Progress in the Implementation of the IAEA Action Plan on Nuclear Safety Supplementary Information

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INTRODUCTION

1. The draft IAEA Action Plan on Nuclear Safety[1] (the Action Plan) built on the Declaration of the IAEA Ministerial Conference in June 2011, the conclusions and recommendations of the three conference working sessions of this Conference, the IAEA Fact Finding Mission to Japan and the 2011 INSAG Letter Report to the Director General. The draft Action Plan was adopted by the Board of Governors at its September 2011 meeting and was unanimously endorsed by Member States at the 2011 IAEA General Conference. The ultimate goal of the Action Plan is to strengthen nuclear safety, emergency preparedness and radiation protection of people and the environment worldwide.

2. The Action Plan requests the Director General to report on the progress in its implementation to the Board of Governors and General Conference in 2012,[2] and subsequently on an annual basis as may be necessary. This is the second annual report by the Director General in response to that request. Since the 2012 General Conference, the Director General has submitted three reports on progress in the implementation of the Action Plan to the Board of Governors[3]. This document provides Supplementary information to the Report of the Director General on Progress in the Implementation of the Action Plan on Nuclear Safety contained in GOV/INF/2013/8-GC(57)/INF/5.

3. During the period covered by this report around 20 new extrabudgetary projects with an approximate budget of € 11 million, have been initiated by the Secretariat. There projects are related to significant key areas of the Action Plan. Further information on extrabudgetary expenditures, as well as expenditures of the regular budget is provided in Tables 1 and 2 of Annex II to the Supplementary information. These projects are described in Annex III to this Supplementary information.

SAFETY ASSESSMENTS IN THE LIGHT OF THE ACCIDENT AT TEPCO'S FUKUSHIMA DAIICHI NUCLEAR POWER STATION

ACTION: Undertake assessment of the safety vulnerabilities of nuclear power plants (NPPs) in the light of lessons learned to date from the accident

GOALS

Assessment of the design of nuclear power plants

4. Member States are requested to promptly undertake an assessment of the design of their NPPs against site specific extreme natural hazards and to identify and implement any necessary corrective actions in a timely manner. The Secretariat is requested to provide support to Member States that are undertaking assessments and to undertake peer reviews of these assessments upon request.

IAEA Methodology

5. The Secretariat is requested to develop a methodology and make it available to Member States which may wish to use when carrying out their assessments and to provide assistance and support to Member States in the implementation of the results of their assessments of NPP design against site specific extreme natural hazards.

BACKGROUND

6. Safety assessments of NPPs are a means of evaluating compliance with safety requirements for all facilities and activities and determining the measures that may need to be taken to ensure strengthened safety. These are carried out and documented by the organization responsible for

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[1] GOV/2011/59-GC(55)/14 5 September 2011

[2] GOV/INF/2012/11 – GC(56)/INF/5 (9 August 2012)

[3] GOV/INF/2012/16 (13 November 2012), GOV/INF/2013/1 (6 February 2013) and GOV/INF/2013/7 (23 April 2013).

operating an NPP, and are independently verified and submitted to the regulatory body as part of the licensing or authorization process.

7. During the period covered by the last annual report, the Secretariat organized an international experts' meeting (IEM) on *Reactor and Spent Fuel Safety in the Light of the Accident at the Fukushima Daiichi Nuclear Power Plant* [4]. The IEM showed that significant efforts and actions have been undertaken by Member States and relevant organizations with the common goal of improving safety, ensuring protection against extreme events and enhancing mitigation of severe accidents.

8. The Secretariat also developed a methodology for assessing the safety vulnerabilities of an NPP based on the IAEA Safety Standards. At the request of the Government of Japan, the IAEA conducted an international expert mission in January 2012 aimed to review the approach of the Nuclear and Industrial Safety Agency's (NISA) to the Comprehensive Assessments for the Safety of Existing Power Reactor Facilities.

9. During the period covered by this annual period, the Secretariat continued to support Member States in performing assessment of the design of their NPPs against extreme natural hazards. This support included:

- Organization and conduct of IEMs on:
  - Protection against Extreme Earthquakes and Tsunamis in the Light of the Accident at the Fukushima Daiichi Nuclear Power Plant; and
  - Human and Organizational Factors in Nuclear Safety in the Light of the Accident at the Fukushima Daiichi Nuclear Power Plant;
- Organization and conduct of an international workshop on the Safety of Multi-unit NPP Sites against External Natural Hazards;
- Preparation of guidance for the application of probabilistic safety assessment (PSA) of a NPP to the assessment of external events;
- Development of a safety report on safety margins for NPP's;
- Preparation of guidance for post-accident monitoring; and
- Sharing the results of an international mission to the Onagawa NPP in Japan.

ACHIEVEMENTS

Assessment of the design of nuclear power plants

10. In September 2012, the 3rd in a series of IEMs (IEM 3) was organized on the topic of *Protection against Extreme Earthquakes and Tsunamis in the Light of the Accident at the Fukushima Daiichi Nuclear Power Plant*[5]. The meeting was attended by around 130 experts and government officials from 37 Member States, regulatory bodies, utilities, technical support organizations, academic institutions, vendors, and research and development organizations. The IEM shared the lessons learned from assessing the impact of extreme natural events on NPPs. The experts discussed the development of recent technologies and the results of on-going research programmes relating to site evaluation and nuclear power plant safety that aim to provide protection against earthquakes and tsunamis; shared the lessons learned from recent extreme earthquakes and tsunamis; and identified issues that should be investigated further.

11. Some of the key lessons learned highlighted by the experts included:

- The need to collect prehistoric data for seismic hazard assessments, as historical data are not sufficient to capture low frequency seismic events;
- Tsunami hazard assessment should take into account recent advances in deterministic and probabilistic approaches;

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[4] http://www-pub.iaea.org/iaeameetings/43900/International-Experts-Meeting-on-Reactor-and-Spent-Fuel-Safety-in-the-Light-of-the-Accident-at-the-Fukushima-Daiichi-Nuclear-Power-Plant

[5] http://www-pub.iaea.org/iaeameetings/42731/International-Experts-Meeting-on-Protection-against-Extreme-Earthquakes-and-Tsunamis-in-the-Light-of-the-Accident-at-the-Fukushima-Daiichi-Nuclear-Power-Plant

- Design safety margins for flooding, particularly for flooding induced by a tsunami, should be reviewed using a probabilistic approach to identify any severe cliff edge effects;
- Uncertainties associated with the assessment of natural events need to be further explored;
- The design of an NPP should provide for a sufficient margin of safety along with an evaluation of potential cliff edge effects for each natural hazard considered, to ensure that the values associated with such effects do not approach the design basis for external events;
- The response of an NPP to extreme natural hazards involves complex interactions of equipment and human performance, and therefore an integrated plant response assessment methodology is needed for evaluation of the effectiveness of various defence in depth features.

12. IEM 1[6] and IEM 3 identified issues associated with the assessment of multi-unit NPP sites against a combination of natural hazards. In response, the Secretariat undertook a series of activities to share and exchange information and experience among Member States and to develop guidance for the assessment of multi-unit NPP sites in relation to multiple external hazards.

13. The Secretariat and the Atomic Energy Regulatory Board of India jointly organized an International Workshop on the Safety of Multi-unit NPP Sites against External Natural Hazards at the Bahbha Atomic Research Centre in Mumbai, India, in October 2012. . The Workshop was attended by 70 participants from 13 Member States. The objective of the workshop was to share information on the scientific and technical issues related to the safety of multi-unit NPP sites in relation to external natural hazards in the light of the accident at TEPCO's Fukushima Daiichi Nuclear Power Station (the Fukushima Daiichi accident). The workshop covered the lessons learned from past earthquakes affecting NPPs, the assessment of external natural hazards at sites with multiple NPPs, external event PSA, and external event site safety assessment.

14. The workshop highlighted the activities undertaken by the Secretariat and the Member States to meet the challenges in ensuring safety of the multi-unit NPP sites against multiple external hazards. The workshop participants recognized that assessing safety at multi-unit NPP sites by extrapolating the results from a single unit NPP safety assessment is not appropriate. Safety assessments need to take into account the potential interactions between NPP units including issues such as, common cause failures, the implications for shared structures, systems and components (SSC's) important to safety. The Secretariat is utilizing the information shared by the participants and the issues identified during the workshop in the development of detailed guidelines for site evaluation and safety assessment with respect to multiple external natural hazards on multi-unit NPP sites.

15. In February 2013, the Secretariat organized and conducted a meeting to discuss the development of a methodology for the PSA of an NPP site against external events. The objective of the meeting was to establish a framework which can address the interaction of multiple NPP units when exposed to multiple hazards. Experts from operating organizations and regulatory bodies from 11 Member States participated in this meeting in which there was agreement on the overall approach to address this complex issue.

16. In December 2012, the Secretariat organized the technical meeting on 'Safety Assessment of Operating Nuclear Power Plants' with 30 experts from operating and regulatory organizations from 15 Member States and discussed international experiences, challenges and lessons learned that will help nuclear power plants implement the recommendations from the safety assessments. The topics discussed at the meeting included:

- Lessons learned from the results of European Union (EU) and non-EU safety assessments;
- The actions derived from the safety assessments and implementation strategies;

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[6] International Experts Meeting on Reactor and Spent Fuel Safety in the Light of the Accident at the Fukushima Daiichi Nuclear Power Plant http://www-pub.iaea.org/iaeameetings/43900/International-Experts-Meeting-on-Reactor-and-Spent-Fuel-Safety-in-the-Light-of-the-Accident-at-the-Fukushima-Daiichi-Nuclear-Power-Plant

- The IAEA Action Plan on Nuclear Safety implementation and results; and
- The IAEA *Methodology for Assessment of Safety Vulnerabilities of Nuclear Power Plants against Site Specific Extreme Natural Hazards.*

17. While there were some differences in the priorities and schedules reported by the participants, this meeting again highlighted the common actions being performed or planned to be performed by the Member States in response to these safety assessments.

18. One of the lessons learned from IEM 1 was that the adequacy of safety margins and protective measures should be ensured through periodical review and examination of site specific external hazards and extreme natural events. Recognizing the importance of the concept of safety margin, the Secretariat organized meetings with relevant experts to prepare further guidance to Member States on safety margins for NPPs. The guidance will provide information on the derivation of individual safety margin definitions as they relate to deterministic safety analysis (DSA) and PSA and provide practical examples of the application of the expanded safety margin concept. The objective is to build a technical basis for the establishment of an expanded definition of safety margin considering the current state of technologies and connecting with relevant IAEA Safety Standards and supporting documents such as IAEA Specific Safety Guide No 2, SSG-2, *Deterministic Safety Analysis.* The guidance will provide updated information on the variability of safety margins with time that may arise from modifications to the original NPP design and degradation as a result of ageing of plant and equipment.

19. The Fukushima Daiichi accident demonstrated it is essential to have capabilities to monitor important plant safety parameters under severe accident conditions. In this light, the Secretariat organized international meetings in Japan (September 2012) and in Vienna (March 2013) with the objective of discussing instrumentation and control (I&C) issues and reflecting current knowledge, practices, operating experience, and trends related to NPP accident monitoring systems. The Secretariat is finalising a report to provide an overview of accident monitoring systems and functions in NPPs, as well as to identify current challenges and key issues with special focus on the lessons learned from the Fukushima Daiichi accident. The report also describes the basic principles of accident monitoring, the methodology for implementing accident monitoring instrumentation, subjects to be considered during the design of such instrumentation, example designs, operating experience, and areas where new methodologies or technologies may be needed. The draft report was shared with Member States at a Technical Meeting in May 2013 attended by 46 experts from 16 Member States. The draft report will be published in 2014.

20. The Secretariat organized and conducted an expert mission to the Onagawa NPP in Japan in July 2012. The objective of the mission was to examine the possible effects of the Great East Japan Earthquake (GEJE) on the performance of SSCs important to safety at the Onagawa NPP. The effects of the earthquake, tsunami and hydrogen explosions at the Fukushima Daiichi NPP make it impossible to identify the impact of the GEJE on SSCs. The mission considered the response of the SSC's at Onagawa NPP to the high level of ground motion experienced from the earthquake and to collect information for inclusion into an earthquake experience database being developed by the IAEA International Seismic Safety Centre (ISSC).

21. The following areas were addressed :

- Performance of SSC's with respect to their structural behaviour, as observable from their current condition;
- Performance of SSCs' with respect to their operability following the GEJE and on-going systems and component testing; and
- Review of activities to repair SSCs'.

22. The mission concluded that despite prolonged ground motion and a significant level of seismic energy input, the SSCs at Onagawa NPS performed their intended functions without suffering any significant damage. The lack of any serious damage to all classes of seismically designed facilities attests to the robustness of these facilities under severe seismic ground motion. The mission concluded that the facilities of the Onagawa NPS remain "remarkably undamaged" given the

magnitude, distance and duration of ground motion. The mission report is available on the IAEA website.

23. In May 2013 the Secretariat organized and conducted the 5th in the series of IEMs on the topic of *Human and Organizational Factors in Nuclear Safety in the Light of the Accident at the Fukushima Daiichi Nuclear Power Plant*[7] (IEM 5). The objective of the meeting was to share knowledge and experience gained in the light of the Fukushima Daiichi accident concerning human and organizational factors (HOF), particularly the interactions between individuals, technology and organizations (ITO) and their influence on nuclear safety. The meeting was attended by more than 150 participants from around 40 Member States and four international organizations representing governmental, regulatory, operating, technical support, research and educational organizations.

24. The experts discussed the considerations for the development of an integrated approach to safety, including the need to complement the traditional approach to safety with an ITO systemic approach. Many of the experts considered that a more holistic safety approach taking account of ITO, could capitalize on understanding the strengths as well as the vulnerabilities in all factors influencing nuclear safety. Some of the key messages highlighted by the experts included:

- Consideration of national cultural aspects is necessary in any efforts associated with the assessment and strengthening of safety culture;
- Support for newcomer countries is very important in the application of the concept of safety culture and NPP vendors also have an important role to play in providing support;
- The importance of emphasizing the priority of safety in situations where NPP's may be part of a larger, non-nuclear organization should be reinforced;
- The influence of the regulatory culture on the culture of the operating organization should be considered and understood and regulators, as well as operators, should undertake safety culture self-assessments;
- The importance of maintaining a strong safety culture during the phasing out of a national nuclear energy programme and during the transition from operating to decommissioning NPPs;
- Flexibility in the response to events is essential to be able to adapt to the unexpected; and
- Learning from successful normal operations can be used to enhance resilient capabilities in an organization to be prepared for the unexpected.

25. Experts from Japan expressed the view that the Fukushima Daiichi accident could have been avoided. Other experts considered that there was a need to guard against complacency and the attitude that a severe accident "could not happen here" could have a significant influence on safety culture. The experts considered that all operators and regulators must look at what can be learned from the Fukushima Daiichi accident and should not distance themselves by differentiation.

26. In September 2012, the Secretariat published a report on *Safety Culture in Pre-Operational Phases of Nuclear Power Plant Projects* (IAEA Safety Report Series no. 74). The objective of this publication is to provide practical guidance, on how to develop and implement programmes to help strengthen the safety culture throughout the pre-operational phases of an NPP project, from project conception to initial fuel loading In addition, the Secretariat provided further guidance on safety culture in 2013 with the publication of TECDOC-1707 *Regulatory Oversight of Safety Culture in Nuclear Installations*. The aim of this publication is to provide regulatory bodies with practical guidance on how to establish their own regulatory oversight of safety culture.

IAEA Methodology

27. The Secretariat completed the validation of a tool developed to extend the application of the IAEA *Methodology to Assess the Safety Vulnerabilities of Nuclear Power Plants against Site Specific Extreme Natural Hazards* to include consideration of the robustness of NPP systems in relation to the combined effects of extreme natural events. While the tool is intended to supplement the International

[7] http://www-pub.iaea.org/iaeameetings/45441/International-Experts-Meeting-on-Human-and-Organizational-Factors-in-Nuclear-Safety-in-the-Light-of-the-Accident-at-the-Fukushima-Daiichi-Nuclear-Power-Plant

Probabilistic Safety Assessment Review Team module of the Design Safety Review Service, it can also be used by Member States in a stand-alone manner during PSAs. Assistance in completing the validation of the tool was provided by the Gösgen NPP in Switzerland.

NEXT STEPS

28. The activities to be undertaken by the Secretariat include:

- Organize and conduct a Technical Meeting on Evaluation of Nuclear Power Plant Design Safety in the Aftermath of the Fukushima Daiichi Accident in August 2013;
- Organize and conduct a Technical Meeting to compile results of national assessments and stress-tests provided by Member States in August 2013;
- Organize and conduct an International Conference on Topical Issues on Defence-in-Depth – Advances and Challenges for Nuclear Installation Safety in October 2013.
- Organize and conduct a Technical Meeting on Source Term Evaluation for Severe Accidents in October 2013;
- Organize and conduct an IEM on Severe Accident Management in March 2014; and
- Publish a technical report on post-accident monitoring systems by the end of 2014.

PROGRESS IN IMPLEMENTATION OF ACTION 1[8]

29. The figure below provides an assessment, as of July 2013, of the current and projected progress in implementation of Action 1. The assessment is based on the activities completed, in progress and planned and included in this annual report and those included in the 2012 annual report. The implementation of the "planned" activities is subject to the availability of funds for the 2014-2015 period.

30. Beyond 2015, the implementation of the Action Plan will be integrated in the regular activities of the respective IAEA divisions, as represented in the diagram by the blue arrow. In particular, these activities include the lesson learned from the Action Plan projects, the recommendations from those completed projects and the IEM's which require further work as well as the findings from the IAEA Fukushima Comprehensive Report.

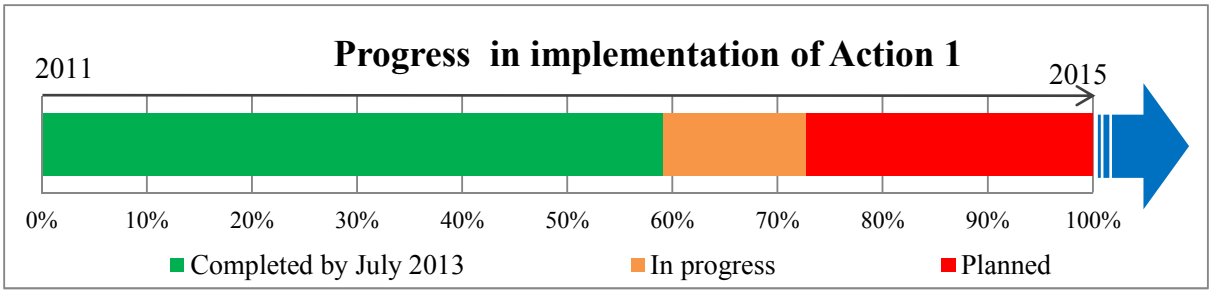

Figure 1: Assessed progress in implementation of Action 1, as of July 2013. The activities marked in green were completed by July 2013. The implementation of the activities marked in orange has started and continues beyond July 2013. The activities marked in red are to be undertaken and completed by the end of 2015.

