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

Report by the Director General

Summary

Pursuant to resolution GC(61)/RES/8, 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;
- Self-assessments and the Agency's peer review services;
- Nuclear installation safety;
- Radiation safety and environmental protection;
- Transport safety;
- The safety of spent fuel and radioactive waste management;
- Safety in uranium mining and processing, decommissioning and environmental remediation;
- The safe management of radioactive sources;
- Capacity building;
- Nuclear and radiological incident and emergency preparedness and response; and
- Civil liability for nuclear damage.

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 sixty second regular session (2018) of the General Conference in response to resolution GC(61)/RES/8, in which the General Conference requested the Director General to report in detail on implementation of the resolution and on other relevant developments in the intervening period. This report covers the period 1 July 2017 to 30 June 2018.

2. The Agency continued its efforts to maintain and strengthen nuclear, radiation, transport and waste safety, and emergency preparedness and response capabilities, focusing, inter alia, on the technical areas and geographical regions where the need for such efforts is greatest. The Agency implemented numerous activities to assist Member States considering or planning introducing nuclear power or radiation technology in establishing or strengthening their safety infrastructure and regulatory framework as well as building competency in several areas related to nuclear and radiation safety.[1]

3. The Agency continued to encourage Member States to become Contracting Parties to the Convention on Nuclear Safety (CNS), the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (Joint Convention), 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). Activities related to the Conventions are reported in detail in subsequent sections of this report: the CNS in Section D; the Joint Convention in Section G; and the Early Notification and Assistance Conventions in Section K.[2]

4. In March 2018, a report by the Director General containing the draft *Nuclear Safety Review 2018* was submitted to the Board of Governors. The final version of the *Nuclear Safety Review 2018*, prepared in the light of discussions at the Board of Governors, is provided as an information document at the 62nd regular session of the Agency's General Conference. The *Nuclear Safety Review 2018* includes the global trends and the Agency's activities in 2017. It also presents priorities and related activities for 2018 and beyond, as identified by the Agency, for strengthening nuclear, radiation, transport and waste

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[1] This relates to operative paragraphs 1 and 3 of resolution GC(61)/RES/8.

[2] This relates to operative paragraph 25 of resolution GC(61)/RES/8.

safety. These priorities are included in the Agency's Programme and Budget for 2018–2019, including outcomes, outputs, timelines and performance indicators.[3]

5. The Agency continued to provide legislative assistance to its Member States to support the development of adequate national legal frameworks and to promote adherence to the relevant international legal instruments. Specific bilateral legislative assistance was provided to 17 Member States through written comments and advice on drafting national nuclear legislation. Assistance in gaining more broadly a better understanding of the relevant international legal instruments was also provided to Member States through awareness missions and workshops conducted in Member States. The seventh session of the Nuclear Law Institute was held in Baden, Austria, in October 2017, and was attended by 60 participants from 53 Member States in Africa, Asia and the Pacific, Europe and Latin America and the Caribbean. The two-week course aimed to enhance knowledge of nuclear law as well as to draft, amend or review national nuclear legislation. The Agency also held one regional workshop on nuclear law for European Member States in Vienna, Austria, in November 2017.[4]

6. The seventh Treaty Event took place during the 61th regular session of the Agency's General Conference. It provided Member States with a further opportunity to deposit their instruments of ratification, acceptance or approval of, or accession to, the treaties deposited with the Director General, including those related to nuclear safety and civil liability for nuclear damage.[5]

7. The Pilot International School for Nuclear and Radiological Leadership for Safety was held in Nice, France, in October–November 2017, attended by 20 junior and middle managers from operators and regulators in radiological and nuclear safety. The Agency conducted an evaluation of this pilot school and developed a plan for its further development, including coordination with relevant nuclear leadership projects. A consultancy meeting was held in Vienna, Austria, in March 2018 to enhance the role play exercises and to extend the training materials of the school from a one-week to a two-week programme.[6]

8. The Agency continued to revise the Safety Guides supporting the Safety Requirements publication *Leadership and Management for Safety* (IAEA Safety Standards Series No. GSR Part 2). The Agency held three consultancy meetings in Vienna, Austria, in July 2017 and in April and May 2018 to revise the Safety Guides and related reports on leadership, management for safety and safety culture. The Agency held a Workshop on the Use of a Harmonized Safety Culture Framework, attended by 29 participants from 24 Member States, and a Workshop on Considerations related to the Interactions between Human, Technical and Organizational Factors in Research Reactor Safety, attended by 24 participants from 21 Member States, in Vienna, Austria, in October and December 2017 respectively. The Agency also held the fifth annual Workshop on Leadership and Culture for Safety for Senior Managers in Helsinki, Finland, in November 2017, attended by 27 representatives from 9 Member States. An Independent Safety Culture Assessment (ISCA) mission to the Institute for Energy Technology took place in Norway in March 2018 and a national workshop on Leadership and Management for Safety in JRTR Research Reactor was held in Amman, Jordan, in March 2018. In addition, the Agency strengthened leadership and management for safety in the relevant parts of OSART and IRRS missions.[7]

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[3] This relates to operative paragraph 4 of resolution GC(61)/RES/8.

[4] This relates to operative paragraphs 25, 36 and 109 of resolution GC(61)/RES/8.

[5] This relates to operative paragraphs 25 and 36 of resolution GC(61)/RES/8.

[6] This relates to operative paragraphs 6, 7, 10 of resolution GC(61)/RES/8.

[7] This relates to operative paragraphs 6, 7 and 54 of resolution GC(61)/RES/8.

9. The Agency continued to support Member Stares in the area of safety and security interfaces. A consultancy meeting on interfaces between safety and security cultures was held in Vienna, Austria, in October 2017. The Agency also held two consultancy meetings in Vienna, Austria, in April and in June 2018 to identify existing gaps in how safety–security interfaces are addressed and discuss an approach to enhance the Secretariat's support to Member States in this area. A workshop on Managing the Interface between Safety and Security for Research Reactors was held in Vienna, Austria, in October 2017. The workshop, attended by 50 participants from 25 Member States, provided a forum to share information and feedback for the development of an Agency publication on the subject.[8]

10. At the request of the Commission on Safety Standards (CSS), the Secretariat undertook a number of actions in response to the International Nuclear Safety Group (INSAG) publication entitled *Ensuring Robust National Nuclear Safety Systems: Institutional Strength in Depth* (INSAG Series No.27), including an assessment of the implications of the INSAG-27 report for the Agency's safety standards and peer review and advisory services.[9]

11. Four Member States nominated a national Radiation Safety Information Management System (RASIMS) coordinator for the first time: Belize, Kyrgyzstan, Palau and Togo. Nine Member States nominated replacement national RASIMS coordinators: Afghanistan, Ghana, Georgia, Kenya, Lesotho, Malawi, Moldova, Saudi Arabia and Seychelles. One hundred and nine Member States updated their radiation safety infrastructure profiles. Technical experts from four Member States participated in a consultancy meeting in Vienna, Austria, in November 2017 to test and evaluate a new version of the RASIMS platform. The Agency held an interregional meeting for RASIMS national coordinators in Vienna, Austria, in April 2018 to start entering national data into the new platform.[10]

12. Over 100 participants attended the Global Nuclear Safety and Security Network (GNSSN) Plenary Meeting which took place during the 61st regular session of the Agency's General Conference in September 2017. Member States' representatives discussed leadership for safety, peer reviews and Member States' experience in knowledge management. The GNSSN Steering Committee met in Vienna, Austria, in December 2017 and in April 2018 to advise the Agency, inter alia, on capacity building methodologies and nuclear safety knowledge management to sustain national programmes for safety.[11]

13. The Agency continued its cooperation with the Ibero-American Forum of Radiological and Nuclear Regulatory Agencies (FORO). The Agency organized two FORO Steering Committee meetings in Buenos Aires, Argentina, in June–July 2017 and in Asunción, Paraguay, in November 2017. The Agency renewed its Practical Arrangements with FORO in Buenos Aires, Argentina, in July 2017, on the 20th anniversary of its cooperation with FORO. Eight Member States from the Latin America region not members of FORO participated in this event. Eight additional meetings were held under the FORO extrabudgetary programme. The topics covered included: application of a risk matrix to new radiotherapy techniques; development of competencies in medical and industrial applications in regulatory bodies; safety culture; harmonization of inspection practices for research reactors; stress evaluation of nuclear power plants (NPPs); and maintenance of the FORO web-based information technology platform (RED). The Agency participated in a meeting of the European Nuclear Safety Regulators Group (ENSREG) in Brussels, Belgium, in December 2017 to exchange information in areas of mutual interest such as nuclear safety and radioactive waste management. The Agency also

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[8] This relates to operative paragraphs 9 and 54 of resolution GC(61)/RES/8.

[9] This relates to operative paragraph 8 of resolution GC(61)/RES/8.

[10] This relates to operative paragraph 11 of resolution GC(61)/RES/8.

[11] This relates to operative paragraph 12 of resolution GC(61)/RES/8.

participated in two meetings of ENSREG Working Groups 1 and 2 in Brussels, Belgium, in March 2018 to exchange information on planned IRRS and ARTEMIS missions in the European Union member countries.[12]

14. In January 2018, the Agency published a Technical Document on *Technical and Scientific Support Organizations Providing Support to Regulatory Functions* (IAEA-TECDOC-1834). The Agency organized two Steering Committee meetings of the Technical and Scientific Support Organizations (TSO) Forum in Vienna, Austria, in October 2017 and April 2018. Two consultancy meetings were held in Vienna, Austria, in July and December 2017, attended by experts from ten Member States. The meetings developed a project entitled the Technical and Scientific Support Organizations Initiative intended to assist TSOs, in particular with support for self-assessment methodologies. A workshop on building technical and scientific capabilities in embarking countries was held in Vienna, Austria, in April 2018, attended by representatives from TSOs and regulatory bodies of 13 Member States. The objective of the meeting was to exchange experience and feedback on issues of technical and scientific capacity in embarking countries. The Agency also held the third Programme Committee meeting for the preparation of the Fourth International Conference on Challenges Faced by Technical and Scientific Support Organizations in Enhancing Nuclear Safety and Security.[13]

15. In October 2017, the Agency published the *Proceedings of the International Conference on Effective Nuclear Regulatory Systems Sustaining Improvements Globally*. The Agency also collected the replies of 27 regulatory bodies to a questionnaire on regulatory experience management practices. The Agency organized two consultancy meetings in Vienna, Austria, in November–December 2017 and in April 2018 to analyse the results of the questionnaire and to develop a technical document on managing regulatory experience.[14]

B. The Agency's Safety Standards Programme

16. The CSS met in Vienna, Austria, in November 2017 and in April 2018. The Emergency Preparedness and Response Standards Committee (EPReSC), the Nuclear Safety Standards Committee (NUSSC), the Radiation Safety Standards Committee (RASSC), the Transport Safety Standards Committee (TRANSSC) met twice in Vienna, Austria, in November 2017 and June 2018. The Waste Safety Standards Committee (WASSC) met in Vienna, Austria, in November 2017. The CSS endorsed the following draft Safety Guides for submission for publication: *Arrangements for Preparedness for a Nuclear or Radiological Emergency*; *Arrangements for the Termination of a Nuclear or Radiological Emergency*; *Organization, Management and Staffing of the Regulatory Body for Safety*; *Functions and Processes of the Regulatory Body for Safety* and *Operating Experience Feedback for Nuclear Installations*.[15]

17. In January 2018, the Secretariat invited all Member States to nominate representatives for all five Safety Standards Committees. In addition, it offered the possibility of nominating a second 'corresponding member' who would have the same access as the members attending the meetings to all relevant information, including opportunities to comment in writing on draft standards. The Agency is

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[12] This relates to operative paragraphs 13 and 54 of resolution GC(61)/RES/8.

[13] This relates to operative paragraphs 3 and 32 of resolution GC(61)/RES/8.

