

# IAEA requirements for preparedness and response for a nuclear or radiological emergency (IAEA GS-R-2)

NTW EP&R INCEPTION SEMINAR

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# IAEA requirements for EP&R (IAEA GS-R-2)



## General requirements - *Basic responsibilities*

- **1a** Adequate preparations shall be established and maintained at local and national levels and, where agreed between States, at international level to respond to nuclear emergencies.
- **1b** The State shall ensure that the regulatory body and response organizations have the necessary resources and that they make preparations and arrangements to deal with any consequences of a nuclear emergency, whether [it] occurs within or beyond national borders. These preparations shall include the actions to be taken both in and after an emergency.

# IAEA requirements for EP&R (IAEA GS-R-2)



## General requirements - *Basic responsibilities*

- **1c** Legislation shall be adopted to allocate clearly the responsibilities for preparedness and response. This shall include establishing or identifying an existing governmental body or organization to act as a national coordinating authority. This authority shall ensure that the functions and responsibilities of operators and response organizations are clearly assigned and understood, and that arrangements are in place for achieving and enforcing compliance with the requirements.
- **1d** The regulatory body shall ensure that [on-site] emergency arrangements are integrated with those of other response organizations. There shall be exercises of the emergency arrangements at suitable intervals, some of which shall be witnessed by the regulatory body.
- **1e** The national coordinating authority and the response organizations shall ensure that the arrangements are coordinated with the arrangements for response to conventional emergencies

# IAEA requirements for EP&R (IAEA GS-R-2)



## Functional requirements – *Establishing emergency management and operations*

- **2a** The transition from normal to emergency operations shall be clearly defined
- **2b** Arrangements shall be made to coordinate the emergency responses of all the off-site response organizations with the on-site response
- **2c** Arrangements shall be integrated with arrangements at the national and local level for response to conventional emergencies
- **2d** Arrangements shall be made for the implementation of a command and control system for the response. In addition, arrangements shall be made for obtaining and assessing the information necessary in order to allocate resources for all response organizations
- **2e** Arrangements shall be made for coordinating the response between the response organizations and jurisdictions (including other States) that fall within the precautionary action zone or the urgent protective action planning zone

# IAEA requirements for EP&R (IAEA GS-R-2)



## Functional requirements – *Identifying, notifying and activating*

- **3a** Notification points shall be established that are responsible for receiving emergency notifications. These shall be continuously available
- **3b** The operator shall make arrangements for the prompt identification of an actual or potential emergency and the determination of the appropriate level of response. This shall include a system for classifying all potential emergencies that warrant an emergency intervention
- **3c** The criteria for classification shall be predefined emergency action levels that relate to abnormal conditions for the facility. The classification system shall be established with the aim of initiating a response prompt enough to allow for the implementation of urgent protective action.
- **3d** Each facility shall have a person on the site at all times with the authority and responsibilities to classify an emergency and promptly and without consultation to notify the appropriate off-site notification point and to provide sufficient information for an effective off-site response

# IAEA requirements for EP&R (IAEA GS-R-2)



## Functional requirements – *Identifying, notifying and activating*

- **3e** Operators shall ensure that adequate arrangements are made for identifying a situation that warrants an emergency response and generating adequate information promptly and communicating it to the responsible authorities
- **3f** The responsibilities and initial response actions of all response organizations shall be defined for each class of emergency
- **3g** Arrangements shall be made for response organizations to have sufficient personnel available to perform their assigned initial response actions
- **3h** The State shall make known to the IAEA and to other States its single warning point of contact responsible for receiving emergency notifications and information. This warning point shall be continuously available
- **3i** The State shall make arrangements for promptly notifying and providing relevant information to those States that may be affected by a transnational emergency

# IAEA requirements for EP&R (IAEA GS-R-2)



## Functional requirements – *Taking urgent protective action*

- **4a** Optimized national intervention levels for taking urgent protective actions shall be established that are in accordance with international standards, modified to take account of local and national conditions, such as:
  - (a) the individual and collective doses to be averted by the intervention; and
  - (b) the radiological and non-radiological health risks and the financial and social costs and benefits associated with the intervention
  
- **4b** National guidelines in accordance with international standards shall be adopted for the termination of urgent protective actions

# IAEA requirements for EP&R (IAEA GS-R-2)



## Functional requirements – *Taking urgent protective action*

- **4c** Arrangements shall be made for effectively making and implementing decisions on urgent protective actions to be taken off the site, for the full range of possible emergencies. These arrangements shall include:
  - (a) The specification of off-site emergency zones, which shall be contiguous across national borders, and which shall include:
    - (i) a precautionary action zone, for which arrangements shall be made with the goal of taking precautionary urgent protective action before a release of radioactive material occurs or shortly after a release begins, on the basis of conditions at the facility in order to reduce substantially the risk of severe deterministic health effects
    - (ii) an urgent protective action planning zone, for which arrangements shall be made for urgent protective action to be taken promptly, in order to avert doses off the site in accordance with international standards



# IAEA requirements for EP&R (IAEA GS-R-2)



## Functional requirements – *Taking urgent protective action*

- **4c** Arrangements shall be made for effectively making and implementing decisions on urgent protective actions to be taken off the site, for the full range of possible emergencies. These arrangements shall include:
  - (b) Criteria, based on the emergency classification and on conditions at the facility and off the site, for the formulation of recommendations for urgent protective actions off the site, which are to be provided to off-site officials responsible for taking protective action, and arrangements for any necessary revision of these recommendations
  - (c) A single position on the site at all times with the authority and responsibility promptly to recommend the protective actions to be taken to the appropriate officials off the site
  - (d) Arrangements for the prompt notification of the off-site notification point with the authority and responsibility to take urgent protective action, including all the jurisdictions within the emergency zones

