

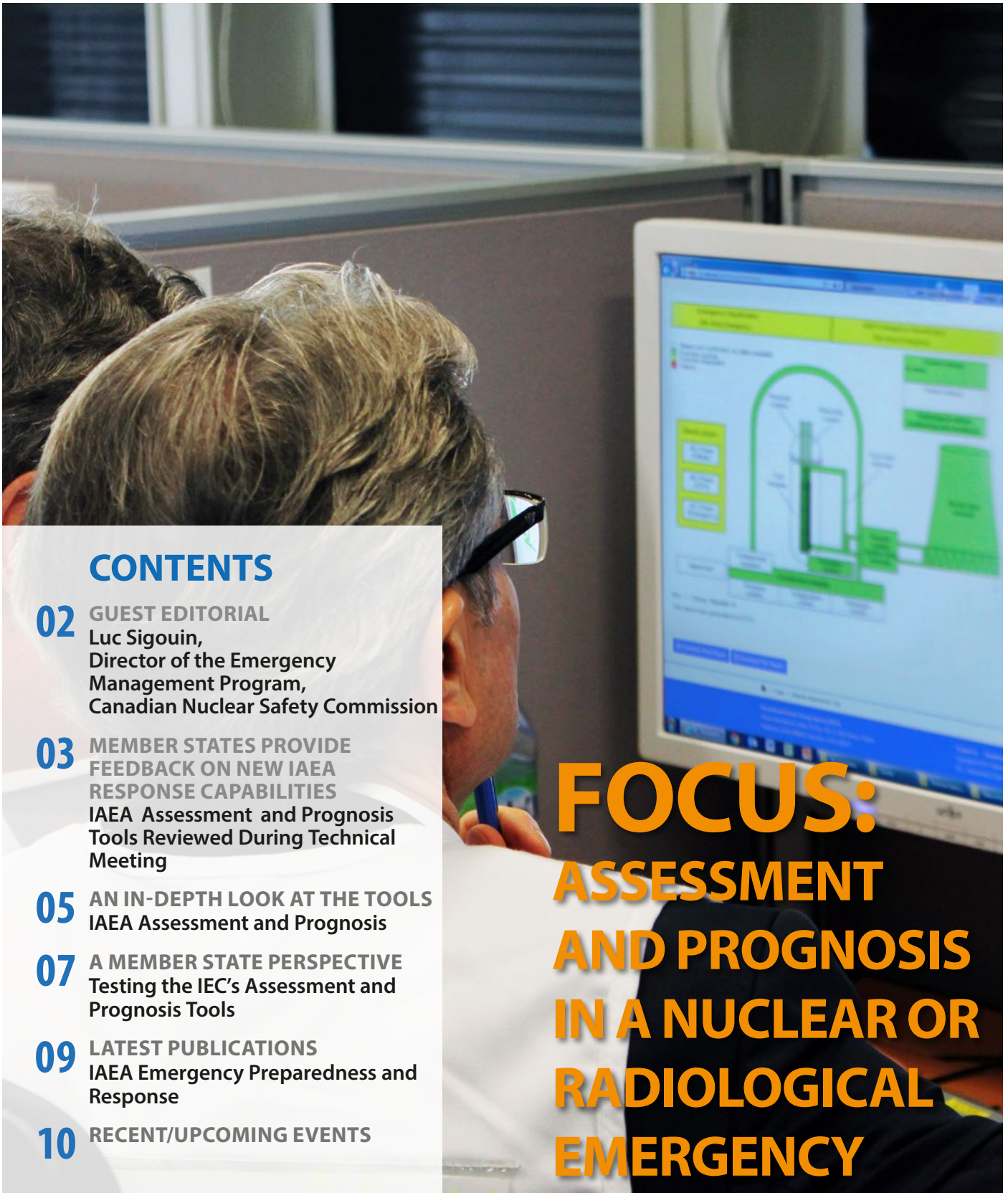


**IEC**  
Incident and  
Emergency Centre

# EPR INSIGHTS

Updates on Emergency Preparedness and Response

Edition 3 – May, 2017



## CONTENTS

- 02** GUEST EDITORIAL  
Luc Sigouin,  
Director of the Emergency  
Management Program,  
Canadian Nuclear Safety Commission
- 03** MEMBER STATES PROVIDE  
FEEDBACK ON NEW IAEA  
RESPONSE CAPABILITIES  
IAEA Assessment and Prognosis  
Tools Reviewed During Technical  
Meeting
- 05** AN IN-DEPTH LOOK AT THE TOOLS  
IAEA Assessment and Prognosis
- 07** A MEMBER STATE PERSPECTIVE  
Testing the IEC's Assessment and  
Prognosis Tools
- 09** LATEST PUBLICATIONS  
IAEA Emergency Preparedness and  
Response
- 10** RECENT/UPCOMING EVENTS