[8] The numbering of Actions in this report is used to facilitate their identification in the graphical representation of progress. The numbering does not imply any order of priority among the 12 Actions.

IAEA PEER REVIEWS

ACTION: ***Strengthen IAEA Peer Reviews in order to maximize the benefits to Member States***

GOALS

Strengthen and Enhance Effectiveness of IAEA Peer Reviews

31. The Secretariat is to assess, and enhance as necessary, the effectiveness of the IAEA peer reviews by incorporating the lessons learned to date from the Fukushima Daiichi accident. The peer review services to be strengthened are in the areas of:

- Regulatory effectiveness- the Integrated Regulatory Review Service (IRRS);
- Operational safety – the Operational Safety Review Team (OSART) service;
- Design safety – the Design Safety Review service (DSR) and Site Evaluations;
- Emergency preparedness and response – the Emergency Preparedness and Response Review service (EPREV);
- Site evaluation – the Site and External Events Design service(SEED); and
- Integrated Nuclear Infrastructure Review service (INIR).

Enhance Transparency of Peer Reviews

32. The Secretariat is requested to enhance the transparency of the IAEA peer review missions and to promote the sharing of experience and lessons learned among Member States from the utilization of these services, including by making available information on where and when Member States have hosted IAEA peer review missions along with the results of such reviews.

Member States to host IAEA Peer Reviews

33. Member States encouraged to voluntarily host IAEA peer reviews, including follow up reviews, on a regular basis; the Secretariat to respond in a timely manner to requests for such reviews. Each Member State with NPPs to voluntarily host at least one IAEA Operational Safety Review Team (OSART) mission during the coming three years, with the initial focus on older NPPs. Thereafter, OSART missions to be voluntarily hosted on a regular basis.

BACKGROUND

34. The main objectives of the IAEA peer reviews are to provide an independent assessment of the safety of an activity or facility and to assist Member States in improving their performance in the area under review.

35. During the period of the last annual report the Secretariat undertook a comprehensive review of its peer review services and identified a number of areas for their enhancement by incorporating the lessons learned from the Fukushima Daiichi accident. The Secretariat made available on the IAEA web site information on where and when peer reviews have been carried out. During the period covered by this annual report the Secretariat continued to strengthen and enhance the effectiveness of the IAEA peer review services and to make available the results of the peer reviews conducted.

ACHIEVEMENTS

Strengthen and Enhance Effectiveness of IAEA Peer Reviews

36. The Secretariat continues to strengthen and enhance its peer review services. To this end, the following activities have been undertaken:

- Additional guidelines on the activities to be undertaken by Member States to prepare to host an IRRS mission and host follow-up missions have been developed and published;
- The ‘Fukushima module’ has been further improved to make it consistent with the standard IRRS mission report template;
- A schedule of the IRRS missions to be conducted to Member States for the period 2013-2015 has been finalized;

- An advisory service for the Design and Safety Assessment Review service has been developed to assist Member States embarking on nuclear power programmes in developing their safety assessment capabilities;
- An evaluation methodology and guidance for INIR Phase III has been developed;
- The second train-the-trainers type workshop "Assessment of National Emergency Preparedness and Response (EPR) Capabilities and Implementation of EPREV" for potential EPREV team members was carried out in June 2013 and,
- Lessons learned continue to be incorporated into the OSART peer review service guidelines and to be disseminated to Member States.

Enhance Transparency of Peer Reviews

37. The Secretariat continues to make available information to the public relating to where and when IAEA peer review missions have been carried out along with the mission results. The Action Plan website has been restructured and simplified to make it more user-friendly, such as through the publication of web-stories to make our work more understandable to the public. The Secretariat is continuing its efforts in making available IAEA peer reviews reports on the Member States platform.

Member States to host IAEA Peer Reviews

38. During the period covered in this annual report, the Secretariat organized and conducted:
- 3 IRRS missions to: Bulgaria, Finland and Poland;
- 5 EPREV missions to: Armenia, Kazakhstan, Lithuania, Uruguay and Jordan.
- 8 OSART missions to: Bulgaria(Kozloduy), Brazil(Angra 1), Czech Republic(Temelin), France(Gravelines and Chooz), India(Rajasthan), Mexico(Laguna Verde), Switzerland (Mueleberg);
- 7 OSART follow up missions to: Armenia (Armenia 2), Brazil(Angra 2), Czech Republic(Dukovany), France(Cattenom), Russian Federation(Smolensk), South Africa(Koeberg), United States of America (Seabrook);
- 3 Integrated Nuclear Infrastructure Review (INIR) missions to: Poland, South Africa and Vietnam; and
- 6 Site and External Events Design (SEED) review missions to: Czech Republic, Indonesia, Japan, Kazakhstan, Turkey and Vietnam.

39. The INIR mission to South Africa was the first such mission to a Member State with an existing nuclear power programme that is planning expansion. The mission provided support to South Africa to determine the current status of its nuclear infrastructure and identified further development needs.

40. The OSART programme was established in 1982 and has provided advice and assistance to Member States for 30 years on the safety of nuclear power plants during construction, commissioning and operation. During 2013, the Secretariat completed the 175th OSART mission since the start of the programme. The results of missions continue to be incorporated into the OSART mission results database and are available on the IAEA Web-site. While some Member States request OSART missions on a regular basis, other Member States have not hosted such missions in the recent years. Member States are encouraged to host OSART missions as called for in the Action Plan.

NEXT STEPS

41. The activities to be undertaken by the Secretariat include:
- Reassess the EPREV performance indicators methodology;
- Develop computer-based training for EPREV team members;
- Review the EPREV process so that the peer reviews can easily be adapted to the needs of Member States;
- Develop a mechanism for a workable and sustainable funding of EPREV missions;
- Prepare and conduct INIR missions to Jordan (INIR Phase 2), Morocco and Nigeria;
- Revise the Safe Long Term Operations (SALTO) guidelines in 2013;

- Organize and conduct a Technical Meeting on Evaluation of the OSART programme and its further evolution in the Republic of Korea in October 2013;
- Conduct the next INIR Mission in Turkey in November 2013;
- Develop new OSART guidelines 2014;
- Develop OSART guidelines for NPP during construction in 2014; and
- Undertake a pilot mission using the new OSART methodology in 2014 or 2015.

PROGRESS IN IMPLEMENTATION OF ACTION 2

42. The figure below provides an assessment, as of July 2013, of the current and projected progress in implementation of Action 2. The assessment is based on the activities completed, in progress and planned and included in this annual report and those included in the 2012 annual report. The implementation of the "planned" activities is subject to the availability of funds for the 2014-2015 period.

43. Beyond 2015, the implementation of the Action Plan will be integrated in the regular activities of the respective IAEA divisions, as represented in the diagram by the blue arrow. In particular, these activities include the lesson learned from the Action Plan projects, the recommendations from those completed projects and the IEM's which require further work as well as the findings from the IAEA Fukushima Comprehensive Report.

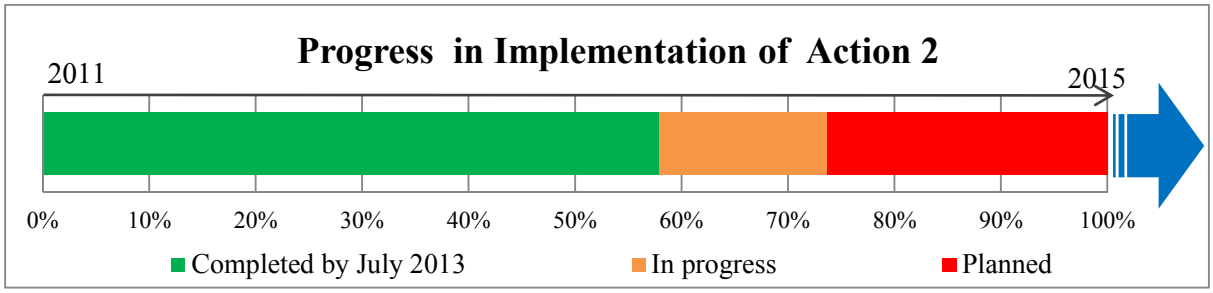

Figure 2: Assessed progress in implementation of Action 2, as of July 2013. The activities marked in green were completed by July 2013. The implementation of the activities marked in orange has started and continues beyond July 2013. The activities marked in red are to be undertaken and completed by the end of 2015.

EMERGENCY PREPAREDNESS AND RESPONSE

ACTION: *Strengthen emergency preparedness and response*

GOALS

Review of national emergency preparedness and response arrangements

44. Member States are requested to conduct a prompt national review and thereafter regular reviews of their emergency preparedness and response arrangements and capabilities. The Secretariat is to provide support and assistance to Member States through Emergency Preparedness Review (EPREV) missions, as requested.

Review and strengthen the international emergency preparedness and response framework

45. All relevant parties (the Secretariat, Member States and relevant international organizations) are requested to review and strengthen the international emergency preparedness and response framework. In addition, Member States to consider establishing national rapid response teams, on a voluntary basis that could also be made available internationally through the IAEA Response Assistance Network (RANET).

46. The Secretariat, in case of a nuclear emergency and with the consent of the State concerned, is to conduct timely fact-finding missions and to make the results of such missions publicly available.

BACKGROUND

47. Sound preparedness for and effective response to any radiation related (radiological and nuclear) event are essential to avoid or minimize the impacts of those events if they were to occur. The Fukushima Daiichi accident reinforced the importance of careful attention to emergency preparedness and response (EPR) at all levels, on-site, local, national and international.

48. During the period covered by the last annual report, the Secretariat undertook activities to assist Member States in strengthening EPR at the national and international levels. The Secretariat convened the Inter-Agency Committee on Radiological and Nuclear Emergencies (IACRNE) meeting in December 2011 where proposals to strengthen the international emergency preparedness and response framework were addressed. The Secretariat prepared a revision of the Joint Radiation Emergency Management Plan of the International Organizations (JPLAN) and a revised draft edition of the RANET document was sent to Parties to the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (the Assistance Convention) for comment.

49. During the period covered by this annual report the Secretariat has continued to support the strengthening of national and international emergency preparedness and response arrangements.

ACHIEVEMENTS

Review of national emergency preparedness and response arrangements

50. In order to support the strengthening of national EPR, the Secretariat organized and supported the implementation of 35 national, regional and interregional training courses and workshops in different areas of EPR. The Secretariat is planning to support another 24 training events during the remainder of 2013.

51. The Secretariat conducted four Convention Exercises (ConvEx) at different levels of complexity with an increased number of participating Member States. In order to further increase the Member States participation in these exercises, the Secretariat prepared the exercise calendar for 2013 and made it available to Member States on the Unified System for Information Exchange in Incidents and Emergencies (USIE).

Review and strengthen the international emergency preparedness and response framework

52. The Secretariat has established the Emergency Preparedness and Response Expert Group (EPREG) to provide advice on strategies to strengthen and sustain sound international preparedness

for nuclear and radiological emergencies. EPREG consists of 16 senior experts from, Africa, Asia and Pacific, Eastern Europe, Western Europe, North America and Latin America. The first meeting of EPREG was convened in February 2013 to discuss current international activities in the area of emergency preparedness and response and to recommend priorities for their future work.

53. The Secretariat published the *Joint Radiation Emergency Management Plan of the International Organizations* (EPR-JPLAN, Edition 2013) in July 2013 following discussion and agreement at the Inter-Agency Committee on Radiological and Nuclear Emergencies (IACRNE) meetings in October 2012 and May 2013. EPR-JPLAN Edition 2013 incorporates the following main improvements: a revised emergency classification scheme, elaborated response actions, additional clarification of response arrangement and tasks, updated capabilities and contact details of participating organizations, and updated list of publications and legal instruments of relevance to emergency preparedness and response.

54. The revision to the Safety Requirements publication *Preparedness and Response for a Nuclear or Radiological Emergency* (IAEA Safety Standards Series No. GS-R-2, 2002) has been approved for submission to Member States for comments.

55. The Secretariat has revised the internal emergency response plan*, Response Plan for Incidents and Emergencies* (REPLIE) and its associated procedures to include the process for the assessment of potential consequences of an emergency and prognosis of possible scenarios.

56. The Secretariat has finalised the publication titled IAEA Response and Assistance Network (EPR-RANET, edition 2013) taking into account Member States comments before being published in July 2013. The publication includes new guidance regarding the roles, responsibilities and actions needed on the part of all members of the Network to prepare for, request and receive assistance in the event of an emergency. The publication also includes an additional functional area to provide assessment and advice to competent authorities for on-site mitigation activities in case of emergencies at nuclear facilities.

57. The Secretariat has continued to work with State Parties to the Assistance Convention to increase the registration in RANET, resulting in the registration of national assistance capabilities of three additional Member States, Canada, Norway and United Kingdom. The RANET Forum was held during the 56th Regular Session of the General Conference to share the experiences and good practices of receiving or providing assistance under the RANET system. The necessity and effectiveness of immediate assistance under RANET was emphasized.. The importance of initial regionally based assistance for a prompt response in emergency situations was also highlighted.

58. In order to provide States with the information regarding the National Assistance Capabilities (NAC) registered in the RANET, in January 2013, the IAEA Secretariat launched the RANET database on the USIE website. The database features all information related to the NAC: Field Assistance Teams (FAT), External Based Support (EBS) and registered resources.

59. The annual process of updating the registrations of NAC was initiated and discussed at the RANET Technical Meeting in February 2013. At this meeting participants also discussed:

- An evaluation of the 2012 ConvEx2b as well as preparation made for the ConvEx 2b in April 2013;
- Ways of using capabilities of newly introduced functional areas;
- The programme of the RANET review missions; and
- EPR-RANET Edition 2013 including the process for conducting fact-finding missions in the event of a nuclear or radiological emergency.

Participants agreed with the programme of RANET review missions as well as with the EPR-RANET Edition 2013.

60. The Secretariat commenced the development of compatibility guidelines to improve effectiveness of international assistance under RANET. In the reporting period, the Secretariat organized meetings with Member States to discuss the compatibility issues that may exist when providing assistance in the areas of radiation monitoring, environmental sampling and analysis and

nuclear installation assessment and advice. Based on these inputs the Secretariat prepared initial draft guidelines in these areas that are planned to be finalized by the end of 2013.

61. The Capacity Building Centres are being established considering previous experiences and inputs from Member States. Several efforts were made to identify organizations that could host Capacity Building Centres and several organizations in Member States expressed their willingness to be part of this initiative. Practical arrangements (PAs) have been made between the IAEA and the Ministry of Foreign Affairs of Japan under which the "IAEA Response and Assistance Network (RANET) Capacity Building Centre" was designated in the Fukushima City. As part of its efforts to "strengthen the assistance mechanisms to ensure that necessary assistance is made available promptly", the Secretariat conducted in May 2013 the first RANET workshop at this centre. The workshop was attended by over 40 participants from 18 Member States.

62. During the period covered in this report, the Secretariat issued the following EPR-series publications:

- *Actions to Protect the Public in an Emergency due to Severe Conditions at a Light Water Reactor* (EPR-NPP Public Protective Actions, 2013);
- *Cytogenetic Dosimetry: Applications in Preparedness for and Response to Radiation Emergencies* – Training Materials (EPR-Biodosimetry/T, 2013);
- *Considerations in Emergency Preparedness and Response for a State Embarking on a Nuclear Power Programme* – Training Materials (EPR-Embarking/T, 2013),
- *Medical Preparedness and Response to a Nuclear and Radiological Emergency* – Training Materials (EPR-Medical/T, 2013).

63. In addition, the publication *Lessons Learned from the Response to Radiation Emergencies* (1945-2010)" (EPR-Lessons Learned, 2012) was translated into Russian while the publication *Communication with the Public in a Nuclear or Radiological Emergency* (EPR-Public Communications, 2012) was translated into French and Spanish. The e-learning tools associated with EPR-Public Communications, 2012 are in the development phase. Furthermore, Russian and Chinese versions of the *Operations Manual for Incident and Emergency Communication* (EPR-IEComm, 2012) were published and versions in French, Spanish and Arabic are being prepared.

NEXT STEPS

64. The activities to be undertaken by the Secretariat include:

- Continue establishing Capacity Building Centres to ensure that all regions and all relevant EPR areas are covered;
- Develop a concept for an upgraded database on EPR arrangements in Member States;
- Continue to promote RANET within the national and international communities to achieve regional balance of registered national assistance capabilities including the promotion of registrations in the new RANET functional area and to exercise the provision of assistance in this area;
- Finalize the methodology for the performance of NAC reviews while encouraging State Parties registered in RANET to invite RANET review mission; and to prepare the complete draft of assistance compatibility guidelines; and
- Continue developing/upgrading EPR standards and guides.

PROGRESS IN IMPLEMENTATION OF ACTION 3

65. The figure below provides an assessment, as of July 2013, of the current and projected progress in implementation of Action 3. The assessment is based on the activities completed, in progress and planned and included in this annual report and those included in the 2012 annual report.

The implementation of the "planned" activities is subject to the availability of funds for the 2014-2015 period.

66. Beyond 2015, the implementation of the Action Plan will be integrated in the regular activities of the respective IAEA divisions, as represented in the diagram by the blue arrow. In particular, these activities include the lesson learned from the Action Plan projects, the recommendations from those completed projects and the IEM's which require further work as well as the findings from the IAEA Fukushima Comprehensive Report.

