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

Building on the Action Plan on Nuclear Safety

*Report by the Director General***Summary**

This report has been prepared in response to operative paragraph 29 of resolution GC(59)/RES/9 on measures to strengthen international cooperation in nuclear, radiation, transport and waste safety, adopted by the General Conference on 17 September 2015, which requests the Agency to “continue to build upon the 2011 Action Plan on Nuclear Safety, the experience of States in implementing the Action Plan, as well as the observations and lessons contained in the IAEA Fukushima Report, and the principles of the Vienna Declaration, and use them for defining its nuclear safety strategy and its programme of work” and requests the Secretariat to “report periodically to the Board of Governors”.

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Report by the Director General

A. Introduction

1. Operative paragraph 29 of resolution GC(59)/RES/9 on measures to strengthen international cooperation in nuclear, radiation, transport and waste safety, adopted by the General Conference at its 59th regular session on 17 September 2015, requests the Agency to “continue to build upon the 2011 Action Plan on Nuclear Safety, the experience of States in implementing the Action Plan, as well as the observations and lessons contained in the IAEA Fukushima Report, and the principles of the Vienna Declaration, and use them for defining its nuclear safety strategy and its programme of work” and requests the Secretariat to “report periodically to the Board of Governors”.
2. This report has been prepared in response to that request.
3. The IAEA Action Plan on Nuclear Safety (the Action Plan), adopted by the Board of Governors in 2011 and unanimously endorsed by Member States at the 55th regular session of the General Conference in September 2011, defined a programme of work to strengthen the global nuclear safety framework. Within the framework of the Action Plan, many activities were undertaken by the Secretariat, Member States and other relevant organizations to strengthen nuclear safety worldwide. The Secretariat delivered its final report on the Action Plan to the Board of Governors in September 2015. The Agency continues to implement the remaining projects related to the Action Plan through the relevant Agency Departments within the framework of its regular programme.
4. The report by the Director General on the Fukushima Daiichi accident was released shortly before the 59th regular session of the General Conference in 2015. The report and the accompanying five technical volumes were the result of an extensive international collaborative effort. The report and the technical volumes provide a description of the accident and its causes, evolution and consequences, based on the evaluation of data and information from many sources, including the results of the work carried out in implementing the Action Plan. The report considered human, organizational and technical factors, and identified a number of observations and lessons which may be useful to governments, regulators and nuclear power plant (NPP) operators throughout the world.
5. As part of the significant efforts and initiatives undertaken after the Fukushima Daiichi accident, the Contracting Parties to the Convention on Nuclear Safety unanimously adopted the Vienna Declaration on Nuclear Safety (hereinafter referred to as “the Vienna Declaration”) in February 2015. The Vienna Declaration includes principles for the implementation of the third objective of the

Convention, which is to prevent accidents with radiological consequences and to mitigate such consequences should they occur.

6. During the period of implementation of the Action Plan there was a focus on the safety of NPPs, particularly in relation to extreme natural hazards, and on related radioactive waste management and radiation safety matters. Going forward, strengthening nuclear, radiation, transport and waste safety will be considered in a more comprehensive manner, including those aspects related to extending the operating life of NPPs, decommissioning of facilities, disposal of high level radioactive waste, innovative technologies such as fast reactors as well as small and medium sized or modular reactors, and the safety of radiation sources used in non-power applications. The Agency will work to foster a strong safety culture.

7. The Agency has developed a methodology to systematically analyse observations and lessons. The application of the methodology will identify priority areas for the Agency's programme of work to strengthen nuclear, radiation, transport and waste safety.

B. Identification of Observations and Lessons

8. The Agency will assess observations and lessons identified through the implementation of the Action Plan, the Director General's report on the Fukushima Daiichi accident, and activities in relation to the international framework for safety, including the Vienna Declaration. In addition, the Agency will identify and assess lessons from the full range of its activities related to nuclear, radiation, transport and waste safety.