**FOCUS:  
ASSESSMENT  
AND PROGNOSIS  
IN A NUCLEAR OR  
RADIOLOGICAL  
EMERGENCY**

**A**s Director of the Emergency Management Program at the Canadian Nuclear Safety Commission, I lead a team which works closely with the IAEA to support the development of the IAEA assessment and prognosis process. Technical assessment specialists from across the CNSC have been involved in the testing of the IAEA assessment tools and procedures and I have seen first-hand how prompt and effective assessment during an emergency can support Member State emergency response efforts.

“**The Canadian Nuclear Commission values the innovative approach the Agency has taken to develop its assessment tools.**”

The IAEA Action Plan on Nuclear Safety, adopted in 2011, called for the IAEA “to provide Member States, international organizations and the general public with timely, clear, factually correct, objective and easily understandable information during a nuclear emergency on its potential consequences, including analysis of available information and prognosis of possible scenarios based on evidence, scientific knowledge and the capabilities of Member States”.

Since then, we have welcomed the updates provided by the Secretariat on their work. At the recent Technical Meeting to review the IAEA’s procedures to conduct assessment and prognosis, we contributed to the discussions by detailing our own national challenges faced in developing situational awareness and evaluating potential hazards during an emergency.

The Canadian Nuclear Safety Commission values the innovative approach the Agency has taken to develop its assessment tools. During the recent Technical Meeting, we confirmed our support

and welcomed the decision to make these tools available to Member States through a dedicated website.

We have participated in several exercises with the IAEA to practise the assessment and prognosis process since 2014. With full access not only to the tools, but also to the detailed procedures and the draft manual documenting the assessment and prognosis process, we have successfully tested the effective sharing of information during a nuclear or radiological emergency to conduct an assessment with the IAEA.



*Luc Sigouin works as the Director of the Emergency Management Program at the Canadian Nuclear Safety Commission. In this function, he has assisted in various exercises and collaborated closely with the IAEA.*

Like other Member States, Canada has requested that the Secretariat continue to work closely with us to refine the arrangements for assessment, prognosis and communication, including arrangements for the timely sharing of relevant technical parameters (GC(60)/RES/9). We are looking forward to continued cooperation with the IAEA IEC in this area.

### **Luc Sigouin,**

*Director of the Emergency Management Program,  
Canadian Nuclear Safety Commission*

## IAEA ASSESSMENT AND PROGNOSIS TOOLS REVIEWED DURING TECHNICAL MEETING

# MEMBER STATES PROVIDE FEEDBACK ON NEW IAEA RESPONSE CAPABILITIES

**I**n a nuclear or radiological emergency, situational awareness and the understanding of the potential hazards and how they may evolve are critical for response efforts.

The IAEA is helping Member States meet this challenge by developing tools to operationalise the IAEA's assessment and prognosis process. Seventy-seven participants from 53 Member States and three International Organizations met from 28 November to 2 December 2016 at the IAEA Headquarters to review and make recommendations on how the IAEA conducts its assessment and prognosis for a nuclear or radiological emergency. In addition, more than 40 others connected via online stream.

Central to the discussions during the week were the IAEA assessment and prognosis tools which were developed, built and exercised by the IAEA

as part of its work to further strengthen EPR following the Fukushima Daiichi accident. These tools comprise a Reactor Assessment Tool, an Emergency Response Action Assessment Tool, a Protective Actions Assessment Tool, a Radiological Source Assessment Tool, a Dose Assessment Tool and a Monitoring Data Assessment Tool (see page 5 for a summary of the tools).

“The need for IAEA assessment and prognosis was recognised during the Agency's actions in response to the accident at the Fukushima Daiichi nuclear power plant in 2011”, said Elena Buglova, Head of the IAEA IEC, during the opening session of the meeting.