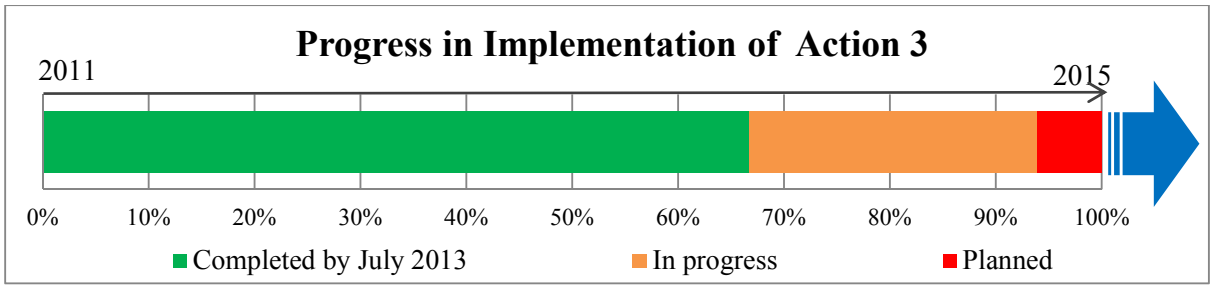

Figure 3: Assessed progress in implementation of Action 3, as of July 2013. The activities marked in green were completed by July 2013. The implementation of the activities marked in orange has started and continues beyond July 2013. The activities marked in red are to be undertaken and completed by the end of 2015.

NATIONAL REGULATORY BODIES

ACTION *Strengthen the effectiveness of national regulatory bodies*

GOALS

Enhance the Integrated Regulatory Review Service (IRRS)

67. Member States are requested to conduct a prompt national review and thereafter regular reviews of their regulatory bodies, including an assessment of their effective independence, adequacy of human and financial resources and the need for appropriate technical and scientific support, to fulfil their responsibilities.

68. The Secretariat is requested to enhance the IRRS for peer review of regulatory effectiveness through a more comprehensive assessment of national regulations against IAEA Safety Standards.

Voluntarily host IRRS missions

69. Each Member State with NPPs is requested to voluntarily host, on a regular basis, an IAEA IRRS mission to assess its national regulatory framework along with a follow-up mission that is to be conducted within three years of the main IRRS mission.

BACKGROUND

70. The IAEA Fundamental Safety Principles state that an effective legal and governmental framework for safety, including an independent regulatory body, must be established and sustained. The Governments of Member States are responsible for securing adherence to the international instruments relevant to nuclear safety, through establishing and maintaining the necessary legal and governmental infrastructure, including an effective independent regulatory body for the regulation of facilities and activities that give rise to radiation risks. An effective, competent and independent regulatory framework is therefore an essential prerequisite to any nuclear programme.

71. During the period covered by this annual report, the Secretariat continued to undertake activities to support strengthening the effectiveness of national regulatory bodies.

ACHIEVEMENTS

Enhance the Integrated Regulatory Review Service (IRRS)

72. A Technical Meeting of the IRRS Team Leaders for Sharing Experience and Improving the Implementation of the Service was held in January 2013 to share experience and further strengthen the effectiveness of national regulatory bodies through the IRRS. Thirteen senior regulators from 13 Member States participated. The main purpose of this meeting was to provide a platform for the exchange of information, experience and lessons learned from the IRRS missions conducted since 2006. In addition, the future expectations for the IRRS programme and improvements in the planning and implementation of the IRRS in the longer term were also explored.

73. The meeting reviewed the results of all the IRRS missions with the objective of improving the IRRS programme and guidance. Other IAEA Review Services were examined to identify any lessons to be learned that could enhance the IRRS. It was proposed to hold this kind of meeting at regular intervals in order to sustain this improvement process. Revised IRRS guidelines were published in May 2013.

74. Performance indicators and criteria have been developed on the effectiveness and efficiency of the IRRS process and an automated tool to assess the performance of the individual missions has been developed and will be applied in future missions. The schedule of the IRRS missions to be conducted between 2012 and 2015 has been finalized and will be made available to Member States through the Action Plan website.

International Conference on Effective Nuclear Regulatory Systems

75. In April 2013 the Secretariat, in conjunction with the Canadian Nuclear Safety Commission, organized the third in a series of International Conferences on Effective Nuclear Regulatory Systems hosted by Canada in Ottawa. This was the first event with a regulatory focus since the Fukushima

Daiichi accident and bore the theme 'Transforming experience into regulatory improvements'. The President's Report on the conference identified six action items that need to be addressed, implemented and followed-up:

- Regulators must increase peer pressure, especially at the next Review Meeting of the Convention on Nuclear Safety(CNS) in April 2014;
- There is a need for a regulatory operating experience program to share experiences in order to improve regulations as well as regulatory systems and processes;
- The safety of spent fuel pools should be reviewed for weaknesses in defence in depth and to eliminate as far as possible the possibility of a serious accident;
- Regulatory bodies should implement the IAEA Safety Standards on emergency preparedness and response, ensure that national communication plans are developed and tested and facilitate the preparation and conduct of national exercises;
- Regulatory bodies must be involved early in the process of long term spent fuel management; and
- Regulatory bodies must promote safety and security cultures as blame free but accountable.

76. The President of the Conference has recommended that a further regulatory conference be organized to review the progress made as a result of the findings of this conference, as well as to discuss and assess possible new regulatory issues.

77. An 'IAEA Report on *Strengthening Nuclear Regulatory Effectiveness* has been published based on the outcomes of the Ottawa Conference, the 2nd Extraordinary Meeting of the CNS, the results of the Member States 'stress tests' and the findings of IRRS Missions held since the Fukushima Daiichi accident.

78. Following a request from Member States, the Secretariat has extended the scope of the IAEA Self-Assessment of Regulatory Infrastructure for Safety (SARIS) self-assessment by establishing new question-sets based on the relevant IAEA Safety Standards. In this respect, two new questionnaires on NPP Design and NPP Commissioning and Operation, respectively, have been finalised. A technical meeting on the SARIS methodology and tool was conducted in December 2012 with the objective to present the latest developments in the methodology and tools provided by the IAEA for the self-assessment of national regulatory infrastructure for safety. During this meeting, the SARIS methodology and software was presented to Members States and their experience relating to self-assessment was discussed in the context of the continuous improvement of the Secretariat's programme in this area.

79. The IAEA draft safety report on *Managing the Competence of the Regulatory Body* (formerly called Managing Regulatory Body Competence) has been finalized and has been submitted for publication. The purpose of this report is to provide guidance to Member States based on the IAEA Safety Standards, making specific reference to managing regulatory competence in those Member States embarking on a nuclear power programme. In addition, the methodology for the application of the Guidelines for Systematic Assessment of Regulatory Competence Needs (SARCON) has been enhanced and tailored to meet the specific needs of Member States. This represents an important step forward towards improving the support offered by the Secretariat to Member States in developing their regulatory bodies.

80. In March 2013, the Secretariat organized and conducted a meeting to discuss the revision of the IAEA's training course textbook on *IAEA Regulatory Control of Nuclear Power Plants* (IAEA-TCS-15 Edition 2002) to take account of the developments in the IAEA Safety Standards and the lessons learned so far from the implementation of the Action Plan. The meeting proposed revisions to the table of contents for the textbook, identified the main messages of the content for each of the chapters and outlined a plan of action for further revision.

NEXT STEPS

81. The activities to be undertaken by the Secretariat include:

- Continue the analysis of past IRRS missions and the identification of possible improvements of the IRRS process;
- Develop further performance indicators and criteria on the effectiveness and efficiency of the IRRS process and apply the automated tool developed to assess the performance of the individual IRRS missions;
- Finalize the IRRS training material for all participants of the IRRS process; and
- Publish the document *Managing the Competence of the Regulatory* Body by the end of 2013.

PROGRESS IN IMPLEMENTATION OF ACTION 4

82. The figure below provides an assessment, as of July 2013, of the current and projected progress in implementation of Action 4. The assessment is based on the activities completed, in progress and planned and included in this annual report and those included in the 2012 annual report. The implementation of the "planned" activities is subject to the availability of funds for the 2014-2015 period.

83. Beyond 2015, the implementation of the Action Plan will be integrated in the regular activities of the respective IAEA divisions, as represented in the diagram by the blue arrow. In particular, these activities include the lesson learned from the Action Plan projects, the recommendations from those completed projects and the IEM's which require further work as well as the findings from the IAEA Fukushima Comprehensive Report.

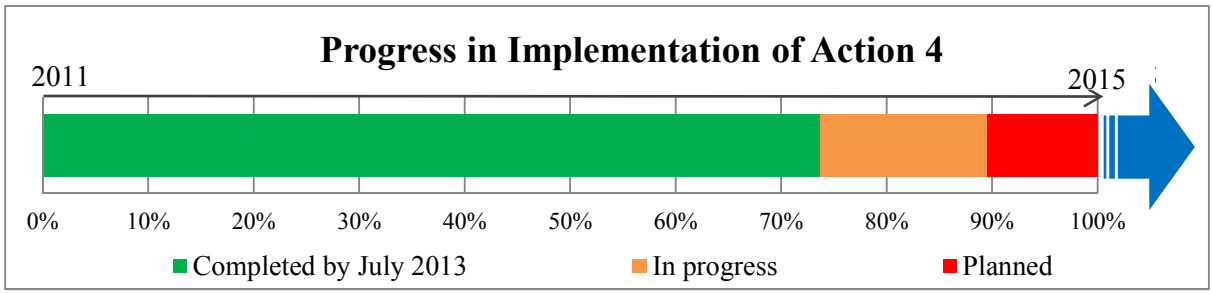

Figure 4: Assessed progress in implementation of Action 4, as of July 2013. The activities marked in green were completed by July 2013. The implementation of the activities marked in orange has started and continues beyond July 2013. The activities marked in red are to be undertaken and completed by the end of 2015.

OPERATING ORGANIZATIONS

ACTION: *Strengthen the effectiveness of operating organizations with respect to nuclear safety*

GOALS

Strengthening the effectiveness of operating organizations

84. Member States are requested to ensure improvement, as necessary, of management systems, safety culture, human resources management, and scientific and technical capacity in their respective operating organizations. The Secretariat is to provide assistance in strengthening the effectiveness of operating organizations.

85. Each Member State with an NPP is requested to voluntarily host at least one IAEA OSART mission during the three years from the adoption of the Action Plan, with the initial focus on older NPPs. Thereafter, OSART missions to be voluntarily hosted on a regular basis.

Strengthen cooperation with WANO and other organizations

86. The Secretariat is required to strengthen cooperation with the World Association of Nuclear Operators (WANO) by amending the existing Memorandum of Understanding (MoU) between the two organizations to enhance information exchange on operating experience and on other relevant safety and engineering areas and, in consultation with other relevant stakeholders, to explore mechanisms to enhance communication and interaction among operating organizations.

BACKGROUND

87. The IAEA Fundamental Safety Principles state that the prime responsibility for safety rests with the person or organization responsible for facilities and activities that give rise to radiation risks. While the safety of an NPP is ensured by means of proper site selection, design, construction and commissioning, an effective operating organization ensures that a high level of safety is achieved through the effective management and control of operational activities.

88. During the period covered in this report, the Secretariat continued to provide support to Member States through the OSART service and through the conclusion of cooperative arrangements with national and international organizations to strengthen the effectiveness of operating organizations.

ACHIEVEMENTS

Strengthening the effectiveness of operating organizations

89. The Secretariat organized and conducted the Nuclear Operating Organization Cooperation Forum during the 56th Regular Session of the General Conference in September 2012. The Forum was attended by more than 70 delegates from Member States. The topics discussed included, enhancing interactions between the Secretariat and the nuclear industry, enhancing interaction between experienced operating organizations and those Member States that are ‘newcomers’ and strengthening the capabilities of the Forum to collect and disseminate operational best practices.

90. The Secretariat organized and conducted a technical meeting on safety culture during pre-operational phases of an NPP programme in South Africa in November 2012. The meeting was attended by 152 participants from 27 Member States from operating organizations, regulatory bodies and research institutions. The technical aspects and behavioural and social science approaches to safety culture improvement were discussed. The importance of safety culture in the early phases of an NPP programme was highlighted.

91. The Secretariat organized and conducted a technical meeting in March 2013 on the Design Review Process to Support Expanding and New Nuclear Power Programmes. Thirty-two experts from 17 Member States and 2 international organizations participated and discussed relevant experience and knowledge on the enhancement of the NPP design process. Improvements to the design management processes were explored and the concept of the design authority was discussed.

92. During the period covered in this report, the Secretariat organized and conducted the biennial meetings of two technical working groups. A meeting of the Technical Working Group on Life Management of NPPs (TWGLMNPP) was held in February 2013. The meeting focussed on NPP life management and long term operation, including operation beyond the original design life and took account of the lessons learned from the Fukushima Daiichi accident. Twenty experts from 20 Member States and international organizations participated in the meeting and shared their respective experience with NPP life management. Plans for future work of the TWG-LMNPP were discussed.

93. A meeting of the Technical Working Group on Nuclear Power Plant Instrumentation and Control (TWG-NPPIC) was held in May 2013. Thirty-five representatives from 19 Member States and 2 international organizations participated. The meeting focussed on instrumentation and control (I&C) issues associated with modernizing existing NPPs and developing new designs. The TWG members reported on country activities, current issues, commonly encountered difficulties, and shared best practices and strategies in the design and implementation of NPP I&C systems.

94. The Secretariat is finalizing a Safety Report on *How to Continuously Improve Safety Culture – Applying Organizational Science to Enhance Safety Performance*. In addition, the Secretariat launched preparation of new Safety Requirements for *Leadership and Management for Safety*.

95. The Secretariat organized and conducted a technical meeting on Technical Support Organization (TSO) Role and Responsibilities in May 2013, attended by 28 participants from 18 Member States. The purpose of the meeting was to establish a common understanding of the roles, and responsibilities, and activities of TSOs for strengthening the design, safety and NPP performance as well as the decision making capabilities of NPP owner/operators. The participants specifically emphasized the key role and core activities of TSOs (both internal and external) and their importance to the operation of NPPs.

Strengthen cooperation with WANO and other organizations

96. The Secretariat and WANO signed an MoU at the 56th Regular Session of the General Conference. As a result of this MoU, the two organizations are enhancing their cooperation and are adopting a more coordinated approach to their respective activities, such as coordinating the timing of the Secretariats OSART missions and WANO peer reviews, as well as arranging regular meetings of WANO and the Secretariat to discuss major safety-related activities. Both organizations are cooperating on their respective performance indicator programmes and working towards exchanging information and support in the event of an accident at an NPP or nuclear fuel cycle facility. In addition, the Secretariat and WANO are supporting each other's peer review teams, when appropriate, and regularly exchanging information relating to operating experience.

97. The Secretariat and WANO jointly organized a workshop to discuss operating experience feedback for NPPs in October 2012 at the WANO Moscow Centre. The Workshop was attended by 41 participants from operating organizations and regulatory bodies from 15 Member States. It was agreed that the joint WANO/IAEA operating experience feedback workshop should be a regular annual event with the next meeting to be held in 2013.

98. In September 2012, the Secretariat and the Electric Power Research Institute (EPRI), USA, signed a PA for Scientific and Technical Cooperation on Nuclear Safety and Nuclear Technologies Applied to the Operation and Decommissioning of NPP's. Under the PA, the Secretariat and EPRI will expand their information exchange in the field of nuclear safety and nuclear technologies to support currently operating nuclear reactors and new nuclear power programmes. The three-year cooperation will focus on promoting research on nuclear power technology development, NPP operation, decommissioning and waste disposal.

99. The technical areas covered by the PA include post-Fukushima risk evaluation, plant aging and material degradation, digital instrumentation and controls, nuclear waste characterization and disposal technologies and advanced nuclear fuel technologies. In addition, the Secretariat and EPRI will support the widest possible dissemination of publicly available information on these subjects and prepare joint publications and other information material relevant to the safe operation and decommissioning of NPPs.

NEXT STEPS

100. The activities to be undertaken by the Secretariat include:

- Organize and conduct a Technical Meeting on *Flexible (Non-Baseload) Operation Approaches for NPPs* in September 2013
- Organize and conduct a Technical Meeting on *the Degradation of Primary Components in Pressurized Water Cooled NPPs* in November 2013
- Organize and conduct the *3rd Nuclear Operator Organizations Cooperation Forum* during the 57th Regular Session of the General Conference;
- Prepare a report of IEM on *Human and Organizational Factors in Nuclear Safety in the Light of the Accident at the Fukushima Daiichi Nuclear Power Pla*nt in the near future;
- Organize and conduct the *12th IAEA-FORATOM management system workshop on Journey to Excellence in a Changing Environment* be held in November 2013; and
- Finalise and publish a report on *Human performance and internal communication in emergency situations* in 2014.

PROGRESS IN IMPLEMENTATION OF ACTION 5

101. The figure below provides an assessment, as of July 2013, of the current and projected progress in implementation of Action 5. The assessment is based on the activities completed, in progress and planned and included in this annual report and those included in the 2012 annual report. The implementation of the "planned" activities is subject to the availability of funds for the 2014-2015 period.

102. Beyond 2015, the implementation of the Action Plan will be integrated in the regular activities of the respective IAEA divisions, as represented in the diagram by the blue arrow. In particular, these activities include the lesson learned from the Action Plan projects, the recommendations from those completed projects and the IEM's which require further work as well as the findings from the IAEA Fukushima Comprehensive Report.

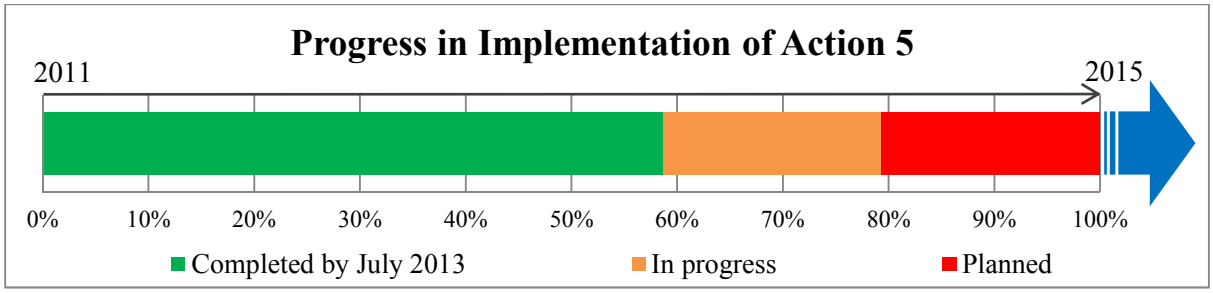

Figure 5: Assessed progress in implementation of Action 5, as of July 2013. The activities marked in green were completed by July 2013. The implementation of the activities marked in orange has started and continues beyond July 2013. The activities marked in red are to be undertaken and completed by the end of 2015.

