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# Measures to Strengthen International Cooperation in Nuclear, Radiation, Transport and Waste Safety

*Report by the Director General*

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## **Summary**

Pursuant to resolution GC(55)/RES/9, a report covering the following subjects is submitted to the Board of Governors and the General Conference for their consideration:

- The Agency's safety standards programme
- Nuclear installation safety
- Radiation safety
- Transport safety
- The safety of spent fuel and radioactive waste management
- The safe decommissioning of nuclear facilities and other facilities using radioactive material
- Safety in uranium mining and processing and remediation of contaminated sites
- Education and training in nuclear, radiation, transport and waste safety
- The Safety and security of radioactive sources
- Nuclear and radiological incident and emergency preparedness and response
- Civil liability on nuclear damage

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## **Recommended Action**

- It is recommended that the Board of Governors and the General Conference consider and take note of this report.



# Measures to Strengthen International Cooperation in Nuclear, Radiation, Transport and Waste Safety

*Report by the Director General*

## **A. Introduction**

1. This report has been produced for the fifty-sixth session (2012) of the General Conference in response to resolution GC(55)/RES/9, in which the General Conference requested the Director General to report in detail on implementation of the resolution, including other relevant developments in the intervening period. This report covers the period 1 July 2011–30 June 2012.
2. The Agency assists Member States in the establishment of comprehensive nuclear safety frameworks for developing and improving their national infrastructure; controlling radiation exposure to people and the release of radioactive material to the environment; restricting the likelihood of nuclear and radiological events; and mitigating the consequences of any such events. The Agency continues to strengthen its efforts to maintain and improve nuclear, radiation, transport and waste safety, giving priority to assisting Member States with the new challenges following the accident at the Tokyo Electric Power Company (TEPCO) Fukushima Daiichi nuclear power plant (hereinafter referred to as “the Fukushima Daiichi accident”), and to building upon the lessons learned from the accident.<sup>1</sup>
3. In its continuous support to States in strengthening and enhancing safety, the Agency has made effective and coordinated use of available resources through the implementation of appraisal and advisory missions, expert missions, fellowships, training courses and other activities under the technical cooperation (TC) programme as well as through extrabudgetary projects.<sup>2</sup>
4. The IAEA Action Plan on Nuclear Safety<sup>3</sup> was submitted to and adopted by the Board of Governors at its September 2011 meeting, and was subsequently presented to the General Conference, where it was endorsed by all 151 Member States. The ultimate goal of the Action Plan is to strengthen nuclear safety worldwide. Implementation of the Action Plan started right after its adoption.

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<sup>1</sup> This relates to operative paragraph 1 and 2 of resolution GC(55)/RES/9.

<sup>2</sup> This relates to operative paragraph 9, 23 and 24 of resolution GC(55)/RES/9.

<sup>3</sup> The IAEA Action Plan on Nuclear Safety, which was approved by the Board of Governors and endorsed by the 55<sup>th</sup> General Conference in September 2011, is contained in document GOV/2011/59-GC(55)/14.

5. On 26 September 2011, the Director General announced the formation of a Nuclear Safety Action Team to ensure proper coordination among all stakeholders and to oversee the prompt implementation of the Action Plan. In November 2011, the Director General reported to the Board of Governors on the activities carried out by the Secretariat in the report on the Initial Progress in the Implementation of the IAEA Action Plan on Nuclear Safety<sup>4</sup>. Further reports on progress were presented to the Board of Governors in March<sup>5</sup> and in June<sup>6</sup> 2012. A report by the Director General on the implementation of the IAEA Action Plan on Nuclear Safety, which deals with many aspects of the Action Plan mentioned in this report, is also being submitted to the Board of Governors and to the General Conference in 2012.<sup>7</sup> The safety priorities of the Action Plan will be considered when developing the next programme and budget cycle (2014–2015).<sup>8</sup>

6. The Fukushima Ministerial Conference on Nuclear Safety<sup>9</sup> will be organized by the Government of Japan in co-sponsorship with the Agency in the Fukushima Prefecture, Japan, in December 2012. The conference will include a ministerial session and followed by technical experts' sessions. The principal objective of the conference will be to contribute to strengthening nuclear safety worldwide. It will also provide another opportunity to share with the international community further knowledge and lessons learned from the Fukushima Daiichi accident, to further enhance transparency, and to discuss the progress of the international efforts in strengthening nuclear safety, including through the implementation of the IAEA Action Plan on Nuclear Safety.

## **B. The Agency's Safety Standards Programme**

7. In November 2011, the final report of the Joint Task Force of the Advisory Group on Nuclear Security (AdSec) and the Commission on Safety Standards (CSS) was approved by a joint session of AdSec and the CSS and submitted to the Director General. The report recommended inter alia the establishment of a standing Nuclear Security Guidance Committee (NSGC),<sup>10</sup> open to all Member States, to make recommendations on the development and review of IAEA Nuclear Security Series publications.

8. The NSGC was established in March 2012.<sup>11</sup> The background to the establishment of the NSGC, and its objectives and intended operation, including its interaction with the existing IAEA Safety Standards Committees and CSS, are described in document GOV/INF/2012/3, *Development and review of the Agency's Nuclear Security Series publications*. The NSGC has approved the draft Nuclear Security Fundamentals on the objective and essential elements of a State's nuclear security

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<sup>4</sup> Initial Progress in the Implementation of the IAEA Action Plan on Nuclear Safety GOV/INF/2011/15.

<sup>5</sup> Progress in the Implementation of the IAEA Action Plan on Nuclear Safety GOV/INF/2012/2.

<sup>6</sup> Progress in the Implementation of the IAEA Action Plan on Nuclear Safety GOV/INF/2012/10.

<sup>7</sup> First Annual Report on the Implementation of the IAEA Action Plan on Nuclear Safety GOV/INF/2012/11-GC(56)/INF/5.

<sup>8</sup> This relates to operative paragraph 4, 5, 7 and 25 of resolution GC(55)/RES/9.

<sup>9</sup> This relates to operative paragraph 6 of resolution GC(55)/RES/9.

<sup>10</sup> This relates to operative paragraph 11 of resolution GC(55)/RES/9.

<sup>11</sup> This relates to operative paragraph 11 of resolution GC(55)/RES/9.

regime. This document is being submitted to the Board of Governors, as recommended by the NSGC.<sup>12</sup>

9. The CSS endorsed for submission to the Board of Governors the draft *Regulations for the Safe Transport of Radioactive Material: 2012 Edition*. The CSS also endorsed for publication five draft Safety Guides on safety case and safety assessment for predisposal management of radioactive waste, safety in the utilization and modification of research reactors, periodic safety review of nuclear power plants, advisory material for the Agency's *Regulations for the Safe Transport of Radioactive Material: 2012 Edition*, and external expert support for the regulatory body.<sup>13</sup>

10. In the reporting period, the Board of Governors approved the following as Agency safety standards: *Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards (BSS)* (IAEA Safety Standards Series No. GSR Part 3)<sup>14</sup>, *Safety of Nuclear Power Plants: Design* (IAEA Safety Standards Series No. SSR-2/1) and *Regulations for the Safe Transport of Radioactive Material: 2012 Edition* (to be published as IAEA Safety Standards Series No. SSR-6).

11. In the reporting period, nine Agency safety standards were issued: *Safety of Nuclear Power Plants: Design* (SSR-2/1), *Safety of Nuclear Power Plants: Commissioning and Operation* (SSR-2/2), *Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards — Interim Edition* (GSR Part 3 (Interim)), *Geological Disposal Facilities for Radioactive Waste* (SSG-14), *Storage of Spent Nuclear Fuel* (SSG-15), *Establishing the Safety Infrastructure for a Nuclear Power Programme* (SSG-16), *Control of Orphan Sources and Other Radioactive Material in the Metal Recycling and Production Industries* (SSG-17), *Meteorological and Hydrological Hazards in Site Evaluation for Nuclear Installations* (SSG-18), *National Strategy for Regaining Control over Orphan Sources and Improving Control over Vulnerable Sources* (SSG-19).<sup>15</sup> Lessons that may be learned from studying the Fukushima Daiichi accident will be reflected in these Agency safety standards as revised and issued in the future.

12. The Secretariat established an internal Safety Standards Review Task Force to review the Agency's safety standards in the light of the Fukushima Daiichi accident.<sup>16</sup> The approach proposed by the task force was welcomed by the CSS (November 2011) with priority given to the review of the Safety Requirements applicable to nuclear power plants (NPPs) and to the storage of spent fuel.

13. In March 2012, the CSS considered the Secretariat's task force progress report on the review of the Agency's safety standards in the light of the lessons learned to date from the Fukushima Daiichi accident. The report identified areas where the Safety Requirements publications could be further strengthened. The CSS also supported the Secretariat's proposal to incorporate improvements through each publication, as addenda to each individual Safety Requirements. The improvements will be reviewed and approved in one document prepared by the Secretariat to improve the efficiency of the review and approval process. A CSS progress report was provided to the Director General in May 2012.<sup>17</sup>

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<sup>12</sup> Draft Nuclear Security Fundamentals: Objective and Essential Elements of a State's Nuclear Security Regime GOV/2012/39.

<sup>13</sup> This relates to operative paragraph 12 of resolution GC(55)/RES/9.

<sup>14</sup> This relates to operative paragraph 29 of resolution GC(55)/RES/9.

<sup>15</sup> This relates to operative paragraph 12 of resolution GC(55)/RES/9.

<sup>16</sup> This relates to operative paragraph 26 and 27 of resolution GC(55)/RES/9.

<sup>17</sup> This relates to operative paragraph 26, 27 and 37 of resolution GC(55)/RES/9.

14. The CSS agreed that a document outline be prepared by the Secretariat to initiate the revision process of *Governmental, Legal and Regulatory Framework for Safety* (GSR Part 1), *Site Evaluation for Nuclear Installations* (NS-R-3), *Safety of Nuclear Power Plants: Design* (SSR-2/1), *Safety of Nuclear Power Plants: Commissioning and Operation* (SSR-2/2) and *Safety Assessment for Facilities and Activities* (GSR Part 4), in conjunction with the already agreed revision of *Preparedness and Response for a Nuclear or Radiological Emergency* (GS-R-2) and *The Management System for Facilities and Activities* (GS-R-3). This document outline has been approved by the Safety Standards Committees at their meeting in June 2012 and is being submitted for approval to the CSS at its meeting in October 2012. A table proposing detailed improvements to these Safety Requirements is being prepared by the Secretariat and will be submitted to the Safety Standards Committees for detailed review at their forthcoming meetings in 2012, before consultations with Member States.<sup>18</sup>

15. The Agency continued to cooperate with the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) and the International Commission on Radiological Protection (ICRP) to have a sound scientific base for the development of the Agency safety standards. The Agency continued its work on the development of the Information System on Occupational Exposure in Medicine, Industry and Research (ISEMIR) and in the updating of the Directory of Radiotherapy Centres (DIRAC), which are used in UNSCEAR assessments.<sup>19</sup>

16. An agreement was reached with UNSCEAR on the redesign and the use of the Agency's Database on Discharges of Radionuclides to the Atmosphere and Aquatic Environment (DIRATA). The database will be used jointly by both organizations. The primary objective of the data is to inform the public about discharges of radionuclides from nuclear facilities. Additionally, these data are used as inputs for UNSCEAR's assessment of radiological impacts to the public arising from those discharges.<sup>20</sup>

17. Following the Fukushima Daiichi accident, the Agency collaborated closely with international organizations such as UNSCEAR, the World Health Organization (WHO) and the Food and Agriculture Organization of the United Nations (FAO) on issues related to assessments of exposures to the public and radiological impacts to the environment, remediation, and preparedness and response to nuclear and radiological emergencies affecting human health, food, agriculture, fisheries and forestry.<sup>21</sup>

18. The IAEA and the Nuclear Energy Agency of the Organisation for Economic Co-operation and Development (OECD/NEA) jointly operate the Information System on Occupational Exposure (ISOE) for nuclear power plants. Currently, utilities and regulatory authorities from 29 Member States participate in ISOE. In December 2011, a cooperation agreement was signed to facilitate systematic and regular provision from ISOE to UNSCEAR of data and information on occupational radiation exposure at nuclear facilities.<sup>22</sup>

19. In line with the Action Plan for Occupational Radiation Protection endorsed by the Board of Governors in 2003 and concluded in June 2011, the Agency and the International Labour Organization (ILO) have been cooperating in the collection and dissemination of information on occupational radiation protection in developing countries. Currently, the three international organizations (IAEA,

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<sup>18</sup> This relates to operative paragraph 26, 27 and 37 of resolution GC(55)/RES/9.