Assessment in an emergency at a Nuclear Power Plant is based on data characterizing fundamental safety functions. Ms Buglova emphasized that, “at the time, it was not within the IAEA's



Participants in the technical meeting on the IAEA Emergency Assessment and Prognosis Tools. (Photo: S. Harvey/IAEA)

mandate to include the prognosis of the potential evolution of the accident or an assessment of its possible consequences in the information shared with Member States. This role was assigned to the Agency under the IAEA Action Plan on Nuclear Safety in 2011 and, since then we have been working continuously to strengthen our assessment and prognosis tools and capabilities”.

These new state-of-the-art tools and the new assessment and prognosis procedures have been through rigorous tests during the many international nuclear and radiological emergency exercises conducted to evaluate and further improve response arrangements and capabilities of the IAEA and its Member States.

During these exercises, Member States participated in the process and evaluated the outputs generated from the tools, including materials for press releases and technical reports.

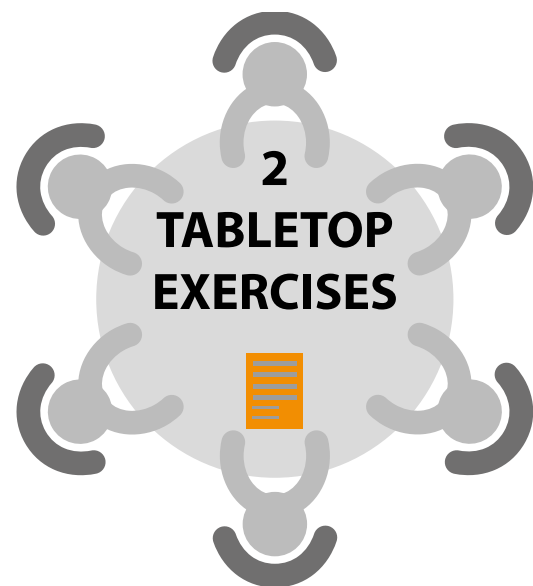
Participants at the technical meeting requested that the IAEA training material developed for staff within the IAEA Incident and Emergency System be adapted and shared with Member States in order to support their training programmes on the assessment and prognosis process. Some also expressed the wish for the tools to be accessible in other languages through translation of the instructions.

Joseph Chaput, Incident and Emergency Assessment Officer at the IAEA, and Scientific Secretary for the meeting, said, “This was a very valuable meeting where we could share the important work we have been doing since the adoption of the IAEA Action Plan on Nuclear Safety to implement the IAEA assessment and prognosis process. We received feedback from Member States on our procedures and tools and will base our amendments on these”.

## FACTS & FIGURES FROM THE TECHNICAL MEETING



**MORE THAN 25  
PRESENTATIONS  
AND 10  
SCIENTIFIC  
POSTERS**



## IAEA ASSESSMENT AND PROGNOSIS

# AN IN-DEPTH LOOK AT THE TOOLS

**I**n close cooperation with the Member States, the IAEA has developed customized assessment tools in order to implement its assessment and prognosis process. These tools are for the use of experts at the IAEA and designated national experts in Member States through implementation of a specific process of development and clearance. Beginning in March 2017, these tools were made available at the dedicated website to the IAEA Member States' emergency contact points to support the implementation of the IAEA procedures used in the assessment and prognosis process.

The website currently features the following tools:

### Reactor Assessment Tool

This tool supports experts as they assess and evaluate the on-site scene at a nuclear power plant or research reactor during an emergency. Using data provided by the Accident State, such as the status of critical safety functions or data on the release of radioactive material, the tool creates a very useful 'snapshot' of the current conditions and generates a report which can be shared with Member States so they can best understand what is happening at the impacted site. It also allows several users (at the IAEA and/or in Member States) to have a common report which can be used during an emergency to ensure all parties have a



*The assessment and prognosis tools are used during an IAEA Full Response Exercise held in March 2017 in Vienna. (Photo: S. Harvey/IAEA)*

complete understanding of the event and as a basis for providing clear and concise information to the public in, for example, a press release.

### **Emergency Response Action Assessment Tool**

This tool helps nuclear emergency response experts to assess response actions during a nuclear or radiological emergency based on international safety standards. It explains the types of actions which may be needed based on information about the emergency, for example whether to evacuate or impose food restrictions. It also tracks information from specific locations to produce a complete view of the situation which can be put into a report.

