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International Scavenging for First Responder Guidance and Tools: IAEA Products

W. M. Stern, L. Berthelot, K. Bachner, K. Koeppel

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Nonproliferation and National Security Department

Brookhaven National Laboratory

U.S. Department of Energy
USDOE Office of Science (SC),
International Atomic Energy Agency

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U.S. DEPARTMENT OF ENERGY | Office of Science

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Warren M. Stern, Katherine Bachner
Brookhaven National Laboratory

Lisa Berthelot
BNL Contractor

Kimberly Koeppel
National Counter Terrorism Center

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Executive Summary

In fiscal years (FY) 2016 and 2017, with support from the U.S. Department of Homeland Security (DHS), Brookhaven National Laboratory (BNL) examined the International Atomic Energy Agency (IAEA) radiological emergency response and preparedness products (guidance and tools) to determine which of these products could be useful to U.S. first responders. The IAEA Incident and Emergency Centre (IEC), which is responsible for emergency preparedness and response, offers a range of tools and guidance documents for responders in recognizing, responding to, and recovering from radiation emergencies and incidents.

In order to implement this project, BNL obtained all potentially relevant tools and products produced by the IAEA IEC and analyzed these materials to determine their relevance to first responders in the U.S. Subsequently, BNL organized and hosted a workshop at DHS National Urban Security Technology Laboratory (NUSTL) for U.S. first responders to examine and evaluate IAEA products to consider their applicability to the United States. This report documents and describes the First Responder Product Evaluation Workshop, and provides recommendations on potential steps the U.S. federal government could take to make IAEA guidance and tools useful to U.S. responders.

During the Workshop, participants received comprehensive presentations of selected IAEA guidance and tools for emergency preparedness and response products, as well as more tailored presentations of products designed for first responders. The products included international safety standards, technical guidance, training materials, and portable and e-learning tools, in addition to the IAEA's first responder manual. After review and discussion of the available materials, participants found certain IAEA products to be potentially helpful to them. In particular, the group felt they would use the IAEA First Responder Manual if it were converted to an application that works on their smartphones or tablets with certain technical improvements. There was also general consensus that accident reports detailing past emergencies, the response to them and the lessons learned would be useful and filled a gap for first responders. In the same light, the IAEA EPR-Lessons Learned document was also deemed to be very useful, in particular for training first responders. There was also general consensus that the IAEA's comprehensive e-learning tool on emergency public communication is unique and fills a gap in the current training tools available to U.S. audiences.

Based, on the results of the workshop, the BNL coordinators of the effort recommend that appropriate officials:

- Initiate a process to convert the First Responder Manual PDA into an application appropriate for modern mobile devices, with additional technical features and more detailed input from U.S. first responders.

- Work with appropriate U.S. agencies (FEMA, DOE, HHS, EPA, etc.), so that they are aware of and promote IAEA accident reports and lessons-learned documents to U.S. first responders (e.g., on their web sites and at conferences).

- Work with relevant state and local communication officials (PIOs) to make them aware of new IAEA radiation emergency communication training products.

- Further explore whether a new online computer-networking tool can be developed for U.S. first responders, or whether U.S. first responders should be registered to use the existing IAEA EPnet (Emergency Preparedness Network).

- Determine whether and how IAEA training materials can be certified or accredited in the United States.

- Create a process so that U.S. State and local authorities responsible for radiation emergency response are aware of new documents and activities at the IAEA.

Introduction/Background

The International Atomic Energy Agency is an international agency focused on promoting the safe, secure and peaceful use of nuclear technologies. Established in 1957, the IAEA is currently (as of February 2016) made up of 168 member states, including the United States. A component of the IAEA's work is nuclear safety and security, including emergency preparedness and response. Emergency preparedness and response at the IAEA is the responsibility of its Incident and Emergency Centre (IEC). The IEC offers a range of tools and guidance documents for responders in recognizing, responding to, and recovering from radiation emergencies and incidents. These tools and guidance are developed with member countries and represent the international radiological response and recovery community's collective knowledge and recommendations on preparedness, response and recovery.

The Department of Homeland Security Science and Technology directorate (DHS/S&T) provides support to U.S. first responders tasked with responding to radiological and nuclear incidents. To support such responders, DHS/S&T has initiated a portfolio of Radiological/Nuclear Response and Recovery Research and Development projects. The programs of this portfolio seek to collect identified capability gaps, responder needs, and requirements from existing interagency documents, and pursue technical research and development resulting in knowledge products and technology that serve as actionable, operational tools for responders.

Under this program, DHS/S&T supported a project by Brookhaven National Laboratory (BNL) to determine which of the IAEA guidance and tools would be most useful to first responders in the United States. The project had a secondary goal of establishing links between first responders in the United States and international first responders in the area of radiological response, allowing the United States to continue to take advantage of insights from others. The workshop provided a unique opportunity to engage with radiological response focused stakeholders, develop an inventory of interests and overlapping materials and guidance, and understand and develop assessment methodologies.

Additionally, a representative from Interpol participated in the workshop and discussions, providing context from the perspective Interpol has gained through working with law enforcement to develop and implement training courses and table-top exercises to help member countries develop their capacity to prevent and respond to nuclear or radioactive incidents.

The project had several key steps, including obtaining all potentially relevant tools and products produced by the IAEA and analyzing these materials to determine their relevancy to first responders in the United States. Subsequently, BNL organized and hosted a workshop at the DHS National Urban Security Technology Laboratory (NUSTL) for U.S. first responders to examine and evaluate IAEA products.

This report documents and describes the First Responder Product Evaluation Workshop and provides recommendations on potential upgrades necessary to make IAEA products useful to first responders in the United States.

Document Selection

The workshop organizers provided comprehensive presentation of all IAEA guidance and tools in emergency preparedness and response to participants and made hard copies available. The products included international safety standards, technical guidance, training materials, and portable and e-learning tools. The full list of documents and descriptions is provided in Appendix A.

The IAEA provides specific guidance for first responders for radiological emergencies, which was the focus of the two-day workshop with detailed briefings and associated work sessions. The objective was to familiarize participants with specific tools of potential—and targeted—interest and use for them.

The first targeted briefing focused on the IAEA first responder tools:

- Manual for First Responders to a Radiological Emergency
- Training Materials for First Responders to a Radiological Emergency
- E-learning for First Responders to a Radiological Emergency
- Portable Digital Assistant for First Responders to a Radiological Emergency
- Poster and leaflets on radiation injuries and radiation protection

As a supplemental consideration, Interpol also provided an overview of ongoing interactions with law enforcement and the available tools and reports developed by Interpol, related to radiological or nuclear events. In particular, Interpol was able to share its Radiological Nuclear Terrorism Guidance Manual. This manual is intended primarily for law enforcement and other entities that can play a role in the preparedness and response to criminal and terrorist attacks involving radiological and nuclear materials. The manual serves as a reference document to be used in conjunction with other relevant documents and/or policies used in a national and international setting.

The second targeted briefing considered the IAEA emergency public communication tools:

- Communication with the Public in a Nuclear or Radiological Emergency (manual)
- Training Materials for Communication with the Public
- E-learning for Communication with the Public

The associated work sessions explored the IAEA Portable Digital Assistant Tool (EPR-First Responders/PDA 2009) and the IAEA e-learning on Public Communication in a Nuclear or Radiological Emergency (EPR-Public Communications/e-learning 2016). The PDA work session engaged participants to

explore the quick guides and to test the tool's usability. The communication session walked participants through the tool's modular structure and presented an emergency scenario to take on the role of a different kind of "responder"—public information officers.

To support the workshop's objective of considering IAEA products as well as U.S. tools to assess any potential gaps, a briefing was provided on U.S. federal guidance relevant to first responders. The guidance presented included the Protective Action Guidance (PAG), National Council on Radiation Protection & Measurements (NCRP) reports and commentary, Planning Guidance for Response to a Nuclear Detonation, DHS "100 Minute" RDD Guidance [draft], Health and Safety Planning Guide (for IND), Quick reference Guide: Radiation Risk Information for Responders Following a Nuclear Detonation, Nuclear/Radiological Incident Annex, and CDC Radiation Hazard Index.

We provided a document interface table to support participants in associating which IAEA tools might have the closest US equivalent. For example, we highlighted legal or regulatory documents, as well as usable planning and execution tools.