# IAEA requirements for EP&R (IAEA GS-R-2)



## Functional requirements – *Taking urgent protective action*

- **4d** The jurisdictions within the PAZ and UPZ shall make arrangements to take appropriate urgent action promptly upon the notification of an emergency. These arrangements shall include arrangements for: taking appropriate actions for the protection of emergency workers; alerting permanent, transient and special population groups or those responsible for them; taking urgent protective actions; protecting supplies of food and water; imposing restrictions on the immediate consumption of produce from farms or gardens and of locally produced milk; monitoring and decontaminating evacuees; caring for evacuees; alerting special facilities; and the control of access to and restriction of traffic by air, water, road and rail. Arrangements shall be coordinated with all jurisdictions within any emergency zone.
- **4e** The operator shall ensure the availability of means of communication necessary to off-site agencies with responsibility for taking protective actions within the PAZ and UPZ at all times

# IAEA requirements for EP&R (IAEA GS-R-2)



## **Functional requirements – *Providing information and issuing instructions and warnings to the public***

- **5a** Arrangements shall be made, before and during operations, to provide information on the response to an emergency to permanent, transient and special population groups or those responsible for them and to special facilities within the PAZ and UPZ. This shall include information on the nature of the hazard, on how people will be warned or notified and on the actions to be taken in the event of an emergency. The information shall be provided in the languages mainly spoken in the zones and the effectiveness of this public information programme shall be periodically assessed
- **5b** Arrangements shall be made to provide promptly a warning and instruction to permanent, transient and special population groups or those responsible for them and to special facilities in the PAZ and UPZ upon declaration of an emergency class. Thus shall include instructions in the languages mainly spoken in these zones on the immediate actions to be taken

# IAEA requirements for EP&R (IAEA GS-R-2)



## Functional requirements – *Protecting emergency workers*

- **6a** Arrangements shall be made to designate as emergency workers those who may undertake an intervention: to save lives or prevent serious injury; to take actions to avert a large collective dose; or to take actions to prevent the development of catastrophic conditions
- **6b** Those called upon to respond at a facility or within the PAZ or UPZ shall be designated as emergency workers. Such assisting personnel as police, fire fighters, medical personnel and drivers and crews of evacuation vehicles shall be designated as emergency workers
- **6c** National guidance that is in accordance with international standards shall be adopted for managing, controlling and recording the doses received by emergency workers. This guidance shall include default operational levels of dose for emergency workers for different types of response activities, which are set in quantities that can be directly monitored during the performance of these activities. In setting the default operational levels of dose, the contribution to doses via all exposure pathways shall be taken into account

# IAEA requirements for EP&R (IAEA GS-R-2)



## Functional requirements – *Protecting emergency workers*

- **6d** The anticipated hazardous conditions in which emergency workers may be required to perform response functions shall be identified
- **6e** Arrangements shall be made for taking all practicable measures to provide protection for emergency workers for the range of anticipated hazardous conditions in which they may have to perform response functions. This shall include: arrangements to assess continually and to record the doses received by emergency workers; procedures to ensure that doses received and contamination are controlled in accordance with established guidance and international standards; and arrangements for the provision of appropriate specialized protective equipment, procedures and training for emergency response in the anticipated hazardous conditions

# IAEA requirements for EP&R (IAEA GS-R-2)



## Functional requirements – *Assessing the initial phase*

- **7a** The operators shall make arrangements to assess promptly: abnormal conditions at the facility; exposures and releases of radioactive material; radiological conditions on and off the site; and any actual or potential exposures of the public. These assessments shall be used for emergency classification and recommendations for urgent protective actions to be taken off the site. These arrangements shall include access to instruments displaying or measuring those parameters that can readily be measured or observed in the event of an emergency and which form the basis for the EALs used to classify emergencies. For these arrangements the expected response of the instrumentation or systems at the facility under abnormal conditions shall be taken into account

# IAEA requirements for EP&R (IAEA GS-R-2)



## Functional requirements – *Assessing the initial phase*

- **7b** For the PAZ and UPZ, arrangements shall be made for promptly assessing any radioactive contamination, releases of radioactive material and doses for the purpose of deciding on or adapting the urgent protective actions to be taken. This capability shall include arrangements for promptly conducting environmental monitoring and monitoring for contamination on people (e.g. evacuees) within the emergency zones, including the availability of designated trained teams and instrumentation. In addition, arrangements shall be made for promptly assessing the results of environmental monitoring and monitoring for contamination on people in order to decide on or to adapt urgent protective actions to protect workers and the public, including the application of operational intervention levels
- **7c** Arrangements shall be made to ensure that relevant information is recorded during an emergency and retained for use during the emergency, in evaluations conducted following the emergency and for the long term health monitoring and follow-up of the emergency workers and members of the public who may potentially be affected

# IAEA requirements for EP&R (IAEA GS-R-2)



## Functional requirements – *Managing the medical response*

- **8a** Arrangements shall be made for medical personnel, both general practitioners and emergency staff, to be made aware of the medical symptoms of radiation exposure and of the appropriate notification procedures and other immediate actions warranted if an emergency is suspected
- **8b** Facilities shall make arrangements to treat a limited number of contaminated or overexposed workers, including arrangements for first aid, the estimation of doses, medical transport and the initial medical treatment of contaminated or highly exposed individuals in local medical facilities
- **8c** Jurisdictions within the emergency zones shall have a medical management plan for performing triage and assigning any highly exposed members of the public to appropriate medical facilities. This plan shall include operational criteria.