### **Radiological Source Assessment Tool**

This tool supports radiological safety experts when they evaluate radiological material, devices and sources which could be involved in an emergency. The user provides information such as on the material involved, the type of device and the level of radioactivity present. This information is fed into the tool and the generated output helps determine whether a source is dangerous and at which level. The tool also links to an online database with photographs and design details of thousands of sources and devices, which assist in formulating plain language descriptions.

### **Dose Assessment Tool**

This tool helps experts to evaluate potential exposures to people who have handled or been

in the vicinity of radiological material. A quick evaluation of the magnitude of radiation exposure will help determine if someone requires a detailed dose assessment and subsequent medical attention.

### **Monitoring Data Assessment Tool**

This tool provides a link to the International Radiation Monitoring Information System (IRMIS). IRMIS is used to display and assess off-site radiation measurements during an emergency. Member States can upload data from fixed monitoring stations, aerial (plane or helicopter) monitoring systems, vehicle and handheld surveys into a central database available to all registered users in Member States. The measurements displayed in IRMIS are referenced to the IAEA Operational Intervention Levels, thus enabling an analysis on the opportunity and the extension of the protective actions planned or implemented in the off-site area of an affected nuclear or radiological facility.

The IAEA is continually improving the existing tools. Changes are considered after each exercise. The IAEA is also actively developing specialized tools for other nuclear or radiological emergency scenarios, including tools to evaluate radiological dispersal devices (so called dirty bombs), specialist tools for assessing conditions at spent fuel pools, advanced tools to support public information officers and tools to communicate the accident evolution during an emergency.



*The assessment and prognosis tools are used during an IAEA Full Response Exercise, Vienna, March, 2017 (Photo: S. Harvey/IAEA)*

## TESTING THE IAEA ASSESSMENT AND PROGNOSIS TOOLS

# A MEMBER STATE PERSPECTIVE

**M**azzammal Hussain works at the Pakistan Nuclear Regulatory Authority (PNRA) as a Senior Scientific Officer. He spent one year on a fellowship at the IEC, from August 2015, where he was involved in the development of the IAEA assessment and prognosis tools and procedures. In September 2016, the IEC conducted an exercise with the National Radiation Emergency Coordination Centre (NRECC) in the PNRA to test these tools. This interview is based on the PNRA participation in this exercise. The NRECC is the national focal point for notification and information exchange with the IAEA under the Convention on Early Notification of a Nuclear Accident (Early Notification Convention). Being a State Party to the Early Notification Convention and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency, Pakistan participates in IAEA Convention Exercises to test its national response arrangements.

### **Mr. Hussain, please tell us a little about the exercise?**

The exercise was conducted with the IEC in September 2016. The IEC developed an emergency scenario at a nuclear power plant in order to help the PNRA practise using the assessment and prognosis tools and procedures with the support of IEC technical experts.

Based on the exercise scenario, the IEC reviewed information fed into the tools from the Technical Support Persons (TSPs) of NRECC to produce a status summary report and press release. The TSPs reviewed these documents and rapidly provided their feedback during the exercise.

### **Why was this important?**

When new tools and procedures are introduced, it is essential to include them in training sessions to familiarize staff with them. In doing so, staff



*Mazzammal Hussain at work in Pakistan's National Radiation Emergency Coordination Centre. (Photo: PNRA)*

gain experience on how to apply them in case of a real emergency. More generally speaking, it is also important to have exercises which evaluate harmonization of response actions and compare responses with international standards such as the “Preparedness and Response for a Nuclear or Radiological Emergency” (IAEA Safety Standards Series No. GSR Part 7). This exercise provided an opportunity to learn how these tools could be useful for PNRA in assessing a situation and communicating with the IEC during a nuclear or radiological emergency.

### **What was your role in the exercise?**

In my work with the NRECC, I assist in the response to a nuclear or radiological emergency as per PNRA’s response procedures. I am also responsible for ensuring that national EPR arrangements are in line with international standards. I was fortunate to be directly involved in the development of the assessment and prognosis

tools and procedures during my one-year IEC fellowship. I was able to learn and observe their use in IAEA Full Response Exercises prior to being made available for external counterparts. Participation in this exercise gave me an opportunity to see how these tools work in both the Member States and at the IAEA.