IAEA SAFETY STANDARDS

ACTION: *Review and strengthen IAEA Safety Standards and improve their implementation*

GOALS

Review and revise the relevant IAEA Safety Standards

103. The Secretariat and the Commission on Safety Standards are requested to review and revise as appropriate, and strengthen the IAEA Safety Standards and improve their implementation using the existing process in a more efficient manner.

BACKGROUND

104. The IAEA Safety Standards have a status that is derived from the IAEA's Statute which authorizes the IAEA "to establish or adopt, in consultation and, where appropriate, in collaboration with the competent organs of the United Nations and with the specialized agencies concerned, standards of safety for protection of health and minimization of danger to life and property and to provide for the application of these standards".

105. The IAEA Safety Standards provide a robust framework of fundamental principles, requirements and guidance to ensure safety. They are developed through an open and transparent process for gathering, integrating and sharing the knowledge and experience gained from the actual use of technologies and from the application of the IAEA Safety Standards, including emerging trends and issues of regulatory importance. They contribute to the establishment of a harmonized high level of safety worldwide by serving as the global reference for protecting people and the environment.

106. During the period covered by the last annual report, the Secretariat established a Safety Standards Review Task Force (SSRTF), specifically to review the relevant IAEA Safety Standards. The review did not identify any areas of significant weakness. Proposals to revise the IAEA Safety Standards are being reviewed by the Safety Standards Committees.

ACHIEVEMENTS

107. The Chair of the Commission on Safety Standards (CSS) reported on the progress of the review of the IAEA Safety Standards to the Director General in November 2012. The Chair reemphasized the adequacy of the current Safety Requirements and that no significant areas of weakness had been identified. However, some revisions were proposed to strengthen the Safety Requirements and facilitate their implementation. In addition, the results of the Second Extraordinary Meeting of the Contracting Parties (CPs) to the CNS and the three IEMs held in 2012 were analysed to identify other potential aspects for further review and revision of the IAEA Safety Standards.

108. A draft proposal for the revision, through addenda, of the following IAEA Safety Standards Series publications was submitted to the Safety Standards Committees in January 2013 for a preliminary review:

- *Governmental, Legal and Regulatory Framework for Safety* (GSR Part 1, Vienna, 2010);
- *Site Evaluation for Nuclear Installations* (NS-R-3, Vienna, 2003);
- *Safety of Nuclear Power Plants: Design* (SSR-2/1, Vienna, 2012);
- *Safety of Nuclear Power Plants: Commissioning and Operation* (SSR-2/2, Vienna, 2011);
- *Safety Assessment for Facilities and Activities* (GSR Part 4, Vienna, 2009).

109. Following the Safety Standards Committee reviews, a meeting of a working group of the Nuclear Safety Standards Committee (NUSSC) was held in March 2013 to review the draft addenda for the abovementioned five Safety Requirements before submission to the Safety Standards Committees for a final review in June and July 2013.

110. The draft addenda were approved by the Safety Standards Committees, at their meetings in June and July 2013 and will be sent to Member States for review and comment. The final review and approval by the Commission on Safety Standards is expected in November 2014 and the revisions of these Safety Requirements are planned for submission to the Board of Governors in March 2015.The

revisions to these Safety Requirements are planned for submission to the Board of Governors in March 2015.

111. In parallel, the draft revisions to the IAEA Safety Standards Series Safety *Requirements on Preparedness and Response for a Nuclear or Radiological Emergency* (GS-R-2, Vienna, 2002) and *The Management System for Facilities and Activities* (GS-R-3, Vienna, 2006) have been submitted to the relevant Safety Standards Committees for approval to be sent to Member States for comment.

112. Three Safety Guides have been identified for a pilot review against the set of lessons learned used for the review of the following Safety Requirements: *Design of the Reactor Coolant System and Associated Systems in Nuclear Power Plants* (NS-G-1.9, Vienna, 2004); *Design of Reactor Containment Systems for Nuclear Power Plants* (NS-G-1.10, Vienna, 2004); *Severe Accident Management Programmes for Nuclear Power Plants* (NS-G-2.15, Vienna, 2009.

NEXT STEPS

113. The activities to be undertaken by the Secretariat include:

- Provide the draft addenda to Member States for comment in 2013;
- Revise the draft addenda taking account of Member States comments;
- Submit the draft addenda to Committees and the Commission in 2014;
- Complete the pilot program review of the following Safety Guides:
    i. *Design of Reactor Containment Systems for Nuclear Power Plants* (NS-G-1.10);
    ii. *Design of the Reactor Coolant System and Associated Systems in Nuclear Power Plants* (NS-G-1.9); and
    iii. *Severe Accident Management Programmes for Nuclear Power Plants* (NS-G-2.15).

PROGRESS IN IMPLEMENTATION OF ACTION 6

114. The figure below provides an assessment, as of July 2013, of the current and projected progress in implementation of Action 6. The assessment is based on the activities completed, in progress and planned and included in this annual report and those included in the 2012 annual report. The implementation of the "planned" activities is subject to the availability of funds for the 2014-2015 period.

115. Beyond 2015, the implementation of the Action Plan will be integrated in the regular activities of the respective IAEA divisions, as represented in the diagram by the blue arrow. In particular, these activities include the lesson learned from the Action Plan projects, the recommendations from those completed projects and the IEM's which require further work as well as the findings from the IAEA Fukushima Comprehensive Report.

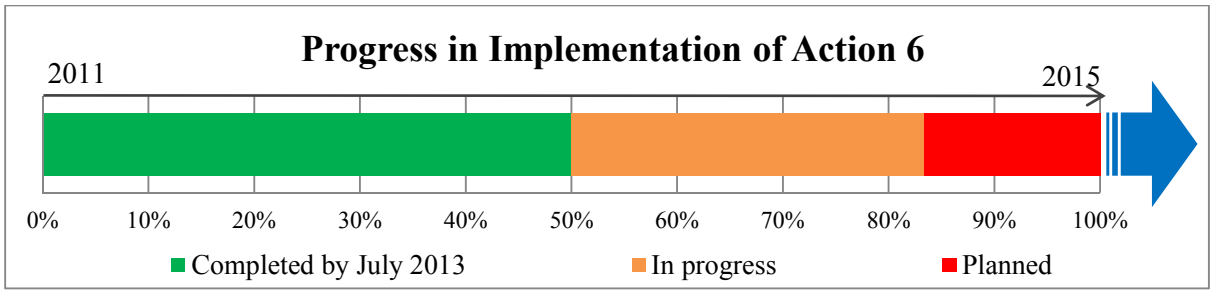

Figure 6: Assessed progress in implementation of Action 6, as of July 2013. The activities marked in green were completed by July 2013. The implementation of the activities marked in orange has started and continues beyond July 2013. The activities marked in red are to be undertaken and completed by the end of 2015.

INTERNATIONAL LEGAL FRAMEWORK

ACTION: *Improve the effectiveness of the international legal framework*

GOALS

Enhance the effective implementation of the Conventions

116. States Parties are requested to explore mechanisms to enhance the effective implementation of the CNS, the Joint Convention on the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management, the Convention on the Early Notification of a Nuclear Accident and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency.

Consider proposals made to amend the Conventions

117. In addition, States Parties are to consider proposals that may be made to amend the CNS and the Convention on the Early Notification of a Nuclear Accident. Member States to join and effectively implement these Conventions

118. The action also encourages Member States which are not yet party to these Conventions to join and effectively implement their provisions.

Establishing a global nuclear liability regime

119. The action also calls upon Member States to work towards establishing a global nuclear liability regime that addresses the concerns of all States that might be affected by a nuclear accident with a view to providing appropriate compensation for nuclear damage, and specifically calls upon the International Expert Group on Nuclear Liability (INLEX) to recommend actions to facilitate the achievement of such a global regime.

BACKGROUND

120. The current international legal framework for nuclear safety consists of legally binding and non-binding instruments issued to assist those involved in the peaceful uses of nuclear energy.

121. The CNS aims to achieve and maintain a high level of safety worldwide at nuclear installations through the enhancement of national measures and international cooperation. Nuclear installations covered by the Convention are defined as land-based civil NPPs under a Contracting Parties jurisdiction including such storage, handling and treatment facilities for radioactive materials as are on the same site and are directly related to the operation of the NPP. Parties to the CNS are required to submit for peer review a report on the measures they have taken to implement each of the obligations of the Convention.

122. Several CPs to the CNS have submitted proposals to enhance the effectiveness of the Convention. The Secretariat acting as the secretary of the CNS, received a request from the Presidency of the Second Extraordinary Meeting to prepare a draft document reflecting various proposals for modifying the “CNS procedures and guidance documents” (INFCIRCs 571, 572 and 573) in order to facilitate the CPs’ review of these proposals in advance of the Second Extraordinary Meeting in August 2012. The revised draft of INFCIRCs were discussed and approved at the Second Consultancy Meeting in July 19- 20, 2012, and thereafter distributed to all CPs at the end of July 2012. The Second Consultancy Meeting has also provided an opportunity to further discuss the proposals for amending the CNS.

123. The Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (Joint Convention) has as one of its objectives to achieve and maintain a high level of safety worldwide in spent fuel and radioactive waste management, through the enhancement of national measures and international co-operation. Its scope of application includes spent fuel and radioactive waste resulting from civilian nuclear reactors and applications and under certain circumstances to spent fuel and radioactive waste from military or defence programmes. The Joint Convention applies to the management of spent fuel and radioactive waste; it also applies to the planned and controlled releases into the environment of liquid or gaseous radioactive materials from

regulated nuclear facilities. Like the CNS, the Joint Convention provides for a peer review mechanism as describe above.

124. The Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency and the Convention on Early Notification of a Nuclear Accident (the Emergency Conventions) are the prime legal instruments that establish an international framework to facilitate the exchange of information and the prompt provision of assistance in the event of a nuclear accident or radiological emergency. These Conventions place specific obligations on the Parties and the IAEA, with the aim of minimizing consequences on health, property and the environment in such cases.

125. In the area nuclear liability, there are currently two international regimes. On the one hand, there is the so-called "Paris regime", which consists of the 1960 Paris Convention on Third Party Liability in the Field of Nuclear Energy (the Paris Convention), concluded under the auspices of the Organization for Economic Cooperation and Development (OECD), open to OECD Member States and to other States only if all Parties give their consent. The Paris Convention is supplemented by the 1963 Brussels Convention Supplementary to the Paris Convention (the Brussels Supplementary Convention) and both conventions have been amended by Protocols adopted in 1964 and 1982, and will be further amended by Protocols adopted on 12 February 2004, which are, however, not yet in force. On the other hand, there is the so-called "Vienna regime", which consists of the 1963 Vienna Convention on Civil Liability for Nuclear Damage (the 1963 Vienna Convention) and of the 1997 Protocol to Amend the Vienna Convention (the 1997 Vienna Convention), both concluded under the auspices of the IAEA and open to all Member States of the United Nations, its specialized agencies or the IAEA, or to all States respectively. Both the Paris and the Vienna regime follow the same basic principles.

126. In order to create a treaty link between the different regimes, two instruments have been adopted: The first one is the 1988 Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention (the Joint Protocol), adopted under the joint auspices of the IAEA and the OECD, which aims at bridging the gap between Parties to the Vienna and the Paris regime and extending the rights under one regime to victims in the territory of Parties to the other. The second instrument is the 1997 Convention on Supplementary Compensation for Nuclear Damage (the CSC), concluded under the auspices of the IAEA, which aims not only at establishing treaty relations between States that either belong to the Vienna or the Paris regime but also with other States, provided their national legislation is consistent with the basic principles set out in the Paris and Vienna regime as laid down in the Annex to the CSC. The CSC also aims at increasing the amount of compensation available in the event of a nuclear incident through supplementary funds to be provided by its Contracting Parties.

ACHIEVEMENTS

Enhance the effective implementation of the Conventions

127. The Secretariat provided support to the Second Extraordinary Meeting of the Contracting Parties to the CNS held in August 2012, as well as to the Organizational Meeting for the Sixth Review Meeting held at the same time. The objectives of the Second Extraordinary Meeting included reviewing and discussing the lessons learned so far from the Fukushima Daiichi accident and reviewing the effectiveness of the CNS. The CPs decided to establish a working group on effectiveness and transparency, which would be open to all CPs and would have the task of reporting to the next Review Meeting to be held from 24 March to 3 April 2014 on a list of actions to strengthen the CNS and on the proposals to amend, where necessary, the Convention.

128. The working group on effectiveness and transparency met in February and again in May 2013 where they identified fourteen areas where improvements (not limited to lessons learned from Fukushima) are worth pursuing and agreed that it will develop working papers on identified areas that define the issues, suggest the rationale for enhancement, identify tools to achieve the enhancement and propose actions to be take.

129. A meeting of the Working Group of Experienced Officers of the CNS and the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste

Management was held in Vienna from 21 to 23 January 2013 to share experiences and identify potential improvements to the review processes under said Conventions. Feedback from experienced officers was extensively discussed and a draft report prepared for the leadership of both Conventions will be finalized by correspondence in 2013.

130. A CNS Officers' Turnover Meeting was held in Vienna, on 17 April 2013. The officers for the 5th Review Meeting provided feedback from previous review meetings and extraordinary meetings and shared experience with the officers elected for the 6th review Meeting.

131. An Inter-Sessional Meeting of the CPs to the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management was held in Vienna, from 16 to 18 April 2013. The purpose of the meeting was to facilitate further consideration of proposals to improve the implementation of the Joint Convention, as requested by the Contracting Parties at the Fourth Review Meeting held in May 2012.

Member States to join and effectively implement the Conventions

132. The second Treaty Event organized by the Secretariat took place during the 56th regular session of the General Conference, and 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, notably those related to nuclear safety, security and civil liability for nuclear damage.

133. During the period covered by this report:

- One Member State (Oman) deposited its instrument to join the Convention on Nuclear Safety;
- Four Member States (Armenia, Bosnia and Herzegovina, Mauritius and Oman) deposited their respective instruments to join the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management;
- Two Member States (Paraguay and the Lao People's Republic) deposited their respective instruments to join the Convention on Early Notification of a Nuclear Accident;
- Two Member States (Paraguay and the Lao People's Republic) deposited their respective instruments to join the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency;
- One Member State (Mauritius) deposited its instrument to join the Vienna Convention on Civil Liability for Nuclear Damage;
- One Member State (Bosnia and Herzegovina) deposited its instrument to join the Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage;
- One Member State (the United Arab Emirates) deposited its instrument to join the Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention: and
- One Member State (Mauritius) signed the Convention on Supplementary Compensation for Nuclear Damage.

134. In order to further encourage Member States to join and effectively implement the Conventions, the Secretariat has continued to undertake activities to highlight their importance. In particular, the Secretariat has continued to support Member States under its legislative assistance programme by assisting 21Member States, as well as the Territories under the jurisdiction of the Palestinian Authority, in reviewing their draft national nuclear legislation and by training scientific visitors (from Saudi Arabia and Vietnam) and fellows (from Bosnia and Herzegovina, Cambodia, and Oman). A follow-up mission was dispatched to Vietnam in June 2013 to conduct further discussions on its legislative framework. Awareness missions were dispatched to Ghana (October 2012), Malaysia (December 2012) and Thailand (July 2013) aimed at raising the awareness of national policymakers about the importance of adhering to relevant international legal instruments adopted under the Agency's auspices. Preparations are under way to conduct similar missions in other interested Member States over the coming months.

135. The second session of the Nuclear Law Institute was organized by the Office of Legal Affairs in Baden, Austria, from 23 September to 5 October 2012. This comprehensive two-week course is helping to meet the increasing demand by Member States for legislative assistance and to enable

participants to acquire a solid understanding of all aspects of nuclear law, as well as to draft, amend or review their national nuclear legislation. Approximately 60 representatives from 51 Member States participated. Using modern teaching methods based on interaction and practice, all areas of nuclear law were comprehensively addressed.

136. The Secretariat organized two workshops on nuclear law—one in Geneva, Switzerland on 29 April 2013 and another in Vienna on 15 July 2013. The workshops provided diplomats and technical experts from the Permanent Missions of IAEA Member States located in Geneva and Vienna with a broad understanding of all aspects of nuclear law. They included presentations on the key international legal instruments relating to nuclear safety, nuclear security, safeguards and civil liability for nuclear damage, as well as an overview of the IAEA's legislative assistance programme.

137. The Secretariat also organized a briefing for experts on nuclear law in Vienna on 15 to 19 July 2013, which provided advanced training in nuclear law, particularly on special issues on the international nuclear law governing the safe, secure and peaceful use of nuclear material and ionizing radiation and on civil liability for nuclear damage. The training course was designed to enable the Secretariat to create a pool of nuclear law experts who may be invited to participate or to deliver presentations in legislative assistance activities.

138. In addition, the Secretariat's outreach capabilities are being further enhanced through, inter alia, the development of new online training material and a third volume of the Handbook on Nuclear Law, which will cover various areas of nuclear law beyond the regulatory matters covered in the previous two volumes. Consultancy meetings were held in November 2012 and March 2013 to further develop the draft text.

Establishing a global nuclear liability regime

139. In the area of civil liability for nuclear damage, the 13th Meeting of the International Expert Group on Nuclear Liability (INLEX) took place in Vienna, from 15 to 17 May 2013. The Group discussed, inter alia, liability in the case of transport of nuclear material, with special focus on the rights of non-nuclear transit States; liability issues in respect of transportable NPPs; and the impact of the 2012 revision of the IAEA transport regulations on the Board decision excluding small quantities of nuclear material from the scope of nuclear liability conventions. The Group also discussed a paper on the benefits of joining the nuclear liability regime and developed corresponding key messages to be used during legislative assistance activities carried out by the Agency.

140. The Secretariat organized the Second Workshop on Civil Liability for Nuclear Damage in Vienna on 14 May 2013. The workshop provided diplomats and experts from Member States with an introduction to the subject, and was attended by 49 participants from 34 Member States. Due to its success, it was decided to henceforth repeat this event on an annual basis.

141. As regards other outreach activities, presentations were made at a briefing for diplomats at UN Headquarters in New York on 1 May 2013. Similarly, the Chairman of INLEX made a presentation on nuclear liability to a three-day IAEA Regional Workshop for Pacific Islands in Nadi, Fiji, from 29 April to 1 May 2013.

142. Preparations are also underway for the conduct of IAEA/INLEX missions in a number of interested Member States in the following months, in order to raise awareness of the international legal instruments relevant for achieving a global nuclear liability regime.

