and Technology Organisation. However, reliability of global supply would remain a challenge, a fact that had been recognized by both the Agency and the OECD/NEA. The Agency would have an important role to play, particularly in helping additional regional capacity to be developed at existing research reactors which were currently underutilized. As implied in paragraph 159, any new irradiation capacity should be based on the use of LEU targets. The United States National Academy of Sciences study referred to in paragraph 156 had now been published and had found that eliminating HEU from the production of molybdenum-99 was technically and economically feasible. In that context, he noted that the Australian Nuclear Science and Technology Organisation had been producing molybdenum-99 using LEU targets for many years and its new facilities would demonstrate that large-scale, routine production of high-quality molybdenum-99 using LEU was certainly feasible.

150. Mr HAMER (Netherlands)\*, referring to the disruptions over the preceding year in the supply of medical isotopes which had had a negative impact on patient services throughout the world, said that the Netherlands hosted one of the five research reactors worldwide that produced molybdenum-99. In August 2008, technical problems had arisen in the primary cooling circuit of that research reactor and the reactor had been shut down. Subsequently, the licence holder had undertaken an investigation and had concluded that repairs would be a complex process which would take a year to complete. Owing to the global implications of such a long period of suspension of production, the licence holder had requested that the reactor be restarted, while ensuring adequate safety measures were in place pending the repair work. As his country's regulatory body had considered those measures to be sufficient, the Government had agreed to restart the reactor for one year, provided that an Agency team conducted its own investigation to confirm the Dutch assessment. That review mission, which had taken place less than a month ago and had comprised Agency staff as well as external safety experts from Argentina, Canada, France, India and South Africa, had confirmed that the licence holder had taken adequate temporary safety measures and that the earlier evaluations by the regulatory body justified the decision in favour of a year-long temporary restart of the reactor.

151. He stressed the importance of the role that international organizations such as the Agency could play not only with regard to safety assessments, but also in connection with the vulnerable global supply of medical radioisotopes, on which so many countries depended. His Government was grateful to the Agency for its swift action and its useful recommendations.

**The meeting rose at 1.05 p.m.**