B.1. Lessons from the Implementation of the IAEA Action Plan on Nuclear Safety

9. Since the adoption of the Action Plan in 2011, many activities have been undertaken by the Secretariat, Member States and other relevant organizations to strengthen nuclear safety worldwide.

10. Strengthening nuclear safety in the light of the Fukushima Daiichi accident has been addressed through a number of measures in the Action Plan, including 12 main actions focusing on: safety assessments; Agency peer reviews; emergency preparedness and response; national regulatory bodies; operating organizations; the Agency's safety standards; the international legal framework; Member States planning to embark on a nuclear power programme; capacity building; protection of people and the environment from ionizing radiation; communication and information dissemination; and research and development (R&D).

11. The nine International Experts' Meetings (IEMs) conducted under the Action Plan covered the areas of reactor and spent fuel safety; enhancing transparency and communication effectiveness in the event of a nuclear or radiological emergency; protection against extreme earthquakes and tsunamis; decommissioning and remediation; human and organizational factors; radiation protection; severe accident management; R&D; and assessment and prognosis in response to a nuclear or radiological emergency.

12. The Secretariat prepared reports that highlighted the expert discussions during these IEMs and other conferences relating to the lessons learned. International missions to Japan were carried out in relation to Japan's comprehensive safety assessment process, the decommissioning of the Fukushima Daiichi NPP, and the remediation of large contaminated areas. The reports on these missions and other relevant information have been made available through the Agency's website.

13. The Secretariat completed its systematic review of the relevant Safety Requirements publications in the IAEA Safety Standards Series to take account of the lessons learned from the Fukushima Daiichi accident. The review identified some areas for improvement and the revised Safety Requirements applicable to NPPs, the storage of spent fuel, emergency preparedness and response (EPR) as well as leadership and management for safety were approved by the Board of Governors. The review and revision of the relevant Safety Guides are being performed in accordance with a prioritization process established by the Commission on Safety Standards and the Safety Standards Committees.

14. The Secretariat has assessed and enhanced the effectiveness of the Agency peer reviews by incorporating the initial lessons learned from the Fukushima Daiichi accident in its Integrated Regulatory Review Service (IRRS), Operational Safety Review Team service (OSART), Site and External Events Design review service (SEED), Emergency Preparedness Review service (EPREV) and Integrated Nuclear Infrastructure Review missions (INIR). The Secretariat enhanced the transparency of the Agency's peer review services and promoted the sharing of experience and lessons learned among Member States, including by providing summary information on its website regarding where and when Agency peer reviews have taken place and by making publicly available the results of such reviews with the consent of the States concerned.

15. Member States have reported on the national assessments of the vulnerabilities of their NPPs against site-specific extreme external events. They also reported on the activities they have carried out to review and strengthen their EPR arrangements, on the use of the Agency's safety standards as the basis for their national regulations and requirements, and on the steps to enhance and expand their environmental radiation monitoring and measuring capabilities. In addition, several Member States provided detailed information on their national implementation of the Action Plan.

16. The Director General's final report on the Action Plan was submitted to the Board of Governors in September 2015.¹ The report showed that progress continued to be made in improving global nuclear safety. Projects under the Action Plan that continue beyond 2015 will be implemented by the relevant Agency Departments within the framework of its regular programme.

B.2. Observations and Lessons from the IAEA Fukushima Report

17. The report by the Director General on the Fukushima Daiichi accident was released shortly before the 59th regular session of the General Conference. The report and the five technical volumes provide a description of the accident and its causes, evolution and consequences, based on the evaluation of data and information from a large number of sources available up to March 2015.

18. The report and the technical volumes consider safety aspects with a focus on the vulnerability of the Fukushima Daiichi NPP to external events, including accident management, regulatory effectiveness, and human and organizational factors. The EPR arrangements of Japan and the international response to the accident are also considered, including that of the Agency and other relevant international organizations. The consequences associated with the release of radioactive materials are analysed, and the post-accident recovery, including the remediation of contaminated areas and on-site stabilization and preparation for decommissioning, are also addressed.