[14] This relates to operative paragraph 16 of resolution GC(61)/RES/8.

[15] This relates to operative paragraph 42 of resolution GC(61)/RES/8.

using electronic means in a systematic manner to facilitate the remote participation of Member States' representatives.[16]

18. The Agency issued the Safety Requirements publication entitled *Safety of Nuclear Fuel Cycle Facilities* (IAEA Safety Standards Series No. SSR-4). The issuance of this publication completes the work to revise the Agency's Safety Requirements publications to take into account lessons arising from the Fukushima Daiichi accident. The Agency also issued the Safety Requirement on *Regulations for the Safe Transport of Radioactive Material, 2018 Edition* (IAEA Safety Standards Series No. SSR-6 (Rev. 1)) and four Safety Guides: *Communication and Consultation with Interested Parties by the Regulatory Body* (IAEA Safety Standards Series No. GSG-6); *Arrangements for the Termination of a Nuclear or Radiological Emergency* (IAEA Safety Standards Series No. GSG-11); *Safety of Nuclear Fuel Cycle Research and Development Facilities* (IAEA Safety Standards Series No. SSG-43) *and Establishing the Infrastructure for Radiation Safety* (IAEA Safety Standards Series No. SSG-44).[17]

19. The Interface Group, which gathers together chairs of the Safety Standards Committees and the Nuclear Security Guidance Committee is responsible for identifying proposed documents in the IAEA Safety Standards Series and IAEA Nuclear Security Series publications that may have safety–security interfaces and referring them to the appropriate Committees for clearance during the development phase. The Interface Group reviewed seven publication proposals for possible safety-security interfaces following a recommendation from the Secretariat's Coordination Committee on Safety Standards and Nuclear Security Series Publications.[18]

20. The Nuclear Safety and Security Online User Interface (NSS-OUI) platform was launched during the 61st regular session of the General Conference. NSS-OUI has been used to support several projects to revise the Safety Standards across topical areas, including the revision by amendment of seven Safety Guides on operational safety of NPPs in one project. The IAEA Safety Glossary has been integrated into the NSS-OUI platform, enabling future electronic versions of the Safety Standards to include user-friendly access to Glossary definitions.[19]

21. The Agency continues to follow the activities of the International Commission on Radiological Protection (ICRP) as an observer in the ICRP committees and participant in several ICRP task groups on specific topics. The Agency continued its cooperation with the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR). The CSS Working Group established to consider the implications for the Agency's safety standards of the UNSCEAR report on *Attributing Health Effects to Ionizing Radiation Exposure and Inferring Risks,* met in Vienna, Austria, in October 2017. The CSS endorsed the Working Group's recommendations to review the Safety Fundamentals and Safety Standards. The recommendations were to identify whether there is a need to refine certain parts of the text of the Safety Fundamentals with respect to the dose and risk concepts set out in the UNSCEAR report, and to determine which safety standards, both currently under development and already published, could be strengthened in this respect. A consultancy meeting was held in Vienna, Austria, in February 2018 to initiate this analysis, in particular to consider retrospective attribution of radiation health effects to past radiation exposures, prospective inference of health risks from radiation exposures and prediction of notional health effects for comparative purposes (e.g. use of collective or population dose). The CSS, at its meeting held in Vienna, Austria, in April 2018, endorsed the recommendations of the consultancy meeting, namely that a Safety Report should be prepared to provide practical

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[16] This relates to operative paragraph 43 of resolution GC(61)/RES/8.

[17] This relates to operative paragraphs 44 and 45 of resolution GC(61)/RES/8.

[18] This relates to operative paragraph 9 of resolution GC(61)/RES/8.

[19] This relates to operative paragraphs 45 and 46 of resolution GC(61)/RES/8.

guidance on how to apply the dose and risk concepts in the UNSCEAR report, and that a review of the Safety Fundamentals should be undertaken by the five Safety Standards Committees.[20]

C. Self-Assessment and the Agency's Peer Review Services

22. The Agency conducted eight Integrated Regulatory Review Service (IRRS) missions in Austria in June 2018, Botswana in October 2017, Chile in January–February 2018, Ethiopia in December 2017, Georgia in February 2018, Luxembourg in June 2018, the former Yugoslav Republic of Macedonia in October 2017, and Nigeria in July 2017. Five IRRS follow-up missions were conducted in Belgium in November 2017, France in October 2017, Greece in November 2017, Jordan in October 2017 and Romania in October 2017. The Agency held two training courses for future IRRS reviewers in the area of radiation and nuclear safety in Stockholm, Sweden, in February 2018, attended by 26 participants from Denmark, Finland, Norway and Sweden, and in Vienna, Austria, in March 2018, attended by 42 participants from 31 Member States. The Agency held a consultancy meeting in Vienna, Austria, in December 2017 to analyse the mission reports of IRRS missions to non-nuclear States in the period 2006–2016.[21]

23. The Agency held four national workshops for Moldova, Norway, Tajikistan and the United Kingdom on the Agency's Self-Assessment of Regulatory Infrastructure for Safety (SARIS). A regional workshop on SARIS was also organized in Nairobi, Kenya, in June 2018 for Member States in the Africa region.[22]

24. The Agency conducted eight Operational Safety Review Team (OSART) missions in Finland (two missions) in March 2018; France in October 2017; the Russian Federation in November 2017; Spain in February 2018; the United Arab Emirates in September 2017; the United Kingdom in January 2018; and the United States of America in August 2017. Four OSART follow-up missions were conducted in France in June 2018, Japan in August 2017, the Netherlands in November 2017 and Pakistan in December 2017.[23]

25. The Agency conducted three Integrated Safety Assessment of Research Reactors (INSARR) missions in the Democratic Republic of the Congo in May 2018, Ghana in April 2018 and Norway in October 2017. Two follow-up INSARR missions were conducted in Jordan in March 2018 and Poland in November 2017.[24]

26. The Agency conducted two Site and External Events Design (SEED) missions in the Republic of Korea in August 2017 and Turkey in July 2017.[25]

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[20] This relates to operative paragraph 47 of resolution GC(61)/RES/8.

[21] This relates to operative paragraphs 49 and 50 of resolution GC(61)/RES/8.

[22] This relates to operative paragraph 3 of resolution GC(61)/RES/8.

[23] This relates to operative paragraphs 49 and 50 of resolution GC(61)/RES/8.

[24] This relates to operative paragraphs 49 and 50 of resolution GC(61)/RES/8.

[25] This relates to operative paragraphs 49 and 50 of resolution GC(61)/RES/8.

27. The Agency conducted five Safety Aspects of Long Term Operation (SALTO) missions in Brazil in May 2018, Bulgaria in June 2018, Sweden in December 2017 and March 2018 and Ukraine in April 2018.[26]

28. The Agency conducted one Independent Safety Culture Assessment (ISCA) mission in Norway in March 2018 and a follow-up mission in the Netherlands in December 2017.[27]

29. The Agency conducted three Integrated Review Service for Radioactive Waste and Spent Fuel Management, Decommissioning and Remediation (ARTEMIS) missions in Bulgaria in June 2018, France in January 2018 and Poland in October 2017. In addition, the Agency conducted an ARTEMIS mission to Italy in July 2017 focussed on decommissioning.[28]

30. The Agency conducted three Occupational Radiation Protection Appraisals (ORPAS) missions in Chile and Morocco in November 2017, and in Panama in February 2018.[29]

31. The Agency conducted thirteen Advisory Missions on Regulatory Infrastructure for Radiation Safety (AMRAS) in Benin in March 2018, Brunei Darussalam in November 2017, Ecuador in April 2018, El Salvador in May 2018, the Gambia in May 2018, Malawi in September 2017, Mozambique in February 2018, Panama in August 2017, Seychelles in August 2017, Sudan in September 2017, Swaziland in January 2018, Tajikistan in December 2017 and Vanuatu in November 2017. The Agency continues to address radiation safety infrastructure in Member States that have expressed an interest in establishing or enhancing their cancer control capacity through imPACT ('integrated missions of the Programme of Action for Cancer Therapy') review missions. Four missions were conducted in Indonesia in January 2018, Swaziland in August 2017, Togo in September 2017 and Ukraine in May 2018.[30]

32. The Agency conducted two Education and Training Appraisal (EduTA) missions to assess education and training in radiation safety in Argentina in November 2017 and in Tajikistan in April 2018.[31]

33. The Agency conducted one Emergency Preparedness Review (EPREV) mission in Slovenia in November 2017.[32]

34. The Agency provided three Technical Safety Review (TSR) services: a Periodic Safety Review (TSR-PSR) for the Czech Republic, a Design Safety Review (TSR-DS) for Bangladesh and a Safety Requirements Review (TSR-SR) for Saudi Arabia.[33]

35. The Agency continued to assess the overall structure, effectiveness and efficiency of peer reviews and advisory services in the areas of nuclear safety and security and emergency preparedness through the Peer Review and Advisory Services Committee. The Agency held a Technical Meeting to Assess the Overall Structure, Effectiveness and Efficiency of Peer Review and Advisory Services in the Areas of Nuclear Safety and Security in Vienna, Austria, in August 2017, attended by 47 participants from

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[26] This relates to operative paragraphs 49 and 50 of resolution GC(61)/RES/8.

[27] This relates to operative paragraphs 49 and 50 of resolution GC(61)/RES/8.

[28] This relates to operative paragraphs 49 and 50 of resolution GC(61)/RES/8.

[29] This relates to operative paragraphs 49 and 50 of resolution GC(61)/RES/8.

[30] This relates to operative paragraphs 1, 3, 49 and 50 of resolution GC(61)/RES/8.

[31] This relates to operative paragraphs 49 and 50 of resolution GC(61)/RES/8.

[32] This relates to operative paragraphs 49 and 50 of resolution GC(61)/RES/8.

[33] This relates to operative paragraphs 49 and 50 of resolution GC(61)/RES/8.

38 Member States. The presentations and outcome of this meeting are available on the GNSSN platform.[34, 35]

D. Nuclear Installation Safety

36. The Agency continued to encourage its Member States, especially those planning, constructing, commissioning or operating NPPs, or considering a nuclear power programme, to become Contracting Parties to the Convention on Nuclear Safety (CNS). This was done through discussions with Member States' representatives during Agency conferences, meetings, peer review missions and visits of the Director General to Member States, as well as through technical cooperation projects. In the reporting period, Cuba, Serbia and the Syrian Arab Republic became new Contracting Parties to the CNS. The Agency held a Regional Workshop in Vienna, Austria, in November 2017, to promote the CNS and the Joint Convention in Latin American and Asian Countries. The Agency undertook activities to further encourage active participation in and contributing to the effectiveness of the peer review process for Contracting Parties. The Agency held a meeting of the CNS's officers on experience and feedback from the peer review of the Vienna Declaration on Nuclear Safety in Vienna, Austria, in January 2018.[36]

37. The Agency held a Technical Meeting on Human Performance Reliability and Resilience in Nuclear Power Plant Operations in Oak Ridge, United States of America, in August 2017, attended by 60 participants from 18 Member States. The participants identified good practices, requirements and assessments to support Member States with established and newly initiated nuclear power programmes. The Agency also held a Technical Meeting on the Management and Leadership of Nuclear Power Projects from New Build to Decommissioning in Vienna, Austria, in August 2017, attended by 40 participants from 26 Member States. The meeting facilitated exchange of experiences in leading and managing major projects for new NPPs, modifying operating NPPs and decommissioning.[37]

38. The Agency held a Technical Meeting on the Development of the Safety Report on Human Reliability Assessment (HRA) for Nuclear Installations, in Vienna, Austria, in November 2017, attended by 40 participants from 20 Member States. The participants discussed recent developments and aspects related to the application of relevant safety guides in HRA.[38]

39. The Agency held a Technical Meeting to Share Experience on Implementing Safety Improvements at Existing Nuclear Power Plants in Vienna, Austria, in June 2018, attended by 35 participants from 21 Member States and 3 international organizations. The meeting provided an opportunity to exchange information on national practices that contribute to enhancing the safety of existing NPPs. The Agency also held consultancy meetings in Vienna, Austria, in November 2017 and April 2018 to develop a Technical Document on experiences on implementing safety improvements at existing NPPs: approaches and strategies aiming at minimizing radioactive releases in the event of nuclear accident.[39]

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[34] See: https://gnssn.iaea.org/main/PRASC/Pages/default.aspx.