<sup>19</sup> This relates to operative paragraph 30 of resolution GC(55)/RES/9.

<sup>20</sup> This relates to operative paragraph 30 of resolution GC(55)/RES/9.

<sup>21</sup> This relates to operative paragraph 30 of resolution GC(55)/RES/9.

<sup>22</sup> This relates to operative paragraph 30 of resolution GC(55)/RES/9.

ILO and WHO) are gathering data on occupational radiation protection through their national contact points to populate the database established by the Agency. This information is also made available to UNSCEAR.<sup>23</sup>

20. In response to a request by the Radiation Safety Standards Committee (RASSC) and the CSS to expedite the development of guidance in relation to the revised dose limits for the lens of the eye published by the ICRP in 2011, a Technical Meeting is planned to be held in October 2012. The meeting will be organized in cooperation with other relevant international organizations. The meeting will include a discussion on the scientific basis for the reduction in the dose limit for the lens of the eye. It will prepare practical guidance for those groups of workers at risk of receiving elevated doses to the lens of the eye, such as interventional radiologists and cardiologists, and industrial radiographers. The guidance to be developed will cover the design of workplaces and equipment, the use of personal protective equipment, the need for specific operational rules, the training of workers, health surveillance of workers and technical issues relating to the monitoring of doses to the lens of the eye.<sup>24</sup>

## C. Nuclear Installation Safety

21. The Agency made significant progress in assisting Member States in developing their national infrastructure for nuclear safety.<sup>25</sup> The Agency conducted over 50 training events ranging from broad introductory courses on establishing safety infrastructures, introduction to safety fundamentals, leadership and management for introducing and expanding nuclear power programmes, and capacity building and infrastructure development for nuclear power programmes, to more specific thematic training courses and workshops on the development of regulations, licensing, site evaluation, and safety assessment.

22. The Agency also tailored some of the existing review services to countries embarking on a nuclear power programme to support the phased approach reflected in *Establishing the Safety Infrastructure for a Nuclear Power Programme* (IAEA Safety Standards Series No. SSG-16) and *Milestones in the Development of a National Infrastructure for Nuclear Power* (IAEA Nuclear Energy Series No. NG-G-3.1). These services include the Integrated Regulatory Review Service (IRRS), the Design and Safety Assessment Review Service (DSARS), the Site and External Events Design (SEED) review service, and the Pre-Operational Safety Review Team (pre-OSART) service. The Agency carried out SEED reviews in Algeria, Bangladesh, Indonesia, Jordan, Nigeria, the United Arab Emirates and Vietnam and an IRRS mission to the United Arab Emirates. In addition, the Agency carried out two Integrated Nuclear Infrastructure Review (INIR) missions to Bangladesh and Belarus, and one INIR follow-up mission to Jordan.<sup>26</sup>

23. In April 2012, the Agency organized a Technical Meeting on Establishing, Developing and Implementing Capacity Building in Member States. At this meeting, capacity building was defined as the systematic and integrated approach that includes education and training, human resource development, knowledge management and knowledge networks to develop and continuously improve

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<sup>23</sup> This relates to operative paragraph 30 of resolution GC(55)/RES/9.

<sup>24</sup> This relates to operative paragraph 30 of resolution GC(55)/RES/9.

<sup>25</sup> This relates to operative paragraph 2 of resolution GC(55)/RES/9.

<sup>26</sup> This relates to operative paragraph 2 of resolution GC(55)/RES/9.

the governmental, organizational and individual competencies and capabilities necessary for achieving safe, secure and sustainable nuclear power programmes.<sup>27</sup> A self-assessment methodology of capacity building, both at governmental and organizational level, was also reviewed and endorsed at the Technical Meeting.

24. The Agency's capacity building activities to support embarking countries (also known as newcomer countries) are being organized in line with phases and actions recommended in *Establishing the Safety Infrastructure for a Nuclear Power Programme* (IAEA Safety Standards Series No. SSG-16). This allows the Agency to more effectively assist Member States in addressing their needs according to the stage of development of the nuclear power programme. The Agency continues to develop and enhance the related training material for the respective packages to support the phased development of Member States' nuclear safety infrastructure programmes. The Agency is also developing a self-assessment methodology and associated software tools, which will become available later in 2012.<sup>28</sup> In addition to the activities supporting Member States in strengthening safety and security, the Agency has also enhanced its mechanisms and tools to capture and preserve the Agency's knowledge and organizational memory in nuclear safety and security by preserving, capturing and enhancing the transfer of knowledge.

25. The Regulatory Cooperation Forum (RCF) brings together embarking countries with countries with mature nuclear power programmes to provide the necessary assistance in capacity building efforts. Agreements among a number of Member State organizations and regulatory authorities have resulted in the development and provision of assistance to embarking countries to strengthen the technical and managerial competences of staff of the regulatory bodies.<sup>29</sup>

26. The Agency recognized the need for continuous evaluation of its activities to ensure coherence amongst its publications and services, as well as in the development of safety modules and a catalogue of assistance activities.<sup>30</sup> An example is the effort to identify and recommend which review services should be performed during the different phases of the development of the embarking countries' nuclear power programme. Specifically, in the review of nuclear infrastructure, for phase 1 and early phase 2 countries, the Agency recommends the use of the Integrated Nuclear Infrastructure Review (INIR). This would be followed by more focused review of the nuclear safety infrastructure using established safety review services such as the Integrated Regulatory Review Service (IRRS). This approach was applied to the United Arab Emirates, as they received an INIR mission in January 2011 and IRRS mission in December 2011.

27. The Agency has developed INIR as an overarching service for evaluation and advice on the development of national nuclear power programmes. In revising *Evaluation of the Status of National Nuclear Infrastructure Development* (IAEA Nuclear Energy Series NG-T-3.2), the Agency has ensured that the related infrastructure publications (IAEA Safety Standards Series No. SSG-16 and the draft publication *Emergency Preparedness and Response Considerations for States Embarking on a Nuclear Power Programme* (EPR-EMBARKING)) are taken into account.<sup>31</sup>

28. In the reporting period, two full scope IRRS missions were carried out in Sweden and the United Arab Emirates. Limited scope missions were carried out in Greece, Republic of Korea, Slovakia,

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<sup>27</sup> This relates to operative paragraph 10 of resolution GC(55)/RES/9.

<sup>28</sup> This relates to operative paragraph 2 and 10 of resolution GC(55)/RES/9.

<sup>29</sup> This relates to operative paragraph 2 and 10 of resolution GC(55)/RES/9.

<sup>30</sup> This relates to operative paragraph 2, 10 and 17 of resolution GC(55)/RES/9.

<sup>31</sup> This relates to operative paragraph 17 of resolution GC(55)/RES/9.

Slovenia and Switzerland. Follow-up missions were carried out in Australia, Canada and Germany. Preparatory steps were taken to organize missions to Finland in November 2012 and to the Czech Republic, Indonesia and Pakistan in 2013. In the framework of an agreement between the Agency and the European Commission (EC), a ten-year programme of IRRS missions to European Union (EU) member States was established in March 2011. In the same framework, data and results of past IRRS missions were analysed and conclusions were drawn in order to enhance the effectiveness of future missions.<sup>32</sup>

29. The IAEA Self-Assessment Methodology and Self-Assessment Tool (SAT), which support Member States in reviewing their national regulatory infrastructure for the safety of nuclear installations, radiation facilities and radioactive sources and support the IRRS service, are being revised and upgraded based on feedback and on the latest versions of the relevant safety standards, including the new BSS.<sup>33</sup>

30. The Agency continued its efforts to assess, and enhance as necessary, the effectiveness of all relevant review missions. A series of meetings have been organized to analyse the effectiveness and efficiency of the IRRS missions. The results are being incorporated in the IRRS guidelines. To measure the effectiveness of the review process, a dozen performance indicators and criteria were proposed and applied to some recent missions.

31. A report on lessons learned from missions conducted in the past five years was presented at the third IRRS Lessons Learned Workshop held in Washington D.C., USA, in October 2011. About 60 senior regulators from 22 Member States attended the workshop, which provided an opportunity to improve the IRRS and support the implementation of the IAEA Action Plan on Nuclear Safety.<sup>34</sup>

32. As a consequence of the Fukushima Daiichi accident, the Agency has received an increasing number of requests for IRRS missions and follow-up missions from Member States with operating nuclear power plants, as well as from Member States embarking on nuclear power programmes. The Agency also elaborated a specific module for the IRRS to review regulatory responses to lessons learned from the Fukushima Daiichi accident. As of July 2011, this module was part of Agency missions held after the accident. In the long run, after revision of the Agency's safety standards to incorporate the lessons learned from the Fukushima Daiichi accident, the module will be fully incorporated into the IRRS modules.<sup>35</sup>

33. To enhance transparency and share information on Agency peer review activities, such as the IRRS, and in line with the IAEA Action Plan on Nuclear Safety, the Agency launched the International Regulatory Network (RegNet) website. Currently, RegNet includes information sharing for the RCF, senior regulators networks, such as from countries operating CANDU-type reactors and control of sources, as well as education and training. Recognizing the need for such a website, the regulators showed great interest in RegNet during the IRRS workshop in Washington, D.C., USA. A meeting is planned to discuss the experience of the participating Member States in using RegNet and feedback on its usefulness and ways of improving it. Improvements to the RegNet website are made under an extrabudgetary project.<sup>36</sup>

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<sup>32</sup> This relates to operative paragraph 2 and 15 of resolution GC(55)/RES/9.

<sup>33</sup> This relates to operative paragraph 1, 2 and 13 of resolution GC(55)/RES/9.

<sup>34</sup> This relates to operative paragraph 15 of resolution GC(55)/RES/9.

<sup>35</sup> This relates to operative paragraph 37 of resolution GC(55)/RES/9.

<sup>36</sup> This relates to operative paragraph 15 of resolution GC(55)/RES/9.

34. On 20 September 2011, the General Committee of the fifth Review Meeting of the Convention on Nuclear Safety (CNS) approved the structure of the Extraordinary Meeting of the Contracting Parties to the CNS to be held from 27 to 31 August 2012. The structure focuses on reviewing and sharing lessons learned and actions (completed or planned) by each Contracting Party in response to the Fukushima Daiichi accident and on reviewing the effectiveness of the CNS. As the structure differs from the usual structure of the review meeting, special guidance on National Reports, guidance for Coordinators and templates for Coordinators' and Rapporteurs' reports were developed for this meeting by the Secretariat and Officers of the Extraordinary Meeting.<sup>37</sup>

35. Special plenary sessions will be held at the Extraordinary Meeting to address the effectiveness of the CNS. In preparation for the discussions, the president of the Extraordinary Meeting asked Contracting Parties to submit proposals to improve the CNS procedures and practices, or to propose amendments to the CNS itself. The Secretariat was asked to prepare a draft document and submit it to Contracting Parties for facilitating the review. Formal proposals to amend the CNS have been made by the Russian Federation, Switzerland and Spain; they were circulated to the Contracting Parties by the Director General, as depositary for the CNS in accordance with Article 32 of the Convention.<sup>38</sup>

36. The International Reporting System for Operating Experience (IRS), jointly operated by the Agency and the OECD/NEA, provides a forum for Member States to share event-related information. Eighty-two reports were submitted in the reporting period. To help operators and regulators identify and implement effective and corrective actions, event reports and summary reports are produced periodically. Recently implemented enhancements to the IRS include the addition of event codes to support the reporting of events occurring at nuclear power plants under construction and the recording of corrective actions taken as a result of an event report.<sup>39</sup>

37. The Agency continued to operate the Incident Reporting System for Research Reactors (IRSRR) and the Fuel Incident Notification and Analysis System (FINAS) as important tools for the exchange of information and operating experience.<sup>40</sup> The IRSRR currently has 54 participating Member States, which operate more than 97% of the research reactors worldwide. Currently, 20 Member States, operating 80% of fuel cycle facilities participate in FINAS. Member States who have not yet joined IRSRR and FINAS were made aware of the benefits of the systems and the need to openly share operating experience, and were invited to participate. The biennial Technical Meetings of the national coordinators for the IRSRR and FINAS are dedicated to sharing knowledge and information on safety related events, lessons learned from events and actions established to prevent recurrences. The latest meeting of national coordinators of the IRSRR was held in October 2011.