19. The report and the technical volumes identify more than 100 observations and lessons in all the areas above, which provides a solid knowledge base to support strengthening nuclear safety throughout the world.

¹ See document GOV/INF/2015/13-GC(59)/INF/5 at:
https://www.iaea.org/About/Policy/GC/GC59/GC59InfDocuments/English/gc59inf-5_en.pdf.

B.3. Activities in Relation to the International Framework, Including the Vienna Declaration on Nuclear Safety

20. The international framework for safety includes legally binding and non-binding instruments under Agency auspices. The Agency facilitates adherence to, and implementation of, these instruments by assisting Member States, upon request, in effectively meeting their commitments. The Agency carries out such activities in particular in relation to:

- The Convention on Nuclear Safety;
- The Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management;
- The Code of Conduct on the Safety and Security of Radioactive Sources;
- The Guidance on the Import and Export of Radioactive Sources; and
- The Code of Conduct on the Safety of Research Reactors.

21. The Agency will identify lessons related to the principles of the Vienna Declaration regarding the implementation of the third objective of the Convention on Nuclear Safety, which is to prevent accidents with radiological consequences and to mitigate such consequences should they occur. The Agency will also identify lessons from its activities in relation to the international framework for safety.

B.4. Lessons from the Agency's Activities in Nuclear, Radiation, Transport and Waste Safety

22. In addition to observations and lessons identified through the implementation of the Action Plan and through the Director General's report on the Fukushima Daiichi accident, as well as from its activities in relation to the international framework for safety, including the Vienna Declaration, the Agency will identify lessons from its activities on nuclear, radiation, transport and waste safety. This will include lessons from peer review and advisory services, expert missions, the work of advisory groups as well as sources of expertise such as major international and regional conferences, meetings and workshops.

23. The Agency will identify lessons from its activities in relation to the safety of extending the operating life of NPPs, decommissioning of facilities, disposal of high level radioactive waste, and innovative technologies such as fast reactors and small and medium sized or modular reactors. Furthermore, the Agency will identify lessons from research reactor utilization, where safety of spent fuel management, along with operational safety enhancements, are major challenges for the research reactor community. Lessons relating to the safety of nuclear fuel cycle facilities, including fuel production, spent fuel storage and spent fuel reprocessing facilities, will also be identified.

24. Workers are exposed to ionizing radiation in a wide range of occupational settings, including at health care facilities, research institutions, nuclear reactors and their support facilities, and various manufacturing facilities. The Agency will identify lessons related to the radiation protection of workers. The Agency will also identify lessons related to the wider use of new technologies using sealed radioactive sources, and the transport of sources within and across national borders.

25. The Agency will identify lessons to enhance its work to foster a strong safety culture for the full range of its activities to strengthen nuclear, radiation, transport and waste safety.

C. Methodology for Systematic Analysis and Prioritization

26. The Agency will apply a methodology to systematically analyse all observations and lessons in order to identify priority areas for the Agency's activities.

27. The methodology will be applied to observations and lessons identified through the implementation of the Action Plan and the Director General's report on the Fukushima Daiichi accident. The methodology will also be applied to lessons from the activities in relation to the international framework for safety, including the Vienna Declaration, and to lessons from the full range of Agency activities in nuclear, radiation, transport and waste safety.

28. The systematic analysis of all observations and lessons will identify priority safety aspects. The extent to which these aspects are covered by current activities will be analysed to identify priorities for the Agency's programme of work.

29. The prioritization of Agency activities will recognize Member States' needs, challenges identified in the *Nuclear Safety Reviews*, insights from the international legally binding and non-binding instruments, guidance and recommendations from relevant advisory bodies on nuclear safety, the Commission on Safety Standards and the Safety Standards Committees, as well as insights from Technical Meetings organized by the Agency.