[35] This relates to operative paragraph 51 of resolution GC(61)/RES/8.

[36] This relates to operative paragraph 25 of resolution GC(61)/RES/8.

[37] This relates to operative paragraphs 3 and 6 of resolution GC(61)/RES/8.

[38] This relates to operative paragraph 44 resolution GC(61)/RES/8.

[39] This relates to operative paragraph 53 of resolution GC(61)/RES/8.

40. The Agency continued to support Member States in the application of the Code of Conduct on the Safety of Research Reactors and the Agency's safety standards. The Agency held a workshop on self-assessment of research reactor safety in Vienna, Austria, in March 2018, and a regional workshop on regulatory inspections of research reactors in Sydney, Australia, in February 2018. The Agency also held two national workshops on periodic safety review for research reactors in Bucharest, Romania, in July 2017 and on assessment of regulatory aspects of molybdenum-99 production in Islamabad, Pakistan, in July 2017.[40]

41. The Agency held a Technical Meeting on the Safety of Research Reactors under Project and Supply Agreements and Review of Their Safety Performance Indicators in Vienna, Austria, in July 2017, attended by 18 participants from 16 Member States. The meeting provided a forum to discuss the safety status of research reactors that are subject to project and supply agreements and ways to enhance the monitoring and safety of these facilities. The Agency held a Workshop on Safety Reassessment of Research Reactors in the Light of the Lessons Learned from the Fukushima Daiichi Accident in Sydney, Australia, in December 2017. The meeting, attended by 26 participants from 22 Member States, provided a forum to exchange information and share experience on safety reassessments for research reactors. The Agency conducted a mission on regulatory inspection for the TRIGA Research Reactors in Morocco in September 2017 and a mission on regulations on licensing and safety of research reactor design in the Islamic Republic of Iran in October 2017. In July 2017, the Agency published the proceedings of the International Conference on Research Reactors: Safe Management and Effective Utilization, held in Vienna, Austria, in November 2015. The conclusions underlined aspects such as the management of ageing of facilities and staff, the need to enhance regulatory effectiveness and to address the relevant lessons from the Fukushima Daiichi accident. In May 2018, the Agency issued a publication entitled *Guidelines for Self-Assessment of Research Reactor Safety* (IAEA Services Series No. 35), to support the INSARR process and to assist research reactor operating organizations in preparing for future INSARR missions.[41]

42. The Agency conducted three research reactor safety expert missions in Chile in November 2017, Indonesia in November 2017 and Nigeria in August 2017. These missions supported safety enhancements in areas such as core conversions from high enriched uranium to low enriched uranium fuel, safety analysis of new fuel types, and review and assessment of safety documents for modifications and experiments at research reactors.[42]

43. The Agency continued to support Member States planning to establish a first or a new research reactor. A workshop on assessment of national nuclear infrastructure to support a new research reactor project was held in Vienna, Austria, in September 2017 and an expert mission on nuclear infrastructure planning and application of the Agency's safety standards for establishing a new research reactor was conducted in La Paz, Bolivia, in November 2017. The Agency conducted a mission on integrated nuclear infrastructure review for research reactors in Abuja, Nigeria, in February 2018. A fact-finding mission was conducted in Tajikistan in November 2017 to establish the progress made in the construction of a research reactor.[43]

44. The Agency held three meetings of the regional advisory safety committees for research reactors in Almaty, Kazakhstan, in December 2017 for the Europe region, in Rabat, Morocco, in July 2017 for the Africa region, and in Argonne, in the United States of America, in October 2017 for the Asia and

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[40] This relates to operative paragraphs 3, 28 and 54 of resolution GC(61)/RES/8.

[41] This relates to operative paragraphs 14, 28, 54 and 57 of resolution GC(61)/RES/8.

[42] This relates to operative paragraphs 17, 28 and 44 of resolution GC(61)/RES/8.

[43] This relates to operative paragraphs 3 and 28 of resolution GC(61)/RES/8.

the Pacific region. These meetings facilitated the sharing of experiences on training and qualification of research reactor personnel, safety documentation, operational radiation protection and waste management for research reactors. The meetings focused on regional strategies for strengthening research reactor safety.[44]

45. The Agency held a Technical Meeting on Criticality Safety in Nuclear Fuel Cycle Facilities in Vienna, Austria, in April 2018, attended by 34 participants from 22 Member States. The meeting provided a forum to discuss criticality safety in handling fissile materials in nuclear fuel cycle facilities, including the relevant safety requirements and guides, and to share national practices and experience related to criticality safety assessment, regulatory oversight and operating experience. The Agency also held a workshop on the regulatory supervision of nuclear fuel cycle facilities in Vienna, Austria, in July 2017, two joint workshops with the Nuclear Energy Agency of the Organisation for Economic Co-operation and Development (OECD/NEA) on fuel cycle facilities, in Paris, France, in September 2017 and April 2018, a workshop on safety reassessment of nuclear fuel cycle facilities in the light of the lessons learned from the Fukushima Daiichi accident in Vienna, Austria, in November 2017 and a workshop on regulation of nuclear fuel cycle facilities in Isfahan, the Islamic Republic of Iran, in February 2018.[45]

46. Participating Member States submitted 85 reports to the International Reporting System for Operating Experience (IRS), which is jointly operated by the IAEA and the OECD/NEA to facilitate the exchange of information on nuclear incidents and accidents in Member States. The Agency, in cooperation with the World Association of Nuclear Operators (WANO), held the Annual Joint IAEA–WANO Moscow Centre Meeting to Exchange Operating Experience in Vienna, Austria, in September 2017. The Agency also held the 14th CANDU Owners Group–IAEA Technical Meeting on the Exchange of Operational Safety Experience of Pressurized Heavy Water Reactors in Cordoba, Argentina, in November 2017, attended by 128 participants from 8 Member States, and a Technical Meeting, in cooperation with OECD/NEA, for sharing of experiences of recent events in NPPs among International Reporting System coordinators in Paris, France, in November 2017, attended by 36 participants from 33 Member States. The Agency conducted five workshops to share operating experience from events at NPPs and their root cause analysis in Vienna, Austria, in October 2017 and February 2018, in Minsk, Belarus, in July 2018, in Moscow, Russian Federation, in April 2018 and in Ljubljana, Slovenia, in May 2018.[46]

47. The Incident Reporting System for Research Reactors (IRSRR) and the Fuel Incident Notification and Analysis System (FINAS) continue to facilitate the exchange of information on nuclear incidents and accidents in Member States. The Agency held a Technical Meeting for National Coordinators of the Incident Reporting System for Research Reactors in Vienna, Austria, in August 2017, attended by 41 participants from 35 Member States. The purpose of the meeting was to share the results of assessments and lessons from recently reported incidents and to identify common trends. Training on event investigation techniques was also provided during the meeting.[47]

48. The Agency held the Fourth International Conference on Nuclear Power Plant Life Management in Lyon, France, in October 2017, in cooperation with the European Commission's Joint Research Centre and the Electric Power Research Institute. Over 350 participants representing 32 Member States and 4 international organizations participated in the Conference. The outcomes of the meeting

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[44] This relates to operative paragraphs 12, 44 and 54 of resolution GC(61)/RES/8.

[45] This relates to operative paragraphs 4, 14 and 44 of resolution GC(61)/RES/8.

[46] This relates to operative paragraphs 14 and 55 of resolution GC(61)/RES/8.

[47] This relates to operative paragraphs 14, 54 and 55 of resolution GC(61)/RES/8.

emphasized the importance of continuous safety improvements, a strong safety culture and operating experience.[48]

49. Representatives from 22 Member States attended the International Generic Ageing Lessons Learned (IGALL) Phase 3 Steering Committee meeting held in Vienna, Austria, in December 2017. The purpose of the meeting was to discuss and approve proposals by IGALL working groups for enhancement of IGALL ageing management programmes, time-limited ageing analyses and ageing management review tables as well as directions for IGALL Phase 4 work in 2018–19. Member States and international organizations participated in three IGALL Phase 4 working group meetings, two in Vienna, Austria, in June 2018 and one in Washington DC, United States of America, in June 2018. The Agency organized four related workshops in Buenos Aires, Argentina, in November 2017, Metsamor, Armenia, in October 2017, Qinshan, China, in March 2018 and Koeberg, South Africa, in November 2017.[49]

50. The Agency conducted a peer review mission on ageing management of research reactors based on SALTO methodology in Belgium in November 2017. Six SALTO workshops and preparatory meetings were held in Brazil in November 2017, Bulgaria in January 2018, Finland in August 2017, Slovenia in October 2017, Sweden in August 2017 and Ukraine in July 2017. Three workshops on ageing management and long-term operation were held in Buenos Aires, Argentina, in September 2017, Bushehr, the Islamic Republic of Iran, in January 2018 and Moscow, Russian Federation, in July 2017. The Agency held a Technical Meeting on Research Reactor Ageing Management, Refurbishment and Modifications in Vienna, Austria, in November 2017, attended by 34 participants from 28 Member States. The participants shared knowledge and experiences related to physical ageing management and obsolescence management in research reactors including modernization projects.[50]

51. The Agency conducted 17 expert missions and capacity building workshops in the framework of SEED in Egypt in August and November 2017, Ghana in November 2017, Jordan in October 2017 and May 2018, Kazakhstan in March 2018, Malaysia in September and November 2017 and April 2018, Nigeria in November 2017, Pakistan in March 2018, Philippines in May 2018, Slovenia in November 2017, Sri Lanka in May 2018, Sudan in March 2018, Thailand in September 2017 and Turkey in March 2018. A regional workshop for Europe on external hazard assessment, design and safety assessment was conducted in Vienna, Austria, in January 2018 and a regional workshop for Asia on site evaluation for nuclear installations was conducted in Daejeon, Republic of Korea, in April 2018. The Agency also held a Technical Meeting in Cadarache, France, in May 2018 on Best Practices in Physics-Based Fault Rupture Models for Seismic Hazard Assessment of Nuclear Installations: Issues and Challenges towards Full Seismic Risk Analysis and a Technical Meeting on the Design and Reassessment of Nuclear Installations for Protection against External Hazards in Vienna, Austria, in June 2018, attended by 58 participants from 37 Member States. The Agency issued the following publications: *Assessment of Vulnerabilities of Operating Nuclear Power Plants to Extreme External Events* (IAEA-TECDOC-1834) in December 2017; *Best Practices in Physics Based Fault Rupture Models for Seismic Hazard Assessment of Nuclear Installations* (IAEA-TECDOC-1833) in January 2018; and *Safety Aspects of Nuclear Power Plants in Human Induced External Events: Assessment of Structures* (Safety Report Series No. 87) in February 2018.[51]

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[48] This relates to operative paragraphs 10 and 57 of resolution GC(61)/RES/8.

[49] This relates to operative paragraph 57 of resolution GC(61)/RES/8.

[50] This relates to operative paragraphs 49, 50, 54 and 57 of resolution GC(61)/RES/8.

[51] This relates to operative paragraphs 45 of resolution GC(61)/RES/8.