38. In April 2012, the Global Nuclear Safety and Security Network (GNSSN) Steering Committee was established with a total of 15 members from Canada, China, Egypt, France, Germany, India, Japan, Republic of Korea, Pakistan, Peru, Russian Federation, South Africa, Spain, UK and the USA. Representatives from regional networks and forums were also invited as observers, including the Asian Nuclear Safety Network (ANSN), the Arab Network of Nuclear Regulators (ANNuR), the Forum of Nuclear Regulatory Bodies in Africa (FNRBA), the European TSO Network (ETSON) and the Ibero-American Forum of Radiological and Nuclear Regulatory Agencies (FORO).<sup>41</sup>

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<sup>37</sup> This relates to operative paragraph 8 of resolution GC(55)/RES/9.

<sup>38</sup> This relates to operative paragraph 8 of resolution GC(55)/RES/9.

<sup>39</sup> This relates to operative paragraph 15 of resolution GC(55)/RES/9.

<sup>40</sup> This relates to operative paragraph 15 of resolution GC(55)/RES/9.

<sup>41</sup> This relates to operative paragraph 18 of resolution GC (55)/RES/9.

39. The Technical and Scientific Support Organization Forum (TSOF) was established in July 2011 with the purpose of promoting cooperation and coordination among Technical Scientific and Support Organizations (TSOs) from Member States worldwide. The TSOF Steering Committee was established and its Terms of Reference agreed in January 2012. The current working programme focuses on the harmonization of TSO activities on a global scale and on the further analysis of the Fukushima Daiichi accident.<sup>42</sup>

40. In March 2012, the Agency conducted an international experts' meeting (IEM) on the topic of reactor and spent fuel safety in the light of the Fukushima Daiichi accident.<sup>43</sup> This was the first of a series of IEMs organized in response to the implementation of the IAEA Action Plan on Nuclear Safety. The primary objectives of this IEM were to analyse relevant technical aspects of reactor and spent nuclear fuel safety and performance; to review what is known to date about the accident in order to understand more fully its root causes; and to share the lessons learned from the accident through an exchange of expert views.

41. The IEM was attended by approximately 250 experts from 44 Member States and 4 international organizations. The IEM showed that despite differences in approaches, priorities and schedule of implementation, the studies and areas for improvement appear to converge on similar conclusions and corresponding actions to strengthen the overall safety framework. In particular, the IEM demonstrated a concerted effort by Member States to establish a robust capacity to protect power reactors against beyond design basis accidents, including an intention to establish an additional layer of protection to prevent a severe accident regardless of the initiating event. The IEM Chairperson summary, the Co-Chairperson summaries and the meeting presentations are available on the Agency's website.

42. The second IEM focused on the topic of enhancing transparency and communication effectiveness in the event of a nuclear or radiological emergency took place in June 2012. The meeting addressed ways to enhance transparency and swift communication during a nuclear emergency. The meeting identified the need for international organizations, national institutions and the media to work together and provide accessible and easily understandable information to the public. It also identified next steps to be taken by the Secretariat to improve communications with Member States, the media and the public during a nuclear or radiological emergency. Further IEMs on protection against extreme earthquakes and tsunamis and on decommissioning and remediation after a nuclear accident are also planned.

43. Within the scope of the IAEA Action Plan on Nuclear Safety, a full set of lessons learned from the Fukushima Daiichi accident is being developed through the review of several reports on the accident and the implementation of IEMs, to analyse all relevant technical aspects. For each of these lessons, a systematic analysis of the Agency safety standards is performed in order to identify potential need for strengthening the requirements or providing additional guidance.<sup>44</sup>

44. The Agency continues to investigate issues related to transportable nuclear power plants (TNPPs) with particular attention given to floating reactors, which are designed to meet the energy needs of islands or remote areas. These include an assessment of whether the current international legal framework and safety standards are applicable and appropriate for this technology. A publication on

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<sup>42</sup> This relates to operative paragraph 16 of resolution GC (55)/RES/9.

<sup>43</sup> This relates to operative paragraph 19 and 37 of resolution GC(55)/RES/9.

<sup>44</sup> This relates to the operative paragraphs 19 and 29 of resolution GC(55)/RES/9.

the legal and institutional issues of TNPPs was drafted under the International Project on Innovative Nuclear Reactors and Fuel Cycles (INPRO) in 2011 and is currently under review by the Secretariat.<sup>45</sup>

45. IAEA Safety Standards Series No. SSR-2/1, *Safety of Nuclear Power Plants: Design*, was published in January 2012<sup>46</sup> following its approval by the Board of Governors in September 2011. It supersedes IAEA Safety Standards Series No. NS-R-1, *Safety of Nuclear Power Plants: Design* (2000 edition).

46. The Operational Safety Review Team (OSART) service remains the Agency's most well-known and valued service to review operational safety of NPPs around the world.<sup>47</sup> During the reporting period, four OSART missions and six OSART follow-up missions were performed. In response to the IAEA Action Plan on Nuclear Safety, the number of requests for OSART missions has increased. There have been eight requests so far in 2012. Developments in relation to the OSART review service following the Fukushima Daiichi accident include the addition of a stand-alone review area on severe accident management to the standard OSART scope. In addition to the significant number of OSART reviews being undertaken for NPPs in the operational and pre-operational phases, OSART guidelines are also being developed to allow corporate reviews to be undertaken. These involve the OSART teams carrying out missions to the corporate headquarters of the operating organisations to review how effectively the safety related support activities for the nuclear power plants are carried out.

47. The Design and Safety Assessment Review Service (DSARS) continues to provide benefits to Member States in the area of safety assessment. The module on Generic Reactor Safety Review (GRSR) is currently being performed for the AES-2006 (also known as WWER-1200) reactor design. The International Probabilistic Safety Assessment Review Team (IPSART) service has been requested by Bulgaria to the Kozloduy nuclear power plant, and a Review of Accident Management Programmes (RAMP) service has recently been requested by Mexico for the Laguna Verde nuclear power plant. In addition, an Advisory Design Safety Assessment Peer Review Service, tailored for embarking countries, is being developed.<sup>48</sup>

48. The Site and External Events Design (SEED) review service has now replaced the Site Safety Review Service. The SEED review service better addresses the needs of Member States in the area of site selection, hazard assessment and the design of the structures, systems and components.<sup>49</sup> In the reporting period, the service was requested by 14 Member States. It supported site selection and/or site assessment in Armenia, Bangladesh, Hungary, Indonesia, Japan, Jordan, Morocco, Nigeria and Romania. It also assisted in the development of model regulations for sites in Vietnam and in the review of site licensing applications in the United Arab Emirates. In addition, it supported capacity building activities in Algeria, China, Indonesia, Republic of Korea and Vietnam. No structural evaluation was requested for newly built or existing facilities. A new module on integrated safety of multi-unit sites is being developed and will be added to the SEED service review package.

49. The responsibility of operators for taking timely measures on nuclear safety, including spent fuel storage and criticality safety has been emphasized at several events organized by the Agency, including the Safety Evaluation of Fuel Cycle Facilities During Operation (SEDO) missions, the training course on the application of the Agency's safety standards for fuel cycle facilities, the SEDO

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<sup>45</sup> This relates to operative paragraph 20 of resolution GC(55)/RES/9.

<sup>46</sup> This relates to operative paragraph 29 of resolution GC(55)/RES/9.

<sup>47</sup> This relates to operative paragraph 33 of resolution GC(55)/RES/9.

<sup>48</sup> This relates to operative paragraph 33 of resolution GC(55)/RES/9.

<sup>49</sup> This relates to operative paragraph 33 of resolution GC(55)/RES/9.

mission to the fuel fabrication facility in Romania, and the national workshop on the nuclear fuel cycle facility licensing system in Indonesia.<sup>50</sup>

50. The Agency continued to monitor the safety of research reactors under project and supply agreements (PSAs) and to contribute to safety improvements of these facilities by organizing biennial meetings, implementing safety review and expert missions, and conducting training activities.<sup>51</sup> The biennial meetings on the safety of research reactors under PSAs contributed to fostering networking and exchange of information and sharing knowledge among the Member States operating reactors under PSAs. The latest meeting on the safety of research reactors under PSA was held in 2011 with the participation of twenty Member States with research reactors. Reporting by the Member States on the safety status of their facilities under PSAs continues to improve, including discussing the safety performance indicators of these facilities during the biennial Technical Meetings. In the reporting period, eight safety review and expert missions were implemented at research reactors under PSAs. They contributed to enhancing the operational safety of the research reactors under PSAs in various areas including ageing management, operational radiation protection programmes, and training and qualification of personnel.

## D. Radiation Safety

51. An interim edition of IAEA Safety Standards Series No. GSR Part 3, *Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards (BSS)*, was issued in November 2011 after the approval by the Board of Governors. The BSS apply to all facilities and activities which may give rise to exposure to ionizing radiation, as well as to existing or unregulated radiation risks, such as risks due to radiation of essentially natural origin, including exposure due to radon in dwellings and workplaces. The findings of *Sources and Effects of Ionizing Radiation: UNSCEAR 2008 Report* and *The 2007 Recommendations of the International Commission on Radiation Protection (ICRP Publication 103)* were taken into account in the drafting of the BSS.

52. Seven international organizations, in addition to the Agency, participated as members of the BSS Secretariat in reviewing and revising the BSS text. Five of these — FAO, ILO, OECD/NEA, WHO and the United Nations Environment Programme (UNEP) — have confirmed their intention to co-sponsor the BSS. The EC and the Pan American Health Organization (PAHO) are now following their own approval processes for co-sponsorship. The final edition of the BSS is expected to be published in 2013.<sup>52</sup>

53. To assist Member States with their implementation of the BSS, two workshops were held in Kuala Lumpur, Malaysia (April 2012), and San Jose, Costa Rica (May 2012). Two additional workshops are planned in Kiev, Ukraine, and in a Member State in the African region. The workshops focused on BSS requirements that were either new or strengthened compared with the previous edition.<sup>53</sup>

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<sup>50</sup> This relates to operative paragraph 14 and 34 of resolution GC(55)/RES/9.

<sup>51</sup> This is related to operative paragraph 39 of resolution GC (55)/RES/9.

<sup>52</sup> This relates to operative paragraph 42 of resolution GC(55)/RES/9.

<sup>53</sup> This relates to operative paragraph 42 of resolution GC(55)/RES/9.

