International Action Plan for Strengthening the International Preparedness and Response System for Nuclear and Radiological Emergencies

Final Report

Report to the Deputy Director General, Department of Nuclear Safety and Security
Prepared by the Work Group on Long Term Sustainability of Emergency Preparedness and Response Programmes

January 2010

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A. Preamble

1. This document is the final report on the actions taken under the International Action Plan for Strengthening the International Preparedness and Response System for Nuclear and Radiological Emergencies (Action Plan).

2. The Action Plan was approved by the IAEA Board of Governors in May of 2004 and endorsed by the IAEA General Conference in September 2004.

3. The objective is to improve and strengthen the international emergency preparedness and response system by focusing the efforts of IAEA Member States, the Secretariat and competent authorities as identified under the Convention on Early Notification of a Nuclear Accident and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency.

4. To ensure implementation and long term sustainability of the international emergency preparedness and response system pursuant to General Conference resolutions GC(46)/RES/9.D, GC(47)/RES/7.A, GC(48)/RES/10.B, GC(49)/RES/9.A, GC(50)/RES/10.A, GC(51)/RES/11.A, GC(52)/RES/9.A, GC(53)/RES/10.5 and 10.11 this report provides also recommendations and a strategy for strengthening international communications, international assistance and long term sustainability.

B. Background

5. Nuclear and radiological emergencies can have serious consequences for life, health, the environment and society over wide geographical areas. Proper management of nuclear or radiological emergencies requires prompt actions to mitigate the effects. States are responsible for establishing appropriate emergency management programmes, deciding upon and taking effective response actions, and ensuring that resources are available for preparedness and response. However, the resources and capabilities of States, individually or collectively, could be exceeded in an emergency. Thus, effective emergency preparedness and response also requires communication and cooperation amongst States and international intergovernmental organizations (hereinafter referred to as international organizations) to ensure a harmonized world wide response to nuclear or radiological emergencies.

6. The international emergency preparedness and response system is comprised of:

- the legal framework provided by the Conventions;
- the Statute of the IAEA;
- arrangements and agreements made by and between IAEA Member States, the Secretariat and by and between relevant international organisations to improve the system;

- arrangements for the exchange of information and resources for identifying, assessing, and responding to a nuclear or radiological emergency – among States Parties, non-Party IAEA Member States, relevant international organizations and the Secretariat; and

- preparedness arrangements to maintain the capability to respond to any nuclear and/or radiological emergency.

7. The Action Plan identified three main areas for strengthening the international emergency preparedness and response system. These areas are international communications (A), international assistance (B), and sustainable infrastructure (C). The Action Plan established six action items for international communications, seven action items for international assistance, and four action items for sustainable infrastructure. Regionally balanced work groups of representatives from Member States and international organisations were established under the Action Plan to address the action items and develop recommendations to strengthen and enhance the international emergency preparedness and response system.

C. Achievements

8. The work on the Action Plan has involved more than 133 experts from 37 countries and 5 international organizations. These experts have addressed all 17 actions identified in the Action Plan. Progress reports under the Action Plan have been endorsed at the Competent Authority Meetings in 2005, 2007, and 2009. The achievements of the three Action Plan Work Groups are summarized below.

9. Work Group A, international communications, addressed 6 action items and developed 26 recommendations which, when fully implemented, will achieve "…an effective internationally harmonized communication system for nuclear and radiological emergencies", as defined in the Action Plan. Key items addressed include:

- Development of the International Radiation Information eXchange (IRIX) standards that facilitate the exchange of incident and emergency related information between existing national, regional and international systems. The IRIX standards include a) an information exchange data-set, b) an associated XML data-format and c) standard Internet web-based information exchange transmission protocol;

- Recommendation to use servers and clients in a scalable star-network topology for the transmission of information and data between States and with the Secretariat and relevant international organizations.

- Identification of the necessary standards for audio-video emergency communication and recommendations regarding the role of the IEC as a central communication node.

The continued refinement and deployment of appropriate standards for information and data exchange as well as for video and voice communications will ensure an effective internationally harmonized communication system for nuclear and radiological emergencies and eliminate the need for States to develop independent standards and systems.

10. Work Group B, international assistance, addressed 7 action items and developed 17 recommendations which, when fully implemented, will achieve "…effective, efficient and compatible arrangements to obtain relevant and adequate assistance, including: sound and timely assessments and advice," as defined in the Action Plan. Key items addressed include:

- Development of the Response Assistance Network (RANET) to ensure a process whereby any State can receive assistance in the case of a nuclear or radiological emergency;
- Development of the International Exchange Program (IXP) to provide atmospheric plume modelling capabilities to any State in the event of a release of radioactive material into the atmosphere;
- Development of standardized radiation medical emergency management criteria to ensure appropriate medical care during nuclear or radiological emergencies;
- Recommendations for the establishment of efficient mechanism for sharing knowledge and experience to ensure effective emergency preparedness and response to nuclear or radiological emergencies, including maritime emergencies.

Sustainability of these activities will ensure effective, efficient and compatible arrangements to obtain relevant and adequate assistance, including: sound and timely assessments and advice.

11. Work Group C[1], sustainable infrastructure, addressed 4 action items and the 43 recommendations[2] from Work Groups A & B. Additionally Work Group C developed a plan for implementation and proposes a strategy for a "… sustainable, effective and efficient infrastructure for enhancement of the international preparedness and response system," as defined in the Action Plan and contained in this report[3,4].

D. Challenge

12. Since the Chernobyl accident in 1986, major political and technological developments have lead to significant improvements in national and international emergency preparedness and response systems. Continued advancement provides

[1] List of members is in Appendix 6.
[2] List of all recommendations is in Appendix 5.
[3] Summary reports prepared by the two Work Group C sub-groups are in Appendix 3 and 4.
[4] This report was also reviewed by peer review members (see Appendix 6).

opportunities to establish a cost effective state-of-the-art international emergency preparedness and response system.

