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IAEA Safety Standards and Guidelines for Preparedness and Response to Nuclear and Radiological Emergencies

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International EPR Framework

- Legal instruments
- Safety Standards
- Tools, protocols and operational arrangements
Safety Requirements


- establishes requirements for an adequate level of preparedness and response for a nuclear or radiological emergency in any State
Safety Guides


- Assists in fulfilling requirements for efficient emergency preparedness and response
IAEA Safety Guides (cont’d)


- Generic criteria
- Operational Intervention Levels
  - Examples of default OILs for deposition, individual monitoring and food, milk and water contamination
- Emergency actions levels for LWRs
- On-scene observables
- Plain language explanation of actions vs OILs
Reference level of residual dose between 20 mSv - 100 mSv

Generic Criteria of projected or received dose warranting specific protective actions

Default triggers: measurable parameters or observables (e.g. OILs, EALs)
System of Generic & Operational Criteria

GENERIC CRITERIA

- Operational Intervention Levels (OIL)
- Emergency Action Levels (EAL)
- Observables/Indicators

- Field and laboratory measurements
- Abnormal facility conditions
- Conditions on-scene

ACTION
Background and Rationale

**Concern**
- Severe deterministic effects
- Possible increase in stochastic effects

**Generic Criteria**
- \( \approx 1000 \text{ mGy in hours} \)
- \( \approx 100 \text{ mSv in 7 days} \)
- \( \approx 100 \text{ mSv in year} \)

**Actions**
- Precautionary protective actions
- Urgent protective actions
- Early protective actions
Example of Latest Developments (1)

- Actions to Protect Public in Emergency due to Severe Conditions at Light Water Reactors (EPR-NPP Public Protective Actions, 2013)
  - Provides tools and criteria to be used as basis at preparedness stage for protection of public in response to emergency involving actual or projected severe damage to fuel in reactor core or spent fuel pool at light water reactor (LWR) or spent fuel pool
  - Could also be of direct use in response to emergency
Describes in Details

- Emergency Classification System
  - Alert, Site Area Emergency, General Emergency
- Response Time Objectives for actions upon declaration of General Emergency
- Emergency Zones and Distances
- Protective actions and other response actions in different Emergency Zones and Distances
Addressed Protective Actions

- Iodine Thyroid Blocking
- Sheltering
- Evacuation
- Relocation
- Prevention of inadvertent ingestion
- Decontamination of individuals
- Food, milk and water restrictions
- Identification/management of exposed/contaminated
- International trade
- Stopping or relaxing response actions
Operational Intervention Levels (OILs) used after a release

...need to be developed in advance

- Needed for immediate decisions
- No time to develop during emergency
- Difficult to develop and justify criteria during emergency
  - Difficulty in gaining public trust
Application OILs

- Provided:
  - Numerical values for default OILs
  - Plain language explanations for OILs
  - Strategy for identification/dealing with contamination and hotspots
Default OILs Are Provided For:

- Dose rate above the ground
  - For: Evacuation, Relocation, Food restrictions

- Dose rate from the thyroid

- Dose rate from skin contamination

- Food, milk and water Cs-137 and I-131 concentrations
Unit and Quantity Confusion

Contamination

Cs-137 Bq/cm²
Bq
Dose
I-131 Bq/kg
Sv
High doses
R/h
High concentrations

cps

Am I safe?

In food
In water
In soil
On ground

High activities
Activity

μSv/h
Sv/h
mSv/h

Above the safety limit

IAEA
Example Typical Public Questions and Concerns in a Nuclear Emergency

- What dose I may have received and what it means to my health?
- What could be the consequences for my health?
- Can children play outside?
- Should I take measures to decontaminate my home?
- What does radiation levels 20 times above normal mean?
Communication with Public and Decision Makers

Measured quantity

<table>
<thead>
<tr>
<th>QUANTITY</th>
<th>HEALTH HAZARD IN PERSPECTIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>μSv/h</td>
<td>POSSIBLY DANGEROUS TO HEALTH</td>
</tr>
<tr>
<td></td>
<td>Register for medical examination.</td>
</tr>
<tr>
<td>μSv/h</td>
<td>HEALTH CONCERNS</td>
</tr>
<tr>
<td></td>
<td>The danger to the health is low. As a precaution register for medical screening.</td>
</tr>
<tr>
<td>μSv/h</td>
<td>PROVISIONALLY SAFE</td>
</tr>
<tr>
<td></td>
<td>Safe if certain specified limitations are followed.</td>
</tr>
<tr>
<td>μSv/h</td>
<td>SAFE</td>
</tr>
<tr>
<td></td>
<td>There are no hazards to health.</td>
</tr>
</tbody>
</table>

Health hazard in perspective
Example of Latest Developments (2)

- Specific assistance in building effective emergency preparedness and response capabilities and arrangements for countries embarking on use of nuclear power
  - Guidance
  - Training materials
Example of Latest Developments (3)

- Communication with the Public in a Nuclear or Radiological Emergency
  - EPR-Public Communications, 2012
  - CD with lectures, work sessions and exercise for 1-week course
  - Explanatory materials
Explanatory Materials

• Specific emphasis on provision of plain language explanation
Assistance in Implementation of Safety Standards and Guidelines in EPR

- National, regional and interregional training events
  - For all categories of those involved in EPR
- Exercises
  - National
  - ConvEx exercises
- Capacity Building Centres (CBC) in EPR area
Emergency Preparedness Review (EPREV)

- To independently appraise national capabilities in emergency preparedness and response
Incident and Emergency Centre

Focal point for EPR and custodian of IAEA Incident and Emergency System

Implementing IAEA functions in EPR
Conclusion

• Application of IAEA Safety Standards and guidelines assists in development of efficient EPR infrastructure and contributes to harmonized response
• IAEA is ready to assist in application of Safety Standards and guidelines
Thank you!