54. Discussions during both workshops identified key issues where guidance material should be prepared and the Agency was urged to prioritize the development of the three General Safety Guides dealing with occupational, medical and public exposure. While certain regional differences regarding priorities emerged, the following topics were regarded as being of the highest priority for the participating Member States: (1) applying the principle of optimization, including the use of dose constraints and the establishment of diagnostic reference levels; (2) applying the new occupational dose limit for the lens of the eye; (3) establishing a regulatory infrastructure for industries using naturally occurring radioactive material (NORM); (4) establishing and implementing a national action plan to reduce exposure due to radon in dwellings; and (5) managing the transition from an emergency exposure situation to an existing exposure situation.<sup>54</sup>

55. The Agency commenced to work on the draft Safety Guide *Occupational Radiation Protection*, which combines five existing Safety Guides. Development of the draft Safety Guide *Radiation Safety in Medical Uses of Ionizing Radiation* was approved by the CSS in March 2012. When completed, this Safety Guide will provide guidance on how to apply the requirements of the revised BSS to medical uses of radiation, including guidance on medical exposure (of patients, carers and comforters, and volunteers as part of a programme of biomedical research), occupational exposure of health professionals, and public exposure. For the implementation of the requirements of the revised BSS regarding public exposure and protection of the environment, two draft Safety Guides are being developed addressing radiological environmental impact analysis for facilities and activities (DS 427) and regulatory control of radioactive releases to the environment from facilities and activities (DS 442).<sup>55</sup>

56. The Agency's Environmental Modelling for Radiation Safety (EMRAS II) programme was completed at the end of 2011. The aim of this programme was to strengthen the capabilities of Member States in assessing exposure to the public and the radiological impacts to the environment arising from radionuclides discharged into the environment. More than 140 scientists from 40 Member States participated actively in nine working groups of this programme. A follow-up programme, the Modelling and Data for Radiological Impact Assessments (MODARIA) will be launched in the second half of 2012.<sup>56</sup>

57. The Agency continued its advisory work with the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (the London Convention) and with the Convention for the Protection of the Marine Environment of the North-East Atlantic (the OSPAR Convention). In accordance with the considerations in the revised BSS, the Agency developed methodologies and guidance on assessments of radiological impacts on the public and environment in an integrated approach. These methodologies will be applied through the auspices of the London Convention in implementing regulatory frameworks which allow exemption and clearance parameters for materials with low amounts of radioactivity.<sup>57</sup>

58. Dissemination of information and training are important actions identified in the International Action Plan for the Radiation Protection of Patients endorsed by the IAEA General Conference in 2002. In the reporting period, new standard training packages were produced for radiation protection in paediatric radiology as well as for digital radiology. Furthermore, four standard training packages were translated into Russian and two in Spanish. In addition, nine regional training courses were held

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<sup>54</sup> This relates to operative paragraph 42 of resolution GC(55)/RES/9.

<sup>55</sup> This relates to operative paragraph 42 of resolution GC(55)/RES/9.

<sup>56</sup> This relates to operative paragraph 30 of resolution GC(55)/RES/9.

<sup>57</sup> This relates to preambular paragraph (r) of resolution GC(55)/RES/9.

in all regions during 2011. In the past two years, the number of visits to the Radiation Protection of Patients website (rpop.iaea.org) more than doubled. Users in 190 countries accessed the website in the reporting period. A major part of the website was also released in Spanish during the year. Informative posters Russian on radiation protection of patients as well as medical staff in fluoroscopy were published in both English and Spanish.<sup>58</sup>

59. The Agency's International Conference on Radiation Protection in Medicine — Setting the Scene for the Next Decade will review advances, challenges and opportunities in the field of radiation protection in medicine and assess the impact of the International Action Plan for the Radiation Protection of Patients. The conference is planned to be held in Bonn, Germany, from 3 to 7 December 2012.<sup>59</sup>

60. The publication *Avoidance of Unnecessary Dose to Patients While Transitioning from Analogue to Digital Radiology* (IAEA-TECDOC-1667) was issued in 2011. Further guidance on justification of medical exposure in diagnostic imaging was finalized and will be published soon. Developers of appropriateness criteria for justification of medical exposure in diagnostic imaging took steps towards harmonizing the development of these criteria in a Technical Meeting held in March 2012.<sup>60</sup>

## **E. Transport Safety**

61. The International Conference on the Safe and Secure Transport of Radioactive Material: The Next Fifty Years of Transport — Creating a Safe, Secure and Sustainable Framework (Transport Conference), was held in Vienna in October 2011. The President's findings from the Transport Conference are available on the Agency website. The conference covered all the areas of transport identified in resolution GC(55)/RES/9.<sup>61</sup>

62. Extrabudgetary funding to enable greater participation in the Transport Safety Standards Committee (TRANSSC)<sup>62</sup> has been supplied. A proposal is being considered to hold TRANSSC, or a pre-meeting related to TRANSSC, in a regional setting in early 2013, in combination with a related technical cooperation training course.

63. In March 2012, a Technical Meeting produced a report of recommended activities to address the President's findings of the Transport Conference. The outline of work prepared for the Technical Meeting summarized the President's findings under eight topical areas including: harmonization, denials of shipment, basis of provisions, Safety Requirements and security recommendations, national implementation and industry compliance, emergency response, communications, and regional considerations. A ninth topic in the Transport Conference President's findings on liability was not

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<sup>58</sup> This relates to operative paragraph 43 of resolution GC(55)/RES/9.

<sup>59</sup> This relates to operative paragraph 43 of resolution GC(55)/RES/9.

<sup>60</sup> This relates to operative paragraph 43 of resolution GC(55)/RES/9.

<sup>61</sup> This relates to operative paragraphs 46 to 56 of resolution GC(55)/RES/9.

<sup>62</sup> This relates to operative paragraph 31 of resolution GC(55)/RES/9.

addressed by the Technical Meeting because that topic had been assigned to the International Expert Group on Nuclear Liability (INLEX) for consideration.<sup>63</sup>

64. To facilitate the presentation of recommended actions and to avoid unnecessary repetition of the same action under the eight topical areas, the Technical Meeting determined that a consolidated list of recommended actions would be an efficient and succinct means of addressing the Transport Conference President's findings. The Technical Meeting concluded that the following list of recommended actions, with no priority assigned, would contribute to the safe, secure and sustainable future transport of radioactive material: improve UN inter-agency coordination in all aspects of transport safety and security; facilitate the transport of radioactive material by providing increased training and improved communication for Member States and the general public on radioactive material transport; improve Member State and regional coordination and implementation of transport safety and security programmes; improve the interface and coordination of transport safety and security programmes at all levels; and, through periodic review and revision as required, achieve harmonized regulations and guidance for transport safety and security.<sup>64</sup>

65. Informal discussions on effective communication between relevant shipping and coastal States, with Agency participation, were held during the General Conference in 2011.<sup>65</sup> This issue was discussed at the Transport Conference and the following Technical Meeting, leading to a proposal to develop guidance on best practices for communication between relevant governments.

66. In December 2011, at the 22<sup>nd</sup> regular meeting of the Inter-Agency Committee on Radiological and Nuclear Emergencies (IACRNE) relevant international organizations, including the International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO), discussed lessons identified in the response to the Fukushima Daiichi accident and efficient international cooperation in relation to radiation emergencies, including emergencies during transport. An IACRNE Working Group on Transport was established building on experience with the ad-hoc transport task force. In cooperation with ICAO and IMO, the Agency is developing cooperative arrangements (protocols) on information exchange and technical support in nuclear or radiological emergency.<sup>66</sup>

67. Competent Authorities identified under the Convention on Early Notification of a Nuclear Accident (Early Notification Convention) and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (Assistance Convention) discussed methods of information exchange in case of a radiation incident or emergency at their sixth meeting in April 2012. It was agreed that the Unified System for Information Exchange in Incidents and Emergencies (USIE) developed by the Secretariat in cooperation with Member States served its purpose and that it should be used also for transport emergencies.<sup>67</sup>

68. Based on feedback from Member States, some examples of the effective use of networks have been gathered.<sup>68</sup> Specific advances include work led by Belgium in a 23-country European network to define the minimum requirements for compliance assurance. In addition memoranda of understanding are in place between France and the UK, and between the USA and Canada.

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<sup>63</sup> This relates to operative paragraphs 46 to 56 of resolution GC(55)/RES/9. On consideration of this topic by INLEX, see Section L below.

<sup>64</sup> This relates to operative paragraphs 46 to 56 of resolution GC(55)/RES/9.

<sup>65</sup> This relates to operative paragraph 49 of resolution GC(55)/RES/9.

<sup>66</sup> This relates to operative paragraphs 51 of resolution GC(55)/RES/9.

<sup>67</sup> This relates to operative paragraphs 50 of resolution GC(55)/RES/9.

<sup>68</sup> This relates to operative paragraphs 13 and 53 of resolution GC(55)/RES/9.

69. Regional Agency technical cooperation projects that include transport safety have been initiated in Latin America, in Asia and the Pacific, and in Africa.<sup>69</sup> A similar project in Europe still awaits funding. An Agency's regional meeting was held in Jordan in May 2012.

70. The seventh meeting of the International Steering Committee on Denials of Shipment was held in February 2012.<sup>70</sup> The Steering Committee accepted the challenge to complete its work by the General Conference in 2013 by agreeing that an inter-agency group would manage work in this area after 2013, while the networks of regional coordinators would provide additional support to transport regulators, reporting to TRANSSEC. In addition, the Steering Committee produced a consolidated action plan focusing on essential activities with a goal of completing the work in 18 months.

71. The Agency has a well-established training course on the security of radioactive material in transport. Six regional and four national training courses were conducted for Member States. Recently, a training course on security in transport of nuclear material has been developed. This training course takes into account the new recommendations for transport of nuclear material stated in the fifth revision of document INFCIRC/225 issued as *Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Revision 5)* (IAEA Nuclear Security Series No. 13). A pilot training course was conducted in June 2012 and two regional training courses will be conducted later in 2012. Training courses relevant to all security publications on transport will be developed in line with the recommendations of the Transport Conference.<sup>71</sup>

## **F. The Safety of Spent Fuel and Radioactive Waste Management**

72. A regional meeting on the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management was held in Buenos Aires, Argentina, in October 2011. The meeting focused on the benefits of applying the Joint Convention review process in Latin American Member States and was attended by 23 participants from 9 countries in the Latin American region.<sup>72</sup>

73. The Agency also held the Second Technical Meeting on Implementation of the Code of Conduct on the Safety and Security of Radioactive Sources with Regard to Long Term Strategies for the Management of Disused Sealed Radioactive Sources in February–March 2012.<sup>73</sup> The meeting addressed the synergies between the Code of Conduct and the Joint Convention and a decision was taken to establish an open-ended working group at the Fourth Review Meeting of the Joint Convention with the aim of discussing issues specific to the end-of-life management of disused sources.<sup>74</sup>

74. A meeting of the General Committee of the Joint Convention took place in Vienna, Austria, in March 2012. This meeting was chaired by the designated President of the Fourth Review Meeting of the Joint Convention and was attended by the Chairpersons of the six Country Groups of the Review

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<sup>69</sup> This relates to operative paragraphs 9 and 55 of resolution GC(55)/RES/9.

<sup>70</sup> This relates to operative paragraph 54 of resolution GC(55)/RES/9.

<sup>71</sup> This relates to operative paragraph 52 of resolution GC(55)/RES/9.

<sup>72</sup> This relates to operative paragraph 58 of resolution GC(55)/RES/9.

<sup>73</sup> Please refer also to Section J, "Safety and Security of Radioactive Sources".

<sup>74</sup> This relates to operative paragraph 58 of resolution GC(55)/RES/9.

Meeting. The meeting focused on the final preparations for the Fourth Review Meeting of the Contracting Parties to the Joint Convention.<sup>75</sup>

75. A Joint Convention Officers' meeting was held in Vienna, Austria, from 12 to 13 May 2012 prior to the opening of the Fourth Review Meeting. The meeting was attended by all the officers of the Fourth Review Meeting (Chairpersons, Vice-Chairpersons, Rapporteurs and Country Group Coordinators) and was chaired by the President of the Fourth Review Meeting. The purpose of the meeting was to discuss and finalize arrangements for the organization and conduct of the Fourth Review Meeting (organization of the Country Group sessions, timing of the sessions, contents of the Rapporteurs' reports and similar administrative matters), as well as to allow the officers of each of the six Country Groups to meet and discuss specific issues to be addressed during the Review Meeting.<sup>76</sup>

76. At the time of the Fourth Review Meeting of the Contracting Parties to the Joint Convention held in Vienna, Austria, from 14 to 23 May 2012, there were 63 Contracting Parties to the Joint Convention.<sup>77</sup> During the Fourth Review Meeting, the National Reports submitted by the Contracting Parties, which describe how their obligations under the Joint Convention are being implemented, were reviewed by the Contracting Parties. The Review Meeting was attended by more than 600 delegates from the Contracting Parties. The Contracting Parties recognized the importance of continuous improvement and the need for the invigoration of the peer review process including an increase in the preparation and willingness of Contracting Parties to challenge and comment on the presentations of other Contracting Parties. During the Review Meeting, a number of challenges were identified for Contracting Parties with respect to their implementation of particular provisions of the Joint Convention.<sup>78</sup> The summary report of the meeting and the president's report are available on the Agency's web site.<sup>79</sup>

77. The Net Enabled Waste Management Database (NEWMDB) contains information on national radioactive waste management programmes, plans and activities, relevant laws and regulations, policies, and radioactive waste inventories. The information is supplied voluntarily by the Member States on an annual basis. Fifty-one Member States are currently participating in NEWMDB, with new reports pending from China, Poland, the Russian Federation and South Africa. Efforts are being made to encourage further Member States to submit reports. The submissions currently account for about 90% of worldwide NPP energy production, but the data in NEWMDB also include non-power-related waste and even waste generated by military programmes or former research and development activities.<sup>80</sup>

78. Specifically, NEWMDB contains a representation of the waste management infrastructure of each Member State, including data on storage, processing, and disposal; significant milestones in the development and life cycles of programmes and facilities; yearly information on trends; information on laws, regulations, and regulatory authorities; licensees; facility information, including planned and existing capacities; waste volumes (in storage and disposed); and other information relevant to radioactive waste management.<sup>81</sup>

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<sup>75</sup> This relates to operative paragraph 58 of resolution GC(55)/RES/9.