52. The Agency developed a methodology for multi-unit probabilistic safety assessment (PSA) which is used as a base for an ongoing case study on the subject.[52]

53. The Agency held a Technical Meeting on the Development of a Methodology for Aggregation of Various Risk Contributors for Nuclear Facilities, in Vienna, Austria, in March 2018, attended by 45 participants from 24 Member States. The participants exchanged experience in the field of risk aggregation, including various sources of radioactivity and operational states, multi-unit sites and a full spectrum of hazards.[53]

54. The Agency held a Regional Workshop on Periodic Safety Assessment Programmes in Bratislava, Slovakia, in May 2018. The purpose of the workshop was to improve awareness of the Agency's safety standards in relation to NPPs, safety factors included in the periodic safety reviews (PSR), as well as Member States' experience and practices regarding PSRs for NPPs.[54]

55. The Agency held a Technical Meeting on Current Approaches in Member States to the Analysis of Design Extension Conditions (DEC) for New Nuclear Power Plants in Vienna, Austria, in March 2018. The meeting provided a platform for technical discussions on approaches to defining and analysing DEC, especially those involving core melting, and input for an IAEA Technical Document under development on the same topic.[55]

56. In July 2017, the Agency published a Technical Document entitled *Assessment of Equipment Capability to Perform Reliably under Severe Accident Conditions* (IAEA-TECDOC-1818). This publication provides the technical basis for the reliable performance of electrical instrumentation and control equipment during a severe accident. The Agency held a Technical Meeting for the Development of a Technical Document on Developing Design Criteria for a Diverse Actuation System for Nuclear Power Plants in Vienna, Austria, in July 2017. The meeting was attended by 29 participants from 17 Member States.[56]

57. The Agency held a Technical Meeting on the Implementation and Integration of Accident Management Guidelines and Interface with Emergency Preparedness and Response in Vienna, Austria, in September 2017, attended by 39 participants from 23 Member States and 2 international organizations. The participants shared good practices and experiences concerning implementation of severe accident management guidelines and their interface with emergency preparedness and response arrangements.[57]

58. The Agency continued coordinating a study on how the *Safety of Nuclear Power Plants: Design* (IAEA Safety Standards Series No. SSR-2/1 (Rev. 1)) is applicable to small and medium sized or modular reactors (SMRs) intended for near term deployment. The study has focused on two types of land based SMR technologies (light water reactors and high temperature gas-cooled reactors) and consists of assessments by organizations from the Agency's Member States regarding how and to what extent the existing safety requirements, which are mainly applicable to light water reactors, might be applicable to these two SMR technologies. The Agency also held a Technical Meeting on Challenges in the Application of the Design Safety Requirements for Nuclear Power Plants to Small and Medium

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[52] This relates to operative paragraph 60 of resolution GC(61)/RES/8.

[53] This relates to operative paragraph 60 of resolution GC(61)/RES/8.

[54] This relates to operative paragraph 44 of resolution GC(61)/RES/8.

[55] This relates to operative paragraphs 44 and 45 of resolution GC(61)/RES/8.

[56] This relates to operative paragraphs 62 and 63 of resolution GC(61)/RES/8.

[57] This relates to operative paragraphs 63 and 64 of resolution GC(61)/RES/8.

Sized Reactors in Vienna, Austria, in September 2017, attended by 50 participants from 36 Member States and two international organizations. The participants exchanged information on national views regarding the development and deployment of SMRs and on the challenges involved and lessons learned in the application of design safety requirements to advanced reactor technologies such as SMRs. In cooperation with 18 Member States, the Agency initiated a coordinated research project on defining approaches and methodologies for the sizing of emergency planning zones for SMRs. The first coordination meeting was held in Vienna, Austria, in May 2018 to exchange information and discuss the planned outcomes.[58]

59. The Agency facilitated the organization of two meetings of the Small Modular Reactor Regulators' Forum in Vienna, Austria, in November 2017 and March 2018. The Forum initiated the second phase by establishing three working groups: licensing; design and safety analysis; and manufacturing, commissioning and operations. The Agency made available the report from the first phase of the Forum.[59, 60]

60. The Agency participated as an observer in the 25th annual meeting of the Forum of the State Nuclear Safety Authorities of the Countries Operating WWER Type Reactors (WWER Regulators' Forum) in Ostrovets, Belarus, in June 2018. The participants reported on the most safety significant and relevant events at the water cooled, water moderated power reactors (WWERs), and shared information on the latest developments in the area of nuclear and radiation safety regulation. The Agency also organized the annual meeting of the CANDU Senior Regulators Group in Buenos Aires, Argentina, in November 2017. The Group discussed proposals for sharing of experience amongst operators of Canada Deuterium–Uranium (CANDU) reactors, in particular for decision making on regulatory oversight during refurbishments, long-term operation, decommissioning and radioactive waste management.[61]

E. Radiation Safety and Environmental Protection

61. The Agency held a Technical Meeting on Preventing Unintended and Accidental Exposures in Nuclear Medicine in Vienna, Austria, in May 2018, attended by 45 representatives from 33 Member States and 9 international organizations. The purpose of the meeting was to develop an action plan for strengthening the prevention of unintended and accidental exposures in diagnostic and therapeutic nuclear medicine procedures in Member States. The Agency held a regional training course on radiation protection in high dose rate brachytherapy in San Lorenzo, Paraguay, in November 2017. The course addressed strategies for optimization of radiation protection and safety in high dose rate brachytherapy. A national workshop to assist authorities with the implementation of the International Basic Safety Standards (IAEA Safety Standards Series No. GSR Part 3) was conducted in Havana, Cuba, in April 2018.[62]

62. The Agency initiated the Regulatory Infrastructure Development Project to support Member States in Africa, Latin America and the Caribbean in establishing and implementing a national radiation safety regulatory infrastructure in line with the Agency's safety standards. A meeting to launch

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[58] This relates to operative paragraphs 45 and 65 of resolution GC(61)/RES/8.

[59] See: https://www.iaea.org/topics/small-modular-reactors/smr-regulators-forum.

[60] This relates to operative paragraphs 10, 12 and 65 of resolution GC(61)/RES/8 and operative paragraphs [include NE RES].

[61] This relates to operative paragraphs 12, 57 and 110 of resolution GC(61)/RES/8.

[62] This relates to operative paragraphs 17, 66 and 74 of resolution GC(61)/RES/8.

the project was held in Nairobi, Kenya, in July 2017 for the Africa region and in Montevideo, Uruguay, in November 2017 for the Latin America and the Caribbean region.[63]

63. The Agency continued to support the Information System on Occupational Exposure (ISOE) jointly operated by the IAEA and the OECD/NEA Technical Centre. One new utility member from the United Arab Emirates joined the ISOE.[64]

64. The Information System on Occupational Exposure in Medicine, Industry and Research — Industrial Radiography (ISEMIR-IR), a forum to exchange experiences and optimize radiation protection for industrial radiography sectors, was updated and released online.[65, 66]

65. The Agency held a regional workshop on dose assessment in overexposure situations in Buenos Aires, Argentina, in October 2017. The purpose of the workshop was to discuss the current methodologies and regional practices for dose assessment of workers after an overexposure situation and to present the results of a regional intercomparison of physical, biological, retrospective and computational dosimetry performed in 2016. The Agency continued its activities within the ten-year project Enhancing Radiation Safety through Efficient and Modern Dosimetry (RADSED) launched in 2016. Dosimetry methodologies based on applications of radio photoluminescence (external dosimetry) and on inductively coupled mass spectrometry (internal dosimetry) have been identified and evaluated.[67]

66. In line with the outcomes of the 2014 International Conference on Occupational Radiation Protection: Enhancing the Protection of Workers — Gaps, Challenges and Developments, the Agency, in cooperation with the International Labour Organization (ILO), organized three regional workshops on occupational radiation protection in Ibaraki, Japan, in October 2017, Antananarivo, Madagascar, in December 2017 and Ankara, Turkey, in April 2018 to promote the application of the International Basic Safety Standards (IAEA Safety Standards Series No. GSR Part 3) and the Safety Guide *Occupational Radiation Protection* (IAEA Safety Standards Series No. GSG-7).[68]

67. A draft Safety Report entitled *Occupational Radiation Protection in Uranium Mining and Processing Industry* was submitted for publication in February 2018. This document explains how to apply a graded approach to the protection of workers in the uranium mining and processing industry. The Agency held two consultancy meetings in Vienna, Austria, in November 2017 and March 2018 to finalize a first draft of a Technical Document on the application of graded approach for NORM residues management.[69]

68. The Agency organized the International Conference on Radiation Protection in Medicine: Achieving Change in Practice in Vienna, Austria, in December 2017. This was attended by 534 participants from 96 Member States and 16 international organizations, co-sponsored by the World Health Organization (WHO) and the Pan American Health Organization. The participants discussed, inter alia, strengthening the implementation of the Bonn Call for Action to further improve radiation protection in medicine. The Agency held a Technical Meeting on Experiences in the Implementation of the Bonn Call for Action in Vienna, Austria, in March 2018, attended by 41 participants from

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[63] This relates to operative paragraph 3 of resolution GC(61)/RES/8.

[64] This relates to operative paragraph 67 of resolution GC(61)/RES/8.

[65] https://nucleus.iaea.org/isemir/IR/Home/LandingPage.

[66] This relates to operative paragraph 68 of resolution GC(61)/RES/8.

[67] This relates to operative paragraph 69 of resolution GC(61)/RES/8.

[68] This relates to operative paragraphs 44 and 70 of resolution GC(61)/RES/8.

[69] This relates to operative paragraphs 72 and 104 of resolution GC(61)/RES/8.

21 Member States and 9 international organizations. The purpose of the meeting was to exchange information concerning the finalization of an online Bonn Call for Action Implementation Toolkit.[70]

69. The Agency held a training course on radiation protection of patients in diagnostic imaging for Member States in the Asia and the Pacific Region in Vienna, Austria, in December 2017, attended by 23 participants from 15 Member States. The training course, held in co-operation with the WHO, emphasized, inter alia, responsibilities in the medical area to support justification of medical exposures in diagnostic imaging through the implementation of imaging referral guidelines. The Agency also held a Regional Workshop on Justification and Appropriate Use of Imaging in Zagreb, Croatia, October 2017, in cooperation with the European Society of Radiology and the WHO. The workshop, attended by 45 participants from 20 Member States, identified means and good practices for improving justification of medical exposures.[71]

70. The Agency held a Technical Meeting on Strengthening Safety Culture in Radiotherapy through the Use of Incident Learning Systems in Vienna, Austria, in October 2017, attended by 40 participants from 30 Member States and 10 international organizations. The meeting encouraged the use of incident learning systems in radiotherapy, such as the Safety in Radiation Oncology (SAFRON) voluntary reporting and learning system, developed by the Agency to strengthen a culture of safety in radiotherapy and further international collaboration in this area. The meeting also encouraged the use of incident learning systems to strengthen a culture of safety in radiotherapy and to develop a strategy to alert medical personnel regarding medical events with transboundary implications.[72]

71. In November 2017, the Safety Standards Committees approved the draft Safety Guide entitled *Radiation Safety of X-ray Generators and Radiation Sources Used for Inspection Purposes and for Non-Medical Imaging* for submission to the CSS. The draft Safety Guide was presented at the Airport 2017 — IT, Security & Disaster and Crisis Management Conference held in Vienna, Austria, in September 2017.[73]

72. The Agency finalized the Safety Report on the design and conduct of indoor radon surveys. The report was prepared in cooperation with the WHO. The Agency continued to assist Member States in evaluating the need for a national action plan to control exposure to radon, including a regional training course held in November 2017 in cooperation with the University of Cantabria in Ciudad Rodrigo, Spain, at the university's radon test facility. The training provided 20 architects and building professionals from 13 Member States in Europe with knowledge and experience of methods to reduce radon concentrations in existing buildings.[74]

73. The Agency organized two consultancy meetings in Vienna, Austria, in October and December 2017 to review the state of knowledge on levels of natural radionuclides in food and to develop guidance on the control of both natural and artificial radionuclides in food and drinking water. The meetings were organized in cooperation with the Food and Agriculture Organization of the United Nations and the WHO.[75]

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[70] This relates to operative paragraph 74 of resolution GC(61)/RES/8.