# IAEA requirements for EP&R (IAEA GS-R-2)



## Functional requirements – *Managing the medical response*

- **8d** Arrangements shall be made at the national level to treat people who have been exposed or contaminated. These shall include: guidelines for treatment; the designation of medical practitioners trained in the early diagnosis and treatment of radiation injuries; and the selection of approved institutions to be used for the extended medical treatment or follow-up of persons subjected to radiation exposure or contamination. This shall also include arrangements for consultation on treatment following any exposure that could result in severe tissue damage or other severe deterministic health effects with medical practitioners experienced in dealing with such injuries
- **8e** Arrangements shall be made for the identification, long term health monitoring and treatment of people in those groups that are at risk of sustaining detectable increases in the incidence of cancers as a result of radiation exposure due to an emergency. The monitoring shall be based on criteria that provide an opportunity to detect increases in the incidence of cancers and to treat cancers more effectively at an early stage

# IAEA requirements for EP&R (IAEA GS-R-2)



## Functional requirements – *Keeping the public informed*

- **9a** Arrangements shall be made for: providing useful, timely, truthful, consistent and appropriate information to the public in the event of an emergency; responding to incorrect information and rumours; and responding to requests for information from the public and from the news and information media
- **9b** The operator, the response organizations, other States and the IAEA shall make arrangements for coordinating the provision of information to the public and to the news and information media in the event of an emergency

# IAEA requirements for EP&R (IAEA GS-R-2)



## **Functional requirements – *Taking agricultural countermeasures, countermeasures against ingestion and longer term protective actions***

- **10a** Optimized national intervention levels and action levels for agricultural countermeasures, countermeasures against ingestion and longer term protective actions shall be established that are in accordance with international standards, modified to take account of local and national conditions, such as:
  - (a) the individual and collective doses to be averted by the intervention; and
  - (b) the radiological and non-radiological health risks and the financial and social costs and benefits associated with the intervention

# IAEA requirements for EP&R (IAEA GS-R-2)



## Functional requirements – *Taking agricultural countermeasures, countermeasures against ingestion and longer term protective actions*

- **10b** Arrangements shall be made for taking effective agricultural countermeasures, including restriction of the consumption, distribution and sale of locally produced foods and agricultural produce following a release of radioactive material. These arrangements shall include:
  - default OILs for environmental measurements (such as dose rates due to deposition and deposition densities) and food concentrations;
  - the means to revise the OILs;
  - timely monitoring for ground contamination in the field;
  - the sampling and analysis of food and water; and
  - the means to enforce agricultural countermeasures

# IAEA requirements for EP&R (IAEA GS-R-2)



## Functional requirements – *Taking agricultural countermeasures, countermeasures against ingestion and longer term protective actions*

- **10c** In the UPZ and beyond, where relocation may be necessary as a result of a major release of radioactive material, arrangements shall be made for effective temporary relocation. These arrangements shall include: OILs for dose rates due to deposition and deposition densities; the means to revise the OILs; timely monitoring for ground contamination; the means for accomplishing relocation; and arrangements for assisting those persons who have been relocated
- **10d** For the emergency zones, arrangements shall be made for monitoring the contamination levels of vehicles, personnel and goods moving into and out of the contaminated areas in order to control the spread of contamination. This shall include the setting of operational criteria for the results of the monitoring that indicate the need for decontamination or controls in accordance with international standards

# IAEA requirements for EP&R (IAEA GS-R-2)



## **Functional requirements – *Taking agricultural countermeasures, countermeasures against ingestion and longer term protective actions***

- **10e** Arrangements shall be made for the safe and effective management of radioactive waste in accordance with international standards. These arrangements shall include: criteria for categorizing waste; a plan for monitoring and sampling to characterize the contamination and the waste; measurable criteria in terms of dose reduction for use in assessing the effectiveness of decontamination efforts; a method of testing decontamination methods before their general use; a method of duly minimizing the amount of material declared as waste and avoiding the unnecessary mixing of different waste types; a method of determining appropriate methods of storage, predisposal management and disposal; and a plan for the long term management of waste

# IAEA requirements for EP&R (IAEA GS-R-2)



## **Functional requirements – *Taking agricultural countermeasures, countermeasures against ingestion and longer term protective actions***

- **10f** Arrangements shall be made to assess exposure incurred by members of the public as a consequence of an emergency, and the results shall be made publicly available. The assessments shall be based on the best available information, and shall be promptly updated in the light of any information that would produce substantially more accurate results. Comprehensive records shall be maintained of assessments and their updates, and of monitoring results for workers, the public and the environment

# IAEA requirements for EP&R (IAEA GS-R-2)



## **Functional requirements – *Mitigating the non-radiological consequences of the emergency and the response***

- **11a** Jurisdictions within the emergency zones shall make arrangements for justifying, optimizing and authorizing different intervention levels or action levels following an event for which agricultural countermeasures or longer term protective actions are in place. The process shall include arrangements for consulting the people affected. Public concern, effects on economic conditions and employment, long term needs for social welfare and other non-radiological effects of longer term protective actions shall be considered in this process. This process shall provide for exception from accordance with international standards where these are justified