Methodology

Participant selection

The participants were selected based on the goal of drawing attendees who could provide an accurate picture of how U.S. first responders might take advantage of IAEA products. As such, the first criterion for selecting participants was whether the individual was an actual first responder or had a direct role in working with and/or preparing first responders for radiological response. The second criterion was first response specialty. We sought to ensure that the participants adequately represented varying types of first responders (e.g., fire, police, public health). Finally, we sought to ensure that the responders were geographically diverse (within the U.S.). Roughly ⅓ of the participants were from police departments, ⅓ from fire departments and ⅓ from public health/safety departments. Regionally, approximately ⅓ of the participants were from the Northeast, ⅓ from the West, ⅕ from the South, and one participant from the Upper Midwest. In addition to the State and local participants, the IAEA Incident and Emergency Centre and INTERPOL played a central role in presentations and DHS and DOE also participated. The full list of participants is in Appendix B.

Table 1: State and Local Participants

Last Name	First Name	Affiliation
Allen	Keith	Dallas Police Dept.
Baldini	Ed	Philadelphia Police Dept.
Brunner	Brennan	Minnesota Dept. of Public Safety
Cordova	Charlie	Seattle Fire Dept.
Day	Jeff	Los Angeles County Health Dept.
Gavin	Michael	Poudre County Emergency Management (CO)
Irwin	Bill	Vermont Health Dept.
Karam	Andy	New York Police Dept. Counterterrorism Div.
Mogil	Arthur	New York Police Dept. Counterterrorism Div.
Rice	Timothy	New York Fire Dept.
Rowley	Mark	New Mexico State Police
Santagata	Fran	Colorado Dept. of Public Safety
Teitler	Mark	New York Police Dept. Counterterrorism Div.
Williamson	John	Florida Dept. Of Health

Workshop Agenda

The agenda was developed in consultation with the IAEA with the purpose of exposing participants the widest range of IAEA products, focusing on those specifically designed for first responders. The agenda (Appendix C) included four distinct areas. The first section introduced participants to a range of response products produced by the IAEA, even those not specifically developed for first responders. The purpose of this is to determine if more generic IAEA response products might have some application for U.S. first responders. The second portion of the workshop provided briefings on U.S. response products, to ensure that responders were aware of what products are already available to them and create a common baseline. Third, the participants were briefed on IAEA products designed for first responders (first responder toolkit) and IAEA public communication tools. Finally, the responders participated in two work sessions using the IAEA first

responder personal digital assistant tool and the IAEA public communication e-learning system. At various points in the workshop, participants completed questionnaires (described below) in order to record their responses to the various IAEA tools.

Questionnaire development and approach

In considering how to collect information from the participants, open discussion, group breakout discussions, and questionnaires were deemed useful in order to capture the most feedback on all relevant materials and tools and engage participants in sharing their collective and individual thoughts and experiences. Two questionnaires were developed for the workshop. Questionnaire number 1 asked the participants to consider IAEA emergency preparedness and response (EPR) standards, guidance, and tools. Questionnaire number two asked the participants to consider the utility of IAEA first responder tools and public communication tools. These questionnaires are included as Appendices D and E, respectively.

The questionnaires were developed through consideration of the various IAEA documents and tools that would be presented as part of the workshop. Each document or tool presented had a dedicated section of the questionnaire, with questions that pertained specifically to that tool, as well as space to allow the respondents to provide information about their awareness and knowledge of the particular product and perspectives on its potential usefulness. The questionnaires also requested that respondents apply a metric rating of the utility of each tool for themselves and/or their first responder colleagues with a rating of one being the lowest utility and a rating of 10 being the highest perceived utility. The information solicited through the responses to each question were meant to provide insights into the first responder community understanding of existing international tools and guidance on radiological emergency response; gather feedback on the IAEA guidance and tools; determine what specific aspects of IAEA publications and tools may be useful for the U.S. first responder community; and also provide information about analogous U.S. federal, state, or local guidance and tools currently in use by first responders.

During the workshop response methods for the submitted questionnaires varied. The workshop divided into three facilitated groups, to discuss the questions and the responses. Some groups had each person individually fill out questionnaires, and other groups held a discussion, completing one version of the questionnaire that incorporated the views discussed and the general agreed-upon sentiment for each question (if agreement was reached). Most of the submitted questionnaires, whether from an individual or a group, had responses included for a majority of the questions, but not every question required a response. Non-responses mainly stemmed from the fact that there were some documents included in the questionnaire lists that were not explicitly covered during the workshop. Guidance referenced in the questionnaires but not presented during the workshop was generally included to be more comprehensive in assessing what information and

guidance participants might have previously been exposed to related to radiological emergency response.

Questionnaire Responses and Participant Feedback

Participants had a number of opportunities to share their experience with and feedback on the IAEA tools and guidance. In addition to the discussion periods during the workshop, the two comprehensive questionnaires given to participants allowed us to compile and analyze feedback. This section extracts the major conclusions from participants' feedback from the questionnaires and insights recorded over the course of the two-day workshop. Participants generally agreed on some of the outcomes, while they viewed others as having a single idea worth considering and potentially actionable in the future.

Participants were generally aware of the existence of IAEA tools in nuclear and radiological emergency preparedness and response. A number of participants use IAEA tools for training. Participants discovered the full range of tools, which introduced new items to many. There was a general consensus that finding information on the IAEA website was complicated; however, when directed to the specific webpage with emergency preparedness and response technical tools, participants found it to be well-organized and easier to access. One participant said he was not very aware of IAEA products prior to the workshop but having been introduced to them *"wished he knew more about them when he was developing his policies."*

Participants agreed that there could be more/better promotion of IAEA tools and easier access to them through better distribution. This could be achieved through closer connections created directly with the IAEA.

There was general consensus that the IAEA's hierarchical structure for publications was useful, though few state and local stakeholders had previous knowledge of the general hierarchy and structure for IAEA publications, guidance, and tools: starting with high level requirements, through more detailed safety guides, down to implementable technical documents. Participants found the Safety Standards publications to be less relevant to their work at state and local levels (as those publications are intended for national-level implementation). In general, participants praised the IAEA documents containing checklists and called for more checklists, which are of great use to first responders.

As a general note for all IAEA products, units would need to be changed in IAEA guidance for U.S. applicability but, other than converting measurements and units, a number of tools can be used immediately with minimal changes to the content.

Through the questionnaires and discussion, the participants offered the following commentary and analysis of specific IAEA products:

Tools directly usable in the United States

First Responder Tools: The IAEA First Responders manual was mostly rated between 7 and 10 (out of ten), with one participant calling it a "*one stop shop*" for all first responders (law enforcement, fire, medical, public information, etc.), which is easy to read and use. Participants viewed the checklists in the manual as very useful, especially the checklists for immediate/urgent actions. Participants also highly rated the manual's Action Guides in the questionnaires, and, following the conclusion of the workshop, some state and local organizations have already made plans to incorporate material from the manual into their radiological and nuclear response policies. One participant noted that "*the U.S. does not have something similar [to the First Responders manual] as a consolidated document for first responders*."

Participants appreciated the IAEA's high-tech and low-tech tools for different purposes. Some participants preferred high-tech solutions like digital applications (apps) for smartphones and tablets and online tools, whereas others preferred physical materials (like flashcards) to be carried around. Of the suite of EPR-First Responder tools, participants deemed the checklists to be among the most useful in an emergency response. The in-depth discussion on the IAEA EPR-First Responders/PDA generated a number of ideas. Primarily, there was consensus that it could be upgraded to an editable app with the following functionality:

- Logging/tracking/timestamp features
- Auto-save function
- Offline usability
- Link to RadResponder
- Clickable checklists
- Communications link/inputs by administrator
- App personalization options for different organizations/personnel (ie. ICS assignments)
- Categorized lists with drop-downs/sub-headers
- Role assignments through the app
- Ability to link language and tools to U.S. guidance/NIMS language, etc.