[71] This relates to operative paragraph 75 of resolution GC(61)/RES/8.

[72] This relates to operative paragraphs 6, 7 and 76 of resolution GC(61)/RES/8.

[73] This relates to operative paragraph 77 of resolution GC(61)/RES/8.

[74] This relates to operative paragraph 78 of resolution GC(61)/RES/8.

[75] This relates to operative paragraph 79 of resolution GC(61)/RES/8.

74. The Agency held a consultancy meeting in Vienna, Austria, in February 2018 to develop the Safety Guide on the *Application of the Concept of Exemption* (DS499), including trade in non-food commodities. The Agency held a workshop in Vienna, Austria, in November 2017 on the derivation of specific clearance levels for materials suitable for disposal in landfills. The Agency also completed a project on derivation of specific clearance levels in materials as suitable for disposal in landfills and initiated a project on derivation of activity levels in material with residual radioactivity for reuse and recycling for civil engineering purposes. The Agency held two consultancy meetings on the management of large amount of waste containing residual levels of radionuclides and on the derivation of specific clearance for materials that are suitable for reuse in Vienna, Austria, in November 2017 and March 2018.[76]

75. The Agency held a consultancy meeting in Vienna, Austria, in February 2018 to discuss the structure and content of a new Safety Report provisionally entitled *Living and Working in Areas Affected by Past Nuclear or Radiological Events and Activities: Experiences from Affected Areas*. The Safety Report will deal with, inter alia, national experiences in the long-term management of contaminated sites, and the relationship between national authorities and relevant stakeholders in the decision making process related to radiological and non-radiological risks.[77]

76. The Agency initiated a Coordinated Research Project entitled Integrating Perceived and Actual Risk in Stakeholder Communications (IPARSC). This project is intended to support assessment of risk perception and effective risk communication in existing exposure situations, such as uranium legacy sites or post-accident situations, including cases where public acceptance is a prerequisite to implementing radiation protection, remediation and waste management measures.[78]

F. Transport Safety

77. The Agency finalized a revision of the document GOV/1998/17 entitled *Safety of Transport of Radioactive Material* in which the international instruments and regulations relating to the transport of radioactive material are identified.[79]

78. The Agency held a consultancy meeting in Vienna, Austria, in March 2018 to review Member States' comments and finalize a draft revision of the Safety Guide *Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material* (2018 Edition) (DS496). The Agency held a consultancy meeting in Vienna, Austria, in October–November 2017 to finalize a draft Safety Guide entitled *Format and Content of the Package Design Safety Report for the Transport of Radioactive Material* (DS493). The draft was revised based on Member States' comments and taking into account the current revised edition of Safety Requirement *Regulations for the Safe Transport of Radioactive Material* (IAEA Safety Standards Series No. SSR-6 (Rev. 1)).[80]

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[76] This relates to operative paragraphs 44, 80 and 84 of resolution GC(61)/RES/8.

[77] This relates to operative paragraphs 44 and 82 of resolution GC(61)/RES/8.

[78] This relates to operative paragraph 82 of resolution GC(61)/RES/8

[79] This relates to operative paragraph 86 of resolution GC(61)/RES/8.

[80] This relates to operative paragraph 44 of resolution GC(61)/RES/8.

79. The Agency held the third and fourth consultancy meeting to address transport security and safety interfaces for low-activity radioactive materials in Vienna, Austria, in August 2017 and January 2018 to further develop a Technical Document on this subject.[81]

80. The Agency conducted an expert mission in Peru in October 2017 to discuss the transport safety regulations requirements and to provide guidance on how to request a Transport Safety Appraisal Service (TranSAS) review. The Agency also conducted a train-the-trainers course on transport of radioactive material in Madrid, Spain, in September 2017 and a regional training course on transport safety for the Latin America and the Caribbean region in Montevideo, Uruguay, in November-December 2017. A revision of the training manual for transport safety was completed in 2017. Three e-learning modules on transport safety were produced in Arabic, English and French. These modules were made available on the GNSSN platform.[82, 83]

G. The Safety of Spent Fuel and Radioactive Waste Management

81. The Agency continued to encourage its Member States to become Contracting Parties to the Joint Convention and to encourage active participation in the peer review process and contribute to the effectiveness of that process. In the reporting period, Cuba, Mexico and Serbia adhered to the Joint Convention. The Agency organized a side event during the 61st regular session of the General Conference to celebrate the 20th anniversary of the adoption of the Joint Convention. Representatives from five Contracting Parties shared experiences and highlighted the role of the Convention as the only legally binding international instrument to address, on a global scale, the safe management of spent fuel and radioactive waste. A regional workshop to promote the Joint Convention in the Africa region was conducted in Rabat, Morocco, in December 2017. The Agency held the Sixth Review Meeting of the Joint Convention in Vienna, Austria, in May–June 2018, attended by more than 850 delegates from 69 Contracting Parties and 4 observers: two Signatory States of the Joint Convention, Lebanon and the Philippines; the Islamic Republic of Iran; and the OECD/NEA. The summary report was made available on the Agency's website.[84, 85]

82. The Contracting Parties reviewed national reports in Country Group sessions and identified that good progress was being made in many areas of spent fuel and radioactive waste safety. Open-Ended Working Group (OEWG) sessions were held to discuss proposals submitted by Contracting Parties. At the Plenary the Contracting Parties adopted proposals to improve the effectiveness of the review process addressing the submission and the content of the national reports, the submission of proposals to be considered at review meetings, as well as videoconferencing. Finally, the Contracting Parties decided by consensus to hold an Extraordinary Meeting prior to the Organisational Meeting of the Seventh Review Meeting, with the view to discuss possible ways to improve procedural mechanisms of the Joint Convention.[86]

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[81] This relates to operative paragraph 9 of resolution GC(61)/RES/8.

[82] See: https://gnssn.iaea.org/main/getr/Pages/eLearning-Transport-Safety.aspx.

[83] This relates to operative paragraphs 9, 95 and 109 of resolution GC(61)/RES/8.

[84] See: https://www-ns.iaea.org/conventions/results-meetings.asp?s=6&l=40.

[85] This relates to operative paragraphs 23 and 25 of resolution GC(61)/RES/8.

[86] This relates to operative paragraphs 23 and 25 of resolution GC(61)/RES/8.

83. During the second week of the Review Meeting, two sequential topical sessions were held. The first focussed on recent developments and challenges in the safe management of disused sealed radioactive sources. The second addressed general safety issues, challenges and public acceptance aspects associated with the storage and disposal of higher-level radioactive waste. In addition, a side event on the Uranium Legacy Sites — The Environmental Remediation Programme in Central Asia was hosted by the European Union.[87]

84. In 2017, the Agency initiated a four-year project on responsible and safe management of radioactive waste and spent fuel to follow up on the conclusions of the 2016 International Conference on the Safety of Radioactive Waste Management. The purpose of the project is to assist Member States in the management of radioactive waste and the implementation of national strategies for its long-term management. As part of the project, the Agency held a workshop on responsible and safe management of radioactive waste and spent fuel in Vienna, Austria, in September 2017, attended by 37 participants from 30 Member States.[88]

85. The Agency held a national workshop on policy and strategy for radioactive waste management in Shanghai, People's Republic of China, in July 2017, attended by 20 participants. The Agency also held eight assistance activities, including workshops, expert missions, and training courses in support of Member States' programmes on safety of spent fuel and radioactive waste management. These activities were held with the support of the technical cooperation programme and the Asian Nuclear Safety Network (ANSN).[89]

86. The Agency held the first international meeting of the Forum on the Safety of Near Surface Disposal in Vienna, Austria, in October–November 2017, attended by 48 participants from 32 Member States. The participants identified four topics to be included in the Forum's future work programme: use of the safety case in decision making on near surface disposal; regulatory experiences and processes; post-closure safety assessment; and communication of the safety case. The Agency also held a Technical Meeting to establish a working group on the use of monitoring programmes in the safe development of geological disposal facilities for radioactive waste in Vienna, Austria, in December 2017, attended by 28 participants from 19 Member States. The meeting discussed the draft Terms of Reference of the Working Group and suggestions for improving the structure and content of the future Agency document to be developed in accordance with the working group's objectives. The Agency finalized a Technical Document provisionally entitled *Managing Integration of Post-closure Safety and Pre-closure Activities in the Safety Case for Geological Disposal*.[90]

87. The Agency held two meetings of the International Project on the Interaction and Roles of Regulators and Operators in the Licensing Process for the Development of Safe Geological Disposal Facilities in Vienna, Austria, in November 2017 and April 2018. The meeting enabled a common understanding of, and supported the development of guidance on, the types of preparation that a regulatory body should consider at the different stages of a geological disposal programme.[91]

88. The Agency organized a plenary meeting of the International Project on Demonstration of the Operational and Long-Term Safety of Geological Disposal Facilities for Radioactive Waste (GEOSAF Part III) in Vienna, Austria, in June 2018. The meeting discussed the results and draft report

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[87] This relates to operative paragraphs 23 and 25 of resolution GC(61)/RES/8.

[88] This relates to operative paragraphs 17 and 97 of resolution GC(61)/RES/8.

[89] This relates to operative paragraphs 17 and 97 of resolution GC(61)/RES/8.

[90] This relates to operative paragraph 98 of resolution GC(61)/RES/8.

[91] This relates to operative paragraph 98 of resolution GC(61)/RES/8.

on GEOSAF Part III. The Agency also held two Technical Meetings of the Working Groups of the International Project on Demonstration of the Operational and Long-Term Safety of Geological Disposal Facilities for Radioactive Waste in Vienna, Austria, in December 2017 and April 2018. The purpose of the meeting was to share information on the provisional outcomes of the GEOSAF Part III project collected by the individual working groups.[92]

89. The Agency held a Technical Meeting to establish a working group on the use of monitoring programmes for radioactive waste geological disposal facilities in Vienna, Austria, in December 2017. The new working group will take into account the outcomes of both the Agency's project GEOSAF and the European Union's Modern2020 project on the development and demonstration of monitoring strategies and technologies for geological disposal, in particular regarding practical implementation of the guidance in the Agency's Specific Safety Guide entitled *Monitoring and Surveillance of Radioactive Waste Disposal Facilities* (IAEA Safety Standards Series No. SSG-31) and in a Technical Document entitled *Monitoring of Geological Repositories for High Level Radioactive Waste* (IAEA-TECDOC-1208).[93]

90. The Agency held two Technical Meetings on the development of an approach to define generic test conditions for dual purpose casks in Vienna, Austria, in October 2017 and April 2018, attended by 43 participants from 24 Member States. The purpose of the meetings was to address generic test conditions for dual purpose casks for spent nuclear fuel and draft terms of reference for a new international project on this subject. The Agency also held a consultancy meeting in Vienna, Austria, in November 2017 to further revise the Safety Guide entitled *Storage of Spent Nuclear Fuel* (DS489).[94]

H. Safety in Uranium Mining and Processing, Decommissioning and Environmental Remediation

91. The Agency held the second Technical Meeting of the second phase of the Modelling and Data for Radiological Impact Assessments (MODARIA II) programme in Vienna, Austria, in October-November 2017, attended by 150 participants from 47 Member States. This programme builds on experience and transfers knowledge in the field of assessment of radiation doses from radionuclides released into or already present in the environment.[95]

92. The International Project on Managing the Decommissioning and Remediation of Damaged Nuclear Facilities (DAROD) concluded with its final workshop held in Penrith, United Kingdom, in October 2017. The workshop, attended by 35 participants from 20 Member States, was hosted by the United Kingdom's Nuclear Decommissioning Authority and included a visit to the nuclear fuel reprocessing and nuclear decommissioning site at Sellafield. The workshop focussed on strategic planning, the regulatory framework and technical solutions for decommissioning and remediation of accident-damaged and legacy nuclear facilities.[96]

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[92] This relates to operative paragraph 98 of resolution GC(61)/RES/8.