13. Historically, programmes to improve emergency preparedness and response have often been initiated but not sustained. Significant initiatives have been undertaken during the past decade contributing to the formation of a comprehensive and effective international emergency preparedness and response system, such as the establishment of IAEA's Incident and Emergency Centre; bilateral, multilateral and regional activities; and current work under the Action Plan. However, activities to implement and sustain these initiatives at the national, regional and international levels have been lacking. Overarching coordination of emergency preparedness and response initiatives at the international level is needed to focus efforts on identifying gaps and issues and reducing duplication, thus ensuring a more effective and efficient utilization of resources and the development and implementation of harmonized, efficient and optimized national, regional and international emergency preparedness and response systems that can be sustained. This level of coordination does not exist today.

14. States have the responsibility for establishing, maintaining and improving emergency management programmes that are effective and efficient. The programmes should use a graded approach based on threat assessments of all nuclear and radiological activities, taking into account national, regional and international considerations. An effective emergency preparedness and response system must include appropriate arrangements that are harmonized at the national, regional and international levels.

15. A concerted effort is required by all Member States and international organizations to ensure full implementation of recommendations arising from the Action Plan. It is a challenging but achievable goal that will provide for a strengthened and sustainable international emergency preparedness and response system implemented at the national, regional and international levels.

16. The continuing challenge is ensuring that all States and relevant international organizations fully implement the recommendations for a sustained cost effective state-of-the-art baseline system that:

- uses a graded approach based on threat assessments;
- uses existing technologies, tools, systems, best practices and lessons learned;
- is harmonized at the national, regional and international levels;
- is adaptable and flexible;
- is fully sustainable with optimal use of resources;
- provides continuous feedback for improvements; and
- is coordinated and integrated to ensure a strong international commitment for success.

E. Approach

17. Developing and maintaining a robust emergency preparedness and response system is an important national, regional and international priority which is cross-cutting and involves a multitude of different players and expertise. The infrastructure required to quickly initiate and uphold a response to a nuclear or radiological emergency is challenging to develop and maintain. A complete emergency preparedness and response system contains multiple preparedness elements (policy, planning, programme and technology development, equipment, training and readiness assurance) and response elements (crisis and consequence management) that comprise a complete organisational entity. Organising an effective international emergency preparedness and response system is further complicated by the variety of needs and views posed by Member States and international organizations of the system's capabilities. Additionally, the unpredictable nature of an emergency requires a balanced programme involving planning, training and exercises to ensure an effective and efficient response.

18. The Action Plan provided an excellent framework for developing processes and methods for strengthening the international emergency preparedness and response system. To continue this momentum it is envisaged that from 2010 onwards Member States and the Secretariat will implement the following key strategic elements:

1. establishment of a Senior Emergency Preparedness and Response Policy Group;
2. ensuring equal representation by all States and relevant international organisations at Competent Authority Meetings;
3. implementation of emergency preparedness and response initiatives;
4. provision of continuous feedback and improvement; and
5. establishment of a sustainable infrastructure including resources.

F. Strategy

19. The strategy comprises the key elements identified in 1-5 above, which are based on the framework established by the Action Plan. The strategy ensures continued enhancement and long term sustainability of the emergency preparedness and response system by employing a multilayer process, from policy setting to operational matters, open to all States and international organizations and involving the Secretariat to ensure that all elements of the emergency preparedness and response system are covered.

20. Establishment of a senior policy group to provide the Deputy Director General (DDG), Department of Nuclear Safety and Security advice and guidance on all strategic emergency preparedness and response matters is key. The Secretariat, based on advice and guidance from the DDG through the senior policy group, will coordinate and facilitate all accepted initiatives to enhance emergency preparedness and response, including assistance to Member States in preparedness and operational matters. The responsibility for the development, maintenance and sustainability of the emergency

preparedness and response infrastructure is a joint responsibility of the Secretariat, Member States, and relevant international organizations for national, regional and international systems. Continuous feedback and improvement will be achieved through the coordination and facilitation by the Secretariat in conjunction with the Competent Authority Meetings opened to all States.

F.1. Senior Emergency Preparedness and Response Policy Group

21. GOAL: To have in place a standing body of senior governmental and international organization officials holding national or international responsibilities in emergency preparedness and response to provide advice to the Deputy Director General, Department of Nuclear Safety and Security on overall emergency management programmes.

22. JUSTIFICATION: Although a myriad of groups contributing to an international emergency preparedness and response system can be identified, there does not exist today an overarching coordination of emergency preparedness and response issues addressed by these groups or their products. Numerous permanent and temporary bodies associated with the IAEA deal with emergency preparedness and response. Examples include the Action Plan Work Groups; competent authorities; various committees under the Commission on Safety Standards; the interim IRIX Steering Committee as well as other advisory and steering committees; Basic Safety Standards drafting groups; and the Interagency Committee on Radiological and Nuclear Emergencies. Greater effectiveness of the important and significant contributions to the emergency preparedness and response work could be achieved if the activities were coordinated.

23. Programmes to improve emergency preparedness and response have often been initiated but not sustained. Significant initiatives have been undertaken during the past decade contributing to the formation of a comprehensive and effective international emergency preparedness and response system including current work under the Action Plan. A single policy group will add to and sustain these enhancements by overseeing and assuring development of a compatible, harmonized, consistent, efficient and optimized emergency preparedness and response system that is represented consistently in cross cutting activities. This policy group will address coordination of emergency management programmes and focus efforts on reducing duplication, thus ensuring a more effective and efficient utilization of resources.

24. OUTPUT: Creation of Senior Emergency Preparedness and Response Policy Group (SEPRPG) as a standing body of senior governmental and international organization emergency preparedness and response officials.

25. DESIRED OUTCOME: Coordinated, effective, harmonized and sustainable international emergency preparedness and response system.

26. TIMING: It is envisaged that the SEPRPG will be in place within six months of approval of this strategic element. To facilitate establishment and full operation, attached is a proposal for Terms of Reference for the group (Appendix 1).

27. RESOURCES: The resource burden will primarily be on the Member States and international organizations in providing the time and travel for their SEPRPG member. It is estimated that the average cost for each SEPRPG member will be US $12,000.00 per year for travel and a half person month of effort per year per member with the exception of the Chair who will expend one person month of effort per year.