# IAEA requirements for EP&R (IAEA GS-R-2)



## **Functional requirements – *Mitigating the non-radiological consequences of the emergency and the response***

- **11b** Arrangements shall be made for responding to public concern in an actual or potential emergency. Preparations shall include arrangements for promptly explaining any health risks and what are appropriate and inappropriate personal actions for reducing risks. These arrangements shall include monitoring for and responding to any related health effects and preventing inappropriate actions on the part of workers and the public. This shall include the designation of the organization(s) with the responsibility for identifying the reasons for such actions (such as misinformation from the media or rumours) and for making recommendations on countering them. How these recommendations are to be included in the national emergency response shall be specified

# IAEA requirements for EP&R (IAEA GS-R-2)



## Functional requirements – *Conducting recovery operations*

- **12a** Arrangements shall be established for the transition from emergency phase operations to routine long term recovery operations. This process shall include: the definition of the roles and functions of organizations; methods of transferring information; methods of assessing radiological and non-radiological consequences; and methods of modifying the actions taken to mitigate the radiological and non-radiological consequences
- **12b** Decisions to cancel restrictions and other arrangements imposed in response to an emergency shall be made by a formal process that is in accordance with international guidance. The regulatory body shall provide any necessary input to the intervention process. Such input may be advice to the government or regulatory control of intervention activities. Principles and criteria for intervention actions shall be established and the regulatory body shall provide any necessary advice in this regard. This process shall include public consultation. The process shall provide for exceptions from compliance with national regulations and international standards, where justified

# IAEA requirements for EP&R (IAEA GS-R-2)



## Requirements for infrastructure – *Authority*

- **13a** The authority for developing, maintaining and regulating arrangements for preparedness and response shall be established by means of acts, legal codes or statutes,
- **13b** All the operating and local and national organizations involved shall document their own role, functions, authorities and responsibilities and assent to the authorities, roles and responsibilities of other response organizations
- **13c** Arrangements shall include the clear allocation of responsibilities, authorities and arrangements for coordination in all phases of the response
- **13d** The arrangements for the delegation and/or transfer of authority shall be clearly specified in the relevant emergency plans

# IAEA requirements for EP&R (IAEA GS-R-2)



## Requirements for infrastructure – *Organization*

- **14a** The organizational relationships and interfaces between all the major response organizations shall be established
- **14b** The positions responsible within each operating and response organization for the performance of the response functions shall be assigned in the emergency plans
- **14c** Personnel shall be assigned to appropriate positions in all operating and response organizations in order to perform the functions necessary to meet the functional requirements
- **14d** Sufficient numbers of qualified personnel shall be available at all times in order that appropriate positions can be promptly staffed as necessary following the declaration and notification of an emergency

# IAEA requirements for EP&R (IAEA GS-R-2)



## Requirements for infrastructure – *Coordination of emergency response*

- **15a** Arrangements for the coordination of emergency response and protocols for operational interfaces between operators and local, regional and national governments shall be developed, as applicable. These arrangements shall include the organizations responsible for emergency services and for response to conventional emergencies. The arrangements shall be clearly documented and this documentation shall be made available to all relevant parties
- **15b** When several different organizations or other States are expected to have or to develop tools, procedures or criteria for use in responding to the same emergency, coordination arrangements shall be put in place to harmonize the results of assessments of contamination, doses and health effects and of any other appropriate assessments made in order not to give rise to inconsistency and confusion

# IAEA requirements for EP&R (IAEA GS-R-2)



## Requirements for infrastructure – *Coordination of emergency response*

- **15c** Arrangements shall be made to ensure that all States within defined emergency zones are provided with appropriate information for developing their own preparedness to respond to an emergency and arrangements shall be made for appropriate transboundary coordination. These arrangements shall include: arrangements and protocols to provide information necessary to develop a coordinated means for notification, classification schemes, intervention criteria and criteria for the introduction and revoking of protective actions; arrangements for public information; and arrangements for the exchange of information between decision making authorities. The language and physical units to be used shall be determined in advance

# IAEA requirements for EP&R (IAEA GS-R-2)



## Requirements for infrastructure – *Plans and procedures*

- **16a** Plans or other arrangements shall be made for coordinating the national response to the range of potential nuclear and radiological emergencies. These arrangements shall specify the organization responsible for the development and maintenance of the arrangements; shall describe the responsibilities of the operators and other response organizations; and shall describe the coordination effected between these arrangements and the arrangements for response to a conventional emergency
- **16b** Each response organization shall prepare a general plan or plans for coordinating and performing their assigned functions. Emergency plans shall be prepared which specify how the responsibilities for the management of interventions will be discharged on the site, off the site and across national borders, as appropriate, in separate but interconnecting plans

# IAEA requirements for EP&R (IAEA GS-R-2)



## Requirements for infrastructure – *Plans and procedures*

- **16c** The plans for response to a nuclear emergency shall be coordinated with any other plans (such as for physical security, law enforcement or fire fighting) that may be implemented in an emergency in order to ensure that the simultaneous implementation of the plans would not seriously reduce their effectiveness or cause conflicts
- **16d** The appropriate responsible authorities shall ensure that: emergency plans are prepared and approved; response organizations are involved in the preparation of emergency plans, as appropriate; the content, features and extent of emergency plans take into account the results of any threat assessment and any lessons learned from operating experience and from emergencies that have occurred; and emergency plans are periodically reviewed and updated