[93] This relates to operative paragraphs 44 and 98 of resolution GC(61)/RES/8.

[94] This relates to operative paragraphs 44 and 99 of resolution GC(61)/RES/8.

[95] This relates to operative paragraphs 101 of resolution GC(61)/RES/8.

[96] This relates to operative paragraph 101 of resolution GC(61)/RES/8.

93. The Agency held a Technical Meeting to launch the International Project on Decommissioning of Small Facilities in Vienna, Austria, in June 2018, attended by 41 from 33 Member States. The project will focus on national infrastructures for planning and decommissioning of small medical, industrial and research facilities, and the application of relevant safety standards.[97]

94. The Agency held two consultancy meetings in Vienna, Austria, in February and June 2018 to develop a new Safety Guide entitled *Application of the Concept of Clearance* (DS500) as a follow-up to the outcomes of the International Conference on Advancing the Global Implementation of Decommissioning and Environmental Remediation Programmes. The new Safety Guide will expand the scope of the Safety Guide *Application of the Concepts of Exclusion, Exemption and Clearance* (IAEA Safety Standards Series No. RS-G-1.7).[98]

95. Also building on the outcomes of the same conference, the Agency held a Technical Meeting on the planning and implementation of long-term institutional controls and the release of sites from regulatory control in Vienna, Austria, in November–December 2017. Twenty participants from 15 Member States discussed practices and experiences in dealing with regulatory, technical, societal and financial aspects related to the topic. The outcome of the meeting will be used to revise the Safety Guide entitled *Release of Sites from Regulatory Control on Termination of Practices* (IAEA Safety Standards Series No. WS-G-5.1), and to develop a publication on long-term institutional controls and the related new training materials.[99]

96. In addition, again following up on the same conference, the Agency continued the revision of training materials on decommissioning safety and is developing new decommissioning training modules on regulatory supervision, characterization, planning, safety assessment, and release of sites from regulatory control. The Agency held two consultancy meetings to finalize the revision of a basic training module for decommissioning safety in Vienna, Austria, in March and June 2018 and a consultancy meeting to develop a dedicated training module for regulatory supervision in Vienna, Austria, in April 2018.[100]

97. The Agency held a Technical Meeting to launch a new International Forum on Safety Infrastructure for Uranium Production and Management of NORM Residues in Vienna, Austria, in June 2018, attended by 36 participants from 27 Member States. This project provides a forum to promote a regulatory capacity for safe and sustainable uranium production, including management of NORM residues, and set the strategic direction of future work on the safety of uranium production and NORM residues management. The project aims to assist Member States with the regulatory aspects of the management of NORM residues, including the regulatory programme for Member States commencing uranium production for the first time.[101]

98. In October 2017, the Agency published a Technical Document entitled *Management of Large Volumes of Waste Arising in a Nuclear or Radiological Emergency* (IAEA-TECDOC-1826). The publication focuses on waste management planning as part of overall emergency preparedness. It incorporates lessons learned from previous emergencies, considerations of the range of impacts of potential future emergencies, and experiences from legacy sites. As part of the cooperation established between the Agency and the Fukushima Prefecture, two meetings were held in Fukushima Prefecture,

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[97] This relates to operative paragraph 101 of resolution GC(61)/RES/8.

[98] This relates to operative paragraphs 101 and 102 of resolution GC(61)/RES/8.

[99] This relates to operative paragraphs 101 and 102 of resolution GC(61)/RES/8.

[100] This relates to operative paragraphs 102 and 109 of resolution GC(61)/RES/8.

[101] This relates to operative paragraph 104 of resolution GC(61)/RES/8.

Japan, in July and December 2017. The purpose of the meetings was to assist the Fukushima Prefecture in the management of waste from remediation activities. The Agency concluded an extrabudgetary project on the development of clearance levels for the safe disposal of materials through landfill disposal, produced a draft report and launched a follow-up project to further address clearance for the reuse and recycling of materials.[102]

99. The Agency's Coordination Group for Uranium Legacy Sites (CGULS) developed the *Strategic Master Plan for Environmental Remediation of Uranium Legacy Sites in Central Asia* (SMP). The SMP provides a strategy for remediation of uranium legacy sites in Central Asia and a master plan for implementing the strategy. During the 61st regular session of the General Conference, parties collaborating on the development of the SMP signed a Preface to the document, stating their support for a coordinated approach to remediation of the uranium legacy sites in Central Asia. The SMP was endorsed on 18 September 2017 by representatives of Kyrgyzstan, Tajikistan and Uzbekistan as well as by representatives of the European Commission and the European Bank for Reconstruction and Development. Endorsement of the SMP by the Economic Affairs Committee of the Commonwealth of Independent States followed on 22 March 2018.[103]

100. The Agency continued to respond to Member States' requests for specific assistance through the Coordination Group for Uranium Legacy Sites. The Agency held three consultancy meetings in Vienna, Austria, to review integrated environmental impact assessments and feasibility studies for remediation of uranium legacy sites in October 2017 for sites in Uzbekistan, and in November–December 2017 and in January–February 2018 for sites in Tajikistan. The annual meeting of the Coordination Group for Uranium Legacy Sites was held in Tashkent, Uzbekistan, in June 2018.[104]

101. In the framework of the International Working Forum on Regulatory Supervision of Legacy Sites, the Agency held a Workshop on Planning for Remediation of Legacy Sites in Bessines-sur-Gartempe, France, in October 2017. Part of the event was held jointly with the Uranium Mining and Remediation Exchange Group. The workshop, attended by 45 participants from 20 Member States and one international organization, included a site visit to several former remediated uranium mining and milling sites in the Bessines-sur-Gartempe area. The workshop focused on status, achievements and challenges for management of sites after remediation, including possible options for site reuse.[105]

I. The Safe Management of Radioactive Sources

102. The Agency conducted eleven missions to provide assistance in the management and recovery of disused sources in Chile in March 2018, Cuba in April 2018, Cyprus in November 2017, Ghana in July 2017 and January 2018, Honduras in July 2017, Indonesia in February 2018, the Islamic Republic of Iran in October 2017, Malaysia in July and September 2017, and Slovenia in November 2017. A number of operations were conducted to remove disused sealed radioactive sources (DSRSs) from user premises and to place them in safe and secure storage conditions. Thirty DSRSs in Category 1 and 2 were removed from six Member States: two disused teletherapy sources from Bolivia, five from Ecuador, three from Lebanon, five from Paraguay, eight from Peru and seven from Uruguay. The

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[102] This relates to operative paragraph 105 of resolution GC(61)/RES/8.

[103] This relates to operative paragraphs 12 and 106 of resolution GC(61)/RES/8.

[104] This relates to operative paragraph 106 of resolution GC(61)/RES/8.

[105] This relates to operative paragraph 107 of resolution GC(61)/RES/8.

Agency initiated further projects for the removal of Category 1 and 2 DSRSs in Albania, Bahrain, Burkina Faso and the former Yugoslav Republic of Macedonia.[106]

103. The Agency continued to assist Member States that are pursuing borehole configurations as an option for the disposal of disused sealed radioactive sources. In September 2017, a Technical Document entitled *Generic Post-closure Safety Assessment for Disposal of Disused Sealed Radioactive Sources in Narrow Diameter Boreholes* was published. The Agency is developing the equipment required to implement operations needed for the borehole disposal of DSRS and as part of this effort a pilot test to demonstrate the complete operational cycle for DSRS borehole disposal was conducted in Pretoria, South Africa, in September 2017.[107]

104. The Agency continued to support Member States in establishing or upgrading their national source registers through the Regulatory Authority Information System (RAIS). National expert missions on the use and customization of RAIS were conducted in eight Member States: Bahrain; Jamaica; Kuwait; Mongolia; Morocco; Qatar; Seychelles and Sudan, and a regional training course took place in Tunis, Tunisia, in November 2017.[108]

105. In April 2018, the Agency published the *Guidance on the Management of Disused Radioactive Sources*, supplementary to the Code of Conduct on the Safety and Security of Radioactive Sources as approved by the Board of Governors and endorsed by the General Conference. The guidance is based on the Agency's safety standards and nuclear security guidance, and it addresses safety and security in an integrated manner. The report of the Chairman of the Open-ended Meeting of Legal and Technical Experts on the Implementation of the Code of Conduct on the Safety and Security of Radioactive Sources, which took place in June 2017, was made available on the Agency's website[109]. The Agency participated in the Annual General Meeting of the International Source Suppliers and Producers Association in Bethesda, United States of America, in February 2018 at which the Agency presented the report of the Chairman of the Open-ended Meeting of Legal and Technical Experts on the Implementation of the Code of Conduct on the Safety and Security of Radioactive Sources and promoted the new supplementary *Guidance on the Management of Disused Radioactive Sources*.[110]

106. As of 30 June 2018, 137 States had made a political commitment to implement the Code of Conduct on the Safety and Security of Radioactive Sources, of which 114, including 6 States in the reporting period, 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 143 States have nominated points of contact to facilitate the export and import of radioactive sources. Three States have notified the Director General of their intention to act in a harmonized manner and in accordance with the Code's supplementary Guidance on the Management of Disused Radioactive Sources. The Agency held an Open-ended Meeting of Legal and Technical Experts on Implementation of the Guidance on the Import and Export of Radioactive Sources in Vienna, Austria, in June 2018. The meeting provided an opportunity for exchange of information among Member States and identified current needs to ensure safe and secure management of radioactive sources during import and export worldwide. The meeting concluded that there is currently no need to initiate the revision of

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[106] This relates to operative paragraph 114 of resolution GC(61)/RES/8.

[107] This relates to operative paragraph 114 of resolution GC(61)/RES/8.

[108] This relates to operative paragraph 115 of resolution GC(61)/RES/8.

[109] See: https://www-ns.iaea.org/downloads/rw/code-conduct/info-exchange/chairman-report-june2017.pdf.

[110] This relates to operative paragraphs 14 and 116 of resolution GC(61)/RES/8.

the *Guidance on the Import and Export of Radioactive Sources* and efforts should be focused on the full and systematic implementation of its current provisions.[111]

107. The Agency finalized a Technical Document on notification, authorization and inspection of safety and security of radiations sources. This Technical Document is the first Agency document to address the implementation of safety requirements and security recommendations in a harmonized way, taking into account differences in States' regulatory infrastructures.[112]

108. The Agency held a regional meeting on the management of radioactivity in scrap metal for recycling and in semi-finished products in Abuja, Nigeria, in June 2018. The purpose of the meeting was to share experience among Member States from the Africa region on regulating and managing radioactivity in scrap metals for recycling and use in semi-finished products.[113]

J. Capacity Building

109. The Agency's Steering Committee on Education and Training in Radiation, Transport and Waste Safety met in Vienna, Austria, in December 2017 to advise the Secretariat on the implementation of the Strategic Approach to Education and Training in Radiation, Transport and Waste Safety 2011–2020[114]. The Steering Committee issued recommendations to analyse the impact of expert missions to assist Member States in establishing their strategies for education and training in radiation, transport and waste safety. The Steering Committee on Regulatory Capacity Building and Knowledge Management held its ninth annual meeting in Vienna, Austria, in December 2017. The Committee discussed the implementation of the Strategic Approach to Education and Training in Nuclear Safety 2013–2020[115]. It also addressed other matters relevant to education and training, such as knowledge management, the methodology for Systematic Assessment of Regulatory Competence Needs (SARCoN), and training on safety leadership and safety culture.[116]

110. Five Postgraduate Educational Courses in Radiation Protection and the Safety of Radiation Sources were conducted in English, French and Spanish at the Agency-affiliated regional training centres in Africa, Asia and Latin America and the Caribbean. Eight train-the-trainers events for radiation protection officers were organized for 105 Member States to develop sustainable national competencies in this topical area in Tirana, Albania, in June 2018, Baku, Azerbaijan, in July 2017, Abidjan, Ivory Coast, in October 2017, Accra, Ghana, in October 2017, Bangkok, Thailand, in October 2017, Montevideo, Uruguay, in March 2018, Hanoi, Viet Nam, in May 2018, and Dushanbe, Tajikistan, in June 2018. The Agency conducted two expert missions to Argentina in July 2017 and April 2018 to review and update the postgraduate course on nuclear safety for the Latin America Region in line with the Agency Basic Professional Training Course on Nuclear Safety (BPTC). A BPTC was held in Daejon, South Korea, in June–July 2017 in the framework of the ANSN. The Agency also continued to organize a range of specialized training events in the field of radiation, transport and waste safety, including 12 training courses in the area of radiation protection of patients in nuclear medicine, interventional

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[111] This relates to operative paragraphs 27 and 117 of resolution GC(61)/RES/8.