### **What was the participants' experience with the tools and procedures?**

The IAEA assessment and prognosis tools are very straightforward and user-friendly. As I had worked in their development, there was no significant difficulty in learning to use and handle them during the exercise. PNRA TSPs were very pleased with the structure and functionality of the tools. Supplying the IEC with information was easier and more time-efficient as the tools summarized the assessment and prognosis of the event in very clear language. Having used the tools in this exercise, I believe that some basic training sessions should help other Member States to assess a situation, use the new tools and be in a better position to provide timely information to the IEC.

### **How did your organization benefit from using the tools during the exercise?**

The assessment and prognosis tools facilitated the exchange of technical information and also made it easier to predict the information needs of the IAEA during the exercise. This supported our real-time management of technical information. I believe the new tools, combined with the IEC support, saved time and made it possible to communicate technical information in a concise manner.

### **What did you learn from conducting the exercise?**

This was the first time that we conducted an exercise using these new tools and we believe our team has learned how to operate them quickly and correctly. Furthermore, this exercise also gave us an opportunity to validate and compare our own arrangements for the assessment of the situation with the IAEA approach. This knowledge will be invaluable in the fulfilment of our responsibilities in the event of a nuclear or radiological emergency. Ultimately, we believe these tools save time during the response to an emergency by supporting the rapid provision of technical information.

## **MEET THE IEC STAFF**



### **Joseph Chaput**

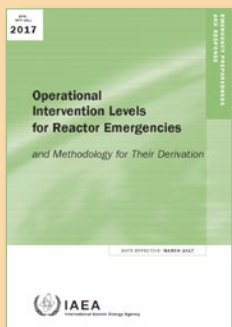
“ We have made significant progress over the last several years implementing the Agency’s role in Assessment and Prognosis. Our success in this challenging area has been possible thanks to the extensive Member State support we have received. We have participated in more than 20 international exercises and we look forward to future opportunities to work with all our counterparts on the assessment and prognosis process. ”

*Joseph Chaput is the Incident and Emergency Assessment Officer working in the IAEA IEC. He has worked on the implementation of the assessment and prognosis role of the IAEA, developing and exercising the customized tools to support this role.*



# IAEA EMERGENCY PREPAREDNESS AND RESPONSE

## LATEST PUBLICATIONS

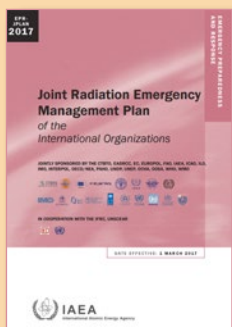
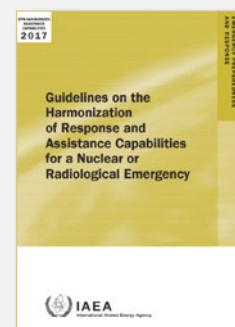


### Operational Intervention Levels for Reactor Emergencies and Methodology for Their Derivation, EPR-NPP-OILs (2017)

Operational Intervention Levels (OILs) are operational criteria that allow decision-makers to promptly implement protective actions and other response actions on the basis of monitoring results available during a nuclear or radiological emergency. This publication provides the criteria to implement these protective actions, based on simple and reliable ambient gamma dose rate monitoring results, thus ensuring a faster and more effective protection of the public.

### Guidelines on the Harmonization of Response and Assistance Capabilities for a Nuclear or Radiological Emergency, EPR-Harmonized Assistance Capabilities (2017)

This publication provides guidelines on processes that may be implemented as part of EPR arrangements to assist in harmonizing national EPR capabilities, and international assistance when this is requested, so that the products of their response operations are comparable and compatible.



### Joint Radiation Emergency Management Plan, EPR-JPLAN (2017 update)

This seventh edition of the JPLAN describes a common understanding of how each organization is responding to emergencies and their preparedness arrangements. Eighteen international intergovernmental organizations, members of the Inter-Agency Committee on Radiological and Nuclear Emergencies (IACRNE), have developed and co-sponsored the 2017 edition.

## Translated publications

**Preparedness and Response for a Nuclear or Radiological Emergency, General Safety Requirements (GSR Part 7)** - Translated into Russian (Arabic, Chinese and English versions also available)



**Actions to Protect the Public in an Emergency due to Severe Conditions at a Light Water Reactor** - Translated into Japanese and Spanish (English and Russian also available).