Accident Reports and EPR-Lessons Learned: There was general consensus that one of the strongest points the IAEA offers is in its provision of Accident Reports detailing past emergencies, the response to them and the lessons learned. In the same light, participants deemed the IAEA EPR-Lessons Learned document to be very useful, in particular for training first responders. Participants identified this document to be usable *"as is"* and the type of document that "*always resonates with first responders."* Participants agreed that such a comprehensive compilation of the responses to past emergencies does not exist in the United States. One participant pointed out that *"the IAEA serves as the best source of information in this area because the organization has authority and validation."*

Participants rated these tools between 8 and 10 out of 10, and one participant described them as *"exceedingly valuable from a planning and training perspective."* When asked whether participants used other sources of similar accident reports, a participant said "*no*" and that "*IAEA accident reports are the best source of analysis."* Participants called these "*excellent tools*" and were enthusiastic to read more of them. One participant encouraged a summarized version of the reports, converted into *"easy-to-read leaflets."*

Emergency Public Communication: There was general consensus that the IAEA's comprehensive e-learning tool on emergency public communication is unique and fills a gap in the U.S. (FEMA training is general, and EPR provides limited scripted information). Participants also thought it could be useful for non-PIOs to provide an understanding of public information needs to subject matter experts and described it as a strong tool for adult learning.

Tools usable in part in the United States

Exercises: Participants rated the EPR-Exercise tools highly (8-10/10), finding them to be very useful tools even though they identified that the tools did not necessarily fill a gap in the U.S. due to HSEEP and REP requirements. The EPR-Exercise manual was described as being *"a very good tool for developing different training scenarios, especially non-NPP emergency scenarios*." One participant noted that the medical scenario exercise is very useful and will be incorporated into his/her organization's exercise.

Medical: Overall, the EPR-Medical tools were well received (rated 7-9/10 on average), providing a very detailed level of information and serving as a useful basis for training activities. Participants singled out Section F on dose assessment as being very good. Participants also thought that the breakdown of response into different subject areas (on-scene, hospital, psychological) with further breakout on more specific topics in each area was useful. Participants thought this material was useful for training and that this material would also be a good supplement to existing training. One participant noted that "*the training material is outstanding"* and the three modules are well-organized (At the Scene, At the Hospital, Advanced medical Care).

Leaflets and poster: A number of participants thought the leaflets and poster on radiation injuries and radiation protection were very good and envisioned them being especially usable in various electronic formats, including on portable devices. The pictures were described as "*very good and helpful*" and the posters as *"always working well with first responders."* Participants suggested less text and more bullet points with simple, straightforward guidance for first responders.

EPR-Method: Participants found this document to have very useful graphics and very good appendices. As it is a tool for emergency planners, it was not deemed to be usable in its entirety by first responders.

EPnet: Participants were enthusiastic about the concept of a network for first responders to radiological emergencies. The IAEA's EPnet was introduced and considered to be an interesting and promising platform to engage first responders at national and international levels.

Tools less or not useful

The IAEA Safety Standards were not considered to be very useful for the operational first responder community, though some information (e.g. tables) in GS-G-2.1 were noted as potentially usable. We anticipated this feedback, as the Safety Standards are intended for implementation at the federal level. The Safety Standards were included in the presentation to participants to provide a comprehensive overview of IAEA products.

Participants also considered IAEA tools that are intended for NPP or research reactor preparedness and response only to be less useful. Participants identified the EPR-NPP Public Protective Actions publication and charts as good tools but noted that expert explanations would likely be needed to accompany the charts. Additionally the similar visual look and feel of the charts could make quick differentiation between charts displaying various types of information difficult. One participant noted a gap in this regard: "*effectively communicating a visual representation of risk is a huge challenge*."

Conclusions and Recommendations

The two-day workshop brought together international, federal, state, and local stakeholders to review and discuss existing tools and guidance for first responders to utilize in response to radiological emergencies, with a focus on determining what IAEA documents, guidance, and tools would be useful within the United States.

First responders require easy to use job-aids and tools that support public safety considerations and rapid decision making during a radiological emergency. These tools should be designed for responders with varying levels of radiological training, including those with no radiation-specific training, and for responders with varying types of radiation detection equipment, including those with no equipment. To better meet this need, the authors of this report recommend that DHS or other U.S. agencies take the following step:

- Convert the First Responder Manual PDA into an application appropriate for modern mobile devices, with additional technical features and more detailed input from U.S. first responders. Consider potential integrations with existing app-based tools (e.g., RadResponder).

First responders can learn from and leverage new products and tools that are developed for the international community, but those products may need to be adjusted, edited, or modified for use in the United States. The goal of leveraging international products is to adopt and share useful tools, best practices, and

procedures. To take advantage of these resources, the authors of this report recommend that DHS or other U.S. agencies take the following steps:

- Work with appropriate U.S. agencies (FEMA, DOE, HHS, EPA, etc), so that they are aware of and promote IAEA accident reports and lessons-learned documents to US first responders (e.g., on their web sites and at conferences).
- Create a process so that U.S. State and local authorities responsible for radiological emergency response are aware of new documents and activities at the IAEA.
- Further explore whether a new online networking tool can be developed for U.S. first responders, or whether US first responders should be registered in IAEA use of EPnet.

The case studies and lessons learned from radiological accidents and incidents are helpful to the first responder community. First responders need easy to understand briefing products and training materials to incorporate "lessons learned" during radiological response into their own protocols. To better meet this need, the authors of this report recommend that DHS or other U.S. agencies take the following step:

- Provide simple, validated "lessons-learned" and case study documentation materials that can be used for training and briefing purposes. Participants viewed materials related to real-world examples as extremely useful to the first responder community in terms of understanding the issues and providing relevant training.

First responders require training courses to be accredited and certified by appropriate U.S. agencies and organizations to ensure the curriculum, associated materials, and completion are appropriately recognized. While there are many applicable radiological courses available internationally, they must be reviewed and accepted to have an impact on domestic preparedness. To better meet this need, the authors of this report recommend that DHS or other U.S. agencies take the following steps:

- Work with relevant State and local communications officials (PIOs) to make them aware of new IAEA radiation emergency communication e-learning tool.
- Determine whether and how IAEA training materials can be certified or accredited in the U.S.
- Determine if certain IAEA training materials can be adapted for use or incorporated into existing certified training curricula for first responders.

Appendix A: Summary of IAEA EPR Products

Workshop participants were presented with a number of IAEA tools for radiation emergency preparedness and response, as listed below. The IAEA's hierarchical publication structure was also described. We include summaries and the table of contents for certain documents in order to provide further information to the reader on the contents and detail of the document.

GSR Part 7: Preparedness and Response for a Nuclear or Radiological Emergency (FAO, IAEA, ICAO, ILO, IMO, INTERPOL, OECD/NEA, PAHO, CTBTO, UNEP, OCHA, WHO, WMO). 2015.

These Safety Standards establish requirements for an adequate level of preparedness and response for a nuclear or radiological emergency. The safety requirements are binding on Member States in relation to operations assisted by the IAEA. They are recommended for use by Member States and by national authorities in relation to their own activities. They contribute to the harmonization worldwide of arrangements for preparedness and response and are intended to be applied by the government at the national level by means of adopting legislation and establishing regulations, and by making other arrangements, including assigning responsibilities (e.g. to the operating organization or the operating personnel of a facility or an activity, local or national officials, response organizations or the regulatory body) and verifying their effective fulfilment. The requirements are also intended for use by response organizations, operating organizations and the regulatory body, as well as by authorities with responsibilities for emergency preparedness and response at the local and regional level. The requirements apply for preparedness and response for a nuclear or radiological emergency in relation to all facilities and activities, as well as sources, and irrespective of the initiator of the emergency, which could be a natural event, a human error, a mechanical or other failure, or a nuclear security event. The requirements stress the coordination of preparedness and response, as well as appropriate integrated with arrangements for the response to a conventional emergency and with the response measures for a nuclear security event.

GSG-2: Criteria for Use in Preparedness and Response for a Nuclear or Radiological Emergency (Jointly sponsored by the FAO, IAEA, ILO, PAHO, WHO). 2011.

This Safety Guide supports GSR Part 7 and presents a coherent set of generic criteria (expressed numerically in terms of radiation dose) that form a basis for developing the operational levels needed for decision making concerning protective actions and other response actions necessary to meet the emergency response objectives. The Safety Guide also proposes a basis for a plain language explanation of the criteria for the public and for public officials that addresses the risks to human health of radiation exposure and provides a basis for a response that is commensurate with the risks.

Index:

GS-G-2.1: Arrangements for Preparedness for a Nuclear or Radiological Emergency (Jointly sponsored by the FAO, OCHA, ILO, PAHO and WHO). 2007.