28. Additionally, the cost of preparing, convening and providing secretariat support for the SEPRPG will be covered through the regular budget of the IAEA, estimated to be US $10,000.00, exclusive of staff time which is estimated at one person month of effort per year.

F.2. Competent Authorities Meetings

29. GOAL: To enhance and further promote cooperation in preparedness and response to nuclear and radiological emergencies by ensuring that the scope is expanded beyond the current limitations of the Conventions; all Member States, non-Member States, and relevant international organizations are afforded the opportunity to fully participate in meetings of representatives of competent authorities identified in the Emergency Notification and Assistance Technical Operations Manual (ENATOM); and issues, problems and concerns are followed-up at a senior level.

30. JUSTIFICATION: Any State can be impacted by a nuclear or radiological emergency. Therefore, all States regardless of the nuclear and radiological activities/programmes within their country, and relevant international organisations, should be afforded the opportunity to:

- exchange technical information, knowledge and experience,
- discuss ways to enhance emergency preparedness and response programmes, and
- make recommendations to the Senior Emergency Preparedness and Response Policy Group.

31. OUTPUT: Expanded scope of and full participation in the biennial meetings of representatives of all competent authorities and relevant international organizations (CA Meetings); and follow-up at the senior level.

32. DESIRED OUTCOME: Representatives of all States and relevant international organizations can fully participate in meetings to discuss and propose ways to continue to enhance, improve and sustain the international emergency preparedness and response system. The meeting of competent authorities will be chaired by a member of the SEPRPG to ensure that issues, proposals and recommendations identified by the Competent Authorities Meeting are communicated and considered by the SEPRPG, DDG, DG, Board of Governors and General Conference as appropriate (see also Appendix 2).

33. TIMING: Reoccurring: 2011, 2013, 2015, etc.

34. RESOURCES: The cost of preparing and convening the Competent Authorities Meeting will be covered through the regular budget of the IAEA, estimated to be US

$60,000.00 biennially, exclusive of staff time which is estimated at one person month of effort per year. The cost of participant's attendance at the Competent Authorities Meeting is the responsibility of the State or international organization, estimated at US $6,000.00 biennially.

F.3. Implementing Emergency Preparedness and Response Initiatives

35. GOAL: To ensure an ongoing process involving all Member States, relevant international organizations, Secretariat and SEPRPG to implement recommendations, identify and implement initiatives, and identify resource requirements.

36. JUSTIFICATION: Activities to ensure effective and efficient implementation of emergency preparedness and response initiatives at the national, regional and international levels need to be coordinated, well thought out and developed, cost effective, implementable, and sustainable. Achievement of this goal and ensure an ongoing process requires clearly defined roles and responsibilities amongst all parties. States have the responsibility for establishing and maintaining national emergency management programmes. State programmes must take a graded approach based on threat assessments of all nuclear and radiological activities/programmes, also taking into account national, regional and international considerations. International organizations have important roles and programmes with regard to international preparedness for and response to a nuclear or radiological emergency. International organizations must coordinate and cooperate with respective Member States and amongst international organizations to ensure effective emergency management programmes. The IAEA's principal responsibilities are to promote, coordinate and facilitate emergency preparedness and response systems with and among Member States and international organizations at the national, regional and international levels.

37. The responsibilities for emergency preparedness and response systems within the IAEA are assigned to the IAEA's Incident and Emergency Centre under the Department of Nuclear Safety and Security. The Incident and Emergency Centre's mission is identified as promotion, coordination and facilitation of emergency management programmes. However, functional areas within the Incident and Emergency Centre mission statement need to be strengthened to provide for a more focused and enhanced ongoing process to achieve the above stated goal.

38. The process envisioned for the Incident and Emergency Centre is to focus its efforts in two main functional areas. These areas are: (1) preparedness, and (2) operations.

- The preparedness area includes developing emergency preparedness and response standards, technical documents and guidance; plans and procedures; training; coordinating meetings such as competent authorities, technical, consultant and other meetings; and outreach and assistance to Member States and international organizations in developing and implementing emergency management programmes at the national, regional and international levels; and coordination with programmes in other relevant international organisations.

- The operations area includes responsibility for operation of the IAEA's Incident and Emergency Centre, including monitoring of shipments and events; activation of the Centre during nuclear and radiological incidents or emergencies; operation, maintenance and continued development of data, video and voice communications networks and systems, including databases, communications and assistance protocols and contact lists; notifications and facilitation of assistance requests via the RANET; and participation in exercises and feedback.

39. This process ensures integration and coordination of the emergency preparedness and response system involving all Member States, relevant international organizations, the Secretariat and SEPRPG. This process will also ensure the development and implementation of harmonized, efficient and optimized national, regional and international systems and reduce duplication of programmes at the national, regional and international levels, among Member States and international organizations.

40. OUTPUT: An established ongoing process that is facilitated and coordinated by the Secretariat to maintain and enhance emergency preparedness and response systems; implement on-going tasks and recommendations; and identify and address future recommendations, initiatives and resource needs.

41. DESIRED OUTCOME: Development and implementation of harmonized, efficient, optimized and sustainable national, regional and international emergency preparedness and response systems; reduced duplication.

42. TIMING: An ongoing process.

43. RESOURCES: The resource burden for this activity will primarily be on the Member States and the Secretariat. It is estimated that the average cost for:

- Member States to develop and implement an effective and efficient programme, where none previously existed, based on a graded approach will be US $200,000.00 per country, including personnel costs.
- The Secretariat to develop and implement this process, including providing limited financial resources to Member States' newly developed programmes will be US $5,000,000.00 per year, including sustainability and continued enhancement of the international emergency preparedness and response system. It is further estimated that the Secretariat will require a full time staff of 20 persons to fulfil this promotion, coordination and facilitation role described herein.

F.4. Feedback and Improvements

44. GOAL: To ensure formalized, coordinated and timely processes for sharing knowledge and experience, for exchanging information and data, and for providing ongoing feedback that supports a process of continuous improvement among the Secretariat, Member States and international organizations.