# IAEA requirements for EP&R (IAEA GS-R-2)

## Requirements for infrastructure – *Plans and procedures*

- **16e** Emergency plans shall include, as appropriate:
  - (a) allocation of responsibilities for performing the required functions
  - (b) identification of the various operating and other conditions which could lead to the need for intervention
  - (c) intervention levels, based on a consideration of guidelines for the relevant protective actions and the scope of their application, with account taken of the possible degrees of severity of accidents or emergencies that could occur
  - (d) procedures, including communication arrangements, for contacting any relevant response organizations and for obtaining assistance from fire fighting, medical, police and other relevant organizations
  - (e) a description of the methodology and instrumentation for assessing the emergency and its consequences on and off the site
  
- **16f** The operating organization shall prepare an emergency plan that shall be coordinated with those of all other bodies having responsibilities in an emergency, including public authorities, and shall be submitted to the regulatory body

# IAEA requirements for EP&R (IAEA GS-R-2)



## Requirements for infrastructure – *Plans and procedures*

- **16g** The emergency plan of the operating organization shall include the following (inter alia):
  - (1) a description of the on-site organization, including the designation of persons for ensuring liaison with off-site organizations
  - (2) the conditions under which an emergency shall be declared, and a description of suitable arrangements for alerting response personnel and public authorities
  - (3) the arrangements for initial and subsequent assessment of the radiological conditions off the site
  - (4) arrangements for minimizing the exposure of persons off the site and for ensuring medical treatment of casualties, including arrangements to take protective actions if warranted to reduce the risk of severe deterministic health effects
  - (5) the actions to be taken by persons and organizations involved in the implementation of the plan
  - (6) arrangements for declaring the termination of an emergency

# IAEA requirements for EP&R (IAEA GS-R-2)



## Requirements for infrastructure – *Plans and procedures*

- **16h** The operating and response organizations shall develop the necessary procedures, analytical tools and computer programs in order to be able to perform the required functions
- **16i** Procedures, analytical tools and computer programs to be used in performing functions to meet the requirements for emergency response shall be tested under simulated emergency conditions and shall be validated as correct prior to use
- **16j** Offsite emergency plans and any transboundary plan shall be implemented by the response organizations

# IAEA requirements for EP&R (IAEA GS-R-2)



## Requirements for infrastructure – *Logistical support and facilities*

- **17a** Adequate tools, instruments, supplies, equipment, communications systems, facilities and documentation shall be provided for performing the required functions. These items and facilities shall be selected or designed to be operational under the postulated conditions that may be encountered in the emergency response, and to be compatible with other procedures and equipment for the response, as appropriate. These support items shall be located or provided in a manner that allows their effective use under postulated emergency conditions
- **17b** Emergency facilities shall be designated where the following will be performed in the different phases of the response: the coordination of local off-site response actions; the coordination of national response actions; coordination of public information; and coordination of off-site monitoring and assessment. These emergency facilities shall be suitably located and/or protected so as to enable the exposure of emergency workers to be managed in accordance with international standards

# IAEA requirements for EP&R (IAEA GS-R-2)



## Requirements for infrastructure – *Logistical support and facilities*

- **17c** Laboratories shall be designated to make the necessary arrangements to be able to perform appropriate and reliable analyses of environmental and biological samples and measurements of internal contamination for the purposes of an emergency response. It shall be ensured that these facilities would be operational under postulated emergency conditions
- **17d** A national emergency facility or facilities shall be designated for the coordination of response actions and public information
- **17e** Arrangements shall be made to obtain appropriate support for logistics and communication, for social welfare and in other areas from the organizations responsible for providing such support in conventional emergencies

# IAEA requirements for EP&R (IAEA GS-R-2)



## Requirements for infrastructure – *Training drills and exercises*

- **18a** The operator and the response organizations shall identify the knowledge, skills and abilities necessary to be able to perform the required functions. The operator and the response organizations shall make arrangements for the selection of personnel and for training to ensure that the personnel have the requisite knowledge, skills, abilities, equipment and procedures and other arrangements to perform their assigned response functions. The arrangements shall include ongoing refresher training on an appropriate schedule and arrangements for ensuring that personnel assigned to positions with responsibilities for emergency response undergo the specified training
- **18 b** Exercise programmes shall be conducted to ensure that all specified functions and all organizational interfaces are tested at suitable intervals. These programmes shall include the participation in some exercises of as many as possible of the organizations concerned. These exercises shall be systematically evaluated and some exercises shall be evaluated by the regulatory body. The programme shall be subject to review and updating in the light of experience gained

# IAEA requirements for EP&R (IAEA GS-R-2)



## Requirements for infrastructure – *Training drills and exercises*

- **18c** The staff responsible for critical response functions shall participate in a training exercise or drill at least once every year
- **18d** The officials off the site responsible for making decisions on protective actions for the population within the PAZ and/or UPZ shall be trained in the strategy for protective action and shall regularly participate in exercises
- **18e** The performance of exercises shall be evaluated against established response objectives that demonstrate that identification, notification, activation and other initial response actions can be performed in time to achieve the practical goals of emergency response

# IAEA requirements for EP&R (IAEA GS-R-2)



## Requirements for infrastructure – *Quality assurance programme*

- **19a** The operator and the off-site response organizations shall establish a quality assurance programme, in accordance with Review of current off-site nuclear emergency preparedness and response arrangements in EU member states and neighbouring countries international standards, to ensure a high degree of availability and reliability of all the supplies, equipment, communication systems and facilities necessary to perform the required functions. This programme shall include arrangements for inventories, resupply, tests and calibrations, made to ensure that these items and facilities are continuously available and functional for use in an emergency. Arrangements shall be made to maintain, review and update emergency plans and procedures and other arrangements and to incorporate lessons learned from research, operating experience and emergency drill and exercises