This Safety Guide provides guidance on those selected elements of the GSR Part 7 Requirements for which guidance has been requested by Member States and for which there is an international consensus on the means to meet these requirements; describes appropriate responses to a range of emergencies; provides background information, where appropriate, on the past experience that provided a basis for the Requirements, thus helping the user to better implement arrangements that address the underlying issues. The guidance is applicable to the entire range of emergencies, concentrated on the general aspects of emergency preparedness.

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Appendix VIII: Emergency facilities and locations
Annex: Supporting information for Zone sizes in Appendix II

EPR-Lessons Learned: Lessons Learned from the Response to Radiation Emergencies (1945-2010) (EPR-Lessons Learned). 2012.

Covering the entire range of nuclear and radiological emergencies, this publication provides a review of the lessons from the response to a number of radiation emergencies with the purpose of consolidating the lessons. It also takes account of the lessons obtained from other emergency situations, where these lessons are relevant. A further objective is to demonstrate the necessity of establishing arrangements for emergency preparedness and response, for which the IAEA Safety Requirements, GSR Part 7 provides a background. The publication is aimed at national authorities and regulatory organizations, emergency planners and a broad range of specialists, including physicists, technicians and medical specialists, and persons responsible for radiation protection. This document does not address the lessons relating to the prevention of radiation events through the radiation safety measures that are incorporated into the design of facilities and their operation.

EPR-Exercise: Preparation, Conduct and Evaluation of Exercises to Test Preparedness for a Nuclear or Radiological Emergency (EPR-Exercise). 2005.

This publication provides practical guidance for planners to efficiently and effectively prepare, conduct and evaluate emergency response exercises. It covers response exercises for emergencies involving all types of nuclear or radiological practices, given in threat categories I to V, as described in GSR Part 7 and EPR-Method. It also includes a section on special considerations for exercises for response to emergencies arising from malicious acts.

This publication focuses primarily on the process involved in preparing and controlling a large-scale exercise, i.e., a partial or full-scale exercise combined with a field exercise.

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EPR-Exercise/T: Training Materials for Preparation, Conduct and Evaluation of Exercises to Test Preparedness for a Nuclear or Radiological Emergency (Training Materials). 2006.

These materials are designed for the training course on preparation, conduct and evaluation of exercises to test preparedness for a nuclear or radiological emergency. They contain information on: 1) emergency exercise concepts, terminology, preparation process, conduct and evaluation; 2) practical knowledge and the ability to prepare, conduct and evaluate an exercise to test national preparedness for a nuclear or radiological emergency; 3) example scenarios for exercises and knowledge on how to customize the standard exercise package, and to organize and conduct this customized standard exercise at the national level.

EPR-Method: Method for Developing Arrangements for Response to a Nuclear or Radiological Emergency - updating IAEA-TECDOC-953. 2003.

This publication provides information concerning methodologies, techniques and available results of research relating to response to nuclear or radiological emergencies. It also provides a practical, step-by-step method for developing integrated operator, local and national capabilities for emergency response. This publication concerns preparations for the entire range of radiation emergencies. The method recognizes that a minimum level of preparedness is appropriate in every State, even in those without any known practices using nuclear or radioactive material, because any State could be affected by an emergency involving transport, lost or stolen sources, or transboundary contamination. Planners should remain flexible in its use and adapt the method to local socio-political, economic, and other factors. Emergency preparedness must be carried out at two major levels. First, the operator must be prepared to mitigate the potential consequences of the emergency at the source and notify offsite officials. Second, the off-site officials must be prepared to manage and reduce the impact on the public and the environment. This publication addresses development of a response capability at both levels. This publication does not address the preparations needed for an adequate tactical or investigative response to terrorist or other criminal acts. It does address the co-ordination of such a response with the response dealing with the actual or potential radiological consequences.

TECDOC-1432: Development of an Extended Framework for Emergency Response Criteria: Interim Report for Comments (IAEA/WHO). 2005.

This document proposes an extension of existing criteria for undertaking protective and other actions during or following a nuclear or radiological emergency that addresses the lessons from past emergencies and the emergency preparedness requirements, and provides an internally consistent foundation for the application of radiation protection principles and insights for the conceivable range of protective and other actions, and of emergency conditions across all phases of the response to an emergency. This document also proposes a basis for a common language explanation to the public and to public officials that addresses the human health risks of radiation exposure and provides a basis for a response that is consistent with the known risk. It proposes a complete and coherent set of generic reference levels (GRLs) that can form as basis for developing the operational levels needed for making decisions concerning protective and other actions to meet the emergency response objectives, namely: to prevent the occurrence of deterministic health effects in workers and the public; to render first aid and manage the treatment of radiation injuries to prevent, to the extent practicable, the occurrence of stochastic health effects in the population; to prevent, to the extent practicable, the occurrence of non-radiological effects on individuals and in the population; and to prepare, to the extent practicable, for the resumption of normal social and economic activity. Fundamentally the purpose of the current document is to provide a basis for discussion and comment aimed at reaching consensus on an enhanced international standard.

EPR-First Responders: Manual for First Responders to a Radiological Emergency (IAEA/CTIF/PAHO/WHO). 2006.

This publication provides practical guidance for those responding within the first few hours of a radiological emergency. This includes the emergency service personnel who would initially respond at the local level and the national officials who would support this early response. It provides guidance to the emergency services responding to radiological emergencies. It does not address the response to emergencies involving facilities or operations for which specific emergency arrangements should have been developed and be in place, as required by the Safety Requirements GSR Part 7.

Index

EPR-First Responders/T: Training Materials for First Responders to a Radiological Emergency. 2009.

The IAEA provides a training course in first response to a radiological emergency, based on the EPR-First Responders manual. The training materials explain the concepts and the operational response steps described in EPR-First Responders, which is a task-based manual that provides guidance on functional elements of the first response organizations on the procedures to follow when responding to a radiological emergency. The 10-day training course, which uses these training materials is offered to all Member States. Participants are first responders to a radiological emergency.

EPR-First Responders/PDA: Portable Digital Assistant for First Responders to a Radiological Emergency. 2009.

The portable digital tool may be used by emergency service personnel as an aid in the field when responding to a radiological emergency. It is based on the material in the IAEA EPR-First Responders manual and contains quick guides with response actions, instructions and information useful in the first response to a radiological emergency. The tool has been designed for use on portable devices, such as hand-held computers and smart phones, and requires only a web browser to be used.

EPR-First Responders/E-learning: E-Learning Tools for First Response to a Radiological Emergency. 2009.

This e-learning includes audio of the EPR-First Responders training materials for self-paced learning.

EPR-NPP Public Protective Actions: Actions to Protect the Public in an Emergency due to Severe Conditions at a Light Water Reactor. 2013.

This publication provides an understanding of the actions necessary to protect the public for those responsible for making and for acting on decisions in the event of an emergency involving actual or projected severe damage to the fuel in the reactor core or spent fuel pool at a light water reactor (LWR) or spent fuel pool. It provides a basis for developing the tools and criteria at the preparedness stage that would be needed in taking protective actions and other actions in response to an emergency. It could also be of direct use in the response to an emergency. The tools and criteria can be adapted and applied to other reactor designs. The OILs and charts for placing the health hazard in perspective for measured quantities and doses can be used for releases from RBMK reactors, but may not be valid for CANDU (Canada Deuterium Uranium) reactors.

EPR-NPP Public Protective Actions Charts: Placing the Radiological Health Hazard in Perspective in an Emergency due to Severe Conditions at a Light Water Reactor. 2013.

A system has been created in order to place the radiological health hazard in perspective for a measured quantity or calculated dose in a simple and understandable format for use in an emergency due to severe conditions at a light water reactor or its spent fuel pool. The Charts contained here are from the IAEA Publication EPR-NPP Public Protective Actions (described above), which provides more information. The intended audience includes emergency planners, decision makers and those involved in communication with the public.

EPR-Research Reactor: Generic Procedures for Response to a Nuclear or Radiological Emergency at Research Reactors. 2011.

This publication provides guidance for development of emergency response procedures and implementation of an Emergency Plan at research reactors in Threat Categories II and III (see GRS Part 7). It does not cover nuclear security at research reactors.

This publication:

- Describes appropriate responses to a range of emergencies at Threat Category II and III research reactor sites;
- Describes the on-site organization needed to respond to these emergencies;
- Provides tools to organize the emergency response actions at these reactor sites;
- Provides procedures on how to determine the need for on-site and off-site protective actions.

EPR-Research Reactor/T: Training Materials on Generic Procedures for Response to a Nuclear or Radiological Emergency at Research Reactors. 2011.