143. The Explanatory Text for the Joint Protocol on the Application of the Vienna Convention and the Paris Convention, which was developed by INLEX, was published as IAEA International Law Series No. 5.

NEXT STEPS

144. The activities to be undertaken by the Secretariat include:

- Continue to assist States Parties in their efforts to strengthen the review processes and the effective implementation of the Conventions;

- Continue to carry out, upon request, dedicated awareness missions/seminars to encourage, inform and raise the awareness of national policy-makers in Member States about the importance of adhering to the relevant international legal instruments;
- Continue to provide, upon request, bilateral legislative assistance to support Member States in drafting the required national nuclear legislation;
- Continue to work towards enhancing the Secretariat's outreach capabilities through inter alia the development of new online training material and a third volume of the Handbook on Nuclear Law;
- Conduct the third session of the Nuclear Law Institute, to take place from 29 September to 11 October 2013, and organize the fourth session to take place in 2014;
- Continue to organize and conduct workshops and briefings for Member States on nuclear law, including specific workshops on civil liability for nuclear damage; and
- Continue to assist in the implementation of the recommendations adopted by INLEX on how to facilitate the establishment of a global nuclear liability regime and continue to carry out, upon request, IAEA/INLEX missions in order to encourage member States to give due consideration to adhering to the relevant nuclear liability conventions.

PROGRESS IN IMPLEMENTATION OF ACTION 7

145. The figure below provides an assessment, as of July 2013, of the current and projected progress in implementation of Action 7. The assessment is based on the activities completed, in progress and planned and included in this annual report and those included in the 2012 annual report. The implementation of the "planned" activities is subject to the availability of funds for the 2014-2015 period.

146. Beyond 2015, the implementation of the Action Plan will be integrated in the regular activities of the respective IAEA divisions, as represented in the diagram by the blue arrow. In particular, these activities include the lesson learned from the Action Plan projects, the recommendations from those completed projects and the IEM's which require further work as well as the findings from the IAEA Fukushima Comprehensive Report.

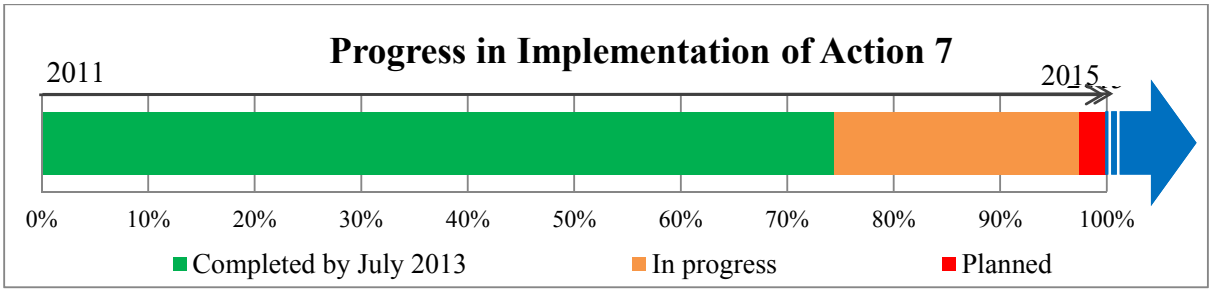

Figure 7: Assessed progress in implementation of Action 7, as of July 2013. The activities marked in green were completed by July 2013. The implementation of the activities marked in orange has started and continues beyond July 2013. The activities marked in red are to be undertaken and completed by the end of 2015.

MEMBER STATES PLANNING TO EMBARK ON A NUCLEAR POWER PROGRAMME

ACTION: *Facilitate the development of the infrastructure necessary for Member States embarking on a nuclear power programme*

GOALS

Create an appropriate nuclear infrastructure based on IAEA Safety Standards and other relevant guidance

147. Member States are requested to create an appropriate nuclear infrastructure based on IAEA Safety Standards and other relevant guidance. The Secretariat is to provide assistance to Member States as may be requested.

Host Integrated Nuclear Infrastructure Reviews (INIR)

148. Member States embarking on a nuclear power programme are requested to voluntarily host INIR and relevant peer review missions, including site and design safety reviews, prior to commissioning the first NPP.

BACKGROUND

149. Launching a nuclear power programme is a major undertaking that requires careful planning, preparation and investment in time and resources. The necessary infrastructure to support the successful introduction of nuclear power covers a wide range of issues, from the physical facilities for the delivery of electricity, the site and supporting facilities for handling radioactive waste, to the legal and regulatory framework to the human and financial resources necessary to implement the required activities. It entails attention to many complex and interrelated issues over a long duration.

150. During the period covered by this annual report, the Secretariat continued to support Member States in their activities to develop the infrastructure necessary to support the introduction of a nuclear power programme. The Secretariat organized and conducted a series of meetings and conferences to exchange knowledge and experience on the development of nuclear power programmes including:

- The 7th Annual Technical Meeting on Nuclear Power Infrastructure;
- The Fourth Meeting of the Technical Working Group on Nuclear Power Infrastructure;
- The International Ministerial Conference on Nuclear Power in the 21st Century; and
- The Technical Meeting on the Cooperation for Human Resources Development among Embarking and Experienced Countries.

151. The Secretariat has also strengthened the services available to Member States through the introduction of a self-assessment methodology for the integrated review of infrastructure for Safety (IRIS), an integrated catalogue of services for embarking countries, interactive e-learning tools and a range of relevant training packages. The Secretariat has provided support and assistance directly to Member States through the INIR service and other national and regional activities.

ACHIEVEMENTS

152. **Support to Member States in infrastructure development**

153. The Secretariat organized and conducted the 7th Annual Technical Meeting on Nuclear Power Infrastructure in February 2013 focusing on the topic of Nuclear Power Project Development in Emerging Nuclear Power States. The workshop was attended by 100 participants from more than 40 Member States and international organizations. The meeting served as a forum for sharing knowledge and experience relating to the management of a nuclear power programme and focused on building knowledgeable and responsible owner-operator organizations to manage an NPP project and the establishment of independent regulatory bodies. The participants also shared their experiences with IAEA peer review services such as INIR and EPREV. The meeting also covered issues faced by NPP owner-operators and regulatory bodies, such as the Technical Support Organization and Research and Development (R&D) infrastructures to support NPPs, capacity building of regulatory bodies, cooperation with vendor country regulatory bodies, and licensing systems.

154. The Secretariat organized and conducted the Fourth Meeting of the Technical Working Group on Nuclear Power Infrastructure. The objectives of the meeting were to share the information and experience on the national and international developments in the area of nuclear power programme, to provide advice to the Secretariat on common approaches for assistance and review missions, and provide feedback and evaluation of effectiveness of the Secretariat's activities for nuclear power infrastructure development. The meeting provided practical suggestions to the Secretariat related to the development of integrated work plans, support for human resource development, and enhanced public communication efforts. The Working Group also discussed and emphasized the importance of the concept of a knowledgeable customer, the critical role of the INIR missions and the value of international cooperation in infrastructure development.

155. In June 2013, the Secretariat organized the International Ministerial Conference on Nuclear Power in the 21st Century, hosted by the Russian Federation in St. Petersburg, Russia, which was joined by 600 participants from 84 Member States and 7 international organizations, including more than 40 minister level participants. The Conference provided an opportunity to take stock of, and discuss, at a high ministerial and international experts' level:

- The role and viability of nuclear power in sustainable development; and
- The status and prospects of nuclear power for the future;
- The importance of nuclear safety and security as necessary prerequisites for nuclear power; and
- The different technical aspects involved in the development of nuclear power.

The Conference emphasised that the establishment of an appropriate nuclear power infrastructure is essential for the development of nuclear power programmes.

156. The Secretariat organized and conducted a Technical Meeting on the Cooperation for Human Resources Development among Embarking and Experienced Countries in June 2013 to provide an opportunity for sharing experience and knowledge in the development and implementation of training courses for embarking countries through cooperation with experienced countries. The meeting examined the emerging demand for training in embarking countries and the suitability of available training courses for key organizations or for specific stakeholders. Cooperation with vendor countries and wider international cooperation on training was discussed.

157. During the 56th Regular Session of the General Conference, the Secretariat held bilateral meetings with Member States embarking on nuclear power programmes to discuss future areas for cooperation. A PA on nuclear education and training was concluded with Vietnam. The Secretariat enhanced its partnership with Ghana in education, training and outreach for nuclear science and technology. In addition, the Secretariat organized a side event entitled "Roles and Challenges of Future Owners and Operators in Countries Embarking on Nuclear Power Programmes" to highlight the support that is available to Member States. The Secretariat has provided Member States embarking on nuclear power programmes with assistance packages for future owner/operator organizations, as well as with support and assistance on site selection and management systems. Integrated work plans to support infrastructure development for six such Member States have been finalized.

158. A series of interactive e-learning training modules is being developed to support Member States in using the IAEA Milestones Approach to introducing a nuclear power programme. The modules can be used for the three phases of developing a nuclear power programme and cover the 19 infrastructure milestones. Five e-learning modules are being developed covering:

- Implementing a Nuclear Power Programme;
- Developing a Human Resource Strategy;
- Stakeholder Involvement;
- Management of a new nuclear power programme; and
- Construction Management module.

159. The first two e-learning modules are already available on the IAEA website at: (http://www.iaea.org/NuclearPower/Infrastructure/elearning/index.html), and the next three modules

will be available in 2013. Both "newcomer" Member States and those expanding their nuclear power programmes may benefit from this series of e-learning modules.

160. The Secretariat finalized a comprehensive catalogue of services to support new nuclear power programmes in the Member States, covering each of the 3 Phases of nuclear power infrastructure development, including the 19 nuclear power infrastructure issues in the IAEA Milestones publication[9]. The objective of the catalogue of services is to integrate all the available assistance and support available to Member States such as Workshops/Training Courses Expert Missions/Advisory Services, Review Missions/Peer Review Services and Training tools and networks. This will allow Member States to identify and request assistance at the most appropriate stage in their implementation of a nuclear power programme. The catalogue can be also used by the Member States expanding their nuclear power programmes.

161. The Secretariat updated the INIR evaluation methodology to incorporate lessons learned from the previous INIR missions, as well as the Fukushima Daiichi accident. To this end, the Secretariat has completed a document, entitled, *Implications of the Fukushima Daiichi Accident for the IAEA Document Milestones in the Development of a National Nuclear Infrastructure for Nuclear Power* that will be used in updating the Milestones publication in 2014.

162. The Secretariat developed a methodology to support the self-assessment of national infrastructures for safety. This methodology, called the Integrated Review of Infrastructure for Safety (IRIS), was presented to Member States during the 56th regular session of the General Conference. A significant step has been made in finalizing and releasing the IRIS software. A Technical Meeting on the Implementation of the IAEA's self-assessment methodology and tools was organized in December 2012. The main objective of the meeting was to present the latest developments in the methodology and tools provided by the IAEA for the self-assessment of national regulatory infrastructure for safety. Members States' experience related to self-assessment was discussed in the context of the continuous improvement of the IAEA's programme in this area. The IRIS self-assessment methodology was used in a national workshop on infrastructure development in the Philippines in December 2012. Furthermore, an updated version of IRIS was used during a workshop on the self-assessment methodology based on *Establishing the Safety Infrastructure for a Nuclear Power Programme* (IAEA Specific Safety Guide Safety Standard Series No. SSG-16) and IRIS in May 2013. The final IRIS product is to be released in the second half of 2013.

163. The Secretariat developed a new web site, focusing on those Member States embarking on a nuclear power programme, under the Regulatory Network Portal (RegNet). The new web site provides a mechanism for the exchange of information between regulatory bodies and makes available a collection of interactive information and guidance regarding the strengthening of the regulatory capabilities for Member States embarking on a NPP programme. The Secretariat presented the web site to Member States at a Technical Meeting on RegNet in June 2013.

164. The preparation of packages of exemplary material for workshops to strengthen technical and managerial competences of staff of regulatory bodies is proceeding. The packages, in the form of written material and power point presentations has been developed for the workshops on National Infrastructure, including:

- Governmental, legal and regulatory;
- Safety regulations;
- Regulatory review and assessment;
- Staffing the regulatory body; and
- Development of the competencies for the conduct of regulatory functions, including the use of external support organizations.

The material will be made available on a dedicated site under the RegNet portal in 2013.

165. The Regulatory Cooperation Forum (RCF) has continued to assist Member States embarking on nuclear power programmes in developing effectively independent and robust regulatory bodies.

[9] Milestones in the Development of a National Infrastructure for Nuclear Power, IAEA Nuclear Energy Series No. NG-G-3.1

The RCF has continued this work with Jordan, Vietnam and Poland. The RCF is reaching out to Member States in order to ensure that they are aware of the Forum and its objectives, focusing in particular on those Member States that are committed to developing a nuclear power programme for the first time and those with smaller programmes considering expansion.

166. The Secretariat continued to support Member States embarking on a nuclear power programme at the regional and national levels. The activities included:

- A review of activities in relation to Saudi Arabia's nuclear power programme;
- A workshop in Turkey on General siting Review and Assessment;
- A seminar in Turkey on SARCoN;
- Training on Level 2 PSA in Jordan;
- A National Workforce Planning workshop in Bangladesh; and
- A Regulatory Control Training Course in Poland

Host Integrated Nuclear Infrastructure Reviews (INIR)

167. The Secretariat conducted INIR Missions to Vietnam, South Africa and Poland, to review their activities in developing nuclear power infrastructure. South Africa was the first Member State with an existing NPP programme to request an INIR Mission. The results of this mission confirmed that the INIR methodology is also applicable to Member States planning to expand their NPP programme.

168. The Secretariat has developed the approach for an INIR Phase 3 Mission. The scope of INIR mission in Phase 3 includes evaluation of all 19 infrastructure issues needed for a nuclear power program, but recognizes that evaluation of many of these issues at Milestone 3 can be dealt with using existing IAEA review services, such as IRRS, EPREV and the pre-OSART service. For those nuclear infrastructure issues not explicitly covered by these services, the specific evaluation criteria which was developed by the Secretariat in "*Evaluation of the Status of National Nuclear Infrastructure Development at Milestone 3*", *Addendum to the Guidance on Preparing and Conducting INIR Missions* (Rev.1) will provide guidance to Member States.

NEXT STEPS

169. The activities to be undertaken by the Secretariat include:

- Make available to Member States the second phase of the e-learning series including the modules on Systematic Approach to Training (SAT), Feasibility Study and Management Systems modules before the end of 2013;
- Proceed with the preparation of packages of exemplary material for workshops to strengthen technical and managerial competences of staff of Regulatory Bodies;
- Organise training on drafting regulations on nuclear safety on a regular basis to assist Member States in revising existing or developing and revising new regulations in safety areas related to NPPs; and
- Provide training workshops and expert assistance to regulatory bodies based on the IAEA Safety Standards and the packages of exemplary material currently being developed.

PROGRESS IN IMPLEMENTATION OF ACTION 8

170. The figure below provides an assessment, as of July 2013, of the current and projected progress in implementation of Action 8. The assessment is based on the activities completed, in progress and planned and included in this annual report and those included in the 2012 annual report. The implementation of the "planned" activities is subject to the availability of funds for the 2014-2015 period.

171. Beyond 2015, the implementation of the Action Plan will be integrated in the regular activities of the respective IAEA divisions, as represented in the diagram by the blue arrow. In particular, these activities include the lesson learned from the Action Plan projects, the recommendations from those completed projects and the IEM's which require further work as well as the findings from the IAEA Fukushima Comprehensive Report.

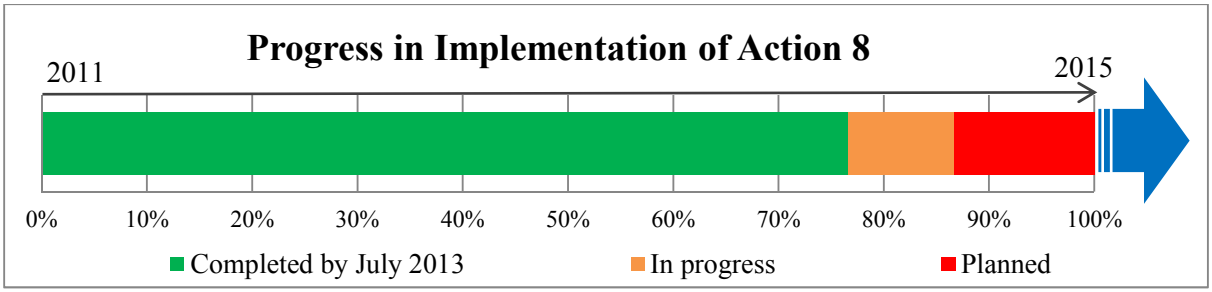

Figure 8: Assessed progress in implementation of Action 8, as of July 2013. The activities marked in green were completed by July 2013. The implementation of the activities marked in orange has started and continues beyond July 2013. The activities marked in red are to be undertaken and completed by the end of 2015.

CAPACITY BUILDING

ACTION: *Strengthen and Maintain Capacity Building*

GOALS

Strengthen, develop, maintain and implement capacity building programs and incorporate lessons learned

172. Member States with nuclear power programmes and those planning to embark on such a programme are requested to strengthen, develop, maintain and implement their capacity building programs, including education, training and exercises at the national, regional and international levels; to continuously ensure sufficient and competent human resources necessary to assume their responsibility for safe, responsible and sustainable use of nuclear technologies.

173. Member States with nuclear power programmes and those planning to embark on such a programme are requested to incorporate lessons learned from the Fukushima Daiichi accident into their nuclear power programme infrastructure. The Secretariat is requested to assist Member States upon request.

BACKGROUND

174. Capacity building is the systematic and integrated approach that includes education and training, human resource development, knowledge management and knowledge networks to develop and continuously improve the governmental, organizational and individual competencies and capabilities necessary for achieving safe, secure and sustainable nuclear power programme.

175. During the period covered by this annual report, the Secretariat continues to support capacity building activities at the national and regional levels through technical meetings, regional network activities and the production of training material and guidance.

ACHIEVEMENTS

Strengthen, develop, maintain and implement capacity building programs and incorporate lessons learned

176. The Secretariat continues to emphasise the importance of capacity building as part of its strategic human resource development and workforce planning support to Member States. The Secretariat continued to provide support to Member States on their capacity building activities including Bangladesh, Jordan, Poland, Saudi Arabia, Turkey and UAE. The Secretariat has encouraged Member States to use the guidelines and methodology for conducting self-assessments of capacity building needs and has offered support and assistance in the application of the self-assessment methodology to Member States through a series of seminars on capacity building. The first seminar was conducted in Jordan in May 2013 and further seminars will be conducted with other Member States later in 2013. The Second Meeting of the Capacity Building Working Group for Ibero American regulators was held in September 2012.