# IAEA requirements for EP&R (IAEA GS-R-2)



## Requirements for infrastructure – *Quality assurance programme*

- 19b The operating organization and response organizations shall prepare and put in place a comprehensive quality assurance programme covering all activities which may affect the emergency response programme.
- 19c The operator and the off-site response organizations shall make arrangements to review and evaluate responses in emergencies and in drills and exercises, to record the areas in which improvements are necessary and to ensure that the necessary improvements are made

# EU legislative provisions relating to EP&R

NTW EP&R INCEPTION SEMINAR

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# EU legislative provisions relating to EP&R

## EU Requirements (Basic Safety Standards Directive, Public Information Directive, Regulations on food intervention levels)

### BSS Directive (96/29/Euratom) - *Article 50. Intervention preparation*

- 1. Each Member State shall ensure that account is taken of the fact that radiological emergencies may occur in connection with practices on or outside its territory and affect it
- 2. Each Member State shall ensure that appropriate intervention plans, taking account of the general principles of radiation protection for intervention and of the appropriate intervention levels established by the competent authorities, are drawn up at national or local level, in order to deal with various types of radiological emergency and that such plans are tested to an appropriate extent at regular intervals

# EU legislative provisions relating to EP&R

## EU Requirements (Basic Safety Standards Directive, Public Information Directive, Regulations on food intervention levels)

### BSS Directive (96/29/Euratom) - *Article 50. Intervention preparation*

- 3. Each Member State shall ensure, where appropriate, that provision is made for the creation and appropriate training of special teams for technical, medical and health intervention
- 4. Each Member State shall seek to cooperate with other Member States or non-Member States in relation to possible radiological emergencies at installations on its own territory which may affect other Member States or non-Member States, in order to facilitate the organization of radiological protection in these States

# EU legislative provisions relating to EP&R

## BSS Directive (96/29/Euratom) - *Article 51. Implementation of intervention*

1. Each Member State shall make provision for the immediate notification to its competent authorities by the undertaking responsible for the practices involved of any radiological emergency occurring in its territory and shall require all appropriate action to reduce the consequences
2. Each Member State shall ensure that, in the event of an emergency on its own territory, the undertaking responsible for the practices involved makes an initial provisional assessment of the circumstances and consequences of the emergency and assists with intervention
3. Each Member State shall ensure that provision is made, if the situation so requires, for intervention related to:
  - - the environment, to reduce the transfer of radioactive substances to individuals
  - - individuals, to reduce exposure and organize the treatment of victims

# EU legislative provisions relating to EP&R

## BSS Directive (96/29/Euratom) - *Article 51. Implementation of intervention*

4. In the event of an emergency on or outside its territory, each Member State shall require:

- (a) the organization of appropriate intervention, taking account of the real of the emergency
- (b) the assessment and recording of the consequences of the emergency and of the effectiveness of the intervention

5. Each Member State shall, in the event of an emergency occurring at an installation on its territory or being likely to have radiological consequences on its territory, establish relations to obtain cooperation with any other Member State or non-Member State which may be involved

# EU legislative provisions relating to EP&R

## **BSS Directive (96/29/Euratom) - *Article 52. Emergency occupational exposure***

1. Each Member State shall make provision for situations where workers or intervention personnel involved in different kinds of intervention are liable to be subjected to emergency exposure resulting in doses in excess of the dose limits for exposed workers. To this end, each Member State shall establish exposure levels taking into account the technical obligations and health risks. These levels shall be operational guides
2. Each Member State shall require radiological monitoring and medical surveillance of the special emergency intervention teams

# EU legislative provisions relating to EP&R

## **BSS Directive (96/29/Euratom) - *Article 53. Intervention in cases of lasting exposure***

Where the Member States have identified a situation leading to lasting exposure resulting from the after-effects of an emergency, they shall, if necessary and to the extent of the exposure risk involved, ensure that:

- (a) the area concerned is demarcated;
- (b) arrangements for the monitoring of exposure are made;
- (c) any appropriate intervention is implemented, taking account of the real characteristics of the situation
- (d) access to or use of land or buildings situated in the demarcated areas is regulated



# EU legislative provisions relating to EP&R

## Public Information Directive (89/618/Euratom) - *Article 5. Prior information*

1. Member States shall ensure that the population likely to be affected in the event of an emergency is given information about the health-protection measures applicable to it and about the action it should take in the event of such an emergency

2. The information supplied shall at least include:

- 1. Basic facts about radioactivity and its effects on human beings and on the environment;
- 2. The various types of emergency covered and their consequences for the general public and the environment;
- 3. Emergency measures envisaged to alert, protect and assist the general public in the event of an emergency;
- 4. Appropriate information on action to be taken by the general public in the event of an emergency

# EU legislative provisions relating to EP&R

## Public Information Directive (89/618/Euratom) - *Article 5. Prior information*

3. This information shall be communicated to the population likely to be affected without any request being made
4. Member States shall update the information and circulate it at regular intervals and whenever significant changes in the arrangements that it describes take place. This information shall be permanently available to the public