45. JUSTIFICATION: The Action Plan recognized that because serious emergencies and the opportunities to learn from real responses are infrequent, it is important to share the lessons identified from drills, exercises and actual experiences and to ensure effective

preservation of knowledge for future emergency planners/responders. In fact, the sharing of knowledge and experiences and exchanges of information and data that could impact systems is another key element to ensuring continuous system improvements and enhancements. This exchange includes information on incidents and emergencies; emergency management programmes at the national, regional and international levels; changes and improvements proposed and/or being implemented; information from meetings and conferences; and from other technical fora. Among stakeholders there is also recognition for the need to:

- exchange information, knowledge, and experiences;
- follow-up to ensure appropriate actions for improvement are taken;
- share international emergency preparedness and response outcomes and recommendations from meetings; and
- enhance opportunities for coordinated international emergency preparedness and response activities among the Secretariat, Member States, and international organizations.

46. The process envisioned includes development of a database maintained by the IAEA's Incident and Emergency Centre that provides a calendar, status of ongoing and planned events, information and data on exercises, incidents and emergencies, lessons identified and learned, and follow-up and feedback to provide a current, documented and formalized exchange of information, data, knowledge and experience. The database will contain information regarding standards, technical documents and guidance; plans and procedures; training; coordinating meetings such as competent authorities, technical, consultant and other meetings; outreach and assistance to Member States and international organizations; monitoring of shipments and incidents; activation of the Incident and Emergency Centre during nuclear and radiological emergencies; development and maintenance of enhanced data, video and voice communications networks and systems, including databases, communications and assistance protocols and contact lists; notifications and facilitation of assistance requests via the RANET; and participation in exercises and feedback. Database entries will be a shared responsibility between the Incident and Emergency Centre, competent authorities and relevant international organisations to ensure timely and current emergency preparedness and response information and data at the national, regional and international levels.

47. OUTPUT: A process that allows the Member States, Secretariat, and relevant international organizations to timely share knowledge and experience, exchanges of information and data, follow-up improvements and provisions for ongoing feedback of information.

48. DESIRED OUTCOME: An effective international emergency preparedness and response system in which better decisions and actions are taken due to the continuous improvement made based on knowledge gained from sharing of experiences, information exchange and lessons learned.

49. TIMING: Implementation of actions should begin immediately following approval of this report. The IAEA Secretariat, Member States and international organizations must

be willing to assist in development and use of tools and to share information, knowledge and experience openly in a timely manner. Full implementation will be a continuous process to ensure continuous enhancement, improvements and sustainability of the international emergency preparedness and response system.

50. RESOURCES: It is estimated that development and implementation of the feedback and improvements database will be US $150,000.00, based on the assumption that the database can be included in the IAEA's emergency web site database under development by the IAEA's Incident and Emergency Centre. No additional personnel resource are anticipated since additional personnel resources identified under other strategic elements of this report can absorb this function.

F.5. Sustainable Infrastructure and Resources

51. GOAL: To maintain a cost effective and efficient infrastructure to ensure continued enhancement of the international emergency preparedness and response system.

52. JUSTIFICATION: The Action Plan provided a framework for developing processes and methods for strengthening and enhancing the international emergency preparedness and response system. This framework coupled with the approach and strategic elements highlighted above provides for a sustainable infrastructure. This infrastructure includes the Senior Emergency Preparedness and Response Policy Group to provide advice to the Deputy Director General, Department of Nuclear Safety and Security on overall emergency preparedness and response programmes; competent authority and other meetings to promote cooperation in preparedness and response to nuclear and radiological emergencies; the IAEA's Incident and Emergency Centre with strengthened preparedness and operations functional areas to provide for a more focused and enhanced ongoing process to implement recommendations, identify and implement initiatives, and identify resource requirements; and feedback and improvements to allow Member States, the Secretariat, and relevant international organizations to timely share knowledge and experience, exchanges of information and data, and provisions for ongoing feedback of information.

53. OUTPUT: Adequate infrastructure and resources.

54. DESIRED OUTCOME: Continuously maintained and improved international emergency preparedness and response infrastructure.

55. TIMING: An on-going process to ensure continuous enhancement, improvements and sustainability of the international emergency preparedness and response system.

56. RESOURCES: The resource burden for this activity will be on Member States and the Secretariat and an estimate that the average cost will be as follows:

Member State Estimate:

- Sustainability and continued enhancement of newly developed emergency preparedness and response programmes is estimated at US $20,000.00 per year per programme.

- Participation in meetings (competent authorities, technical, consultant, other emergency preparedness and response) is estimated at 2 meetings per year (1 regional and 1 in Vienna) at an estimated cost of US $8,000.00 per year per Member State.
- Three person years of effort per Member State is estimated to maintain these newly developed programmes. Note: Member States that maintain existing programmes are not included in the resource estimate.

Secretariat Estimate:

- Estimates for cost of travel and personnel are included in F.3 strategy above.
- From time to time there will be one time cost to ensure continued emergency preparedness and response system enhancement to procure new or improved equipment.
- The Secretariat should be allocated funds to pay for associated costs (Member State travel, hosting meetings) to support the various emergency preparedness and response meetings scheduled by the Secretariat. This is estimated at US $250,000.00 per year, exclusive of funding for the SEPRPG and competent authorities meetings, which are covered in above estimates.

G. Factors Required for Success

57. The Action Plan provided a framework for developing processes and methods for strengthening the international emergency preparedness and response system and to ensure continued enhancement for a state-of-the-art system. The Action Plan was successfully implemented through coordination and effective cooperation of Member States, the Secretariat, relevant international organizations and regional groups such as the National Competent Authorities Coordinating Group.

58. The Action Plan process has resulted in identification of a number of important activities that need to be addressed by member states, the Secretariat, and stakeholders for successful and meaningful implementation and sustainability of the international emergency preparedness and response system. The process highlighted in strategic elements above provides for successful implementation and sustainability of the system as envisaged by the Action Plan and as proposed in this document through a coordinated effort of Member States, the Secretariat, relevant international organizations and regional groups such as the National Competent Authorities Coordinating Group. Therefore, continued successful implementation in achieving a worldwide emergency preparedness and response system requires:

- policy strategies,
- coordination mechanisms,
- allocation and optimization of resources,
- implementation tools and technologies, and
- applicability to all States.