[112] This relates to operative paragraph 9 of resolution GC(61)/RES/8.

[113] This relates to operative paragraphs 12 and 118 of resolution GC(61)/RES/8.

[114] Note by the Secretariat 2010/44: https://www-ns.iaea.org/downloads/rw/training/strategic-approach2011-2020.pdf.

[115] Note by the Secretariat 2013/9: https://www-ns.iaea.org/downloads/ni/training/strategy2013-2020.pdf.

[116] This relates to operative paragraph 109 of resolution GC(60)/RES/9.

radiology, and safety and accident prevention in radiotherapy held in Africa, Europe and Latin America. The Agency held two Schools for Drafting Regulations on Radiation Safety in Vienna, Austria, in July 2017 for the Europe region and in August 2017 for the Asia and the Pacific region. In November 2017, the Agency started a project for establishing an online School for Drafting Safety Regulations to assist Member States in developing or revising national regulations for radiation, waste, transport and nuclear safety, and emergency preparedness and response.[117]

111. Member States continued to revise and update their national information in Thematic Safety Area 6 (TSA 6) — Education and Training in Radiological Protection and Safety — of RASIMS[118]. The TSA 6 profiles of 74 Member States were updated.[119]

112. The Agency conducted an advisory mission to Uganda in August 2017 to provide advice on the establishment of a national strategy and policy for education and training in radiation protection and safety.[120]

113. The Agency conducted several training courses to deliver selected components of a comprehensive training programme on the safety and regulatory aspects of uranium mining and production, with a focus on the remediation of legacy uranium sites and waste management. Training courses were held in Bishkek, Kyrgyzstan, in November 2017 and Dushanbe, Tajikistan, in September 2017.[121]

114. Two hands-on inspector training courses on regulatory inspection and enforcement were held at the Zwentendorf NPP, Austria, in August–September 2017 and May 2018. The Agency continued the development of a Technical Document to provide inspectors with guidance and methods for gathering information to support specific technical and observation skills for the inspection of NPPs.[122]

115. The Agency continued to provide support for safety assessment capacity building to countries embarking on nuclear power programmes. The Agency enhanced the Safety Assessment Education and Training (SAET) Programme, in support of the updated Safety Requirements *Safety of Nuclear Power Plants: Design* (IAEA Safety Standards Series No. SSR-2/1 (Rev. 1).[123]

116. The Agency continued to analyse Member States' experiences with the use of SARCoN and analysed the results of a survey intended to improve the usability and operational capacities of SARCoN guidelines and software. The Agency held a consultancy meeting in Vienna, Austria, in November 2017 to prepare the first draft of a Technical Document provisionally entitled *Methodology for the Systematic Assessment of the Regulatory Competence Needs (SARCoN) for Regulatory Bodies of Radiation Facilities and Activities*.[124]

117. The Agency organized 45 workshops and training events in emergency preparedness and response (EPR) on the implementation of the General Safety Requirements *Preparedness and Response for a Nuclear or Radiological Emergency* (IAEA Safety Standards Series No. GSR Part 7): 30 at regional

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[117] This relates to operative paragraphs 17 and 109 of resolution GC(61)/RES/8.

[118] See: http://rasims.iaea.org.

[119] This relates to operative paragraph 66 and 109 of resolution GC(61)/RES/8.

[120] This relates to operative paragraph 109 of resolution GC(61)/RES/8.

[121] This relates to operative paragraphs 104 and 109 of resolution GC(61)/RES/8.

[122] This relates to operative paragraph 109 of resolution GC(61)/RES/8.

[123] This relates to operative paragraphs 3 and 109 of resolution GC(61)/RES/8.

[124] This relates to operative paragraph 109 of resolution GC(61)/RES/8.

level and 15 at national level, attended by 722 participants from 79 Member States. Four Schools of Radiation Emergency Management were held in Miharu, Japan, in August–September 2017 and in Seoul, Republic of Korea, in November–December 2017 for the Asia and the Pacific region and in Traiskirchen, Austria, in October–November 2017 for the Europe and Africa regions. A total of 108 participants from 50 Member States attended these Schools.[125]

118. The Secretariat continued its efforts to preserve its own knowledge and institutional memory to mitigate loss of experience. In March 2018, an internal network (intranet) was launched in the framework of the internal knowledge and quality management strategy. The intranet serves to provide information material and resources related to the Agency's nuclear, radiation, waste and transport safety, emergency preparedness and response activities.[126]

119. The Agency held a Technical Meeting on Managing Nuclear Safety Knowledge — Approaches and National Experiences in Vienna, Austria, in July 2017, attended by 51 participants from 33 Member States. Based on the sharing of good practices and experiences at the Technical Meeting, the Agency is developing a Safety Report provisionally entitled *Managing Nuclear Safety Knowledge: National Approaches and Experience*.[127]

120. The Agency organized the annual plenary meeting of the Regulatory Cooperation Forum (RCF) in Vienna, Austria, in September 2017, attended by 70 participants from 29 RCF countries and other Member States. The Agency, in cooperation with the European Commission, organized an RCF Steering Committee meeting in Brussels, Belgium, in June 2018 to exchange information on its activities. The Agency continued to support the national safety infrastructure of Member States who are expanding their existing nuclear power programmes or planning to embark on such a programme. National, regional and interregional workshops and training events were held in Abuja, Nigeria, in December 2017, Moscow, in the Russian Federation, in October 2017, Accra, Ghana, in April, May and June 2018, Amman, Jordan, in January 2018, Nairobi, Kenya, in March 2018.[128]

121. The Agency held the plenary meeting of the Arab Network of Nuclear Regulators (ANNuR) during the 61st regular session of the Agency's General Conference, attended by over 40 participants from 15 Member States and the 9th ANNuR meeting in Hammamet, Tunisia, in March 2018, attended by more than 30 participants from 15 Member States. The Agency continued to assist ANNuR through a project on enhancing the regulatory supervision of research reactors and the Workshop on Establishing a Regulatory Inspection Programme for Research Reactors in Centurion, South Africa, in November 2017. The workshop was attended by 28 participants from 10 Member States. The Agency organized the ANNuR Annual Meeting on Safety and Licensing of Research Reactors in Amman, Jordan, in November 2017. The meeting was attended by 25 participants from 11 Member States. The Agency held a joint workshop of the RCF, ANNuR and Forum of Nuclear Regulatory Bodies in Africa (FNRBA) on regulatory control in Rabat, Morocco, in November 2017. The workshop highlighted the need to further assist embarking countries in the Arab and Africa regions and to develop projects in cooperation with the RCF.[129]

122. The Agency supported the members of the FNRBA in the revision of its Charter to improve the governance and interaction with African stakeholders. The revised Charter was translated into Arabic, English and French and sent to all FNRBA countries. The Agency supported the members of FNRBA

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[125] This relates to operative paragraphs 17 and 109 of resolution GC(61)/RES/8.

[126] This relates to operative paragraph 109 of resolution GC(60)/RES/9.

[127] This relates to operative paragraph 110 of resolution GC(60)/RES/9.

[128] This relates to operative paragraph 109 and 110 of resolution GC(60)/RES/9.

[129] This relates to operative paragraph 110 of resolution GC(60)/RES/9.

during the second coordination meeting with partners held in Vienna, Austria, in July 2017 in the development of project ideas addressing the needs of the regulatory bodies in Africa, including a survey of prioritization and a collaborative assistance platform. The Agency held the FNRBA Steering Committee meeting in Pretoria, South Africa, in May 2018. The Agency signed two Practical Arrangements with the FNRBA and the South African National Nuclear Regulator (NNR) during the Second Nuclear Regulatory Information Conference hosted by NNR in Johannesburg, South Africa, in May 2018. The Agency assisted the European and Central Asian Safety Network (EuCAS) in drafting its first annual report summarizing the achievements of its first two workshops on radioactive waste classification in Sofia, Bulgaria, June 2017 and on regulatory supervision of legacy sites, in Lillehammer, Norway, in November 2017.[130]

123. The Agency held two workshops in Sofia, Bulgaria, in April 2018 and in Tunis, Tunisia, in April 2018 to promote the development of the national nuclear safety knowledge platforms as well as the Agency's capacity building methodology.[131]

124. In the framework of the GNSSN, the Agency developed a prototype for the Global Education and Training Resource (GETR) platform to assist Member States in strengthening their national education and training system. The GETR presents structured information about nuclear safety training and education resources organized by regulatory bodies, technical organizations, research institutions and universities. Over 500 education and training resources and 25 e-learning modules are accessible through the platform.[132]

125. The Agency conducted 66 capacity building activities under the GNSSN extrabudgetary programme: 18 generic GNSSN activities, 15 under the ANSN, 8 under the FNRBA, 11 under ANNuR, 4 under the EuCAS Network, 6 under the TSO Forum and 4 under the Global Nuclear Safety and Security Communications Network (GNSSCOM). The activities were attended by over 700 participants.[133]

K. Nuclear and Radiological Incident and Emergency Preparedness and Response

126. The Agency continued to encourage Member States' adherence to the Early Notification Convention and the Assistance Convention. In the reporting period, one Member State, Georgia, adhered to the Assistance Convention. The Agency organized the Ninth Meeting of the Representatives of Competent Authorities of the Early Notification Convention and the Assistance Convention in Vienna, Austria, in June 2018.[134]

127. The Agency held two consultancy meetings and a Technical Meeting, attended by 62 representatives from 43 Member States and one non-governmental organization, to review the Draft

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[130] This relates to operative paragraph 110 of resolution GC(60)/RES/9.

[131] This relates to operative paragraphs 12, 17 and 110 of resolution GC(61)/RES/8.

[132] This relates to operative paragraph 110 of resolution GC(61)/RES/8.

[133] This relates to operative paragraph 110 of resolution GC(61)/RES/8.

[134] This relates to operative paragraphs 25 and 125 of resolution GC(61)/RES/8.