<sup>76</sup> This relates to operative paragraph 58 of resolution GC(55)/RES/9.

<sup>77</sup> This relates to operative paragraph 57 of resolution GC(55)/RES/9.

<sup>78</sup> This relates to operative paragraph 58 of resolution GC(55)/RES/9.

<sup>79</sup> See also <http://www-ns.iaea.org/conventions/waste-jointconvention.asp?s=6&l=40>.

<sup>80</sup> This relates to operative paragraph 59 of resolution GC(55)/RES/9.

<sup>81</sup> This relates to operative paragraph 59 of resolution GC(55)/RES/9.

79. After extensive upgrades, the NEWMDB is now more user-friendly and contains interactive charts and tables, expanded Country Profiles, and links to external country-specific information sources, such as the websites and reports of the World Nuclear Association (WNA) and the OECD/NEA. The data in NEWMDB can also now be browsed and searched using a map-based tool. The NEWMDB is in a state of continuous improvement, where the focus is on providing more contextual information concerning Member States' radioactive waste management programmes, and synthesis of the data in order to answer frequently asked questions.<sup>82</sup>

## **G. The Safe Decommissioning of Nuclear Facilities and Other Facilities Using Radioactive Material**

80. The reporting period saw the completion of the Agency's International Project on the Use of Safety Assessment in Planning and Implementation of Decommissioning of Facilities using Radioactive Material (FaSa). The three-year FaSa project collected and reviewed national experience and good practices in decommissioning safety assessments and provided valuable input for the revision of the Agency's relevant safety standards. In November 2011, the final meeting of the FaSa project finalized all the activities initiated at the joint meetings and Working Group meetings in the three years that the project ran (2008–2011). Materials prepared at the final meeting will be reviewed by the FaSa Project Coordinating Group for publication in 2012.<sup>83</sup>

81. The annual meeting of the International Decommissioning Network (IDN) was held in November 2011. It included a joint topical session with the Network on Environmental Management and Remediation (ENVIRONET) on "Decommissioning and Environmental Remediation following Severe Accidents". The meeting also reviewed the activities implemented by the IDN since the last meeting and approved the 2012 work programme. The priority areas for future training were identified and proposals for international projects on decommissioning were discussed, including a project on risk management in decommissioning and a project on decommissioning cost estimation for research reactors. Detailed terms of reference for the two projects have subsequently been developed and both projects will be launched formally later this year.<sup>84</sup>

82. The IDN assisted in the organization of several international workshops, implemented mainly under the Agency's technical cooperation programme. In April 2012, a Regional Training Course in Nuclear Facility Decommissioning and Environmental Remediation Skills was held at the Argonne National Laboratory, USA. In August 2011, a Regional Practical Workshop on Decommissioning of Uranium Contaminated Facilities was held in Pretoria, South Africa, to discuss activities and experiences related to the decommissioning of non-reactor facilities. A workshop dealing with the planning and execution of segmentation and dismantling activities in a complex nuclear facility was held in Greifswald, Germany, in September 2011. A workshop on characterization and visualization technologies for decommissioning took place at the Marcoule Nuclear Research Centre in France, in December 2011. Member organizations of the IDN also hosted site visit to Slovakia in October 2011,

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<sup>82</sup> This relates to operative paragraph 59 of resolution GC(55)/RES/9.

<sup>83</sup> This relates to operative paragraph 60 of resolution GC(55)/RES/9.

<sup>84</sup> This relates to operative paragraph 61 of resolution GC(55)/RES/9.

dealing, respectively, with the management of large components and the decommissioning of small nuclear facilities.<sup>85</sup>

83. The Research Reactor Decommissioning Demonstration Project (R<sup>2</sup>D<sup>2</sup>P) provides hands-on experience to demonstrate decommissioning of research reactors. In this reporting period, the R<sup>2</sup>D<sup>2</sup>P moved from its planning to its implementation phase. In July 2011, the Agency organized an international workshop at the Horia Hulubei National Institute of Physics and Nuclear Engineering in Magurele, Romania. The workshop used the decommissioning plan for the Magurele's research reactor to demonstrate review of a decommissioning plan. In May 2012, the Australian Nuclear Science and Technology Organization (ANSTO) hosted a workshop under the R<sup>2</sup>D<sup>2</sup>P, which focused on the final preparatory activities necessary for the safe decommissioning of research reactors.<sup>86</sup>

84. Significant progress has been made on the project for decommissioning nuclear facilities in Iraq. The operating organization has submitted an overarching decommissioning plan to the regulatory body for approval and licensing. Planning has begun for the decommissioning of five facilities, including the IRT 5000 and Tammuz 2 research reactors for Phase 2 of the project (2011–2015). The development of site-specific decommissioning plans and supporting documents began in November 2011. A preliminary draft decommissioning plan for the Tammuz 2 research reactor and a preliminary remediation plan for the Adaya site were reviewed in early 2012. A national policy and strategy for waste management was drafted in November 2009, and the Agency continues to provide expert advice on improving waste management activities in Iraq. Fellowships, site visits and training courses continue to be organized to enhance the knowledge of Iraqi staff in the areas of decommissioning, waste management and radioanalytical laboratory techniques.<sup>87</sup>

85. Several publications dealing with the decommissioning of facilities using radioactive material have been issued in the IAEA Safety Standards Series. In August 2011, the initial draft of a Safety Requirements publication on the planning, implementation and termination of decommissioning activities was reviewed and revised by a group of international experts. In early 2012, the Agency held a Technical Meeting to solicit feedback from participants from over 20 Member States and organizations, including the EC, the OECD/NEA and the Western European Nuclear Regulators' Association (WENRA), on the proposed revisions to the Agency's relevant Safety Requirements publications, as well as to three Safety Guides that deal with decommissioning. The Agency also participated as an observer in WENRA's 28th Annual Meeting, at which the latest version of its *Decommissioning Safety Reference Levels Report* was discussed. WENRA's safety reference levels for decommissioning are broadly based on the Agency's decommissioning-related safety standards and have been incorporated into the national legal and regulatory frameworks of WENRA member countries.<sup>88</sup>

86. During the reporting period, the Agency also published several technical reports on detailed aspects of decommissioning as part of the IAEA Nuclear Energy Series, including: *Policies and Strategies for the Decommissioning of Nuclear and Radiological Facilities* (NW-G-2.1); *Selection and Use of Performance Indicators in Decommissioning* (NW-T-2.1); *Redevelopment and Reuse of Nuclear Facilities and Sites: Case Histories and Lessons Learned* (NW-T-2.2); and *Decommissioning of Small Medical, Industrial and Research Facilities: A Simplified Stepwise Approach* (NW-T-2.3). A report on decommissioning cost estimation, entitled *International Structure for Decommissioning*

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<sup>85</sup> This relates to operative paragraph 61 of resolution GC(55)/RES/9.

<sup>86</sup> This relates to operative paragraph 61 of resolution GC(55)/RES/9.

<sup>87</sup> This relates to operative paragraph 62 of resolution GC(55)/RES/9.

<sup>88</sup> This relates to operative paragraph 26 and 60 of resolution GC(55)/RES/9.

*Costing (ISDC) of Nuclear Installations*, developed jointly with the OECD/NEA and the EC, was also published. In addition, a new Safety Report, *Monitoring for Compliance with Exemption and Clearance Levels* (Safety Reports Series No. 67), was published in 2012.

## H. Safety in Uranium Mining and Processing and Remediation of Contaminated Sites

87. The Agency initiated the revision of the Safety Guide *Management of Radioactive Waste from the Mining and Milling of Ores* (IAEA Safety Standards Series No. WS-G-1.2). The new draft, *Management of Radioactive Residues from Mining, Mineral Processing, and other NORM-related Activities*, has been approved by the CSS and the relevant Safety Standards Committees.<sup>89</sup>

88. The Agency continues the development of training material for Member States that are new to the field of regulation of uranium mine exploration and development. The training material is intended to facilitate early identification of the key issues that must be reviewed by the regulator in the planning stage of a new mine and to explain how these should be addressed in order to minimize the occurrence of future legacy issues. During the reporting period, assistance missions in the area of uranium mining and milling were carried out in Brazil, Mozambique and Zambia. The Agency also participated in a workshop on uranium recovery regulation organized by the United States Nuclear Regulatory Commission's (NRC's) Office of International Programs in Arusha, Tanzania, in January 2012.<sup>90</sup>

89. Launched in 2010, the International Working Forum on Regulatory Supervision of Legacy Sites (RSLs) has focused on efforts to improve the regulation of existing sites and facilities, as well as to avoid the creation of new legacy sites, through strong independent regulatory oversight. Within the framework of the RSLs, the Agency has been engaged in discussions and work with several international organizations including the EC, the World Bank, the European Bank for Reconstruction and Development (EBRD), the United Nations Development Programme (UNDP) and affected Member States regarding uranium legacy sites in Central Asia. Three additional terms of reference were developed for environmental impact assessments and feasibility studies for sites in Kyrgyzstan (Min-Kush) and Tajikistan (Taboshar and Degmai). These terms of reference drew on the baseline document, *Assessment and Proposals for Uranium Production Legacy Sites in Central Asia: An International Approach*, that was prepared through the joint efforts of the Agency and the EC's former Europe Aid Cooperation Office (now the Directorate-General for Development and Cooperation — EuropeAid).<sup>91</sup>

90. Extrabudgetary funds were received to provide technical support for the establishment of a regional watershed monitoring project that was initiated by the EC. The Agency participated in expert missions to support the World Bank's Disaster Hazard Mitigation Project for Kyrgyzstan, including evaluation of the water monitoring programme for radionuclides being carried out at Mailuu-Suu.<sup>92</sup>

91. In October 2011, the second annual meeting of the RSLs was held with 32 participants from 18 Member States, including several site operators. The meeting provided a forum for an exchange of

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<sup>89</sup> This relates to operative paragraph 63 of resolution GC(55)/RES/9.

<sup>90</sup> This relates to operative paragraph 64 of resolution GC(55)/RES/9.

<sup>91</sup> This relates to operative paragraph 66 of resolution GC(55)/RES/9.