These training materials are used in the IAEA training course, which provides participants with knowledge and tools for the development and implementation of a capability to respond to an emergency at a research reactor. It also provides practical instructions for basic assessment and response functions during an emergency at a research reactor. The training is based on EPR-Research Reactor (see above) and Generic Procedures for Response to a Nuclear or Radiological Emergency at Triga Research Reactors (EPR- TRIGA RESEARCH REACTOR 2011).

TECDOC 955: Generic assessment procedures for determining protective actions during a reactor accident. 1997.

This manual provides the tools, procedures and data needed to evaluate the consequences of a nuclear accident occurring at a nuclear power plant throughout all phases of the emergency before, during and after a release of radioactive material. It is intended for use by on-site and off-site groups responsible for evaluating the accident consequences and making recommendations for the protection of the plant personnel, the emergency workers and the public. The scope of this manual is restricted to the *technical assessment* of radiological consequences. It does not address the emergency response infrastructure requirements, nor does it cover the emergency management aspects of accident assessment (e.g. reporting, staff qualification, shift replacement, and procedure implementation). These aspects are covered by other IAEA documents, including EPR-Method (see above) and Intervention Criteria in a Nuclear or Radiation Emergency (IAEA-TECDOC-953).

TECDOC 1162: Generic procedures for assessment and response during a radiological emergency. 2000.

This manual provides the tools, generic procedures and data needed for an initial response to a non-reactor radiological accident. It is intended for use by persons or groups who are responsible for responding to a radiological emergency. This publication provides practical guidance for emergency response that, if implemented, will provide a basic assessment and response capability needed to protect the public and the workers in the event of different types of radiological emergencies (excluding reactor accidents) consistent with international guidance.

Training Materials on generic procedures for assessment and response during radiological emergencies.

TECDOC-1092: Generic procedures for monitoring in a nuclear or radiological emergency. 1999.

Training Materials for emergency monitoring procedures

EPR-Medical: Generic Procedures for Medical Response during a Nuclear or Radiological Emergency (IAEA/WHO). 2005.

The manual provides the practical tools and generic procedures for use by emergency medical personnel during an emergency situation. It provides guidance to be used at the stage of preparedness for development of medical response capabilities. The manual also addresses mass casualty emergencies resulting from malicious acts involving radioactive material. The procedures of this manual could be used at the preparedness stage to train medical personnel participating in response to radiation emergencies. The practical guidance is provided in the form of generic procedures. In order to be effective, these procedures are to be adapted as part of the preparedness process to be integrated into the national and local systems and infrastructure in the country where they are used, and only personnel who have been trained and drilled are to use them. Furthermore, the application of each procedure will depend on the details of each emergency.

EPR-Medical/T: Training Materials for Medical Preparedness and Response to a Nuclear or Radiological Emergency (IAEA/WHO). 2014.

These training materials are the basis for the IAEA training course, which provides participants with knowledge and tools in preparedness for the medical response to a nuclear or radiological emergency. It is based on the IAEA and WHO co-sponsored publication EPR-Medical (see above).

The training course consists of two levels:
• Basic training: This level includes basic notions on radiation and its interaction with matter, an introduction to cell and tissue damage, clinical case studies of emergencies and organizational preparedness activities.
• Advanced training: This level focuses on medical emergency response and the treatment of patients. It includes detailed clinical case studies, a review of medical decisions, critical analysis of emergencies and organizational response activities. It provides tools to understand the treatment of overexposed or radioactively contaminated patients.

Leaflet: Basics of Radiation and Radiation Protection (IAEA/WHO). 2005.

Poster: How to recognize and initially respond to an accidental radiation injury (IAEA/WHO). 2000.

Leaflet: How to recognize and initially respond to an accidental radiation injury (IAEA/WHO). 2000.

EPR-Biodosimetry: Cytogenetic Dosimetry: Applications in Preparedness for and Response to Radiation Emergencies 2011.

EPR-Biodosimetry/T: Training Materials on Cytogenetic Dosimetry: Applications in Preparedness for and Response to Radiation Emergencies. 2012.

SR-2: Diagnosis and treatment of radiation injuries (IAEA/WHO). 1998.

This publication is directed at medical professionals who may be involved in the management of radiation injuries starting from the first few hours or days after an exposure of undefined severity (i.e. those handling the emergency situation may not know the extent and severity of the accident). Experience has shown that in addition to occupational physicians, the complete management of an emergency case involves other professionals such as haematologists, oncologists, plastic surgeons, dermatologists, vascular surgeons, psychiatrists and consultants in other medical specialties. The principal aim of this publication is to provide guidelines to enable medical professionals to carry out prompt diagnostic measures and to offer emergency treatment. This report provides information on clinical criteria for dose assessment. It also discusses the appropriate dose–effect relationship in cases of external radiation involving either total body or local exposures, as well as internal contamination. It is not within the scope of this report to provide details of conventional treatment procedures. However, indications as to when to perform specific therapies are provided. The underlying principles of radiobiology and radiation pathology are not discussed.

SR-4: Planning the medical response to radiological accidents (IAEA/WHO). 1998.

The purpose of this Safety Report is to provide practical information to national and regional health authorities who have responsibility for medical planning for and medical response to a radiological accident. This Safety Report outlines the roles and tasks of health authorities and hospital administrators in emergency preparedness for radiological accidents. Health authorities may use this document as the basis for their medical management in a radiological emergency, bearing in mind that adaptations will almost certainly be necessary to take into account the local conditions. This publication also provides information relevant to the integration of medical preparedness into emergency plans.

EPR-Public Communications: Communication with the Public in a Nuclear or Radiological Emergency. 2012.

This publication provides practical guidance to those responsible for keeping the public and media informed and for coordinating all sources of official information to ensure a consistent message is being provided to the public before, during and after a radiation emergency. This publication describes how to prepare and train for emergency communications before a radiation emergency occurs, explains the need for effective public communications in radiation emergencies, and provides communication principles and tools to assist public information officers in achieving effective communication during a radiation emergency and to help in mitigating its effects.

EPR-Public Communication Plan: Method for Developing a Communication Strategy and Plan for a Nuclear or Radiological Emergency 2015.

This publication provides guidance to national and local authorities on developing a national radiation emergency communication plan (RECP), which incorporates the specific functions, arrangements and capabilities that will be required for public communication during a nuclear or radiological emergency. The two main features of this publication are the template provided to develop an RECP and detailed guidance on developing a communication strategy for emergency preparedness and response to nuclear or radiological emergencies. This publication supports EPR-Public Communications (see above).

EPR-Public Communications/T: Training Materials on Communication with the Public in a Nuclear or Radiological Emergency. 2012.

These materials form the basis of the IAEA training course, which provides practical training to those responsible for communicating with the public and the media, and for coordinating with all sources of official information, in a nuclear or radiological emergency. This training course presents the many goals in strengthening the efficiency of public communications in preparedness and response to a nuclear or radiological emergency, which include supporting the implementation of public protective actions, mitigating the consequences of fear, and gaining and maintaining public trust. This training is based on the IAEA publication EPR-Public Communications (see above).

INES- Event Communications: The Use of the International Nuclear and Radiological Event Scale (INES) for Event Communication. 2014.

INES User's Manual: The International Nuclear and Radiological Event Scale (INES) User's Manual. 2009.

The Fukushima Daiichi Accident. 2015.

The Radiological Accident in Lia, Georgia. 2014.

The Radiological Accident in Nueva Aldea. 2009.

The Radiological Accident in Cochabamba. 2004.

Accidental Overexposure of Radiotherapy Patients in Bialystok. 2004.

The Radiological Accident in Gilan. 2002.

The Radiological Accident in Samut Prakarn. 2002.

The Criticality Accident in Sarov. 2001.

The Radiological Accident in Yanango. 2000.

The Radiological Accident in Istanbul. 2000.

The Radiological Accident in Lilo. 2000.

The Radiological Accident in the Reprocessing Plant at Tomsk. 1998.

The Radiological Accident in Tammiku. 1998.

Accidental Overexposure of Radiotherapy Patients in San José, Costa Rica. 1998.

The Radiological Accident at the Irradiation Facility in Nesvizh. 1996.

An Electron Accelerator Accident in Hanoi, Viet Nam. 1996.

The Radiological Accident in Soreq. 1993.

The Radiological Accident in San Salvador. 1990.

The Radiological Accident in Goiânia. 1988.