# EU legislative provisions relating to EP&R

## Public Information Directive (89/618/Euratom) - *Article 6. Information in the event of an emergency*

1. Member States shall ensure that, when an emergency occurs, the population actually affected is informed without delay of the facts of the emergency, of the steps to be taken and, as appropriate to the case in point, of the health-protection measures applicable to it [

# EU legislative provisions relating to EP&R

## Public Information Directive (89/618/Euratom) - *Article 6. Information in the event of an emergency*

2. The information provided shall cover the points that follow which are relevant to the type of emergency:

- 1. On the basis of the intervention plans previously drawn up in the Member States, the population actually affected in the event of an emergency will rapidly and regularly receive:
  - (a) information on the type of emergency which has occurred and, where possible, its characteristics;
  - (b) advice on protection which, depending on the type of emergency might: cover restrictions on the consumption of certain foodstuffs likely to be contaminated, simple rules on hygiene and decontamination, recommendations to stay indoors, distribution and use of protective substances, evacuation arrangements; be accompanied, where necessary, by special warnings for certain population groups
  - (c) announcements recommending cooperation with instructions or requests by the competent authorities

# EU legislative provisions relating to EP&R

## Public Information Directive (89/618/Euratom) - *Article 6. Information in the event of an emergency*

- 2. If the emergency is preceded by a pre-alarm phase, the population likely to be affected should already receive information and advice during that phase
- 3. This information and advice will be supplemented if time permits by a reminder of the basic facts about radioactivity and its effects on human beings and the environment

# EU legislative provisions relating to EP&R

Public Information Directive (89/618/Euratom) –

## ***Article 7. Information of persons who might be involved in the organization of emergency assistance***

1. Member States shall ensure that any persons who are not on the staff of the facilities but who might be involved in the organization of emergency assistance are given adequate and regularly updated information on the health [risks] their intervention might involve and on the precautionary measures to be taken
2. As soon as an emergency occurs, this information shall be supplemented appropriately, having regard to the specific circumstances

# EU legislative provisions relating to EP&R



## Public Information Directive (89/618/Euratom) – *Article 8. Information procedures*

The information referred to in Articles 5, 6 and 7 shall also mention the authorities responsible for implementing the measures referred to in those Articles

# EU legislative provisions relating to EP&R

**Regulation laying down maximum permitted levels of radioactive contamination of foodstuffs (Council Regulations 3954/87 and 2218/89 and Commission Regulation 944/89)**

- Foodstuffs or feeding stuffs not in compliance with the maximum permitted levels shall not be placed on the market (see Annex to Regulation 2218/89)



# International or European requirements, guidance or recommendations used in mapping

NTW EP&R INCEPTION SEMINAR

February 7 2014

Paris, France

Nadja Železnik, Regional Environmental Center (REC), Slovenia  
Vice president of NTW and WG EP&R chair

# International or European requirements, guidance or recommendations used in mapping

## 12.1 IAEA criteria/guidance used in mapping comparisons

Emergency planning zones (IAEA Safety Guide GS-G-2.1)

**Table 12-1:** Suggested radii of emergency planning zones for reactors >1000 MW(th)

Precautionary action zone (PAZ)	3-5 km
Urgent protective action planning zone (UPZ)	5-30 km

**Table 12-3:** Generic optimized intervention level for terminating intervention

Type of intervention	Dosimetric quantity	Duration of exposure	Generic optimized intervention level
<b>Temporary relocation</b>	Total effective dose from all routes of exposure than can be averted	1 month	10 mSv

# International or European requirements, guidance or recommendations used in mapping

## Guidelines for intervention levels (IAEA Requirements GS-R-2)

**Table 12-2:** Generic optimized intervention levels for initiating intervention

Type of intervention	Dosimetric quantity	Duration of exposure	Generic optimized intervention level
<b>Sheltering</b>	Avertable effective dose	No more than 2 days	10 mSv
<b>Temporary evacuation</b>	Avertable effective dose	No more than 1 week	50 mSv
<b>Iodine prophylaxis</b>	Avertable committed absorbed dose to the thyroid due to radioiodine		100 mGy
<b>Temporary relocation</b>	Total effective dose from all routes of exposure than can be averted	1 month	30 mSv

# International or European requirements, guidance or recommendations used in mapping

Radionuclide	Generic action level <sup>2</sup> (kBq/kg)
<b>Foods destined for general consumption</b>	
Cs-134, Cs-137, I-131, Ru-103, Ru-106, Sr-89	1
Sr-90	0.1
Am-241, Pu-238, Pu-239, Pu-240, Pu-242	0.01
<b>Milk, infant foods and drinking water</b>	
Cs-134, Cs-137, Ru-103, Ru-106, Sr-89	1
I-131, Sr-90	0.1
Am-241, Pu-238, Pu-239, Pu-240, Pu-242	0.001