<sup>92</sup> This relates to operative paragraph 66 of resolution GC(55)/RES/9.

ideas concerning regulatory needs regarding the supervision of legacy sites, and also helped to establish a network and identify points of contact for future regulatory interactions. The RSLs's work plan for 2012 was finalized. It covers three main topical areas: enhancement of the regulatory regime; professional development of regulators; and the application of methods for safety and environmental assessments. An RSLs web page has been developed to facilitate communication of RSLs events and activities, and to serve as a resource for sharing relevant technical publications and knowledge.<sup>93</sup>

## **I. Education and Training in Nuclear, Radiation, Transport and Waste Safety**

92. The Agency has provided both basic professional training on nuclear safety and regulatory control, and specialized workshops on human resources at nuclear installations based on relevant Agency safety standards. The basic professional training covered seismic safety, siting, safety assessment, safety culture, operational safety, regulatory functions, and safety aspects related to research reactors and the nuclear fuel cycle. A total of ten training courses were held within the framework of regional technical cooperation projects or the Asian Nuclear Safety Network (ANSN).<sup>94</sup>

93. The Agency has strengthened the training modules and materials related to safety infrastructure and those institutional, technical and managerial aspects addressed in *Establishing the Safety Infrastructure for a Nuclear Power Programme* (IAEA Safety Standards Series No. SSG-16). Training lectures and materials for courses based on this publication have been posted on a dedicated web page and made available to Member States at large. At the organizational and managerial level, a report is being prepared containing guidance on the management of regulatory competencies for nuclear facilities and other nuclear and radiological activities.<sup>95</sup>

94. New training materials and videos explaining general aspects of the Agency's safety standards, as well as specific video lectures on the safety of research reactors and the nuclear fuel cycle, were developed and widely disseminated. Video presentations were posted on the Agency's website and used for training events. New videos were produced on the basis of workshops covering safety culture during pre-operational phases. Newsletters and nuclear installation training materials were distributed to Member States twice during the reporting period.<sup>96</sup>

95. Competency frameworks such as the Safety Assessment Education and Training (SAET) Programme and training needs assessment tools such as the Guidelines for Systematic Assessment of Regulatory Competence Needs (SARCoN) were further used and developed. A new software tool for applying the SARCoN guidelines was produced and tested through a hands-on seminar held in Vienna, Austria, in December 2011. In that same month, the Steering Committee on Competence of Human Resources for Regulatory Bodies in Member States with Nuclear Power Plants held its third annual meeting with the participation of more than 30 regulators. The Steering Committee revised the implementation of its strategic work programme. It also advised on, and contributed to, further

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<sup>93</sup> This relates to operative paragraph 66 of resolution GC(55)/RES/9.

<sup>94</sup> This relates to operative paragraphs 68 and 70 of resolution GC(55)/RES/9.

<sup>95</sup> This relates to operative paragraph 68, 69, 70 of resolution GC(55)/RES/9.

<sup>96</sup> This relates to operative paragraph 70 of resolution GC(55)/RES/9.

developments of the SARCoN guidelines, as well as assisting in the preparation of a draft Safety Report, *Managing Regulatory Competence*.<sup>97</sup>

96. Enhanced online platforms for the International Seismic Safety Centre (ISSC) and the Global Safety Assessment Network (GSAN) facilitated cooperation and information sharing resulting in a better understanding of safety issues.<sup>98</sup>

97. The Asian Nuclear Safety Network's (ANSN's) Education and Training Topical Group together with the Agency produced guidelines for an Education and Training Review Service (ETReS). A pilot ETReS mission was conducted in Indonesia in June 2012.<sup>99</sup>

98. The Agency continued to support regional training centres. The Korea Institute of Nuclear Safety (KINS) in cooperation with the Agency held more than six training events providing basic professional training in nuclear safety, regulatory control, 'train the trainers' and on-the-job training issues. Within the framework of the Agency's long term agreement with Argentina's Nuclear Regulatory Authority (ARN), a three-month basic professional training course was held in Spanish for Member States in the Latin American region.<sup>100</sup>

99. The Agency's Steering Committee on Education and Training in Radiation Protection and Waste Safety met in November 2011, and provided the Secretariat with advice on the implementation of the *Strategic Approach to Education and Training in Radiation, Transport and Waste Safety 2011–2020* (Note by the Secretariat 2010/Note 44). The suggestions made by the Steering Committee covered areas such as the establishment of national strategies to build competence in radiation protection, training methodologies for different professional categories, including radiation protection officers, and networking mechanisms between the Agency and training centres in the Member States.<sup>101</sup>

100. The Postgraduate Educational Course in Radiation Protection and the Safety of Radiation Sources (which has a nominal duration of six months) has continued to provide a pool of future experts in radiation protection. The Course was held in Argentina in Spanish, and in English in Ghana and Greece.<sup>102</sup> The syllabuses for this Course and for the training of radiation protection officers were updated to take into consideration the requirements and terminology of the new BSS and are expected to be published shortly. Complementary training materials such as presentations and lecture notes have also been drafted.<sup>103</sup>

101. The Agency continued to help Member States build competence in radiation safety by organizing short term training events on a range of topics, such as 'train the trainers' courses for radiation protection officers and events dealing with occupational radiation protection programmes in medical and industrial applications (Nicaragua, November 2011), the authorization and inspection of radiation sources (Ghana, October 2011, and Tunisia, November 2011), and radiation protection and

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<sup>97</sup> This relates to operative paragraph 70 of resolution GC(55)/RES/9.

<sup>98</sup> This relates to operative paragraph 70 of resolution GC(55)/RES/9.

<sup>99</sup> This relates to operative paragraph 70 of resolution GC(55)/RES/9.

<sup>100</sup> This relates to operative paragraph 70 of resolution GC(55)/RES/9.

<sup>101</sup> This relates to operative paragraphs 67 and 69 of resolution GC(55)/RES/9.

<sup>102</sup> This relates to operative paragraphs 9, 12 and 69 of resolution GC(55)/RES/9.

<sup>103</sup> This relates to operative paragraph 70 of resolution GC(55)/RES/9.

optimization in computed tomography (Peru, October 2011).<sup>104</sup> The full list of training events for 2011 and 2013 is available on the Agency's website.<sup>105</sup>

102. Guidance to support Member States in building competence in radiation protection and the safe use of radiation sources via a national strategy for education and training in radiation, transport and waste safety has been drafted by the Secretariat in conjunction with external experts. This guidance is planned to be published shortly, and it will describe a methodology for establishing a national strategy based on four phases, where the outcome of one phase is the starting point for the next phase. The four phases of the overall strategy are analysis of educational and training needs; design of a national training programme; development and implementation of the programme; and periodic evaluation and feedback.<sup>106</sup>

103. Regional technical cooperation workshops have been organized in all the regions to provide Member States with a general understanding of the Agency's methodology for developing a national strategy for education and training in radiation, transport and waste safety, as well as to familiarize Member States with the relevant safety standards and guidance that set out requirements for education and training in radiation safety and support the development of national strategies.<sup>107</sup>

104. An Education and Training Appraisal (EduTA) mission<sup>108</sup> was carried out in Malaysia to appraise the status of the country's provision of education and training in radiation protection, including the associated legislative and regulatory framework, national training programmes for radiation safety, the availability of training course providers and training courses. The successful conclusion of an EduTA mission is a prerequisite for a long term agreement on education and training in radiation protection and nuclear safety between the Agency and the Member State in question.

105. A long term agreement relating to educational and training activities in the area of radiation, transport and waste safety has been submitted to Brazil for consideration. Memoranda of understanding on education and training in radiation protection were signed by the Chair of the African Regional Co-operative Agreement for Research, Development and Training Related to Nuclear Science and Technology (AFRA) and institutions in Algeria, Ghana and Morocco.<sup>109</sup>

106. Regional networks have contributed to building institutional capacity and enhancing managerial capabilities in Member States. The GNSSN has played a major role in bringing together experience and lessons learned from the existing regional and thematic networks. The Agency administrates the extrabudgetary programmes of the ANSN, the ANNuR, the FNRBA and the FORO.<sup>110</sup>

107. The ANSN currently comprises 11 member countries (Australia, Bangladesh, China, Indonesia, Japan, Kazakhstan, the Republic of Korea, Malaysia, Philippines, Thailand and Vietnam) and three supporting countries (France, Germany and the USA), as well as 2 associated organizations (the Association of Southeast Asian Nations (ASEAN) and the EC). In November 2011, the ANSN agreed to establish two new topical groups: the Topical Group on Communication Consultation with

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<sup>104</sup> This relates to operative paragraphs 9, 67 and 69 of resolution GC(55)/RES/9.

<sup>105</sup> See also <http://www-ns.iaea.org/training/calendar.asp?s=9&l=73> and <http://www-ns.iaea.org/training/calendar.asp?rg=&aoc=&yr=2011&lg=&s=9&l=73&submit.x=17&submit.y=11>.

<sup>106</sup> This relates to operative paragraphs 67 and 69 of resolution GC(55)/RES/9.

<sup>107</sup> This relates to operative paragraphs 9, 67 and 69 of resolution GC(55)/RES/9.

<sup>108</sup> This relates to operative paragraphs 9, 70 and 71 of resolution GC(55)/RES/9.

<sup>109</sup> This relates to operative paragraph 71 of resolution GC(55)/RES/9.

<sup>110</sup> This relates to operative paragraphs 18, 68 and 70 of resolution GC(55)/RES/9.

Interested Parties (CTG) and the Topical Group on Leadership and Management for Nuclear Safety of the Regulatory Bodies (LMSTG), in line with the IAEA Action Plan on Nuclear Safety.<sup>111</sup>

108. Mutual collaboration between the Agency and FNRBA (March 2012) and ANNuR (May 2011) was established to develop the safety infrastructure and capacity building of member countries in Africa and the Middle East, respectively.<sup>112</sup> A strategy to support capacity building was developed in consultation with the Steering Committee and Plenary of each network. The work plans for 2012 of these networks were also reviewed in detail and endorsed. The Agency will continue to support both networks together with other major networks in the field of nuclear safety, and to facilitate the voluntary global mobilization of budgetary resources and technical expertise.<sup>113</sup>

109. The Agency and the FORO continue its long relationship of cooperation in areas of mutual interest aimed at achieving a high level of radiation and nuclear safety and security in a sustainable manner in the countries of the Ibero-American region. Four technical projects in these areas have been completed and the first joint publication has been recently issued as a TECDOC on probabilistic safety assessment in accelerators for radiotherapy. The FORO's website is being improved to provide the necessary collaborative environment for individual users, as well as being expanded to accommodate additional countries from the region. In July 2012, the FORO is celebrating its 15th anniversary with the participation of the Agency, WHO and PAHO and senior experts and high officials of the regulatory bodies of the whole region.<sup>114</sup>

## **J. The Safety and Security of Radioactive Sources**

110. As of 30 June 2012, 113 States have made a political commitment to implement the Code of Conduct on the Safety and Security of Radioactive Sources, of which 75 have also notified the Director General of their intention to act in a harmonized manner in accordance with the Code's supplementary Guidance on the Import and Export of Radioactive Sources. A total of 116 States have nominated points of contact for the purpose of facilitating the export and import of radioactive sources and have provided their contact details to the Agency. A workshop for States that have not yet made the political commitment was held in July 2011, with the objective of explaining the Code, its non-legally binding nature and to demonstrate the advantages of expressing a political commitment. This workshop was well received by participants, and has helped to raise the level of political support.<sup>115</sup>

111. Having been endorsed by the General Conference in September 2011, the 2012 Edition of the *Guidance on the Import and Export of Radioactive Sources* was published in May 2012.<sup>116</sup>

112. As recommended by the Open-ended Meeting of Technical and Legal Experts for Sharing of Information on States' Implementation of the Code of Conduct on the Safety and Security of Radioactive Sources and its supplementary Guidance on the Import and Export of Radioactive Sources held in Vienna, Austria, in May 2010, two regional workshops were organized to foster information

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<sup>111</sup> This relates to operative paragraphs 18, 68 and 70 of resolution GC(55)/RES/9.

<sup>112</sup> This relates to operative paragraphs 2, 10, 68 and 70 of resolution GC(55)/RES/9.

<sup>113</sup> This relates to operative paragraphs 10, 18, 68 and 70 of resolution GC(55)/RES/9.

<sup>114</sup> This relates to operative paragraphs 10, 18, 68 and 70 of resolution GC(55)/RES/9.

<sup>115</sup> This relates to operative paragraphs 72 and 74 of resolution GC(55)/RES/9.