Appendix B: International First Responder Tools for Radiological Emergencies Workshop Participant List

Last Name	First Name	Affiliation
Allen	Keith	Dallas Police Dept.
Amir	Orly	DHS/National Urban Security Technology Laboratory
Bachner	Katherine	Brookhaven National Laboratory
Baldini	Ed	Philadelphia Police Dept.
Bechtel	Jeff	Environmental Protection Agency
Berthelog	Lisa	Brookhaven National Laboratory
Blumenthal	Dan	National Nuclear Security Administration
Brietinger	Mark	International Atomic Energy Agency
Brunner	Brennan	Minnesota Dept. of Public Safety
Buteau	Geoff	DHS/National Urban Security Technology Laboratory
Conner	Mike	Interpol
Cordova	Charlie	Seattle Fire Dept.
Crawford	Sean	DHS/FEMA
Day	Jeff	Los Angeles County Health Dept.
Gavin	Michael	Poudre County Emergency Management
Irwin	Bill	Vermont Health Dept.
Karam	Andy	New York Police Dept. Counterterrorism Div.
Koeppel	Kimberly	National Counter Terrorism Center
Mogil	Arthur	New York Police Dept. Counterterrorism Div.
Muscarella	Donna	Brookhaven National Laboratory
Musolino	Steve	Brookhaven National Laboratory
Pepper	Susan	Brookhaven National Laboratory
Rice	Timothy	New York Fire Dept.
Rowley	Mark	New Mexico State Police
Santagata	Fran	Colorado Dept. of Public Safety
Schoonen	Martin	Brookhaven National Laboratory
Stern	Warren	Brookhaven National Laboratory

Stevenson	Ben	DHS/National Urban Security Technology Laboratory
Teitler	Mark	New York Police Dept. Counterterrorism Div.
Williamson	John	Florida Dept. Of Health

Appendix C: International First Responder Tools for a Radiological Emergency Workshop Agenda

United States Department of Homeland Security and Brookhaven National Laboratory

International First Responder Tools for a Radiological Emergency Workshop Agenda

March 14-15, 2017
National Urban Security Technology Laboratory (NUSTL)
201 Varick Street - 5th Floor
New York, NY 10014, USA

Tuesday, March 14, 2017

9:00 am - 9:30 am Introduction and Objective, Warren Stern, BNL, (1)

Round table introductions of all participants (IAEA, INTERPOL, DHS, DOE, FEMA, EPA, NCTC, State and local reps)

9:30 am - 10:30 am Briefing: Overview of IAEA Emergency Preparedness and Response (EPR) Standards, Guidance and Tools, *Mark Breitinger, IAEA, (2)*

(The purpose of this briefing is to provide responders with an overview of IAEA emergency response products, including those that are not specifically addressed, below)

10:30 am – 10:50 am Briefing: Overview of INTERPOL Role and assistance, *Michael Connor, Interpol, (3)*

10:50 am- 11:00 am Briefing: National Counterterrorism Center (NCTC), Office of WMD Counterterrorism (WMD-CT) Training Support, Kimberly Koeppel, NCTC, (4)

11:00 am - 11:30 am Briefing: Overview of US Federal Guidance Relevant to First Responders, Steve Musolino, *BN, (5)*

(The purpose of this briefing is to provide responders with an overview of what emergency response products are currently available from the US Government)

11:30 am – 12:00 pm **Briefing: US REP Program and Its Assistance, Brennan Brunner, Minnesota Department of Public Safety, (6)**

12:00 pm - 1:00 pm **Lunch**

1:00 am - 1:30 pm **Panel Discussion: Links Between US Guidance and IAEA Products—How They Fit Together**
Moderated Discussion of Experts – *Warren Stern, Steve Musolino, Lisa Berthelot, Mark Breitinger, Daniel Blumenthal, (7)*

(The purpose of this briefing is to describe how IAEA and U.S. federal guidance documents relate to one another)

1:30 pm - 2:30 pm **Roundtable Discussion: Local arrangements, tools, sources and perceived gaps (Roundtable discussion, 5 min presentations by first responders), *Moderated by BN , Katherine Bachner/Kim Koeppel, (8)***

(The purpose of this discussion is to hear from the responders about their arrangements and what federal or other guidance and tools they use in developing their response arrangements. A few key local responders will be asked to take a lead in the discussion. This will include unique law enforcement needs.)

2:30 pm - 3:15 pm **Methodology for Evaluating Results of Workshop and questionnaire #1, *BNL, Katherine Bachner/Kim Koeppel, (9)***

(This section has two parts. First will be a briefing describing how we will evaluate the results of the workshop. The second part is the introduction of the first questionnaire, which is intended to determine which of the IAEA products appear most relevant to the responders, based on the first IAEA briefing, above. Responders will complete a short questionnaire. The workshop will examine specific products, below, but in this section, we are attempting to see if there are others that may be of use. This will be revisited at the end of the workshop)

3:15 pm – 3:30 **Coffee Break**

3:30 pm - 4:00 pm **Briefing: Overview of IAEA First Responder Tools - *Mark Breitinger, (10)(11)***

Manual for First Responders to a Radiological Emergency (EPR-First Responders, 2006, IAEA)
(Including Registry Form from Manual)
First Responders to a Radiological Emergency Training Materials (EPR-First Responders/T, 2009, IAEA)
First Response to a Radiological Emergency E-learning (EPR-First Responders/E-learning, 2009, IAEA)
Portable Digital Tool for Assisting First Responders to a Radiological Emergency (EPR-First Responders/PDA, 2009, IAEA)

Poster on how to recognize and initially respond to an accidental radiation injury
Leaflet on how to recognize and initially respond to an accidental radiation injury
Leaflet on the basics of radiation and radiation protection

4:00 pm – 5:00 pm Briefing: Public Communication Tools, Lisa Berthelot, (12)

Communication with the Public in a Nuclear or Radiological Emergency (EPR-Public Communications, 2012, IAEA)
Communication with the Public in a Nuclear or Radiological Emergency E-learning (EPR-Public Communications/E-learning, 2016)

Day 1 Closing

Wednesday, March 15, 2017

9:00 am - 12:00 pm Work Sessions

Work Session 1: Explore and test IAEA Portable Digital Assistant Tool (EPR-First Responders/PDA 2009) - *Led by Michael Conner (Interpol) and Andrew Karam, NYPD, (13)*

The Portable Digital Assistant for First Responders to a Radiological Emergency is a tool designed for use by emergency services personnel when responding to a radiological emergency. It provides practical quick guides and information for the first responder. The tool is based on the material in the IAEA Manual for First Responders to a Radiological Emergency. In this work session, participants will navigate through the PDA tool, exploring the quick guides and testing the tool's usability.

Work Session 2: Explore IAEA public communication e-learning, *Lisa Berthelot, IAEA, (14)*

The IAEA has developed a publicly-available online e-learning tool for those responsible for communicating with the public in a radiological emergency – which may include first responders taking on the role of spokesperson. The e-learning content is equivalent to that of the 5-day in-person training course offered by the IAEA at national and regional levels. Participants will be asked to explore various modules of this newly-released e-learning, including the spokesperson training module.

12:00 pm - 1:00 pm Working Lunch

1:00 pm - 2:30 pm Discussion and questionnaire #2 of First Responder Feedback Regarding the Value, Usability and Preference of Tools, -*Led by Katherine Bachner and Lisa Berthelot, BNL, (15)*

EPR-First Responders toolkit (including PDA),
EPR-Public Communication e-learning

Leaflet on how to recognize and initially respond to radiation injury

Communication with the Public in Nuclear or Radiation Emergency (2012)

Reconsideration of exhibit products from first briefing and commentary

2:30 pm - 3:00 pm **Conclusions and Next Steps, (16)**

Department of Homeland Security
Department of Energy
Brookhaven National Laboratory

Workshop Closing and Departure

Appendix D: DHS Assessment Questionnaire 1

United States Department of Homeland Security and Brookhaven National Laboratory

International First Responder Tools for a Radiological Emergency
Workshop, March 14 and 15, 2017

Workshop Questionnaire
QUESTIONNAIRE #1

IAEA Emergency Preparedness and Response (EPR) Standards, Guidance and Tools

Instructions: *Where relevant, please answer questions by assigning a 1-10 assessment, with 1 indicating the lowest, and 10 indicating the highest. Add your written comments at the end of each question. Your contribution is valuable and will be used by the organizers not only to assess the efficacy of the tools presented here, but also to compile a workshop report noting findings and recommendations. The purpose is to assess the value of the tools presented.*

Overall

How aware of IAEA products were you prior to this meeting?