H. Conclusion

59. All actions and recommendations arising from the Action Plan have been addressed. Implementation of the proposed approach, as described in this report, will ensure the continued enhancement and sustainability of the international emergency preparedness and response activities by providing the means to ensure that all relevant activities are analyzed, endorsed, acted upon, and sustained. This approach provides for a cost effective, efficient and sustainable long-term international emergency preparedness and response programme.

Appendix 1

Work Group on Long Term Sustainability of Emergency Preparedness and Response Programmes (WG-EPR)

Senior Emergency Preparedness and Response Policy Group (SEPRPG)

Terms of Reference

PROPOSAL

Mission

1. To strengthen the international emergency preparedness and response system by focusing the efforts of IAEA Member States, the IAEA Secretariat and competent authorities as identified under the Convention on Early Notification of a Nuclear Accident and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency.

Functions

2. The SEPRPG's primary function is to provide policy advice, guidance and, as necessary, direction to the Deputy Director General, Department of Nuclear Safety and Security (DDGNS) to ensure development of an effective, efficient and sustainable world wide emergency preparedness and response system. This includes, *inter alia*:

    - Considering input from Member States and relevant international organisations in the development of IAEA emergency preparedness and response standards and technical recommendations,
    - Identifying and recommending new actions needed to ensure continuous and coordinated emergency preparedness and response enhancements,
    - Evaluating and prioritizing international emergency management initiatives for preparedness and response to radiological and nuclear incidents and emergencies,
    - Ensuring development of the emergency preparedness and response implementation strategies for proposed initiatives, including institutional arrangements to ensure sustainability of the international emergency preparedness and response framework.

In addition, SEPRPG shall:

- Promote Member State and international organization participation in the adherence to IAEA emergency preparedness and response standards and technical recommendations, and
- Promote harmonized standards for international emergency preparedness and response programmes.

Composition

3. The SEPRPG has 15 to 20 members representing each of the following six regions: Africa, Asia-Pacific, Eastern Europe, Western Europe, North America (including Mexico) and South and Central America (including the Caribbean); and the International Organizations Co-sponsors of the Joint Radiation Emergency Management Plan of the International Organizations.
4. Member candidates are nominated by Member States and international organizations. The nominated members shall be senior governmental or international organizations representatives with high professional competence in the field of preparedness for and response to radiological and nuclear events. The nominated candidates shall, to the extent possible, also be senior decision makers.
5. The members are selected by the Deputy Director General, Department of Nuclear Safety and Security from among the candidates nominated. In selecting the members, the DDGNS shall ensure a balanced regional approach with a minimum of two members from each region and one member from a relevant international organization.
6. Based on the characteristics of a region, e.g., extent of nuclear activities in the area or number of States, the DDGNS may appoint an additional member from each of the various regions to achieve a minimum membership of 15 with a maximum membership of 20.
7. The DDGNS selects and appoints a Chairperson from among the members.

Period of Service

8. The term of each member is three years except for the initial period when one third of members is appointed for 1 year, one third for 2 years and one third for full 3-year term.
9. The members serve no more than two consecutive terms.

Methods of Work

10. The DDGNS provides the secretariat for the group and designates one staff to be the SEPRPG Secretary.
11. The SEPRPG Secretary is responsible for:

    - preparing invitations, provisional agendas, and other meeting documents which will be circulated sufficiently in advance of meetings;
    - preparing meeting reports and keeping record of decisions made by the group; dissenting views will be recorded as such; and
    - establishing and maintaining the group web site to keep each other informed on upcoming meetings, activities, plans, agreements, news, etc.

12. The SEPRPG meets regularly, approximately every 12 months or as deemed necessary, according to a schedule established by the Chairperson in consultation with other members and the DDGNS.
13. In planning dates of meetings, due consideration will be given to holding meetings adjacent to other relevant activities in order to save time and money.
14. The meetings shall be chaired by the Chairperson.
15. The SEPRPG shall make decisions by consensus.
16. The SEPRPG may set up *standing* working groups to work in common areas of interest.
17. The SEPRPG may set up *ad hoc* task groups to address and resolve common open issues.
18. Members are expected to attend SEPRPG meetings.

Administrative Provisions

19. Travel and subsistence expenses of members of the SEPRPG are the responsibility of the respective Member State or international organization.
20. These Terms of Reference enter into force on DD MM YYYY.

Appendix 2

Work Group on Long Term Sustainability of Emergency Preparedness and Response Programmes (WG-EPR)

Competent Authorities Meetings

PROPOSAL

ISSUES: To enhance and further promote cooperation in addressing preparedness and response issues, problems, and concerns related to nuclear and radiological emergencies by ensuring that the scope is expanded beyond the current limitations of the Conventions; all Member States, non-Member States, and relevant international organizations are afforded the opportunity to fully participate in meetings of representatives of competent authorities; and issues, problems and concerns are followed-up at a senior level.

ISSUE #1: Framework of the Competent Authorities Meetings

CURRENT STATUS: The Mandate and Methods of Work (endorsed July 2009) states that Competent Authorities Meetings are conducted within the framework of the Notification and Assistance Conventions which limits the scope of activities to notification and assistance.

PROPOSED CHANGE: To expand the framework of the Competent Authorities Meetings beyond notification and assistance to enable a comprehensive discussion of ways to enhance, improve and sustain the international emergency preparedness and response system, in accordance with the Emergency Notification and Assistance Technical Operations Manual (ENATOM).

ISSUE #2: Participation

CURRENT STATUS: Only States and international organizations that are Parties to the Notification and Assistance Conventions are afforded the opportunity to fully participate in meetings of representatives of competent authorities.

PROPOSED CHANGE: To ensure that all Member States, non-Member States, and relevant international organizations are afforded the opportunity to fully participate in meetings of representatives of competent authorities.

ISSUE #3: Overarching implementation mechanisms

CURRENT STATUS: The Competent Authorities Meeting is a meeting of representatives identified under the Conventions and an effective mechanism does not exist to ensure meeting reports, technical proposals, issues, problems, concerns and recommendations are communicated to and coordinated with

appropriate decision-makers within the Member States, international organizations and the Secretariat.