<sup>116</sup> This relates to operative paragraph 76 of resolution GC(55)/RES/9.

exchange on the implementation of the Code of Conduct and its supplementary Guidance in Latin America (November 2011) and in Africa (January 2012). The workshop in Latin America was held in Spanish and attended by 20 Member States. The workshop in Africa was held in French and attended by 17 States. They provided opportunities for neighbouring States to discuss issues related to the safety and security of radioactive sources and to identify progress made and challenges to be solved at the regional level, such as the conclusion of agreements between neighbouring States to strengthen the control of radioactive source transfers. The fact that each workshop was held in the most widely shared language of the region in question was strongly appreciated.<sup>117</sup>

113. As part of the series of annual meetings organized to share experience in implementing the provisions of the Code of Conduct, a Technical Meeting on Implementation of the Code of Conduct on the Safety and Security of Radioactive Sources with regard to Long Term Strategies for the Management of Disused Sealed Radioactive Sources was held in Vienna, Austria, in February–March 2012. The meeting was attended by 148 experts from 62 Member States and one non-Member State, as well as by observers from the EU, the FAO and the International Source Suppliers and Producers Association (ISSPA). States exchanged their views and experiences on the end-of-life management of radioactive sources once they become disused, with a special focus on sustainable and comprehensive long term management strategies, including the return of disused sources to the supplier and repatriation to the country of origin; dedicated storage facilities and disposal capabilities for disused sources; comprehensive strategies for the end-of-life management of disused sources; and national strategies for regaining control over orphan sources (including disused sources).<sup>118</sup> The report of the Chair of the Technical Meeting is available on the Agency's web site.<sup>119</sup>

114. Progress has been made in the development of a Code of Conduct on the Transboundary Movement of Radioactive Material Inadvertently Incorporated into Scrap Metal and Semi-Finished Products of the Metal Recycling Industries. In January 2012, at the second open-ended meeting, forty-one representatives from 28 Member States including technical and legal experts, reviewed and finalized the draft prepared at the first meeting held in July 2011. The draft document was formally sent to all Member States for comments in April 2012.<sup>120</sup>

115. This Code of Conduct aims at harmonizing the approach of States with regard to discovering the presence of radioactive material that may inadvertently be present in a consignment, and thereafter managing and handling it in a safe manner, so that it can be brought under regulatory control.<sup>121</sup> A dedicated web page has been created to increase awareness of this issue and of the work currently being carried out.<sup>122</sup> The draft Code of Conduct will supplement *Control of Orphan Sources and Other Radioactive Material in the Metal Recycling and Production Industries* (IAEA Safety Standards Series No. SSG-17), which provides recommendations, principally within a national context, on the protection of workers, members of the public and the environment in relation to the control of radioactive material inadvertently present in scrap metal.<sup>123</sup>

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<sup>117</sup> This relates to operative paragraph 77 of resolution GC(55)/RES/9.

<sup>118</sup> This relates to operative paragraph 77 of resolution GC(55)/RES/9.

<sup>119</sup> See also <http://www-ns.iaea.org/downloads/rw/code-conduct/info-exchange/chair-report-tm-march2012.pdf>.

<sup>120</sup> This relates to operative paragraph 78 of resolution GC(55)/RES/9.

<sup>121</sup> This relates to operative paragraph 78 of resolution GC(55)/RES/9.

<sup>122</sup> See also <http://www-ns.iaea.org/tech-areas/radiation-safety/orphan-sources-scrap-metal.asp?s=3&l=22>.

<sup>123</sup> This relates to operative paragraph 78 of resolution GC(55)/RES/9.

116. The Agency has organized appraisal and advisory missions to assess the situation in individual Member States, to monitor the progress made towards a harmonized global system that is compliant with the Agency's safety standards, and to support States in strengthening their national regulatory infrastructure for radiation safety and the control of radiation sources. Expert missions, fellowships, training courses on authorization and inspection of radiation sources were also organized, under the technical cooperation programme and within the framework of various extrabudgetary projects.<sup>124</sup>

117. Networking of radiation safety regulators is being facilitated by the establishment of a dedicated platform, the Control of Sources Network (CSN), within the GNSSN/RegNet platform. A Specific Safety Guide that will set out a roadmap for building a national radiation safety infrastructure is being developed. The Radiation Safety Information Management System (RASIMS) is being used by the Agency and Member States to monitor the status and progress of individual States' efforts to strengthen their national regulatory infrastructure for radiation safety.<sup>125</sup>

118. The Regulatory Authority Information System (RAIS), which assists the regulatory bodies in Member States in maintaining their national register of sources and managing the information related to their regulatory functions, was upgraded and a new version, RAIS 3.2 Web, was released in February 2012.<sup>126</sup>

119. The self-assessment methodology and tools used to assist Member States in reviewing their national regulatory infrastructure for the safe use of radioactive sources, as well as to support the Integrated Regulatory Review Service (IRRS), are being revised and upgraded based on feedback from States and on the latest versions of the relevant Agency safety standards, including the new BSS.<sup>127</sup>

## **K. Nuclear and Radiological Incident and Emergency Preparedness and Response**

120. The Early Notification Convention and the Assistance Convention have established an international framework to facilitate the exchange of information and the prompt provision, upon request, of assistance in case of a nuclear or radiological emergency. Currently, 110 States (4 more than in 2011) and 4 international organizations are parties to the Early Notification Convention, and 104 States (3 more than in 2011) and 4 international organizations are parties to the Assistance Convention. Formal proposals to amend the Early Notification Convention have been made by the Russian Federation and were circulated by the Director General, as depositary for the Convention, on 12 July 2011, in accordance with Article 14 of the Convention.<sup>128</sup>

121. In April 2012, as recommended in the final report on the International Action Plan for Strengthening the International Preparedness and Response System for Nuclear and Radiological Emergencies endorsed by the IAEA General Conference in 2004, the Competent Authorities of all States and relevant international organizations were invited to attend the Sixth Meeting of

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<sup>124</sup> This relates to operative paragraph 9 of resolution GC(55)/RES/9.

<sup>125</sup> This relates to operative paragraphs 1, 2, 13 and 72 of resolution GC(55)/RES/9.

<sup>126</sup> This relates to operative paragraphs 1, 2 and 13 of resolution GC(55)/RES/9.

<sup>127</sup> This relates to operative paragraphs 1, 2 and 13 of resolution GC(55)/RES/9.

<sup>128</sup> This relates to operative paragraph 79 of resolution GC(55)/RES/9.

Representatives of Competent Authorities identified under the Early Notification Convention and the Assistance Convention.<sup>129</sup> The participants reviewed and evaluated the response to the Fukushima Daiichi accident, shared lessons that had been identified and provided feedback with respect to the implementation of the IAEA Action Plan on Nuclear Safety. The participants also discussed the existing communication and exercise arrangements, including the Convention Exercise (ConvEx) regime, and exchanged experience and good practices in the field of emergency preparedness and response (EPR). The meeting was attended by 131 participants from 67 States and 5 international organizations. It also discussed operational arrangements that may further improve the implementation of both the Early Notification Convention and the Assistance Convention. Operational arrangements are mainly contained in the new *Manual for Official Communication in Incidents and Emergencies* (EPR-IEComm), which supersedes *Emergency Notification and Assistance: Technical Operational Manual* (EPR-ENATOM 2007), and in *IAEA Response and Assistance Network: Incident and Emergency Centre* (EPR-RANET 2010). The new manual became effective on 1 June 2012.

122. Feedback on the Unified System for Information Exchange in Incidents and Emergencies (USIE) was consolidated at the meeting of Competent Authorities. The Agency also made available to Member States the web-based interface for USIE using International Radiological Information Exchange (IRIX) and USIE training material.<sup>130</sup> An expert mission was carried out in Armenia to enhance transparency and effectiveness of communication with the public.

123. In accordance with the recommendations outlined in the final report on the International Action Plan for Strengthening the International Preparedness and Response System for Nuclear and Radiological Emergencies, the Emergency Preparedness and Response Expert Group (EPREG) is in the process of being established.<sup>131</sup>

124. The Agency has reviewed the effectiveness of its Emergency Preparedness Review (EPREV) service<sup>132</sup> and produced a report, *EPREV Highlights 2004–2011 — An Evaluation of the EPREV Missions to Improve Effectiveness of the Future Missions*. The lessons learned to date from the Fukushima Daiichi accident were incorporated into specific “Fukushima modules” in both the EPREV service and the IRRS.

125. As highlighted by past EPREV missions, national coordination and cooperation between the various governmental bodies with responsibilities in the area of emergency preparedness and response need to be enhanced. The infrastructure and competencies of regulatory bodies also need to be strengthened in several Member States, with support provided by the Agency’s relevant projects.<sup>133</sup>

126. The Secretariat has produced a draft internal policy document in order to revise the policies, plans and procedures that should be followed to provide Member States, international organizations and the general public with timely, clear, factually correct, objective and easily understandable information during a nuclear and radiological emergency. This will contribute to the Secretariat’s improved communications with Member States, the media and the public.<sup>134</sup>

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<sup>129</sup> This relates to operative paragraph 81 of resolution GC(55)/RES/9.

<sup>130</sup> This relates to operative paragraphs 80, 86 and 90 of resolution GC(55)/RES/9.

<sup>131</sup> This relates to operative paragraph 81 of resolution GC(55)/RES/9.

<sup>132</sup> This relates to operative paragraph 83 of resolution GC(55)/RES/9.

<sup>133</sup> This relates to operative paragraph 83 of resolution GC(55)/RES/9.

<sup>134</sup> This relates to operative paragraphs 88 and 91 of resolution GC(55)/RES/9.

127. The Agency's capabilities for performing technical assessments in the event of a nuclear and radiological emergency have also been reviewed with the aim to identify specialised resources (experts, information resources and dedicated software tools) which can support assessment process in an operative way.<sup>135</sup>

128. Several Member States indicated their intention of registering their assistance capabilities in RANET, including Canada and South Africa, and the United Kingdom has decided to become a member.<sup>136</sup>

129. In January 2012, more than 40 experts from 20 States Parties to the Assistance Convention participated in a meeting in Vienna, Austria, to discuss ways of extending the assistance capabilities and functional areas of RANET. The document *IAEA Response and Assistance Network*, has been revised to include new guidance regarding the roles, responsibilities and actions required of all parties concerned to prepare for, request and receive assistance in the event of an emergency. It also covers an additional functional area on assessment and advice to Competent Authorities regarding on-site mitigation activities in case of emergencies at nuclear facilities. The document was distributed to the State Parties to the Assistance Convention for comments.<sup>137</sup>

130. Additional draft guidance on the application of the International Nuclear and Radiological Event Scale (INES) as a communication tool during severe emergencies was prepared by the Agency and submitted to the INES National Officers for review at their next meeting in July 2012. The terms of reference for the INES Advisory Committee were also revised and submitted to the INES National Officers for their review.<sup>138</sup>

131. The 22<sup>nd</sup> Regular Meeting of IACRNE was hosted by the OECD/NEA in Paris, France, in December 2011. The objective of the meeting was to support the strengthening of the international emergency preparedness and response framework. Representatives of 21 organizations discussed the lessons learned from the Fukushima Daiichi accident and their relevance to the Committee's work. There was overall agreement that IACRNE and the Joint Radiation Emergency Management Plan of the International Organizations provide an effective and comprehensive inter-agency mechanism for the coordination of international response to a nuclear or radiological emergency, whereas several areas were identified as requiring improvement.<sup>139</sup>

132. In line with these discussions, the Agency has prepared a revised version of the Joint Plan (to be issued as EPR-JPLAN 2013 in the EPR Series) and distributed this draft document to the organizations participating in IACRNE for their comments.<sup>140</sup>

133. In March 2012, the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) became a member of IACRNE and a co-sponsor of the Joint Plan.<sup>141</sup>

134. In addition to the meeting of Competent Authorities, the Agency has diversified the ways in which knowledge and experience can be shared through the establishment of the *Incident and*

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<sup>135</sup> This relates to operative paragraphs 87 and 91 of resolution GC(55)/RES/9.

<sup>136</sup> This relates to operative paragraphs 84 and 85 of resolution GC(55)/RES/9.

<sup>137</sup> This relates to operative paragraph 85 of resolution GC(55)/RES/9.

<sup>138</sup> This relates to operative paragraph 88 of resolution GC(55)/RES/9.

<sup>139</sup> This relates to operative paragraph 90 of resolution GC(55)/RES/9.

<sup>140</sup> This relates to operative paragraph 89 of resolution GC(55)/RES/9.

<sup>141</sup> This relates to operative paragraph 89 of resolution GC(55)/RES/9.