Safety Guide entitled *Preparedness and Response to an Emergency During the Transport of Radioactive Material* (DS469) in Vienna, Austria in October 2017.[135]

128. The Agency conducted three exercises with the World Meteorological Organization in August 2017, February and May 2018 to test the provisions for atmospheric transport, dispersion and deposition modelling results. Through the ConvEx-1 exercises, the Agency conducted and analysed three tests of emergency communication channels, which should be available at all times and every day of the year. Problems with establishing communication were followed up with the relevant emergency contact points after each exercise. Around 44% of the contact points responded within the required time. The ConvEx-2b exercise was conducted in December 2017 with 36 participating Member States: 16 tested their capabilities to request assistance and prepare for its receipt, while 20 Member States participated as providers of assistance. For those assisting States, the response times were assessed as part of the objectives of the exercise. Two international organizations participated as assisting international organization. The Agency continued the series of ConvEx-2e exercises to test the assessment and prognosis process, based on national exercises in Member States with operating NPPs. Eight ConvEx-2e exercises were conducted, and the assessment and prognosis process was tested in other exercises. The ConvEx-3 evaluation report, which summarized achievements and lessons learned, was finalized at the Technical Meeting held in Vienna, Austria, in December 2017. The meeting was attended by 75 participants from 56 Member States and 4 international organizations. In June 2018, the Secretariat submitted the Report by the Director General entitled *ConvEx-3 (2017) International Emergency Response Exercise* to the Board of Governors. The report informed the Board of the exercise objectives, preparation, conduct and findings, conclusions and resulting recommendations.[136]

129. The Agency prepared a draft *Operations Manual for IAEA Assessment and Prognosis during a Nuclear or Radiological Emergency* which provides supporting information on the process and associated procedures. Four webinars, attended by more than 50 experts from Member States, were organized to assist in implementing the tools. The Agency held a consultancy meeting on CANDU pressurized heavy-water reactors (PHWR) accident prognosis in Ottawa, Canada, in July 2017. The meeting discussed CANDU PHWR accident progression and developed instructions for prognosis using the CANDU PHWR module of the Agency's reactor assessment tool. The Agency held a consultancy meeting to develop training material for classification, assessment and prognosis during nuclear power plant emergencies in Vienna, Austria, in February 2018 and a pilot workshop on the same subject, also in Vienna, in March 2018. The workshop raised awareness of the new methodology for classification, assessment and prognosis during nuclear power plant emergencies, provided training in it and obtained feedback about it. The Agency held three workshops in Vienna, Austria, in August 2017, and March and June 2018 on notification, reporting and requesting assistance through the implementation of the *Operations Manual for Incident and Emergency Communication* (Emergency Preparedness and Response Series, EPR-IEComm 2012). The Agency further improved its Unified System for Information Exchange in Incidents and Emergencies (USIE) web site by adding a range of new functions. The enhanced website allows updating of information about an event using short messages in free text fields associated with a category (e.g. public information, meteorology) instead of completing report forms. It also makes it easier to identify the appropriate report form when needed and to transfer and store confidential information in an encrypted manner. The new version was made available to registered USIE users in March 2018 with an explanatory document on changes and new features. The Agency also conducted online training on the new features of the USIE in English, French, Spanish and Russian.[137]

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[135] This relates to operative paragraph 44 of resolution GC(61)/RES/8.

[136] This relates to operative paragraph 120 of resolution GC(61)/RES/8.

[137] This relates to operative paragraph 121 of resolution GC(61)/RES/8.

130. The Agency held a consultancy meeting in Vienna, Austria, in July 2017, to review technical guidelines for an updated manual *IAEA Response and Assistance Network* (Emergency Preparedness and Response Series, EPR-RANET 2013), including the mapping of radiation monitoring data during emergencies and the Geographical Information System. The Agency conducted a Response and Assistance Network (RANET) Joint Assistance Team (JAT) exercise in Japan, in October 2017, in the RANET CBC in Fukushima Prefecture. Thirty experts from seven Member States participated in this exercise. The Agency held workshops on notification, reporting and requesting assistance in Vienna, Austria, in March and June 2018. These workshops supported and reviewed the concepts of RANET and promoted adherence to the Early Notification and the Assistance Conventions.[138]

131. The Agency held a consultancy meeting in Vienna, Austria, in April 2018 to consider the implication of the UNSCEAR Report on *Attributing Health Effects to Ionizing Radiation Exposure and Inferring Risks* for the draft Safety Guide on *Arrangements for Public Communication in Preparedness and Response for a Nuclear or Radiological Emergency* (DS475). The Agency organized six workshops on communicating effectively with the public in an emergency at national, regional and interregional level, including one train-the-trainers workshop, which was held in Vienna, Austria, in August 2017. A total of 121 participants from 45 Member States attended these events. The Agency held a consultancy meeting to review the revised EPR-IEComm 2012 in Vienna, Austria, in July 2017. The Agency conducted a national expert mission on strengthening the regulatory infrastructure for communication and consultation with the public in South Africa in March 2018. The Agency held a Technical Meeting on Challenges and Good Practices in Safety and Security Communication in Vienna, Austria, August 2017, attended by 25 participants from 15 Member States. The meeting discussed, inter alia, national experiences in safety and security communication based on real events and provided recommendations to the Agency on capacity building and services in communication. The Agency held two meetings of the Programme Committee for the International Symposium on Communicating Nuclear and Radiological Emergencies to the Public in Vienna, Austria, in October 2017 and February 2018, attended by eleven participants from seven Member States and three international organizations. The plain-language briefing package with background materials was finalized and tested within the Agency's Incident and Emergency System during the Full Response Exercise in December 2017.[139]

132. In January 2018, the Agency held a teleconference with WHO to discuss, inter alia, the development of procedures for coordination between EPREV missions and WHO's Joint External Evaluation missions, in particular its module on radiation emergencies, with a view to reducing unnecessary duplication. A proposal on the scope of this coordination procedure was prepared and submitted to WHO in June 2018.[140]

133. The Secretariat further enhanced the usability of the International Radiation Monitoring Information System (IRMIS), which is a secure website for reporting and visualization of large volumes of radiation monitoring data during a nuclear or radiological emergency. The Agency held a consultancy meeting in Vienna, Austria, in July 2017 to review the IRMIS manual in connection with the revised version of the *Operations Manual for Incident and Emergency Communication* (EPR-IEComm 2012). A draft manual on the use of IRMIS during a nuclear or radiological emergency was developed to assist Member States in implementing the system. IRMIS was used during emergency response exercises such as the ConvEx-2a and during a RANET Joint Assistance Team (JAT) in Japan in October 2017.[141]

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[138] This relates to operative paragraph 124 of resolution GC(61)/RES/8.

[139] This relates to operative paragraph 126 of resolution GC(61)/RES/8.

[140] This relates to operative paragraph 128 of resolution GC(61)/RES/8.

[141] This relates to operative paragraph 129 of resolution GC(61)/RES/8.

134. The Agency has developed a new version of the Emergency Preparedness and Response Information Management System (EPRIMS) platform, to improve capabilities and user friendliness. This new version was launched in May 2018. Two webinars have been organized to provide EPRIMS users and coordinators with relevant information about the new features. To date 102 countries have joined EPRIMS. The Agency held a regional workshop on the use of EPRIMS and maritime EPR self-assessments for Member States from the Mediterranean region in Vienna, Austria, in May 2018. The workshop provided training on preparedness and response arrangements for port and maritime radiological emergencies. The Agency held a consultancy meeting to quality check new features of the EPRIMS software in Vienna, Austria, in April 2018. The Agency held a meeting on EPRIMS self-assessment based on GSR Part 7 for Member States from the Europe region in Portoroz, Slovenia, in May 2018. The meeting provided hands-on training on EPRIMS self-assessment against GSR Part 7 and sharing of national experiences of the platform.[142]

135. The Agency held two consultancy meetings to review and revise the *International Nuclear and Radiological Event Scale (INES) User's Manual, 2008 Edition* in Vienna, Austria, in July 2017 and January–February 2018. The first meeting addressed, inter alia, lessons from the Fukushima Daiichi accident, clarification on rating criteria and INES as communication tool. The second meeting revised the chapter on the impact on people and the environment, and annexes and appendices. The Agency held a train-the-trainers workshop on INES in Vienna, Austria, in October 2017, attended by 32 participants from 28 Member States. The participants received training on the INES methodology and on how to effectively communicate the safety significance of an event to different audiences. The Agency held a national INES training course in Helsinki, Finland, in November 2017. It also held a Technical Meeting in Vienna, Austria, in April 2018 to review, as well as to discuss with representatives of Member States and relevant international organizations, the text of the draft INES User's Manual. Annual Meetings of the INES Advisory Committee were held in Vienna, Austria, in October 2017 and in April 2018 to discuss the draft Manual. A Train-the-Trainers Workshop was held in October 2017, attended by 72 participants from 51 Member States and 2 international organizations.[143]

136. The 26th Regular Meeting of the Inter Agency Committee on Radiological and Nuclear Emergencies (IACRNE) was held in Brussels, Belgium, in November 2017. The meeting addressed, inter alia, EPR activities in member organizations, lessons identified in the ConvEx-3 (2017) exercise, the exercise report and the IACRNE work programme for 2018–2019. The IACRNE Task Group on the development of criteria to support the issuance of significant meteorological information (SIGMET) in the event of a release of radioactive material into the atmosphere completed its final report.[144]

L. Civil Liability for Nuclear Damage

137. The Secretariat continued to assist Member States, upon request, in their efforts to adhere to the relevant nuclear liability instruments.[145]

138. The International Expert Group on Nuclear Liability (INLEX) held its 18th regular meeting in Vienna, Austria, in May 2018. Individual members reported on the most recent developments in the field of civil liability for nuclear damage. The Group also discussed liability issues relating to disposal

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[142] This relates to operative paragraph 130 of resolution GC(61)/RES/8.

[143] This relates to operative paragraph 131 of resolution GC(61)/RES/8.

[144] This relates to operative paragraph 132 of resolution GC(61)/RES/8.

[145] This relates to operative paragraphs 25 and 36 of resolution GC(61)/RES/8.

facilities. In this context, INLEX reaffirmed conclusions of its previous meeting that during the period where institutional controls remain active (the duration of which will differ from country to country and with different classes of waste), there will still be an operator and the waste can be regarded as being in storage. The nuclear liability conventions would therefore continue to apply to such disposal facilities. Following the cessation of institutional controls over the site, however, INLEX noted that, in the absence of an operator, the nuclear liability conventions cannot be applied, and therefore the State which has agreed to the closure of the installation would implicitly be expected to assume responsibility in the event of any nuclear incident.[146]

139. INLEX also addressed the liability issues concerning the exclusion of radioisotopes that have reached the final stage of fabrication from the definition of "radioactive products or waste" in the nuclear liability conventions and therefore from the scope of such conventions. In this context, INLEX concluded that "materials which have not reached the final stage of fabrication so as to be usable for any industrial, commercial, agricultural, medical, scientific or educational purpose, and facilities where such materials are transformed into their final form, are covered by the nuclear liability conventions". INLEX also specifically considered the case of molybdenum-99 contained in "generators" sent to hospitals and medical clinics and noted that, notwithstanding that the molybdenum-99 is not in itself "usable for any scientific, medical, agricultural, commercial or industrial purpose", the fact that it decays naturally results in it having reached its final stage of fabrication so as to be usable for any medical purpose and that molybdenum-99 "generators" hence fall outside the scope of the nuclear liability conventions.[147]

140. INLEX also continued to discuss the issue of the application of the nuclear liability conventions to transportable NPPs and reiterated its conclusions that a transportable NPP in a fixed position (that is, in the case of a floating reactor, anchored to the seabed or the shore, and attached to shore by power lines) would fall under the definition of a "nuclear installation" and therefore be covered by the nuclear liability regime. INLEX also noted that in case of transport of a factory-fuelled reactor, the TNPP would also be covered by the nuclear lability conventions just as any other transport of nuclear material. INLEX will, however, come back to the issue at its next meeting, in particular with regard to factory-fuelled reactors transported and deployed in a host state not party to the same convention as the sending state.[148]

141. The Agency held a Sub-Regional Workshop on Civil Liability for Nuclear Damage for African States, hosted by the Government of Ghana, in Accra, Ghana, in November 2017, attended by 16 participants from 11 Member States. The Agency also held the seventh Workshop on Civil Liability for Nuclear Damage in Vienna, Austria, in May 2018. This workshop provided an overview of the international legal regime on civil liability for nuclear damage and was attended by diplomats from 21 Member States.[149]

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[146] This relates to operative paragraph 37 of resolution GC(61)/RES/8.

[147] This relates to operative paragraph 37 of resolution GC(61)/RES/8.

[148] This relates to operative paragraph 37 of resolution GC(61)/RES/8.

[149] This relates to operative paragraphs 36 and 109 of resolution GC(61)/RES/8.