PROPOSED CHANGE: To ensure that the Competent Authorities Meeting will be an endorsed IAEA technical meeting chaired by a member of the SEPRPG, with the responsibility to communicate the meeting reports and results to the SEPRPG for action, which will ensure further communication and coordination with decision-makers within the Member States, international organizations, and the Secretariat, to include as appropriate the Board of Governors and General Conference.

Appendix 3

Work Group on Long Term Sustainability of Emergency Preparedness and Response Programmes (WG-EPR)

Sub-group on Implementation (SG-I)

SUMMARY REPORT

The SG-I was tasked by the WG-EPR to evaluate and promote action for the implementation of 17 recommendations derived from the WG-A report and the WG-EPR task list. Actions associated with implementation of some recommendations resulted in additional tasks. All recommendations and additional tasks were evaluated, updated as necessary, discussed with WG-EPR and, where appropriate, discussed with the IEC. A detailed description with results and the implementation status of all the 17 recommendations, as well as the additional tasks, are provided in the SG-I final report.

Key items for achieving full and sustainable implementation of international communications as identified in the Action Plan include: 1) implementation of the International Radiation Information eXchange (IRIX) standards, 2) a Public Key Infrastructure (PKI) operated by the IEC to ensure an adequate level of security (i.e. confidentiality, integrity and authentication), 3) Video Tele-Conferencing (VTC) standards, and 4) identification of the IEC as a central node for VTC emergency communication to ensure an effective and efficient world wide VTC programme. Adoption of the IRIX and VTC standards and identification of the IEC as the VTC central node and PKI operator will ensure reliable, secure and standardized information, data, video and voice exchange and eliminate the need for developing independent systems.

The IRIX definitions are based upon internet standards such as XML and web services which ensure easy interfacing between the Secretariat and existing national and international systems. To improve the maturity of the standards, the SG-I further developed and modified the IRIX schema and defined a basic set of IRIX web-service methods. Proof of concept for using the IRIX standards to exchange emergency related information between remote web-servers and clients was demonstrated during the June 2009 WG-EPR meeting and at the July 2009 Competent Authority Meeting in Vienna. An extended demonstration application with automated information exchange between two central servers and two or more clients interfaced to existing national systems is planned for the beginning of 2010.

A more in depth explanation of the relevance of the IRIX standards for national systems is appended to the SG-I final report which is available on the Action Plan web-site. This appendix better explains what the IRIX standards are and gives a description of the scope, utilization and benefits of these standards. The latest versions of the XML-schema and the web-service methods are available for downloading through the IAEA Incident and Emergency Centre (IEC).

Additionally, to ensure continued development of the IRIX standards and long term sustainability, an interim IRIX Steering committee (ISC) has been established. Terms of Reference describing tasks and composition of the ISC have been developed and approved by the WG-EPR. Also a proposal for an orientation and assistance programme to facilitate the implementation of the IRIX standards in national systems has been drafted.

The IEC's first operational version of the Unified System for Incident and Emergency communications (USIE) will be compatible with the IRIX standards. The USIE application will be installed on a central server that is compliant with the Action Plan recommendations regarding high availability and reliability. To ensure an adequate level of security the current and future USIE systems must utilize a Public Key Infrastructure (PKI) operated by the IEC.

Another key activity of the SG-I has been the updating of the VTC recommendations to reflect the latest VTC standards. Together with the recommendation that the IEC acts as a central node for VTC emergency communications, this will ensure an effective and efficient world wide VTC capable programme. Additionally, the ENATOM contact database will be updated with VTC information once USIE is deployed.

A major outcome of the SG-I work is the further development of the IRIX standards and the demonstration that the implementation of these standards is feasible. The use of the IRIX standards in the first USIE application and the consequent adoption of the same standards by Member States and other international organizations will greatly contribute to the achievement of an effective internationally harmonized communication system for nuclear and radiological emergencies, as required in the Action Plan.

Estimated costs and resources for the implementation of the recommendations are contained in the Action Plan Final Report. Additionally, the SG-I report contains a more detailed cost break down by initial set-up and annual maintenance with separate quotations for the IEC, competent authorities with advanced IT infrastructure, competent authorities without advanced IT infrastructure and international organizations.

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Appendix 4

Work Group on Long Term Sustainability of Emergency Preparedness and Response Programmes (WG-EPR)

Sub-group on Follow-up (SG-F)

SUMMARY REPORT

The SG-F was tasked by the WG-EPR to evaluate and promote action for the implementation of 11 recommendations derived from the WG-A and B reports and WG-EPR task list.. Actions associated with implementation of some recommendations resulted in additional tasks. In total, SG-F produced 23 proposals based on: 1) the analysis of the original recommendations of WG-A and WG-B; 2) discussions of context and proposed intent with WG-EPR; and 3) feedback received from discussion and input from other experts. All recommendations and additional tasks were evaluated, updated as necessary, discussed with WG-EPR for final adjudication and disposition. A detailed description with results and the implementation status of all the 11 recommendations are provided in the SG-F final report which is available on the Action Plan web-site.

Key items included a review of existing IAEA documents, systems and programmes to determine if standards, guidance, requirements, systems and/or programmes already existed and, if so, what needed to be done to accomplish the recommendations. The reviews showed that in most instances, standards, guidance, requirements, systems and/or programmes were in place and revisions, updates and modifications would address the area of concern. Additionally, sustainability would enable and accomplish the necessary follow-up action to ensure that the recommendation is fully fleshed out.

SG-F, while supporting the work accomplished under Action Plan WGs A and B, does not support the publication of these reports as IAEA publications. SG-F supports the publication of these reports as reports under the Action Plan, but to make these separate IAEA publications would require a process to continue to review and update the reports, which is considered unnecessary since the sustainability process outlined in the Action Plan final report will ensure a continuous review and updating of a state-of-the-art international emergency preparedness and response programme. Additionally, SG-F proposed processes to ensure that follow-up and continued research of programmes and systems is done through a coordinated identification of standards, guidance, requirements, systems and/or programmes and then through Competent Authorities Meeting, the Senior Emergency Preparedness and Response Policy Group, the Secretariat and Member States involvement and actions to ensure long term sustainability and continued improvement and enhancement.