*Emergency Centre Bulletin* and capacity building networks and programmes. In April 2012, a workshop was convened to discuss lessons identified by Member States when responding to nuclear or radiological emergencies. These lessons will be taken into account in revising the relevant Agency safety standards and guidance material.<sup>142</sup>

135. To improve the capabilities of the Agency's Incident and Emergency Centre (IEC), a new secure access system to the IEC's response area was installed to enhance access management, in particular when the Centre is activated in "Full Response" mode. The IEC's capabilities for video conferencing and computer access were also enhanced. In addition, a new training package consisting of equipment and accompanying software for training radiation monitoring teams in field operations was purchased and the in-house training regime has been strengthened.<sup>143</sup>

136. The Secretariat carried out a survey of existing in-house expertise in the area of radiological consequence assessment and prognosis of possible event progression in order to identify where Member States capabilities will be needed to fill the gaps in the Secretariat's expertise. The results of the survey will be regularly reviewed with in-house counterparts as part of the internal emergency preparedness process.<sup>144</sup>

137. A memorandum of understanding was concluded in December 2011 with the EC regarding its support for the International Radiation Monitoring Information System (IRMIS), thus laying the foundations for further development of a global radiation monitoring information system.<sup>145</sup>

138. The Agency has been developing or refining its safety standards, guidance material and tools related to emergency preparedness and response. The following publications in the EPR Series were issued: *Cytogenetic Dosimetry: Applications in Preparedness for and Response to Radiation Emergencies* (EPR-BIODOSIMETRY 2011); *Communication with the Public in a Nuclear or Radiological Emergency* (EPR-Public Communications 2012) and *Communication with the Public in a Nuclear or Radiological Emergency — Training Materials* (EPR-Public Communications/T 2012). One new publication in the EPR Series, *Considerations in Emergency Preparedness and Response for State Embarking on Nuclear Power Programme*, has also been approved.<sup>146</sup>

139. Six further EPR Series publications are being prepared on protection of the public in the event of a severe NPP or spent fuel emergency; operational criteria for off-site emergency response to a release from a light water reactor (LWR) or spent fuel pool; lessons learned from the response to past radiation emergencies; arrangements for response to radiation emergencies caused by natural disasters; and the application of INES, with a specific emphasis on severe emergencies at NPPs. The revision of *Generic Assessment Procedures for Determining Protective Actions during a Reactor Accident* (IAEA-TECDOC-955) for LWR- and CANDU-type reactors is in progress. In addition, training materials on EPR considerations for a State embarking on a nuclear power programme and on cytogenetic dosimetry applications in preparedness for and response to radiation emergencies are being developed.<sup>147</sup>

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<sup>142</sup> This relates to operative paragraph 90 of resolution GC(55)/RES/9.

<sup>143</sup> This relates to operative paragraph 91 of resolution GC(55)/RES/9.

<sup>144</sup> This relates to operative paragraph 91 of resolution GC(55)/RES/9.

<sup>145</sup> This relates to operative paragraph 91 of resolution GC(55)/RES/9.

<sup>146</sup> This relates to operative paragraph 12 of resolution GC(55)/RES/9.

<sup>147</sup> This relates to operative paragraph 12 of resolution GC(55)/RES/9.

140. Sixty-one Member States responded to a questionnaire on their experience in using the Safety Requirements publication *Preparedness and Response for a Nuclear or Radiological Emergency* (IAEA Safety Standards Series No. GS-R-2) at the national level taking into account lessons identified in the response to the Fukushima Daiichi accident. Ninety five per cent of the responses indicated that the contents of this publication met Member States' expectations either fully or fairly well.<sup>148</sup>

## L. Civil Liability for Nuclear Damage<sup>149</sup>

141. A Special Session of INLEX was held at the Agency's Headquarters in Vienna, in December 2011, to discuss INLEX's role in the implementation of the Action Plan. At the Special Session, INLEX agreed on a number of activities aimed at facilitating the achievement of a global nuclear liability regime, including carrying out joint IAEA/INLEX missions in order to raise awareness of the international nuclear liability regime and encourage wider adherence to the relevant international legal instruments in specific target countries; giving presentations on nuclear liability at various Agency and other meetings during 2012; and organizing a workshop on nuclear liability at Agency Headquarters for diplomats and experts from Member States. INLEX also held a preliminary discussion on specific recommendations to facilitate the achievement of a global nuclear liability regime, with a view to finalizing these recommendations in 2012.

142. Following INLEX's Special Session, three joint IAEA/INLEX Missions have been held: Jordan (May 2012), Republic of Korea (April 2012) and Vietnam (March 2012). Preparations are under way to implement similar missions during the course of the year in countries that have already accepted to host them, such as China, South Africa and Ukraine. Presentations on nuclear liability were made by the Secretariat at relevant IAEA meetings.<sup>150</sup> In addition, as mentioned above, a dedicated Workshop on Civil Liability for Nuclear Damage was held in May 2012 at the Agency's Headquarters with the aim of providing diplomats and experts from Member States with an introduction to the subject. The workshop was attended by 59 diplomats and experts from 34 Member States and one international organization.

143. At the annual regular INLEX meeting held in May 2012, INLEX finalized its recommendations to facilitate the achievement of a global nuclear liability regime. The recommendations adopted by the Group are attached to the report by the Director General on the implementation of the IAEA Action Plan on Nuclear Safety.<sup>151</sup>

144. The Group also agreed on the need to continue to carry out joint IAEA/INLEX missions to raise awareness of the international nuclear liability regime and encourage wider adherence to the relevant international legal instruments. In addition, the Group expressed satisfaction on the outcome of the Workshop on Civil Liability for Nuclear Damage and welcomed the Secretariat's intention to organize similar workshops in the future.

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<sup>148</sup> This relates to operative paragraph 12 of resolution GC(55)/RES/9.

<sup>149</sup> This relates to operative paragraphs 22 and 47 of resolution GC(55)/RES/9.

<sup>150</sup> Technical Meeting on Topical Issues on Infrastructure Development: Managing the Development of a National Infrastructure for NPPs (2427 January 2012); 31<sup>st</sup> Meeting of the CSS (2729 March 2012); meeting of INSAG (1112 April 2012); Sixth Meeting of Representatives of the Competent Authorities identified under the Early Notification Convention and the Assistance Convention (1720 April 2012); and meeting of AdSec (2327 April 2012).

<sup>151</sup> First Annual Report on the Implementation of the IAEA Action Plan on Nuclear Safety GOV/INF/2012/11-GC(56)/INF/5.

145. Finally, the Group noted the request made by IAEA Member States participating in the 2011 Transport Conference that INLEX should address liability issues arising out of the transport of nuclear material, and agreed that these issues had been addressed in the context of drafting recommendations to facilitate the achievement a global nuclear liability regime. However, the Group also agreed that outstanding issues would continue to be monitored as part of its on-going work on ways to address gaps and ambiguities in the nuclear liability regime.

## List of Abbreviations

AdSec	Advisory Group on Nuclear Security
AES-2006/WWER-1200	Water Cooled, Water Moderated Power Reactor (WWER)
AFRA	African Regional Co-operative Agreement for Research, Development and Training Related to Nuclear Science and Technology
ANNuR	Arab Network of Nuclear Regulators
ANSN	Asian Nuclear Safety Network
ANSTO	Australian Nuclear Science and Technology Organization
ARN	Argentina's Nuclear Regulatory Authority
ASEAN	Association of Southeast Asian Nations
Assistance Convention	Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (Assistance Convention)
CANDU reactor	Canada deuterium–uranium reactor
CNS	Convention on Nuclear Safety
ConvEx	Convention Exercise
CSN	Control of Sources Network
CSS	Commission on Safety Standards
CTBTO	Comprehensive Nuclear-Test-Ban Treaty Organization
CTG	Topical Group on Communication Consultation with Interested Parties
DIRAC	Directory of Radiotherapy Centres
DIRATA	Database on Discharges of Radionuclides to the Atmosphere and Aquatic Environment
DSARS	Design and Safety Assessment Review Service
Early Notification Convention	Convention on Early Notification of a Nuclear Accident
EBRD	European Bank for Reconstruction and Development
EC	European Commission
EMRAS	Environmental Modelling for Radiation Safety
ENVIRONET	Network on Environmental Management and Remediation
EPR	Emergency Preparedness and Response
EPREG	Emergency Preparedness and Response Expert Group
EPREV	Emergency Preparedness Review
ETReS	Education and Training Review Service
ETSON	European TSO Network
FAO	Food and Agriculture Organization of the United Nations

FaSa	International Project on the Use of Safety Assessment in Planning and Implementation of Decommissioning of Facilities using Radioactive Material
FINAS	Fuel Incident Notification and Analysis System
FNRBA	Forum of Nuclear Regulatory Bodies in Africa
FORO	Ibero-American Forum of Radiological and Nuclear Regulatory Agencies
GNSSN	Global Nuclear Safety and Security Network
GRSR	Generic Reactor Safety Review
GSAN	Global Safety Assessment Network
IACRNE	Inter-Agency Committee on Radiological and Nuclear Emergencies
ICAO	International Civil Aviation Organization
ICRP	International Commission on Radiological Protection
IDN	International Decommissioning Network
IEC	Incident and Emergency Centre
IEM	International Experts' Meeting
ILO	International Labour Organization
IMO	International Maritime Organization
INES	International Nuclear and Radiological Event Scale
INIR	Integrated Nuclear Infrastructure Review
INLEX	International Expert Group on Nuclear Liability
INPRO	Innovative Nuclear Reactors and Fuel Cycles
INSAG	International Nuclear Safety Group
IPSART	International Probabilistic Safety Assessment Review Team
IRIX	International Radiological Information Exchange
IRMIS	International Radiation Monitoring Information System
IRRS	Integrated Regulatory Review Service
IRS	International Reporting System for Operating Experience
IRSRR	Incident Reporting System for Research Reactors
ISDC	International Structure for Decommissioning Costing
ISEMIR	Information System on Occupational Exposure in Medicine, Industry and Research
ISOE	Information System on Occupational Exposure
ISSC	International Seismic Safety Centre
ISSPA	International Source Suppliers and Producers Association
KINS	Korea Institute of Nuclear Safety

LMSTG	Topical Group on Leadership and Management for Nuclear Safety of the Regulatory Bodies
London Convention	Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter
LWR	Light Water Reactor
MODARIA	Modelling and Data for Radiological Impact Assessments
NEWMDB	Net Enabled Waste Management Database
NORM	Naturally Occurring Radioactive Material
NPP	Nuclear Power Plant
NRC	United States Nuclear Regulatory Commission
NSGC	Nuclear Security Guidance Committee
OECD/NEA	Nuclear Energy Agency of the Organisation for Economic Co-operation and Development
OSART	Operational Safety Review Team
OSCE	Organization for Security and Co-operation in Europe
OSPAR Convention	Convention for the Protection of the Marine Environment of the North-East Atlantic
PAHO	Pan American Health Organization
pre-OSART	Pre-Operational Safety Review Team
PSA	Project and Supply Agreement
R <sup>2</sup> D <sup>2</sup> P	Research Reactor Decommissioning Demonstration Project
RAIS	Regulatory Authority Information System
RAMP	Review of Accident Management Programmes
RASIMS	Radiation Safety Information Management System
RASSC	Radiation Safety Standards Committee
RCF	Regulatory Cooperation Forum
RegNet	International Regulatory Network
RSLs	Regulatory Supervision of Legacy Sites
SAET	Safety Assessment Education and Training
SARCoN	Guidelines for Systematic Assessment of Regulatory Competence Needs
SAT	Self-Assessment Tool
SEDO	Safety Evaluation of Fuel Cycle Facilities During Operation
SEED	Site and External Events Design
TC	Technical Cooperation
TEPCO	Tokyo Electric Power Company
TNPP	Transportable Nuclear Power Plant

TRANSSC	Transport Safety Standards Committee
TSOF	Technical and Scientific Support Organization Forum
TSOs	Technical Scientific and Support Organizations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNSCEAR	United Nations Scientific Committee on the Effects of Atomic Radiation
USIE	Unified System for Information Exchange in Incidents and Emergencies
WENRA	Western European Nuclear Regulators' Association
WHO	World Health Organization
WNA	World Nuclear Association