177. In October 2012, the Secretariat organized and conducted a Technical Meeting on Capacity Building and Human Resource Development for New and Expanding Nuclear Power Programmes in Vienna. Over 40 participants from 20 Member States attended the meeting. Case studies on the Secretariat's capacity building self-evaluation methodology *A Methodology for Self -assessment of Capacity Building in Member States with Nuclear Power Programme and Those Planning to Embark on Such a Programme* were presented.

178. The Secretariat has developed a *Strategic Approach to Education and Training in Nuclear Safety for the period 2013–2020* (the Strategic Approach)[10]. The Strategic Approach supports capacity building activities and includes a summary of the key achievements on education and training in nuclear safety over the period 2001–2012. Member States may use this strategic approach to education and training in developing their own national education and training strategies.

179. The Safety Education and Training Peer Review Service (ETReS) (formerly ETPRES) continues to be requested by Member States. The objective of ETReS is to assist Member States in the development and maintenance of a sustainable and adequate Education and Training programme in nuclear safety consistent with IAEA Safety Standards and international good practices. The Secretariat together with the Asian Nuclear Safety Network (ANSN) Education and Training Topical Group (E&TTG) produced guidelines for the ETReS. An ETReS mission is planned for Bangladesh at the end of 2013.

180. The Secretariat organized the 4th Technical Meeting of the Steering Committee on Regulatory Competence in December 2012. The Steering Committee reviewed the proposed work programme for 2013 for education and training in nuclear safety. In conjunction with the Steering Committee meeting, the Secretariat organized a seminar on SARCoN. During this seminar the new self-assessment software was presented and discussed. In addition, the Secretariat has revised and updated the questionnaires for SARCoN methodology to provide improved guidance on self-assessment of the national resources for education and training. The software and methodology for the application of SARCoN tool have been enhanced and tailored to meet specific Member States' demands and the methodology was applied in Turkey in February 2013 and in the Philippines in June 2013. A new version of the software has been made available for use by Member States.

181. The Secretariat organized a technical meeting of the Global Safety Assessment Network (GSAN) in December 2012. The meeting was attended by participants from 12 Member States and focused on capacity building. The meeting also included presentations on the GSAN web platform and presentations on the safety assessment practices, experiences and needs of the participating Member States.

182. The Secretariat organized and conducted a meeting in Vienna September 2012 for the Capacity Building Management Group (CBCG) of the ANSN, to draft terms of reference for the CBCG. The ANSN held its annual meeting in October 2012. The ANSN held a regional workshop on the Development of National Policy on Human Resources Development to Embark on a Nuclear Power Programme. The workshop was attended by 11 participants from 5 Member States with the objective of the workshop was to raise awareness of the ETReS peer review service. A regional training course on systematic approach to training was held in the Republic of Korea for ANSN member countries in July 2012, attended by 10 participants from 4 Member States. The Secretariat also provided expert support for the implementation of other ANSN workshops, such as on Nuclear Safety Tailored for Regulators in September 2012 and on-the-job training for embarking countries in March 2013.

183. The production of the e-learning package on the Basic Professional Training Course will be finalized in 2014. The Secretariat continues the development of the Cyber Learning Platform (CLP4NET). It is currently installed in Asian, Latin-American, and African Regions and at the IAEA. CLP4NET offers developing countries IAEA e-learning training and education tools via the Internet.

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[10] Strategic Approach to Education and Training in Nuclear Safety 2013–2020 NOTE BY THE SECRETARIAT 2013/Note 9

Video lectures continued to be produced to provide Member States with guidance and training including:

- Capacity Building, http://www-ns.iaea.org/downloads/video/ni/capacity-building/index.htm ;
- The Strategic Approach to Education and Training in Nuclear Safety 2013-2020 http://www-ns.iaea.org/downloads/video/ni/stragtegic-approach/index.htm ;
- Managing the Unexpected – From the perspective of the interaction between Individuals, Technology and Organization http://www-ns.iaea.org/training/ni/train-on-mtu.asp?s=100&l=106 ; and
- Policy on Human Resources Development for Safety Infrastructure http://www-ns.iaea.org/training/ni/train-on-hrd.asp?s=100&l=106 .

NEXT STEPS

184. The activities to be undertaken by the Secretariat include:

- Encourage Member States to develop, maintain and strengthen their national capacity building programmes and provide assistance and support upon request;
- Encourage Member States to share their measures to strengthen cooperation for capacity building at the regional and international levels;
- Organize and conduct seminars on "*Guidance and Methodology for Assessment of Capacity Building in Member States with a Nuclear Power Programme and those planning to embark on such a programme*";
- Revise the SARCoN guidelines;
- Revise the SARCoN application tool; and
- Produce further material and tools including video lectures for training on *Human Resource Development for Nuclear Safety*.

PROGRESS IMPLEMENTATION OF ACTION 9

185. The figure below provides an assessment, as of July 2013, of the current and projected progress in implementation of Action 9. The assessment is based on the activities completed, in progress and planned and included in this annual report and those included in the 2012 annual report. The implementation of the "planned" activities is subject to the availability of funds for the 2014-2015 period.

186. Beyond 2015, the implementation of the Action Plan will be integrated in the regular activities of the respective IAEA divisions, as represented in the diagram by the blue arrow. In particular, these activities include the lesson learned from the Action Plan projects, the recommendations from those completed projects and the IEM's which require further work as well as the findings from the IAEA Fukushima Comprehensive Report.

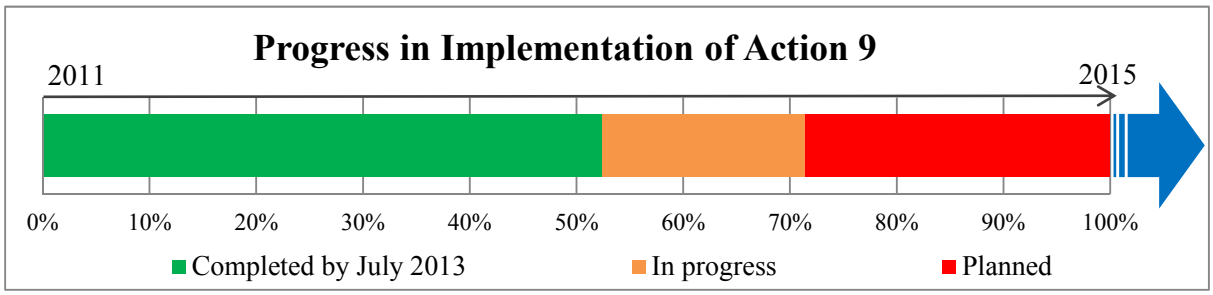

Figure 9: Assessed progress in implementation of Action 9, as of July 2013. The activities marked in green were completed by July 2013. The implementation of the activities marked in orange has started and continues beyond July 2013. The activities marked in red are to be undertaken and completed by the end of 2015.

PROTECTION OF PEOPLE AND THE ENVIRONMENT FROM IONIZING RADIATION

ACTION: *Ensure the on-going protection of people and the environment from ionizing radiation following a nuclear emergency*

GOALS

Facilitate the use of available information, expertise and techniques for monitoring, decontamination, remediation, removal of damaged nuclear fuel and the management and disposal of radioactive waste

187. The Secretariat, Member States and other relevant interested parties are to facilitate the use of available information, expertise and techniques for monitoring, decontamination and remediation for both on nuclear sites and on the adjacent contaminated areas. In addition, the Secretariat is requested to consider strategies and programmes to improve knowledge and strengthen capabilities in these particular areas.

188. Member States, the Secretariat and other relevant interested parties are requested to facilitate the use of available information, expertise and techniques regarding the dismantling of the damaged facility, including removal of damaged nuclear fuel as well as the safe management and disposal of radioactive waste resulting from a nuclear emergency.

Assessment of radiation doses

189. Member States, the Secretariat and other relevant interested parties are also requested to share information regarding the assessment of exposures to people and radiological impacts to the environment.

BACKGROUND

190. In the aftermath of a nuclear emergency, radionuclides that may have been released to the environment can result in the contamination of residential areas and agricultural land. This can give rise to exposure of the public to ionizing radiation. Such exposures may be protracted over long periods of time and may require actions to reduce radiological impacts.

191. During the period covered by the last annual report, the Secretariat organized and conducted a fact finding mission to support the remediation of the radioactively contaminated land and a workshop and an international symposium decommissioning of the Fukushima Daiichi NPP.

192. During the period covered by this annual report, the Secretariat continues to provide support to Member States in their activities to protect people and the environment from ionizing radiation. An IEM on decommissioning and remediation after a nuclear accident was organized and conducted. Expert missions on decommissioning and remediation were conducted in Japan. The IAEA entered into practical arrangements with the Fukushima Prefecture and the Fukushima Medical University on radiation monitoring and remediation and health issues respectively.

ACHIEVEMENTS

Facilitate the use of available information, expertise and techniques for monitoring, decontamination, remediation, removal of damaged nuclear fuel and the management and disposal of radioactive waste

193. In January 2013, the Secretariat organized an IEM on Decommissioning and Remediation after a Nuclear Accident. The aim of this IEM was to contribute to enhancing the safety and effectiveness of future remediation and decommissioning activities worldwide and was attended by over 200 experts from 40 Member States and several international organizations. The IEM identified several areas for improvements in decommissioning and remediation after a nuclear accident. These areas for improvement included, the need for improved guidance, improved sharing of knowledge and experience and strengthened peer review services for planning of both decommissioning and remediation. The meeting also discussed implications of social, psychological and economic impacts of a large nuclear accident.

194. In the context of radiation protection, it was noted at the IEM that the international community should strive to develop a practical definition of 'safe' as an aid for communicating with the public about return to normal living. The IEM brought forward up-to-date practical information related to long-term recovery from a nuclear accident. A report on this IEM will be published in the near future.

195. In response to a request from the Government of Japan, the Secretariat organized and conducted and international peer review of the *Mid-and-Long-Term Roadmap towards the Decommissioning of the TEPCO's Fukushima Daiichi Nuclear Power Station Units 1-4* in April 2013. The objective of the peer review was to provide an independent assessment of the activities associated with the planning and implementation of decommissioning the Fukushima Daiichi NPP. Specifically:

- To improve the decommissioning planning and the implementation of pre-decommissioning activities at Fukushima Daiichi NPP; and
- To facilitate sharing of good practices and lessons learned for decommissioning operations after the accident, identified during the review, with international community.

196. The review was organized in two steps. The objective of the first step undertaken in April 2013 was to review the Roadmap, including the decommissioning strategy, planning and timing of decommissioning phases. Several specific short-term issues and recent challenges were also examined, such as the current condition of the reactors, management of waste, protection of employees and the structural integrity of reactor buildings and other structures. The peer review concluded that relatively stable cooling of the fuel and fuel debris in the reactors and spent fuel pools has been achieved and is adequate to remove the decay heat. However, the review identified several challenges to achieve a sustainable situation over the period of the next 10-20 years. The review identified some additional measures to further enhance the monitoring processes and instruments, for ensuring a prompt identification and mitigation of events at the site, as well as to improve the communication of events to the authorities and the public. The review report has been made available on the IAEA website. The second step will be carried out later in 2013.

197. The Secretariat has prepared a draft report titled *Experiences and Lessons Learned Worldwide in Clean-up and Decommissioning of Nuclear Facilities in the Aftermath of Accidents*, which is being reviewed prior to submission for publication. The report emphasizes the applicable techniques and best practices to support clean up and decommissioning activities following major nuclear accidents such as those corresponding to levels 5-7 on the International Nuclear and Radiological Event Scale (INES). The report addresses the following issues:

- Stakeholder communications and involvement;
- Strategic planning, phases, and specification of a clean-up end state;
- Post-accident stabilization;
- Damaged fuel and fuel debris removal technology;
- Technological advances for characterization activities and characterization data management;
- Considerations for final decommissioning and site remediation; and
- Waste management as it differs from normal practices.

Assessment of radiation doses

198. The Secretariat organized the first technical meeting of the Modelling and Data for Radiological Impact Assessments (MODARIA) in November 2012, which was attended by 151 participants from 43 Member States. The objective of the MODARIA Programme is to enhance the capabilities of Member States to simulate radionuclide transfer in the environment and, thereby, to assess exposure levels of the public in order to ensure an appropriate level of protection from the effects of ionizing radiation associated with radionuclide releases and from existing radionuclides in the environment. The programme will run for 4 years from 2012 to 2015. The MODARIA programme will improve Member States capabilities in the field of environmental radiation dose assessment by obtaining improved data for model testing; comparing models; reaching consensus on modelling

philosophies, approaches and parameter values; developing improved methods; and exchanging information.

199. Proposals for the MODARIA work programme were discussed at the November 2012 meeting which decided that there should be a focus on the following 4 themes:

- Remediation of Contaminated Areas;
- Uncertainties and Variability;
- Exposures and Effects on Biota;
- Marine Modelling.

200. The meeting also decided to establish several working groups to progress activities under these themes. The second Technical Meeting for MODARIA will be held in November 2013.

201. The Secretariat, in cooperation with the World Health Organization (WHO) and the Food and Agriculture Organization (FAO), as well as other relevant international organizations, is undertaking a review of the generic criteria for radioactive material in food, animal feed and drinking water. The review will identify ways to clarify, harmonize and update, if appropriate, the existing guidance documents on contamination levels in food, animal feed and drinking water after nuclear or radiological incidents. The results of this review are expected to become available by the end of 2013.

202. The IAEA have signed a PA with the Fukushima Prefecture on Radiation Monitoring and Remediation. The PA is designed to complement existing Japanese activities and to provide immediate assistance and support which will be of direct benefit to those living in Fukushima Prefecture. These activities will include development of environmental radiation monitoring and mapping technology by unmanned aerial vehicles, analyses of results of environmental monitoring and exposure pathways to reduce or avoid exposure and the management of radioactive waste.

203. An expert mission to Japan was carried out in February 2013 to discuss the issues of remediation, decontamination and management of waste generated during the remediation activities. Approaches to radiological mapping and radiation monitoring of the environment using unmanned aerial vehicles (UAVs) were also discussed with representatives of the Fukushima Prefecture. To follow up, the Secretariat organised a meeting May 2013 where the current state of detector technology and methods for aerial surveys using UAV technology were reviewed and evaluated. The options and recommendations arising from the meeting were presented to stakeholders in Japan to consider the UAV (or UAVs) best suited for the application. In addition, six potential test sites inside the Fukushima restricted zone were explored and documented. The UAV-based gamma spectrometry system is scheduled for delivery to Fukushima Prefecture in 2015.

204. The Secretariat is supporting Member States on the development of *in situ* underwater techniques to monitor releases to and contamination of the coastal marine environment in case of a nuclear emergency. Pilot testing of an underwater gamma spectrometer is underway at the Nuclear Applications Environmental Laboratories (NAEL) in Monaco. The Secretariat is also providing support to other Member States on mobile gamma spectrometry systems which can be used to detect the distribution and intensity of radiation.

205. The IAEA have signed a PA with the Fukushima Medical University to undertake collaborative activities in the area of radiation effects on human health and radiation risk management in Fukushima Prefecture. These activities will include assistance to the University in implementing the Fukushima Health Management Survey project and capacity building and research on human health programmes and enhancement of public awareness of radiological effects on human health through conferences, seminars and workshops.

206. The Secretariat is supporting the establishment of networks of biological dosimetry laboratories which could act in the event of accidental radiation overexposures. Twenty-three institutes have been selected to participate in this network. The Secretariat in collaboration with the Hiroshima International Council for Health Care of the Radiation Exposed (HICARE) organized a training workshop in Hiroshima, Japan in June 2013. The main objective was to develop the ability of biological dosimetry laboratories to use both mature and novel techniques in biological dosimetry for the estimation of radiation doses received by individuals and populations.

NEXT STEPS

207. The activities to be undertaken by the Secretariat include:

- Prepare an IEM on Radiation Protection after the Fukushima Daiichi Accident to be held in February 2014.
- Continue with the development and construction of detector packages for UAVs for delivery in 2015, including:
  - Integration of UAVs, detectors, geo-information system and software to produce environmental contamination maps; and
  - Develop the Secretariats capability to provide training and technical support to Fukushima Prefecture and its municipalities.
- Review and report on the experience and lessons learned worldwide in clean-up and decommissioning of nuclear facilities in the aftermath of an accident and produce an IAEA report in 2014;
- Ensure skilled medical radiation physicists are available to support nuclear or radiological emergency situations through sharing experiences and lessons in a nuclear or radiological emergency learned for medical physicists;
- Provide Member States and responsible organizations with information on available management options for remediation of terrestrial and freshwater ecosystems contaminated with radioactive substances and on the formulation of sustainable remediation strategies;
- Organize and conduct the second Technical Meeting for MODARIA in Vienna in November 2013; and
- Provide support for the application and development of standards related to radionuclides in food and drinking (potable) water.

PROGRESS IN IMPLEMENTATION OF ACTION 10

208. The figure below provides an assessment, as of July 2013, of the current and projected progress in implementation of Action 10. The assessment is based on the activities completed, in progress and planned and included in this annual report and those included in the 2012 annual report. The implementation of the "planned" activities is subject to the availability of funds for the 2014-2015 period.

209. Beyond 2015, the implementation of the Action Plan will be integrated in the regular activities of the respective IAEA divisions, as represented in the diagram by the blue arrow. In particular, these activities include the lesson learned from the Action Plan projects, the recommendations from those completed projects and the IEM's which require further work as well as the findings from the IAEA Fukushima Comprehensive Report.