# International or European requirements, guidance or recommendations used in mapping

## Operational intervention levels (IAEA General Safety Guide GSG-2)

**Table 12-5:** Default operational intervention levels (OILs) for field survey measurements

OIL	OIL value	Response action if OIL is exceeded
<b>OIL1</b>	<ul style="list-style-type: none"> <li>• 1000 <math>\mu\text{Sv/h}</math> gamma dose rate at 1 m from surface</li> <li>• 2000 counts/s direct beta surface contamination</li> <li>• 50 counts/s direct alpha surface contamination</li> </ul>	<ul style="list-style-type: none"> <li>• Immediately evacuate or provide substantial shelter</li> <li>• Provide for decontamination of evacuees</li> <li>• Reduce inadvertent ingestion</li> <li>• Stop consumption of local produce, rainwater and milk from animals grazing in the area</li> <li>• Register and provide for a medical examination of evacuees</li> </ul>
<b>OIL2</b>	<ul style="list-style-type: none"> <li>• 100 <math>\mu\text{Sv/h}</math> gamma dose rate at 1 m from surface</li> <li>• 200 counts/s direct beta surface contamination</li> <li>• 10 counts/s direct alpha surface contamination</li> </ul>	<ul style="list-style-type: none"> <li>• Stop consumption of local produce, rainwater and milk from animals grazing in the area until they have been screened and assessed using OIL5 and OIL6</li> <li>• Temporarily relocate those living in the area; before relocation, reduce inadvertent ingestion; register and estimate the dose to those who were in the area to determine if medical screening is warranted; relocation of people from the areas with the highest potential exposure should begin within days</li> </ul>

# International or European requirements, guidance or recommendations used in mapping

OIL	Contamination	Response action if OIL is exceeded
OIL3	<ul style="list-style-type: none"> <li>• 1 <math>\mu\text{Sv/h}</math> gamma dose rate at 1 m from surface</li> <li>• 20 counts/s direct beta surface contamination</li> </ul>	<ul style="list-style-type: none"> <li>• Stop consumption of non-essential local produce, rainwater and milk from animals grazing in the area until it has been screened and contamination levels have been assessed using OIL5 and OIL6</li> <li>• Screen local produce, rainwater and milk from animals grazing in the area out to at least 10 times</li> </ul>

OIL	OIL value	Response action if OIL is exceeded
	<ul style="list-style-type: none"> <li>• 2 counts/s direct alpha surface contamination</li> </ul>	<ul style="list-style-type: none"> <li>• the distance to which OIL3 is exceeded and assess samples using OIL5 and OIL6</li> <li>• Consider providing iodine thyroid blocking for fresh fission products and for iodine contamination if replacement for essential local produce or milk is not immediately available</li> <li>• Estimate the dose of those who may have consumed food, milk or rainwater from the area where restrictions were implemented to determine if medical screening is warranted</li> </ul>

# International or European requirements, guidance or recommendations used in mapping

**Table 12-6:** Default screening OILs for food, milk and water concentrations from laboratory analysis

OIL	OIL value	Response action if OIL is exceeded
<b>OIL5</b>	<ul style="list-style-type: none"> <li>• 100 Bq/kg gross beta, or</li> <li>• 5 Bq/kg gross alpha</li> </ul>	<ul style="list-style-type: none"> <li>• Above OIL5: assess using OIL6</li> <li>• Below OIL5: safe for consumption during the emergency phase</li> </ul>

**Table 12-7:** Guidance values for restricting exposure of emergency workers

Tasks	Guidance value for dose equivalent from exposure to external penetrating radiation <sup>3</sup>
<b>Life saving actions</b>	500 mSv Value may be exceeded under circumstances in which the expected benefits to others clearly outweigh the emergency worker's own health risks, and the emergency worker volunteers to take the action and understands and accepts this health risk
<b>Actions to prevent severe deterministic effects and actions to prevent the development of catastrophic conditions that could significantly affect people and the environment</b>	500 mSv
<b>Actions to avert a large collective dose</b>	100 mSv

# International or European requirements, guidance or recommendations used in mapping

## 12.2 WHO criteria/guidance used in mapping comparisons

### Iodine prophylaxis

**Table 12-8:** Recommended single dosage of stable iodine according to age group

Age group	Mass of iodine (mg)	Mass of KI (mg)	Mass of KIO <sub>3</sub> (mg)	Fraction of 100 mg tablet
Adults and adolescents (> 12 y)	100	130	170	1
Children (3-12 y)	50	65	85	1/2
Infants (1 month to 3 y)	25	32	42	1/4
Neonates (birth to 1 month)	12.5	16	21	1/8

**Table 12-9:** Recommended repeat dosages

Age group	Repeat dosage
Adults (over 18 y)	0
Adolescents (12-18 y)	1/d
Children (3-12 y)	1/d
Infants (1 month to 3 y)	1/d
Neonates (birth to 1 month)	0
Lactating mothers	0



# International or European requirements, guidance or recommendations used in mapping

**Table 12-10:** Reference levels of dose for different population groups for consideration in planning iodine prophylaxis

Age group	Exposure pathways to be considered	Reference levels <sup>4</sup>
Neonates, infants, children, adolescents to 18 y and pregnant and lactating women	Inhalation (and ingestion <sup>5</sup> )	10 mGy avertable dose to the thyroid
Adults under 40 y	Inhalation	100 mGy avertable dose to the thyroid
Adults over 40 y	Inhalation	5 Gy projected dose to the thyroid

# International or European requirements, guidance or recommendations used in mapping

## 12.3 EU criteria used in mapping comparisons

**European Council Food Intervention Levels** (Council Regulation 2218/89/Euratom)

Table 12-11: Maximum permitted levels for foodstuffs (Bq/kg)

	Baby foods	Dairy produce	Other foodstuffs except minor foodstuffs <sup>6</sup>	Liquid foodstuffs
Isotopes of strontium, notably Sr-90	75	125	750	125
Isotopes of iodine, notably I-131	150	500	2000	500
Alpha emitting isotopes of plutonium and trans-plutonium elements, notably Pu-239, Am-241	1	20	80	20
All other nuclides of half-life > 10 d, notably Cs-134, Cs-137 <sup>7</sup>	400	1000	1250	1000