[WWW.IAEA.ORG/PUBLICATIONS/EPR-SERIES](http://WWW.IAEA.ORG/PUBLICATIONS/EPR-SERIES)



# EVENTS

Contact Point for Events: [IEC-Information@iaea.org](mailto:IEC-Information@iaea.org)

## UPCOMING EVENTS IN 2017

22 May –  
2 Jun

### **Workshop on Monitoring during a Nuclear or Radiological Emergency, Fukushima Prefecture, Japan.**

*Purpose:* Build the capacity of participants from Member States to perform radiological monitoring and, on the basis of such monitoring, to make recommendations for public protective actions in response to nuclear or radiological incidents and emergencies.

6–9  
Jun

### **Fourth Meeting of the Emergency Preparedness and Response Standards Committee (EPRReSC)**

*Purpose:* Make recommendations on the emergency preparedness and response (EPR) aspects of the IAEA's programme for the development, review and revision of safety standards and on the activities to support the use and application of these standards.

12–16  
Jun

### **International Workshop on Nuclear Security Measures and Emergency Response Arrangements for Major Public Events, Washington DC, United States of America (organised by the IEC and the Division of Nuclear Security in the IAEA Department of Nuclear Safety and Security).**

*Purpose:* Enhance awareness and understanding of the planning and execution of nuclear security and emergency response plans in support of the overall safety and security for a major public event.

21–22  
Jun

### **ConvEx-3 full-scale exercise**

*Purpose:* The purpose of the ConvEx-3 exercise is to allow Member States and international organizations to test their own EPR arrangements in a severe nuclear accident scenario. The exercise will give an opportunity to identify good practices and areas requiring improvements in the national and/or international emergency management systems.

28  
Jun

### **Table top exercise of the Dialogue between Coastal and Shipping States, Vienna, Austria.**

*Purpose:* Practise international cooperation in the event of a nuclear emergency at sea. Members of the Dialogue between Coastal and Shipping States will model international cooperation to build confidence and promote transparency. The scenario will test information exchange.

## RECENT EVENTS

13–17  
Feb

### **Technical Meeting on Next Generation Reactors and Emergency Preparedness and Response, Vienna, Austria.**

57 participants from 36 Member States discussed design concepts and safety features of next generation reactors related to off-site emergency response as well as lessons learned from past emergencies. Participants highlighted the need for the IAEA to develop additional technical guidance to elaborate on the methodology to be used for defining EPR arrangements for next generation reactors based on 'Preparedness and Response for a Nuclear or Radiological Emergency' (IAEA Safety Standards Series No. GSR Part 7).



(Photo: S. Harvey/IAEA).

**15  
Feb**

### **Webinar on Medical Preparedness and Response for Nuclear or Radiological Emergencies.**

The IAEA and the World Health Organization (WHO) jointly prepared and offered a freely accessible webinar to raise awareness of the arrangements Member States need to put in place for effective medical EPR for a nuclear or radiological emergency.

**28  
Feb**

### **International exercise to test international exchange of information during a nuclear or radiological emergency, Vienna, Austria.**

During the exercise, the 55 participating States received details about a scenario and practised reporting the event to the IEC using emergency communication channels. After each report, the IEC would provide an update to the scenario which required additional reporting thus making full use of the different features of the emergency communication channels.

**13–17  
Mar**

### **Training Workshop for Senior Educators on Radiation Emergency Preparedness and Response, Vienna, Austria.**

22 experts from 19 different Member States involved in EPR training activities joined the workshop to improve their skills, specifically with regard to adult teaching strategies. The agenda included modules on how to train learners with different knowledge backgrounds, experience and skills, how to design curricula and assessment tools and how to plan, empower and engage students.



(Photo: S. Harvey/IAEA).

**8–26  
May**

### **School on Radiation Emergency Management for Latin America, Mexico City, Mexico.**

*Purpose:* Provide participants with a comprehensive understanding of the basic elements of EPR for nuclear and radiological emergencies, including emergency management systems, protective actions, public communications and international arrangements. The school's target audience is qualified professionals from organizations involved in EPR.

**15–19  
May**

### **Regional training course on the development and use of operational intervention levels (OILs) for reactor emergencies for Member States in the Asia and Pacific Region, Fukushima Prefecture, Japan.**

*Purpose:* Enhance Member States capabilities for protecting the public in the event of a severe reactor emergency, by providing a detailed explanation on the use of IAEA's default operational intervention levels (OILs) and the methodology for their derivation and revision.

## **IMPRESSUM**

EPR Insights: Updates on Emergency Preparedness and Response

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## **DISCLAIMER**

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