30. Safety aspects are dealt with by several Agency Departments, and the application of this methodology will involve cross-Departmental cooperation that will be coordinated by the Department of Nuclear Safety and Security.

D. Implementation

31. The implementation of the prioritized activities within the Agency's programme of work will result in further strengthening of the Agency's safety standards, increased effectiveness of peer review and advisory services, and enhanced international cooperation, capacity building and R&D.

D.1. Safety Standards and Their Application

32. The systematic analysis of observations and lessons will be used to further strengthen the Agency's safety standards. Strengthening the safety standards will provide benefits for all Member States that use them as a reference for their national standards, support activities related to the international framework for safety, improve the effectiveness of peer review and advisory services, and provide an improved basis for capacity building.

33. Support will continue to be provided to Member States, upon request, in the application of the Agency's safety standards.

D.2. Peer Review and Advisory Services

34. The Agency's peer review and advisory services are provided upon request taking into account the needs of Member States. The Agency will continue to provide peer reviews for Member States emphasizing the importance of self-assessment, timely follow-up missions, completion of related action plans, and open and transparent reporting on Agency missions.

35. The systematic consideration of the observations and lessons mentioned in Section B above will be used to continue to enhance the effectiveness of the peer review and advisory services. This can be achieved, for example, by developing improved self-assessment tools and by adding modules on priority topics.

D.3. International Cooperation

36. The Agency will organize and conduct Technical Meetings and conferences to address the identified safety aspects, as appropriate, in order to share experiences and information among Member States. Technical reports will be produced to facilitate the convergence of safety approaches and practices.

D.4. Capacity Building

37. The establishment of education and training infrastructures and processes is fundamental to the capacity building strategy of Member States. Education and training programmes provide a structured knowledge base for individuals involved in the utilization or control of nuclear technologies to develop their skills and expertise, which by implication also means improving national capacity.

38. The Agency will use the results of the systematic analysis of the observations and lessons mentioned in Section B to prioritize its work aimed at improving support for capacity building on nuclear, radiation, transport and waste safety. This will result in improvements to the e-learning training and education modules available to Member States via the Internet which provide guidance and training through video lectures.

D.5. Research and Development in Nuclear Safety and Technology

39. The Agency will continue to promote, summarize, collect and disseminate R&D information to Member States to support the enhancement of their technical capabilities. The Agency will strengthen its interaction with Member States and with other international organizations and bodies, in order to coordinate R&D activities relating to the safety aspects deriving from the systematic analysis to support their R&D efforts. The Agency will encourage discussions on R&D for strengthening nuclear safety as well as the sharing of R&D results as widely as possible for the benefit of all Member States.

E. The Way Forward

40. Going forward, strengthening nuclear, radiation, transport and waste safety will be considered in a comprehensive manner, including those aspects related to extending the operating life of NPPs, decommissioning of facilities, disposal of high level radioactive waste, innovative technologies such as fast reactors and small and medium sized or modular reactors, and the safety of radiation sources used in non-power applications. The Agency will work to foster a strong safety culture.

41. The Secretariat will build upon the Action Plan and its implementation, the IAEA Fukushima Report and the principles of the Vienna Declaration by applying a methodology for systematic analysis of observations and lessons in order to identify priority safety aspects. This methodology will also be applied for a full range of Agency activities in nuclear, radiation, transport and waste safety to identify additional priority safety aspects. The extent to which all these safety aspects are covered by current activities will be analysed to identify priority areas to respond to the request by the General Conference to define the Agency's nuclear safety strategy and its programme of work.

42. The Secretariat will report progress annually to the Board of Governors in March as part of the *Nuclear Safety Review* and to the Board of Governors and the General Conference in September as part of the Director General's report entitled *Measures to Strengthen International Cooperation in Nuclear, Radiation, Transport and Waste Safety*.