_____
_____
_____

Do you use any IAEA products? If so, please list and describe.

_____
_____
_____

How useful do you find the IAEA concept of document hierarchy (Safety Requirements, Safety Guides and EPR-Series)?

_____
_____
_____

Does a similar hierarchy exist for the guidance and tools that you use?

Do you use tools specifically developed for first responders to nuclear and radiological emergencies?

Safety Guides

GSG-2: Criteria for Use in Preparedness and Response for a Nuclear or Radiological Emergency. 2011.

How useful might the guidance in GSG-2 be to you or people you work with?

1 2 3 4 5 6 7 8 9 10

Is there any aspect or part of GSG-2 that seems useful or relevant to you (e.g., approach, specific guidance or table) and if so, what?

Is there any information in GSG-2 that fills a gap in your guidance or regulations?

How would you adapt GSG-2 for use in the United States? What would you change?

Other comments:

GS-G-2.1: Arrangements for Preparedness for a Nuclear or Radiological Emergency. 2007.

How useful might the guidance in GS-G-2.1 be to you or people you work with?

1 2 3 4 5 6 7 8 9 10

Is there any aspect or part of GS-G-2.1 that seems useful or relevant to you (e.g., approach, specific guidance or table) and if so, what?

Is there any information in GS-G-2.1 that fills a gap in your guidance or regulations?

How would you adapt GS-G-2.1 for use in the United States? What would you change?

Other comments:

Technical Tools
Establishing and Maintaining Capabilities for Response

EPR-Lessons Learned: Lessons Learned from the Response to Radiation Emergencies (1945-2010) (EPR-Lessons Learned). 2012.

How useful would EPR-Lessons Learned be to you or people you work with?

1 2 3 4 5 6 7 8 9 10

Is there any particular part of EPR-Lessons Learned that seems useful or relevant to you (e.g., particular chart, guidance, approach) and if so, what?

Does this document or a part of it fill a particular gap for you in preparing for or responding to a radiological emergency?

Are there parts of EPR-Lessons Learned that you would adapt for a US context, which might make it more useful to you or the people you work with?

What tools do you use where experience from past emergencies is compiled, in order to strengthen your emergency preparedness?

Other comments:

EPR-Exercise: Preparation, Conduct and Evaluation of Exercises to Test Preparedness for a Nuclear or Radiological Emergency (EPR-Exercise). 2005.
EPR-Exercise/T: Training Materials for Preparation, Conduct and Evaluation of Exercises to Test Preparedness for a Nuclear or Radiological Emergency (Training Materials). 2006.

How useful would EPR-Exercise be to you or people you work with?

1 2 3 4 5 6 7 8 9 10

How useful would EPR-Exercise/T be to you or people you work with?

1 2 3 4 5 6 7 8 9 10

Is there any particular part of EPR-Exercise and/or its associated training materials that seems useful or relevant to you (e.g., particular chart, guidance, approach) and if so, what?

Do the document and training materials, or a specific part, fill a particular gap for you in preparing for or responding to a radiological emergency?

Are there parts of EPR-Exercise and its training materials that you would adapt for a US context, which might make them more useful to you or the people you work with?

What tools do you currently use for the planning and execution of your emergency exercises?

Other comments:

EPR-Method: Method for Developing Arrangements for Response to a Nuclear or Radiological Emergency. 2003.

How useful would EPR-Method be to you or people you work with?

1 2 3 4 5 6 7 8 9 10

Is there any particular part of EPR-Method that seems useful or relevant to you (e.g., particular chart, guidance, approach) and if so, what?

Does this document or a part of it fill a particular gap for you in preparing for or responding to a radiological emergency?

Are there parts of EPR-Method that you would adapt for a US context, which might make it more useful to you or the people you work with?

How useful do you find Section 4.2, Element A2.3 of EPR-Method (p.48) for providing first responders with guidance concerning recognition and immediate response to a radiation emergency?

Other comments:

_____

_____

_____

Emergencies at Facilities

EPR-NPP Public Protective Actions Charts: Placing the Radiological Health Hazard in Perspective in an Emergency due to Severe Conditions at a Light Water Reactor. 2013.

How useful would the EPR –NPP Public Protective Action Charts be to you or people you work with?

1 2 3 4 5 6 7 8 9 10

Is there any particular part of the EPR – NPP Public Protective Action Charts that seems useful or relevant to you and if so, what?

_____

_____

_____

Do these charts, or their concept, fill a particular gap for you in preparing for or responding to a radiological emergency?

_____

_____

_____

Are there parts of the EPR – NPP Public Protective Action Charts that you would adapt for a US context, which might make it more useful to you or the people you work with?

_____

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_____

Do you have a comparable color-coded system for health hazards in emergencies at facilities or non-facility emergencies?

_____

_____

_____

Other comments:

_____

_____

_____

EPR-Research Reactor: Generic Procedures for Response to a Nuclear or Radiological Emergency at Research Reactors. 2011.
EPR-Research Reactor/T: Training Materials on Generic Procedures for Response to a Nuclear or Radiological Emergency at Research Reactors. 2011.

How useful would EPR-Research Reactor be to you or people you work with?

1 2 3 4 5 6 7 8 9 10

How useful would EPR-Research Reactor/T be to you or people you work with?

1 2 3 4 5 6 7 8 9 10

Is there any particular part of EPR-Research Reactor and/or its associated training materials that seems useful or relevant to you (e.g., particular chart, guidance, approach) and if so, what?

_____

_____

_____

Do the document and training materials, or a specific part, fill a particular gap for you in preparing for or responding to a radiological emergency?

_____

_____

_____

Are there parts of EPR-Research Reactor and its training materials that you would adapt for a US context, which might make them more useful to you or the people you work with?

_____

_____

_____

Other comments:

_____

_____

_____

EPR-TRIGA-Research Reactor: Generic Procedures for Response to a Nuclear or Radiological Emergency at TRIGA Research Reactors. 2011.

How useful would EPR-TRIGA-Research Reactor be to you or people you work with?

1 2 3 4 5 6 7 8 9 10

Is there any particular part of EPR-TRIGA-Research Reactor and/or its associated training materials that seems useful or relevant to you (e.g., particular chart, guidance, approach) and if so, what?

_____

_____

_____

Do the document and training materials, or a specific part, fill a particular gap for you in preparing for or responding to a radiological emergency?

_____

_____

_____

Are there parts of EPR-TRIGA-Research Reactor and its training materials that you would adapt for a US context, which might make them more useful to you or the people you work with?

_____

_____

_____

Other comments:

_____

_____

_____

Medical Preparedness and Response

EPR-Medical: Generic Procedures for Medical Response during a Nuclear or Radiological Emergency (IAEA/WHO). 2005.
EPR-Medical/T: Training Materials for Medical Preparedness and Response to a Nuclear or Radiological Emergency (IAEA/WHO). 2014.

How useful would EPR-Medical be to you or people you work with?

1 2 3 4 5 6 7 8 9 10

How useful would EPR-Medical/T be to you or people you work with?

1 2 3 4 5 6 7 8 9 10

Is there any particular part of EPR-Medical and/or its associated training materials that seems useful or relevant to you (e.g., particular chart, guidance, approach) and if so, what?

_____

_____

_____

Do the document and training materials, or a specific part, fill a particular gap for you in preparing for or responding to a radiological emergency?

_____

_____

_____

Are there parts of EPR-Medical and its training materials that you would adapt for a US context, which might make them more useful to you or the people you work with?

_____

_____

_____

How useful do you find Procedure C1 of EPR-Medical (p. 35-36) for first responders on actions on scene until arrival of emergency medical team?

_____

_____

_____

How useful do you find Worksheet C2 of EPR-Medical (p. 144), the registry form for a person involved in a radiation emergency, to be completed by the first responder?

_____

_____

_____

Other comments:

_____

_____

_____

Leaflet: Basics of Radiation and Radiation Protection (IAEA/WHO). 2005.
Poster: How to recognize and initially respond to an accidental radiation injury (IAEA/WHO). 2000.
Leaflet: How to recognize and initially respond to an accidental radiation injury (IAEA/WHO). 2000.

How useful would the leaflet on basics of radiation and radiation protection be to you or people you work with?