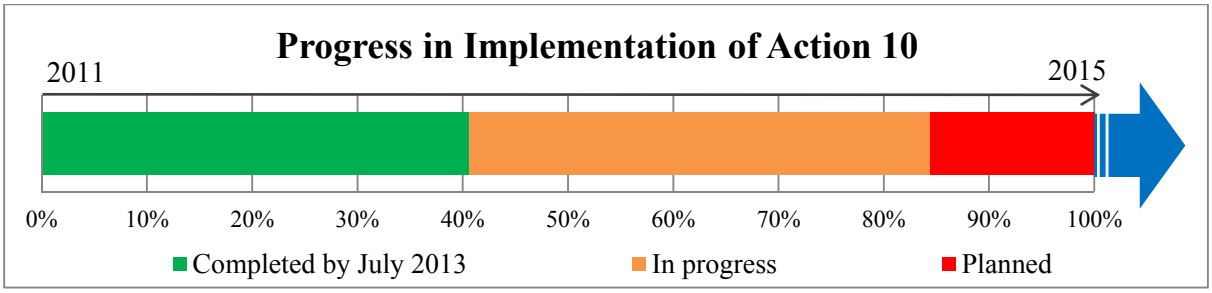

Figure 10: Assessed progress in implementation of Action 10, as of July 2013. The activities marked in green were completed by July 2013. The implementation of the activities marked in orange has started and continues beyond July 2013. The activities marked in red are to be undertaken and completed by the end of 2015.

COMMUNICATION AND INFORMATION DISSEMINATION

ACTION: *Enhance transparency and effectiveness of communication and improve dissemination of information*

GOALS

Strengthen the emergency notification system, and reporting and information sharing arrangements and capabilities

210. Member States are requested to strengthen the emergency notification system, and reporting and information sharing arrangements and capabilities. The Secretariat is to assist Member States in this regard.

Enhance the transparency and effectiveness of communication

211. Member States are requested to enhance the transparency and effectiveness of communication among operators, regulators and various international organizations. The Secretariat is to assist Member States and also strengthen its own coordinating role in this regard.

Provision of information during a nuclear emergency

212. The Secretariat is requested to provide Member States, international organizations and the general public with timely, clear, factually correct objective and easily understandable information during a nuclear emergency.

Organize international experts meetings

213. The Secretariat is requested to organize international experts meetings to analyse all relevant technical aspects and learn the lessons from the Fukushima Daiichi accident.

Assessment of the Fukushima Daiichi Accident

214. The Secretariat is requested to facilitate and to continue sharing with Member States a fully transparent assessment of the Fukushima Daiichi accident, in cooperation with Japan.

The application of the INES scale as a communication tool

215. The Secretariat and Member States, in consultation with the OECD/NEA and the IAEA International Nuclear and Radiological Event Scale (INES) Advisory Committee are requested to review the application of the INES scale as a communication tool.

BACKGROUND

216. Effective, easily understandable and transparent communication during incidents and emergencies is crucial in relation to the public's and media's perception of emergency management of an event and its consequences. In the case of the Fukushima Daiichi accident, the Secretariat served as a useful point of reference. Prior to the adoption of the Action Plan, the Secretariat's role in an emergency was largely limited to distributing information validated by the country concerned to all Member States and relevant international organizations. A broader role was called for in response to nuclear incidents and emergencies, with a widening of the scope of information and assessments shared with Member States, international organizations and the public, regarding the event progression and the projected potential radiological impacts on affected populations, in order to meet the expectations of Member States and the public.

217. During the period since the last annual report, the Secretariat organized and conducted 2 IEMs and one conference (in Ottawa, Canada). The Secretariat also launched the preparation of the IAEA comprehensive Fukushima Report.

ACHIEVEMENTS

Enhance the transparency and effectiveness of communication

218. An upgraded version of the USIE, which takes into account Member States feedback and which adds features such as connectivity with European WebECURIE system, the ability to view latest RANET registration data, and an enhanced alerting service, has been deployed. The Secretariat continued to encourage Member States to register as users of USIE and as a result, the total number of registered external users on USIE increased. However, 56 Member States have not yet registered any user.

219. The Secretariat distributed the *IAEA Operations Manual for Incident and Emergency Communications* (EPR-IEComm 2012) to all its contact points. The manual places expectations on the Secretariat and on the Member States/international organizations regarding notification of and information exchange in the nuclear or radiological emergencies by introducing specific response time objectives for the initial emergency notification and the provision of follow-up information. The manual represents an operational tool for implementation of the Convention on Early Notification of a Nuclear Accident. Through various events including training, the Secretariat places specific emphasis on promoting its application through various events, including training.

220. The Secretariat organized 5 workshops involving a total of 60 Member States to provide training in the use of the EPR-IEComm manual (reporting and information sharing arrangements are key topics at these workshops) and encourage registration in the USIE. In the first half of 2013 the Secretariat organized 4 workshops involving 18 Member States. As a result of these workshops as well as the IEC's communication testing initiative, 216 of 428 Member State contact points have requested changes to at least one of the communication channels (for example, fax numbers or email addresses).

221. To assist Member States in preparing their strategy and national communication plans for clear and effective public communications in nuclear and radiological emergencies, the Secretariat has developed a draft outline of such a plan. It is envisaged that the outline will become an attachment to the *"Communication with the Public in a Nuclear or Radiological Emergency",* (EPR-Public Communications, 2012).

222. The Secretariat organized a train-the-trainers workshop in December 2012 on communication with the public in a nuclear or radiological emergency to expand the roster of experts that could deliver the training in the official IAEA languages. A number of requests from Member States for training at national and international levels have already been received (Belgium, Bolivia, Brazil, Morocco).

223. The Secretariat held a meeting in March 2013 to discuss and review a draft version of the proposed new IAEA General Safety Guide on *Communication and Consultation with Interested Parties.* The Guide is intended for use as a reference document for all facilities and activities giving rise to risks from radiation and will provide guidance on how to comply with the relevant IAEA Safety Requirements.

Provision of information during a nuclear emergency

224. The Secretariat performed a capability review of resources and a comparative gap analysis against the types of issues expected to arise during nuclear emergencies. Procedures have been developed for use in the assessment and prognosis process based on the IAEA Safety Standards and guidelines and the Secretariat's response staff has been trained in their use.

225. The Secretariat has included the assessment and prognosis processes in the refined version of the Incident and Emergency System. The Secretariat continued to discuss with Member States and relevant international organizations their assessment capabilities and ways of sharing these capabilities during a response to a nuclear emergency. Several meetings were conducted with the objectives of establishing:

- The minimum information requirements for assessment and prognosis during a nuclear emergency; and

- The marine modelling capabilities required during a nuclear emergency

226. A new functional area related to assessment and prognosis has been included in the RANET Edition 2013 and has opened a direct pathway for the registration of related national capabilities.

Organize international experts meetings

227. The Secretariat organized and conducted the third IEM in September 2012 on the topic of *Protection against Extreme Earthquakes and Tsunamis in the Light of the Accident at the Fukushima Daiichi Nuclear Power Plant*.

228. The fourth IEM on the topic of *Decommissioning and Remediation after a Nuclear Accident* was held in January 2013. The fifth IEM on *Human and Organizational Factors in Nuclear Safety in the Light of the Accident at the Fukushima Daiichi Nuclear Power Plant* was held in May 2013.

Assessment of the Fukushima Daiichi Nuclear Accident

229. The Government of Japan, in co-sponsorship with the Agency, organized the Fukushima Ministerial Conference on Nuclear Safety in the Fukushima Prefecture, Japan, in December 2012. The Conference was open to the media, Non-Governmental Organizations and International Organizations. This Conference contributed to strengthening nuclear safety worldwide by providing yet another opportunity to share with the international community, at the ministerial and expert levels, further knowledge and lessons learned from the Fukushima Daiichi accident and to further enhance transparency. The Secretariat issued a GovInf summarising the Conference conclusions[11]. The Secretariat made publicly available the reports of the three IEMs held in 2012 to the delegations and participants in the Fukushima Ministerial Conference on Nuclear Safety.

230. At the 56th Regular Session of the General Conference, the Director General announced that the IAEA will prepare a comprehensive report on the Fukushima Daiichi accident to be finalized in 2014. The report will, inter alia, cover the description and context of the accident, safety assessment, emergency preparedness and response, radiological consequences as well as post-accident recovery. Five working groups have been established, each composed of some 15-20 internationally recognized experts, to assist in the preparation of the report. These experts come from around 40 Member States and several international organisations, ensuring a broad representation of experience and knowledge. More than 120 experts attended the first working group meetings in March 2013 to discuss the working methods and an initial proposal for a table of contents for the report. An International Technical Advisory Group (ITAG) was also established in March 2013, comprising experts from relevant international organizations[12]. The role of ITAG is to assist and advise in achieving a high scientific and technical level of the report. The Secretariat has established a Core Group that comprises senior level Secretariat management for close coordination and final approval of the IAEA comprehensive report on the Fukushima Daiichi accident.

The application of the INES scale as a communication tool

231. Following the meeting of the International Nuclear and Radiological Event Scale (INES) National Officers on the application of INES during a severe accident, the Secretariat prepared draft guidance on application of INES in complex severe and evolving events, which was made available to Member States for comments. Based on received comments and suggestions the Secretariat prepared a final draft.

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[11] GOV/INF/2013/2 Date: 6 February 2013 Fukushima Ministerial Conference on Nuclear Safety, 15-17 December 2012

[12] Food and Agriculture Organization of the United Nations(FAO), International Commission on Radiological Protection (ICRP), International Labour Organization (ILO), International Nuclear Safety Group (INSAG), Organization for Economic Co-operation and Development Nuclear Energy Agency (OECD NEA), United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), World Association of Nuclear Operators (WANO) and World Meteorological Organization (WMO).

232. An e-learning tool for INES has been developed to support the application of the methodology for rating the safety significance of nuclear or radiological emergencies. The tool is being reviewed by the INES Advisory Committee and is planned to be published by the end of 2013. Furthermore, the draft INES Event Rating Wizard, as another interactive learning tool to help understand and apply the methodology, has been developed and made available on the USIE to the INES National Officers.

NEXT STEPS

233. The activities to be undertaken by the Secretariat include:

- Organize and conduct IEMs on the topics of:
  - Radiation Protection in February 2014; and
  - Severe Accident Management in March 2014.
- Encourage Member States to register in USIE, as well as to make several functional improvements in USIE, including promoting the International Radiation Information Exchange (IRIX) standards;
- Conduct regular emergency response exercises that include communications among national authorities, international organizations and media; and to prepare exercise calendar for 2014; and in particular to prepare, conduct and evaluate the ConvEx-3 (2013) exercise that is based on a radiological emergency that is triggered by nuclear security event;
- Facilitate and encourage information exchange and knowledge sharing among communicators who may be involved in the response to a nuclear or radiological emergency in order to improve competence, as well as to prepare exercises and plain-language explanatory content for media and public dissemination;
- Publish the guidance for Member States on developing a strategy and national communication plan for clear and effective public communications in nuclear and radiological emergencies and to enhance Member State public communication capabilities through training courses and workshops in English, French and Spanish and to also make the training material and events available in Arabic and Russian;
- Understand Member States' specific assessment and prognosis capabilities and encourage their registration in the RANET;
- Test the assessment and prognosis capability with the support and involvement of Member States and international organizations during full scope exercises such as the ConvEx-3 (2013);
- Assess the applicability of INES methodology to other areas, such as the medical area; and
- Harmonize the application of the INES methodology through different mechanisms for example through e–learning training tools.

PROGRESS IN IMPLEMENTATION OF ACTION 11

234. The figure below provides an assessment, as of July 2013, of the current and projected progress in implementation of Action 11. The assessment is based on the activities completed, in progress and planned and included in this annual report and those included in the 2012 annual report. The implementation of the "planned" activities is subject to the availability of funds for the 2014-2015 period.

235. Beyond 2015, the implementation of the Action Plan will be integrated in the regular activities of the respective IAEA divisions, as represented in the diagram by the blue arrow. In particular, these activities include the lesson learned from the Action Plan projects, the recommendations from those completed projects and the IEM's which require further work as well as the findings from the IAEA Fukushima Comprehensive Report.

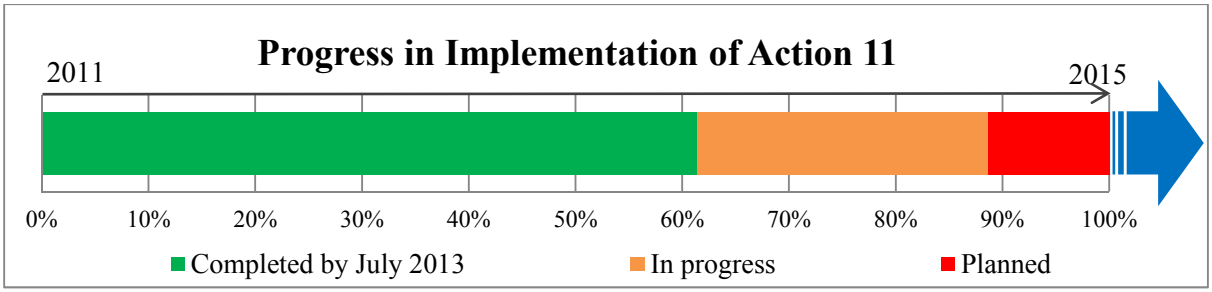


Figure 11: Assessed progress in implementation of Action 11, as of July 2013. The activities marked in green were completed by July 2013. The implementation of the activities marked in orange has started and continues beyond July 2013. The activities marked in red are to be undertaken and completed by the end of 2015.

RESEARCH AND DEVELOPMENT

ACTION: *Effectively utilize Research and Development*

GOALS

Conduct necessary research and development

236. Relevant stakeholders are requested to conduct necessary research and development (R&D) in nuclear safety, technology and engineering, including that related to existing and new design-specific aspects. The Secretariat is to provide support as appropriate.

Utilize the results of research and development

237. Relevant stakeholders and the Secretariat are requested to utilize the results of R&D and to share them, as appropriate, to the benefit of all Member States.

BACKGROUND

238. The Secretariat has a long-standing role in encouraging and supporting R&D to further advance the use of nuclear energy.

239. In the light of the Fukushima accident, R&D have critical roles for a better and safer nuclear industry. R&D can be applied, for example, to understand the root causes of the accident and its consequences; to develop preventative measures to ensure that these and other identifiable scenarios do not result in accidents; and to develop mitigation technologies to prevent severe consequences form unforeseen future events. R&D activities focus on acquiring new scientific knowledge but also on developing technical tools required to control risks and help to develop the expertise capabilities.

240. During the period of this report, the Secretariat continues collecting information on the root causes of the Fukushima Daiichi accident, how the accident proceeded, and how Member States have responded to apply the lessons learned to existing and future nuclear power plants especially from the viewpoint of utilizing R&D.

ACHIEVEMENTS

Conduct necessary research and development

241. The Secretariat organized a meeting with experts from Member States to consider design issues associated with small and medium sized reactors (SMRs) in September 2012. One of the main themes arising during the meeting was the reliability of passive and active safety systems, such as the emergency core cooling system. The meeting identified related research and development activities in the area of probabilistic safety assessment that should be pursued in order to incorporate the lessons learned from the Fukushima Daiichi accident into future SMR designs. Among the specific topics considered were non-electric emergency core and containment cooling system designs, designs for the

mitigation of severe accidents, and the development of a performance evaluation methodology for SMRs.

242. The Secretariat is preparing for the International Conference on Challenges Faced by Technical and Scientific Support Organizations (TSO) in Enhancing Nuclear Safety and Security to be held in April 2014 in Beijing. This will be the third conference on this theme following on from those held in Aix-en- Provence in 2007 and in Tokyo in 2010. The Secretariat organized and conducted the first Programme Committee Meeting in March 2013. The TSO Forum will help organize and promote the conference as one of its main tasks.

243. The Secretariat is developing a symptom-based accident management toolkit (SAMT) for NPPs for use by Member States. The development, the scope and the possible targets of the toolkit and possible functionality for chain of events, progression, and consequences of each potential scenario/severe accident were discussed. Schemes for Severe Accident Management Guidelines SAMGs to be used as guidelines for the development of the toolkit were also identified.

244. The Technical and Scientific Support Organization (TSO) Forum was held during the 56th regular session of the General Conference. The Forum highlighted the important role that the TSOs in Member States will play in future research activities drawing on lessons learned from the Fukushima Daiichi accident. The Secretariat organized and conducted the 3rd Steering Committee (SC) Meeting of the TSO Forum in March 2013 where progress in the work plan of the forum was reviewed and future activities were discussed. Thirty five representatives from international TSOs attended the meeting.

245. The Secretariat has organized and conducted a meeting in April 2013 in Japan on “Lessons learned from the Fukushima Daiichi accident and Water Cooled Reactors (WCR) technology development to cope with Fukushima-type accidents”. The objective of the meeting was to address technical lessons learned from boiling water reactor (BWR) plants regarding the impact of external events and to discuss WCR technology development in the light of the lessons learned. The final goal was to develop WCR technologies, to assess their features, effectiveness and challenges by applying lessons learned from the Fukushima Daiichi accident. The research and development needs for technologies to prevent and mitigate Fukushima-type accidents were discussed along with the opportunities for international collaboration.

Utilize the results of research and development

246. The Secretariat is conducting a survey on the R&D activities carried out in Member States focussing on research institutes as national laboratories, research companies, nuclear vendors, regulatory bodies and TSOs and organized by country and by topic. The collection of this information will allow the creation of a database of R&D activities and evaluating prospective technologies in the light of the Fukushima Daiichi accident. This survey is still on-going and the topics identified for the database include:

- Measures against extreme external events and subsequence events;
- Measures to prevent and/or mitigate hydrogen explosions;
- Filtered containment venting system;
- Design of structures, systems and components important to safety;
- Consideration on design and siting of multi-unit sites;
- Risk assessment and management with PRA; and
- Consideration on beyond design basis events.

247. The Secretariat, in cooperation with the Russian Federation, has initiated a project on Reliable Containment Cooling and Filtered Venting (RCCFV). The objective of this project is to assimilate and publish authoritative information related to the analysis of systems already in place or currently available, by which an NPP containment can be safely cooled and depressurised (vented) through a filtering device that reduces the concentration of radioactive particulates. The expected outcome is to produce a Technical Report, to be made available to Member States which will contain the current approaches for a reliable containment cooling and filtered venting with suggested enhancements to address the vulnerabilities identified in the Fukushima Daiichi accident.

NEXT STEPS

248. The activities to be undertaken by the Secretariat include:

- Continue the preparations for the International Conference on *Challenges Faced by Technical and Scientific Support Organizations (TSO) in Enhancing Nuclear Safety and Security* to be held in April 2014 in Beijing;
- Continue conducting the survey on the R&D activities in Member States and produce a report;
- Coordinate activities to support Member States R&D with OECD/NEA; and
- Progress the project on Reliable Containment Cooling and Filtered Venting (RCCFV).