One exception was the recommendation regarding the World Meteorological Organization (WMO) Regional Specialized Meteorological Centres (RSMC). Since WMO's RSMCs are outside the scope of the Action Plan, SG-F did not address a process to ensure that RSMC products could be obtained by all IAEA Member States. However,

SG-F believes that with the registration of atmospheric plume modelling capabilities by several IAEA Member States under the IAEA Response and Assistance Network (RANET), the capabilities are available to all IAEA Member States and no further action was warrant in this area.

Estimated costs and resources for the implementation of the recommendations are included in the estimates contained in the Action Plan final report. Additionally, the SG-F final report, which estimates costs and other resources for the documented proposals are quoted separately in the SG-F final report.

Appendix 5

Work Group on Long Term Sustainability of Emergency Preparedness and Response Programmes (WG-EPR)

International Action Plan for Strengthening the International Preparedness and Response System for Nuclear and Radiological Emergencies

ACTIONS AND RECOMMENDATIONS

WG-EPR has addressed all actions and recommendations resulting from the Action Plan. A summary description of the actions and recommendations are identified below. However, long-term implementation and sustainability are based on acceptance of the Action Plan final report.

A	**Actions / Recommendations**	
A1	Identify existing communication arrangements	
	R1	Accept the recommended sets of information to be exchanged in case of a nuclear or radiological incident or emergency
	R2	The IAEA should publish the initial version of the data-format as an IAEA document
	R3	Adopt XML as the data exchange format
A2	Strengthen the international system for secure, timely and reliable emergency notification	
	R4	Establish a sustainable mechanism for review, development and updating of the information sets so that the format will continuously meet the global needs of the IAEA Member States and other International Organisation using the information sets.
	R5	Establish a steering committee that is responsible for the future changes of the data-format. The steering committee should be composed of members from MS, the IAEA and all international organizations that adopt the data-format
	R6	The IAEA should also publish future versions of the data-format as an IAEA document
A3	Develop compatible international arrangements that connect and enhance systems for sharing information	
	R7	Develop a technical solution and demonstration of the IRIX system
	R8	Adopt technical solution ensuring Standard Web services over https are used for sending and receiving the IRIX messages
	R9	A scalable star network topology is used for the transmission of messages between the CAs and the IAEA. The nodes of the network are composed of many Web-clients and one or more Web-servers. CAs and IOs act either as a Web client or a Web server. All communications are initiated by the Web clients
	R10	The IAEA sets up a highly reliable Web server node composed of two or more mirrored fault-tolerant servers with automatic failover, preferably located in geographically distant locations, each with its own ISP and interconnected by leased lines

A	Actions / Recommendations	
	R11	The IAEA Web servers are connected to a call-out system capable of notifying the CAs by fax, SMS, phone and email
	R12	The IAEA operates an appropriate Public Key Infrastructure (PKI)
A4	Review and enhance public communication arrangements	
	R13	Review and support publication of the proposed public information arrangements as an IAEA publication
	R14	Encourage MSs and IOs to review their existing arrangements/practices and if necessary adopt the proposed arrangements
A5	Review and implement changes to arrangements for communication between IAEA Member States and the IAEA Secretariat, including the protected web site ENAC	
	R15	That, based on the recommendations made by Expert Groups A1 to A3 and described in the EG A5 report, the IAEA Incident and Emergency Centre develops and implements its part of the IRIX system (a) with a web interface (client) and an interface for automated data exchange and (b) which allows for development and implementation of subsystems, packages or modules for exchange of data and information and for sharing specific assessment and assistance tools
	R16	That the system is implemented in stages where the first stage will involve initial management of radiation events, i.e. notification , reporting and exchange of information during the first phase of emergency
	R17	That the CAs and International Organisations, at a minimum, operate a computer with Internet connection in order to be able to run the web-client
A6	Promote compatibility among arrangements for secure and reliable voice and video communications	
	R18	That the proposed recommendations on technical standards for video conferencing capabilities are adopted and that the existing communication protocol standard outlined in the report are used when CAs and IOs implement such systems
	R19	That the IAEA IEC assumes the responsibility for the central node for audio-video emergency communication and upgrades its audio-video network infrastructure according to the detailed recommendations
	R20	That the implementation of audio-video communication systems is promoted
	R21	That the IAEA IEC is provided with contact information for establishing communication through audio-video communication systems. This information will be part of the contact point information database
General recommendations		
	R22	Consider, as part of the framework of Action C of the Action Plan, the establishment of a communication advisory group for sustainability of the communication system
	R23	Integrate the International Radiation Information Exchange System (IRIX), the usage of audio and video communication systems and arrangements for public information and media communications into the emergency response arrangements of the IAEA Secretariat, CAs and IOs
	R24	Publish the reports of the Communication Work Group as an IAEA publication
	R25	To further develop, implement and maintain the system
	R26	To accept the general, functional, non-functional and technical requirement outlined in the attachment of the Summary Report