1 2 3 4 5 6 7 8 9 10

How useful would the poster on how to recognize and initially respond to an accidental radiation injury be to you or people you work with?

1 2 3 4 5 6 7 8 9 10

How useful would the leaflet on how to recognize and initially respond to an accidental radiation injury be to you or people you work with?

1 2 3 4 5 6 7 8 9 10

Is there any particular part of these materials that seems useful or relevant to you (e.g., particular chart, guidance, approach) and if so, what?

Do these materials, or a specific part, fill a particular gap for you in preparing for or responding to a radiological emergency?

Are there parts of these tools that you would adapt for a US context, which might make them more useful to you or the people you work with?

How useful do you find the concept for these tools for understanding radiation injuries?

Do you have comparable visual products, like the poster? If so, please list which ones.

Other comments:

SR-2: Diagnosis and treatment of radiation injuries (IAEA/WHO). 1998.

How useful might the guidance in SR-2 be to you or people you work with?

1 2 3 4 5 6 7 8 9 10

Is there any particular part of SR-2 that seems useful or relevant to you (e.g., particular chart, guidance, approach) and if so, what?

Does the document, or a specific part, fill a particular gap for you in preparing for or responding to a radiological emergency?

Are there parts of SR-2 that you would adapt for a US context, which might make them more useful to you or the people you work with?

Other comments:

SR-4: Planning the medical response to radiological accidents (IAEA/WHO). 1998.

How useful might the guidance in SR-4 be to you or people you work with?

1 2 3 4 5 6 7 8 9 10

Is there any particular part of SR-4 that seems useful or relevant to you (e.g., particular chart, guidance, approach) and if so, what?

Does the document, or a specific part, fill a particular gap for you in preparing for or responding to a radiological emergency?

Are there parts of SR-4 that you would adapt for a US context, which might make them more useful to you or the people you work with?

Other comments:

Radiological Accident Reports

The Fukushima Daiichi Accident. 2015.
The Radiological Accident in Lia, Georgia. 2014.
The Radiological Accident in Nueva Aldea. 2009.
The Radiological Accident in Cochabamba. 2004.
Accidental Overexposure of Radiotherapy Patients in Bialystok. 2004.
The Radiological Accident in Gilan. 2002.
The Radiological Accident in Samut Prakarn. 2002.
The Criticality Accident in Sarov. 2001.
The Radiological Accident in Yanango. 2000.
The Radiological Accident in Istanbul. 2000.
The Radiological Accident in Lilo. 2000.
The Radiological Accident in the Reprocessing Plant at Tomsk. 1998.
The Radiological Accident in Tammiku. 1998.
Accidental Overexposure of Radiotherapy Patients in San José, Costa Rica. 1998.
The Radiological Accident at the Irradiation Facility in Nesvizh. 1996.
An Electron Accelerator Accident in Hanoi, Viet Nam. 1996.
The Radiological Accident in Soreq. 1993.
The Radiological Accident in San Salvador. 1990.
The Radiological Accident in Goiânia. 1988.

How useful are these accident reports overall to you or people you work with?

1 2 3 4 5 6 7 8 9 10

Do you have any other source of similar accident reports?

_____

_____

_____

Is there any particular report or group of reports that are most useful to you, and if so, why?

_____

_____

_____

If these reports are useful to you, how would you use them?

_____

_____

_____

Other comments:

Appendix E: DHS Assessment Questionnaire 2

United States Department of Homeland Security and Brookhaven National Laboratory

International First Responder Tools for a Radiological Emergency Workshop, March 14 and 15, 2017

Workshop Questionnaire
QUESTIONNAIRE #2

First Responder Tools

EPR-First Responders: Manual for First Responders to a Radiological Emergency (IAEA/CTIF/PAHO/WHO). 2006.

How useful would the First Responder Manual be to you or people you work with?

1 2 3 4 5 6 7 8 9 10

Is there any particular part of the First Responder Manual that seems useful or relevant to you (e.g., particular chart, guidance, approach) and if so, what?

_____

_____

_____

Does this document or a part of it fill a particular gap for you in preparing for or responding to a radiological emergency?

_____

_____

_____

Are there parts of the First Responder Manual that you would adapt for a US context, which might make them more useful to you or the people you work with?

_____

_____

_____

How useful is the registry form (p. 61) from the manual? Would you use it? Please rate and describe its utility below.

1 2 3 4 5 6 7 8 9 10

How helpful would the "Action Guides" and "Instructions" approaches presented in the First Responders Manual be for your preparedness as well as your response activities?

_____

_____

_____

Do you currently use any tools similar to the IAEA *Manual for First Responders to a Radiological Emergency*? _____

If yes, who developed the manual you use?

_____

_____

_____

Other comments:

_____

_____

_____

EPR-First Responders/T: Training Materials for First Responders to a Radiological Emergency. 2009.

How relevant are these training materials to your job? Would you use them? Please rate and describe their utility below.

1 2 3 4 5 6 7 8 9 10

Have you received training or reviewed training materials that cover the same topics as the IAEA *First Responders to a Radiological Emergency Training Materials*?

_____

If yes, who developed this training you received?

_____

_____

_____

Are there topics that are not included in these IAEA training materials that you believe are necessary for training on radiological emergency response?

_____

_____

_____

Are there any particular aspects of the training materials that would be useful to you or your colleagues? If so, please describe below.

_____

_____

_____

Other comments:

_____

_____

_____

EPR-First Responders/E-learning: E-Learning Tools for First Response to a Radiological Emergency. 2009.

How relevant is this E-learning tool to your job? Would you use it? Please rate and describe its utility below.

1 2 3 4 5 6 7 8 9 10

Have you previously used e-learning tools like this for your job?
Yes/No _____

Have you used e-learning tools related to radiological emergency response?
Yes/No _____

If yes, who developed the radiological emergency response e-learning tools you have used?

_____

_____

_____

Other comments:

_____

_____

_____

EPR-First Responders/PDA: Portable Digital Assistant for First Responders to a Radiological Emergency. 2009.

Would an app like the PDA described be useful to you? Please rate and describe.

1 2 3 4 5 6 7 8 9 10

Other comments:

_____

_____

_____

Is there any particular aspect of the app that you think would be useful to you or your colleagues?

_____

_____

_____

How might you adapt the app to make it useful to you?

_____

_____

_____

Do you currently use app-type tools while performing your job?
Yes/No _____

Have you used app-type tools related to radiological emergency response?
Yes/No _____

If yes, who developed the app related to radiological emergency response that you have used?

_____

_____

_____

Public Communication Tools

EPR-Public Communication Plan: Method for Developing a Communication Strategy and Plan for a Nuclear or Radiological Emergency 2015.
EPR-Public Communications: Communication with the Public in a Nuclear or Radiological Emergency. 2012.
EPR-Public Communications/T: Training Materials on Communication with the Public in a Nuclear or Radiological Emergency. 2012.

How useful would EPR-Public Communications be to you or people you work with?

1 2 3 4 5 6 7 8 9 10

How useful would EPR-Public Communications/T be to you or people you work with?

1 2 3 4 5 6 7 8 9 10

Even though you might not be in a public information role, is there any particular part of EPR-Public Communications and/or its associated training materials that seems useful or relevant to you (e.g., particular chart, guidance, approach) and if so, what?

_____

_____

_____

Does the document and training materials, or a specific part, fill a particular gap for you in preparing for or responding to a radiological emergency? If so, please explain.

_____

_____

_____

Are there parts of EPR-Public Communications and its training materials that you would adapt for a US context, which might make them more useful to you or the people you work with?

Do you already have guidance on public communications that you are using? If so, please describe.

Other comments:

EPR-Public Communications/E-learning: E-learning on Communication with the Public in a Nuclear or Radiological Emergency. 2012.

How useful would EPR-Public Communications E-learning be to you or people you work with?

1 2 3 4 5 6 7 8 9 10

Would you use this e-learning, either in its entirety or on a modular basis (e.g. to strengthen or understand certain public information concepts for radiological emergencies)?

Do you already have an e-learning tool on public communications that you are using? If so, please describe.

Other comments:

_____

_____

_____

FINAL:

What products, if any, outside of those planned on the agenda most impressed you as being useful and worthy of further consideration and development?

_____

_____

_____

Please describe the utility of any other tools discussed or described, and note any outstanding gaps in tools or guidance:

_____

_____

_____