PROGRESS IN IMPLEMENTATION OF ACTION 12

249. The figure below provides an assessment, as of July 2013, of the current and projected progress in implementation of Action 12. The assessment is based on the activities completed, in progress and planned and included in this annual report and those included in the 2012 annual report. The implementation of the "planned" activities is subject to the availability of funds for the 2014-2015 period.

250. Beyond 2015, the implementation of the Action Plan will be integrated in the regular activities of the respective IAEA divisions, as represented in the diagram by the blue arrow. In particular, these activities include the lesson learned from the Action Plan projects, the recommendations from those completed projects and the IEM's which require further work as well as the findings from the IAEA Fukushima Comprehensive Report.

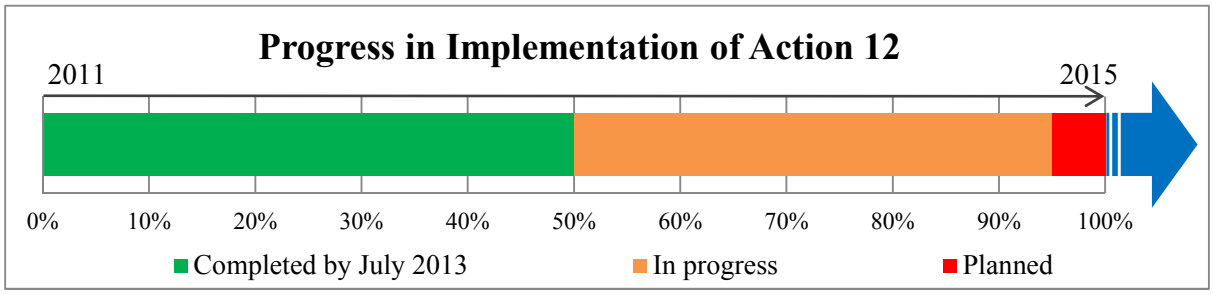


Figure 12: Assessed progress in implementation of Action 12, as of July 2013. The activities marked in green were completed by July 2013. The implementation of the activities marked in orange has started and continues beyond July 2013. The activities marked in red are to be undertaken and completed by the end of 2015.

ANNEX I: OVERALL PROGRESS IN IMPLEMENTATION ASSESSMENT

The figure below shows an assessment of the overall progress in implementation of the Action Plan on Nuclear Safety. The assessment is based on the foreseen activities included in this annual report and those included in the 2012 annual report. The implementation of the "planned" activities is subject to the availability of funds for the 2014-2015 period. The activities marked in green were completed as of July 2013. The implementation of the activities marked in orange has started and continues beyond July 2013. The activities marked in red are to be undertaken and completed by the end of 2015. Beyond 2015, the implementation of the Action Plan will be integrated in the normal activities of the respective IAEA divisions, as represented in the diagram by the blue arrow. In particular, these activities include the lesson learned from the Action Plan projects, the recommendations from those completed projects and the IEM's which require further work as well as the findings from the IAEA Fukushima Comprehensive Report.

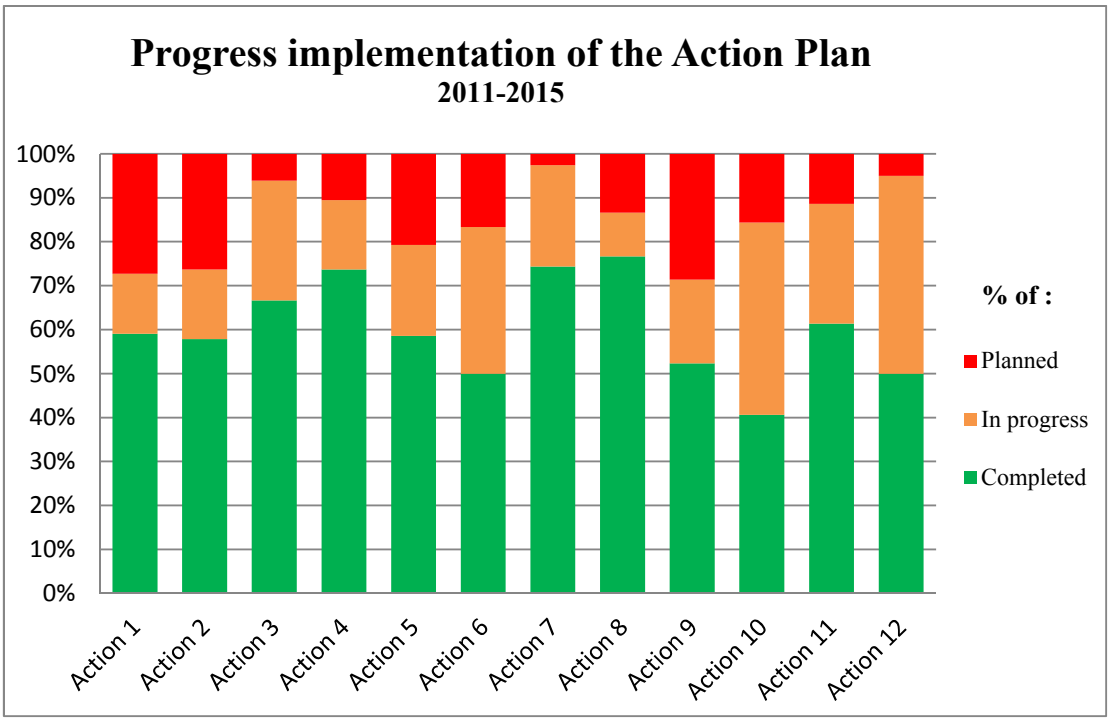


Figure 14: Progress in the implementation of the Action Plan, 2011- 2015

ANNEX II: ACTION PLAN ON NUCLEAR SAFETY EXPENDITURES

A total of €16.16 million of expenditure for the Nuclear Safety Action Plan (NSAP) has been incurred by the Agency since the closure of the Emergency Response in 2011 and the inception of the Action Plan in the latter part of the same year, through to 31 December 2012. The following table (Table 1) provides the breakdown of expenditure by each Major Programme for this period.

Table 1. Total 2012 expenditures for the Nuclear Safety Action Plan

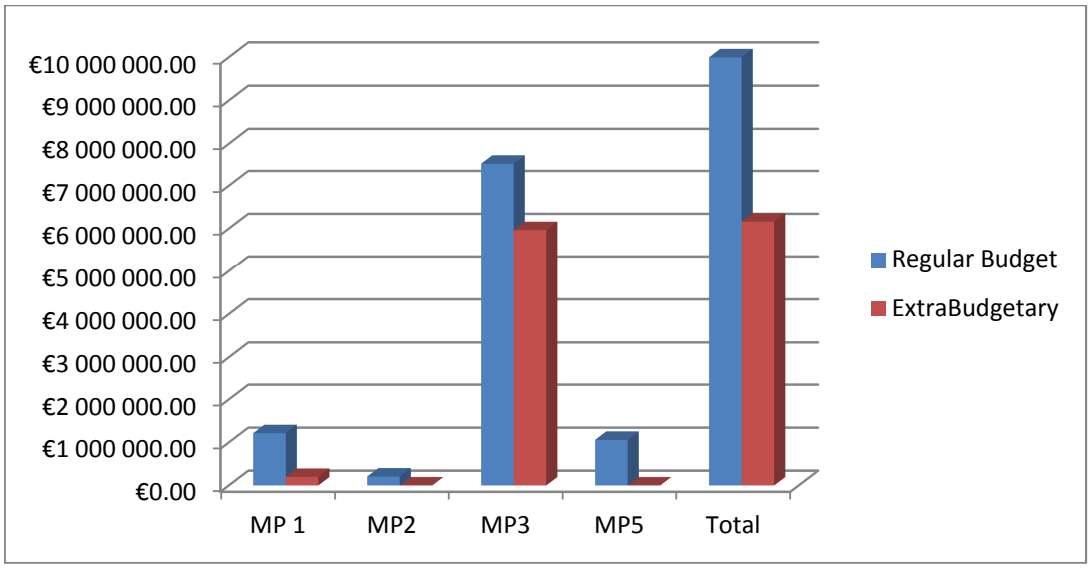
(in € millions, from 1 January to 31 December 2012)

Major Programmes	Regular Budget	Extra Budgetary	Total
MP1	€1 214 889.00	€198 114.00	€1 413 003.00
MP2	€207 116.00	€0.00	€207 116.00
MP3	€7 514 523.00	€5 965 332.00	€13 479 855.00
MP5	€1 060 403.00	€0.00	€1 060 403.00
Total	**€9 996 931.00**	**€6 163 446.00**	**€16 160 377.00**

**Major programmes 4 and 6 have no direct activities in support of the Action Plan.

Fig.1. Total 2012 expenditures for the Nuclear Safety Action Plan

(in € millions, from 1 January to 31 December 2012)



A total of €4.15 million of expenditure for the Nuclear Safety Action Plan (NSAP) has been incurred by the Agency since 1 January 2013 to 30 June 2013. The following table (Table 2) provides the breakdown of expenditure by Major Programme for this period.

Table 2. Total 2013 expenditures for the Nuclear Safety Action Plan

(in € millions, from 1 January to 30 June, 2013)

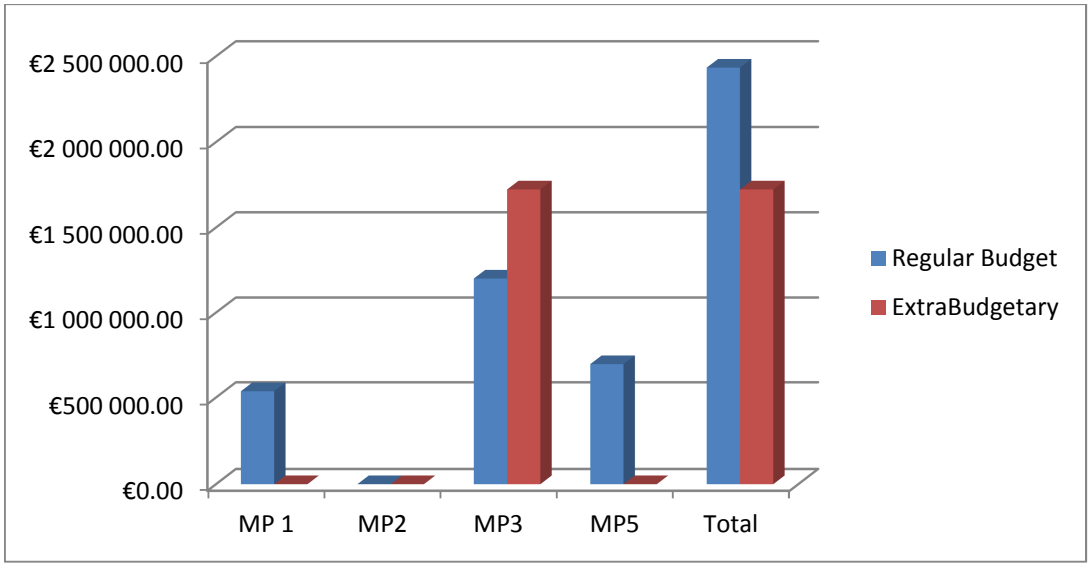
Major Programmes	Regular Budget	Extra Budgetary	Total
MP1	€ 536,296.68	€0.00	€ 536,296.68
MP2	€0.00	€0.00	€0.00
MP3	€ 1,198,507.50	€ 1,719,863.47	€ 2,918,370.97
MP5	€ 699,454.64	€0.00	€ 699,454.64
Total	**€ 2,434,258.82**	**€ 1,719,863.47**	**€ 4,154,122.29**

**Major programmes 4 and 6 have no direct activities in support of the Action Plan.

Major Programme 2 shows no Regular Budget expenditures for the period as the funds allocated for the Action Plan shall be used for the new Coordinated Research Project on traceability, where the first Research Coordination Meeting will be scheduled and convened in late 2013. Furthermore, Extra-budgetary activities under Major Programmes 1 and 2 also show no expenditure but instead they are being implemented within the extra budgetary funds in Major Programme 3, thus these expenditures are reflected under Major Programme 3.

Fig.2. Total 2013 expenditures for the Nuclear Safety Action Plan

(in € millions, from 1 January to 30 June, 2013)



49. Work to improve nuclear safety is a continuous process. Activities associated with the implementation of the Action Plan projects will continue during the 2014–2015 biennium. The year 2015 will be considered as a transition year for the activities associated with and under the Action Plan. Dedicated projects under the Action Plan that are to continue beyond 2015, in particular the lessons learned and the recommendations from the completed projects and the IEMs which require further work, as well as the findings from the IAEA comprehensive report on the Fukushima Daiichi accident, are planned to be followed-up by the respective Departments/Divisions (MP1, MP2, MP3 and MP5). The Department of NS will continue to be a focal point for coordinating the inter-departmental work for the implementation of these projects.

ANNEX III: LIST OF EXTRABUDGETARY NEW PROJECTS INITIATED IN THE PERIOD COVERED BY THIS REPORT

During the period covered by this report around 20 new extrabudgetary projects with an approximate budget of € 11 million, have been initiated by the Secretariat. These projects are related to significant key areas of the Action Plan. The duration of the projects may include the period 2014-15 and beyond.

- *Conduct and organize the International Experts Meetings (IEMs) on:*
    a. Decommissioning and Remediation after a Nuclear Accident (IEM 4)
    b. Human and Organizational Factors in Nuclear Safety in the Light of the Accident at the Fukushima Daiichi Nuclear Power Plant (IEM 5)
    c. International Experts' Meeting on Radiation Protection after the Fukushima Daiichi Accident (IEM 6)
- *Analyses on issues and trends for (Post-) Accident Monitoring (PAM) Systems in Nuclear Power Plants (based on lessons learned from the Fukushima Daiichi accident*)
  The objective of this project is to develop new IAEA publications to reflect current knowledge, practices, operating experience, and trends related to NPP post-accident monitoring systems.

- *External Event Safety Assessment of Multi-Unit Sites*
  The objective of this project is to develop an appropriate methodology and detailed guidelines for external event safety assessment of multi-unit NPP sites, in particular, the following: site evaluation for NPP against the hazards induced by external events, and external event safety assessment of sites locating multiple units of NPP.

- *Designation of an IAEA RANET Capacity Building Centre (CBC) the Fukushima Prefecture*
  The objectives of this project are to designate an IAEA RANET CBC in the Fukushima Prefecture of Japan, to procure radiological and environmental monitoring equipment that will be stored at the CBC in the Fukushima Prefecture and conduct regional training courses, workshops or exercises in EPR.

- *Development of the IRIX standards and implementation of the standard*
  The objective of this project is to review drafts of an updated version of the IRIX specification and relevant documentation taking into account issues and feedback reported by users of the earlier version of the standard.

- *USIE phase II (USIE 2012 Enhancements)*
  The objective of this project is to enhance the functionality of the first version of the USIE system, including adding the ability for counterparts to manage users in their own organizations as well as to update their contact details themselves on the system.

- *Decommissioning and environmental remediation after a nuclear or radiological accident: Approaches, techniques, tools and equipment*
  The objective of this project is to collect experience on approaches, techniques, tools and equipment to deal with clean-up, decontamination and decommissioning after an accident and make available this experience to Member States.

- *Application of Environmental Mapping Technology making use of unmanned aerial vehicles*
  The objective of this project is to develop a low-cost UAV-based mobile gamma spectrometry system for the use in the Fukushima Prefecture.

- *Administrative Support of Radiation Safety and Monitoring Projects*

The objective of this project is to provide administrative support and coordination for the technical projects on radiation safety and monitoring addressing remediation, decontamination and land use in the affected territories in the Fukushima and neighbouring prefectures.

- *Remediation and Decontamination in Fukushima Prefecture*
  The objective of this project is to ensure a presence of IAEA specialists and international experts to discuss issues with local authorities and the various implementing organizations, and regulatory authorities that are engaged in the Fukushima Prefecture.

- *Management of Radioactive Waste from Remediation Activities*
  The objective of this project is to develop and maintain a continuous dialogue with local and national authorities and the various implementing organizations that are engaged in the Fukushima Prefecture to analyse the actual situation regarding the management of generated radioactive waste and to discuss the on-going and planned work in this field.

- *Guidance for the implementation of integrated strategies to reduce radiological impacts to the population subsequent to deposition of radionuclides on inhabited and agricultural areas*
  The objective of this project is to provide guidance on the identification of the appropriate set of protective and remedial actions to reduce exposures to the public after contamination of inhabited and agricultural areas.

- *Strengthening capabilities for radiation protection of workers in emergency situation and occupational radiation protection appraisal services*
  The objective of the project is to strengthen Member States (and IAEA) capabilities for protection of radiation protection workers in emergency situations and to promote the occupational radiation protection self-assessment tool and appraisal services.

- *Assistance in the use of radiation monitoring data to develop maps to be made available to the public*
  The objective of this project is to support the Japanese authorities on the presentation and interpretation of existing dose rate and radionuclide deposition data. The proposed work will be undertaken in the Fukushima prefecture and technical advice will be based on existing IAEA safety standards and good international practices.

- *Development of a TECDOC on "Criteria for Food and Drinking (Potable) Water Contaminated as a Result of a Nuclear or Radiological Emergency - a Synthesis of the Current Situation*
  The objective of this project is to produce a TECDOC that documents the relevant national and international standards, the basis on which they have been derived and the circumstances in which they are intended to be used. The document will facilitate the understanding of numerical values for criteria and their application.

- *Enhancing radiation medicine education by building capacity of health professionals and medical students*
  The objective of this project is to enhance global education in radiation medicine by building capacity of health professionals and medical students from to address radiation anxiety and public awareness.

- *Strengthening research cooperation in radiation disaster medicine including post-traumatic stress disorders*
  The objective of this project is to strengthen research capabilities of health professionals and medical students from the standpoint of radiation education by creating a better understanding and management of public perception and post-traumatic stress disorders.

- *Development of a specific training package for medical radiation physicists in support to nuclear or radiological emergency situations*
  The objective of this project is to prepare a specific training package for medical radiation physicists to provide support during nuclear or radiological emergency situations.

- *Assessment Methodology and Arrangements during Incidents and Emergencies*
  The objective of this project is to identify the available assessment capabilities in Member States in order to develop an acceptable process for the use of assessment tools and capabilities for use during incidents and emergencies.

- *Assistance to the Fukushima Prefecture in long term remediation, decontamination, waste management and radiation monitoring - integrated approach*
  The objective of this project is to support the Fukushima Prefecture in pursuing a comprehensive approach to the remediation efforts, taking all remediation-related technical aspects into account in order to facilitate all remediation activities.