B Actions / Recommendations		
B1	Identify and define the requirements for assistance of different types	
	R1	Types of assistance requirements were identified and defined in proposed Code of Conduct document, later determined to be unnecessary by Member States.
B2	Develop compatible arrangements for response to situations involving lost, stolen, damaged or discovered sources	
	R2	To develop a radiological source support system to be accessed through a web-based portal, to assist countries in developing appropriate emergency response capabilities, facilitate planning and training, and provide guidance during response to radiation event
	R3	To establish and maintain a centrally-administered voluntary register of dangerous sources
B3	Establish compatible arrangements for radiation monitoring and interpretation of results during emergencies	
	R4	To update IAEA documents, IAEA-TECDOC-955, IAEA-TECDOC-1092, and IAEA-TECDOC-1162 and include (a) credible incident/emergency scenarios and requirements those incidents/emergencies would pose for monitoring, (b) identification of the parameters necessary for describing results (c) guidance for interpretation of monitoring results and (d) sharing of results in a standardize electronic form and ensure compatibility with RANET
	R5	To standardize electronic sharing of monitoring results following an XML format and reflecting the forms in TECDOCs 1092 and 1162
B4	Develop – in collaboration with WHO – compatible arrangements for the medical management of radiation injuries, and their diagnosis and treatment, including management of psychological consequences	
	R6	To develop international standard protocols and guidance on treatment of acute radiation syndrome and cutaneous radiation syndrome, different identified aspects of internal and external contamination, management of mass casualty event, application of new approaches in biodosimetry methods, different methods of triage, prevention and management of psychological effects, and long term follow up of exposed individuals
	R7	To promote further research in different identified areas of diagnosis and treatment of radiation injuries for the practical application in medical response to radiation emergencies
	R8	To improve cooperation between Competent Authorities and national health authorities within respective States
	R9	To promote inter-regional and regional networks for emergency assistance and technical co-operation under the international framework
B5	Update – in collaboration with WMO – standard meteorological products, and enhance arrangements for providing associated assistance	
	R10	To update RSMC-provided meteorological products: the extended set for high-speed Internet-capable Member States and the reduced set for fax-only capable Member States. REMARK: No action has been taken on this recommendation since the RSMC are WMO entities not associated with IAEA and thus, WMO must implement this recommendation if they choose.
	R11	To calculate, assess, and distribute dose prediction products for any requesting Competent Authority using the existing capabilities of the Global Dose Assessment Centres (GDACs)
	R12	To promote the conduct of international atmospheric dispersion model intercomparison studies, atmospheric emergency response exercises, and atmospheric tracer experiments to

B Actions / Recommendations		
		evaluate and improve the accuracy and operational use of atmospheric modelling tools
	R13	To ensure that the IAEA-IEC has 24/7 access to meteorological and atmospheric dispersion expertise pertaining to assessing dose
B6	Review the use of models for assessment of the impact of release to the environment with respect to efficient provision of assistance, and enhance arrangements for providing such assistance	
	R14	To encourage leveraging of sharing information and assistance at a regional level
	R15	To further develop the concept for sharing information and assistance taking into account regional needs and synergies and promote a demonstration project focused on regional relationships
	R16	To expand research in: radio-ecological models for tropical regions, impacts of radionuclide contamination, decontamination of housing and other domestic structures, effectiveness of sheltering, interactions between existing environmental compartments, secondary contamination; and incorporate improved deposition mechanisms into models and improve oceanographic models in the gap areas identified in the Summary Report
B7	Review and develop the ERNET concept	
	R17	To develop and publish RANET concept with specifications and standards for emergency response instrumentation

C Actions / Recommendations		
C1	Implement the action plan, using a quality management system	
C2	Evaluate and, where appropriate, enhance the ability of the IAEA's Emergency Response System to fulfil its role as a facilitator and coordinator	
C3	Review and, where appropriate, develop the mechanisms for communicating lessons identified from past events and exercises	
C4	Facilitate and promote adoption and implementation of the updated notification, communications and assistance framework by all States and relevant international organizations	

Appendix 6

Work Group on Long Term Sustainability of Emergency Preparedness and Response Programmes (WG-EPR)[5]

WORK GROUP MEMBERS

Region or Position	Name	Country
Work Group		
Chair	Vince McClelland	US
Africa	Kobus Theron Itimad Soufi	South Africa Morocco
Asia-Pacific	Eulinia Valdezco Marty McGavin*	Philippines Australia
Eastern Europe	Merle Lust Vladimir Kutkov**	Estonia Russia
North America	Ann Heinrich Jean Patrice Auclair***	US Canada
South&Central America	Osvaldo Jordan Loreto Villanueva-Zamora	Argentina Chile
Western Europe	Lynn Hubbard Dominique Rauber	Sweden Switzerland
International Organizations	David Byron	FAO
IAEA	Rafael Martincic	IAEA
Lead Consultancy Group	Elena Buglova	IAEA
Support staff	Larry Reynolds Sandra McInturff Lisa Obrentz	US US IAEA
Sub-group on Implementation		
Lead	Gerhard de Vries	European Commission
Africa	*No representative identified*	
Asia-Pacific	Dewhey Lee	South Korea
Eastern Europe	*No representative identified*	

[5] Work Group C

Region or Position	Name	Country
North America	Eric Pellerin	Canada
South&Central America	Marcos Moreira	Brazil
Western Europe	Jonas Lindgren	Sweden
International Organizations	Mats Eklund	IAEA
Team Experts	Marnix de Ridder Mitch Doran James Essex	Netherlands US US
Sub-group on Follow-up		
Lead	Raul dos Santos	Brazil
Africa	*No representative identified*	
Asia-Pacific	*No representative identified*	
Eastern Europe	*No representative identified*	
North America	Alejandro Cortes	Mexico
South&Central America	Daniel Hernandez	Argentina
Western Europe	Hannele Aaltonen	Finland
International Organizations	Patricia Charlebois**	IMO
Team Experts	Carl-Goran Stalnacke	Sweden

* Steven Solomon alternated during WG meetings

** Accepted invitation to contribute as a WG member, however was unable to fully participate.

*** Denis Carriere initially participated but later changed job and was replaced by Jean Patrice Auclair.

PEER REVIEW MEMBERS

Region	Name	Country
Africa	*No representative identified*	
Asia-Pacific	Naoto Ichii	Japan
	Krishnamachari Muralidhar	India
	Tony Cotterill	New Zealand
Eastern Europe	Alexander Agapov	Russia
	Geza Macsuga	Hungary
	Aram Gevorgyan	Armenia
South&Central America	Pablo Jerez-Vegueria	Cuba
	Francisco Enriquez Guerra	Ecuador
	Rodrigo Salinas Marica	Bolivia
Western Europe	Delphine Xicluna	France
	Finn Ugletveit	Norway
	Marjan Tkavc	Slovenia
	Mike Griffiths	UK
International Organizations	Brian Ahier	OECD/NEA

Note: Since all North America countries were represented on the WG and SG's, no additional representatives from that region were sought for the peer review group.