Webinar on Food Safety in a Nuclear or Radiological Emergency

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Food Safety in a Nuclear or Radiological Emergency: Emergency Preparedness and Decision – Making Criteria

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Basis for Safety Standards
IAEA Statute

• Under Article III.A.6 of its Statute, the IAEA is authorized:

“To establish or adopt, in consultation and, where appropriate, in collaboration with the competent organs of the United Nations and with the specialized agencies concerned, standards of safety for protection of health and minimization of danger to life and property (including such standards for labour conditions), and to provide for the application of these standards...”
✓ An international consensus on what constitutes a high level of safety for protecting people and the environment from harmful effects of ionizing radiation...
Safety Standards in EPR

Overview

• Provide for an adequate level of preparedness and response for any nuclear or radiological emergency, irrespective of the cause
  – Including in relation to arrangements for ensuring food, milk and drinking water safety in an emergency

• Cosponsored by a number of international organizations (e.g. WHO and FAO)
Food Safety: What does it mean?

• Dual connotation:
  – Protection of the food chain and water supply systems from getting contaminated in an emergency
    • e.g. milk from grazing animals or drinking water using open sources (such as rain water)
  – Protecting individuals from ingestion of potentially or actually contaminated food, milk and drinking water in an emergency
    • e.g. locally grown vegetables
Food Safety: How it is achieved?

• Through giving it adequate consideration within the overall protection strategy
  – Protection of the food chain and water supply systems from getting contaminated in an emergency
    • Through actions such as instructing farmers to put grazing animals on safe feed or other individuals to cover open sources for drinking water and associated arrangements
  – Protecting individuals from ingestion of potentially or actually contaminated food, milk and drinking water in an emergency
    • Through actions such as restricting the consumption, sale and distribution of local produce, forest products, drinking water and associated arrangements
Restrictions on food, milk and drinking water

Effective implementation

• To be most effective, restrictions are to be imposed on food, milk and drinking water as a precaution on the basis of observable or facility conditions (before or shortly after the release)

• The restrictions could then be adjusted as monitoring is deployed and results are obtained

• Once detailed characterization is carried out (later in the emergency response), it is needed to identify where and for what foods’ restrictions are

  either
  – Justified in the longer term

  or

  – Need to be lifted
Restrictions on food, milk and drinking water
Effective implementation (cont’d)

• Development of criteria to allow effective implementation of food, milk and drinking water restrictions and associated arrangements
## Restrictions on food, milk and drinking water

### Generic criteria

<table>
<thead>
<tr>
<th>Dosimetric quantity</th>
<th>Projected dose in the first week and set of urgent actions within protection strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effective dose</td>
<td>100 mSv</td>
</tr>
<tr>
<td>Equivalent dose in fetus or embryo</td>
<td>100 mSv</td>
</tr>
<tr>
<td>Sheltering, evacuation, decontamination, restrictions on food, milk and drinking water…</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dosimetric quantity</th>
<th>Projected dose in the first year and set of early actions within protection strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effective dose</td>
<td>100 mSv</td>
</tr>
<tr>
<td>Equivalent dose in fetus or embryo</td>
<td>100 mSv</td>
</tr>
<tr>
<td>Temporary relocation, decontamination, restrictions on food, milk and water …</td>
<td></td>
</tr>
</tbody>
</table>
Restrictions on food, milk and drinking water
Generic criteria (cont’d)

• Basis for implementing restrictions on food, milk and drinking water as either urgent or early protective actions
  – Before sampling and analysis is carried out
  – Usually as a precaution due to limited information available at the time
  – Taking account of all exposure pathways

• For use within the affected areas
Restrictions on food, milk and drinking water
Generic criteria (cont’d)

<table>
<thead>
<tr>
<th>Dosimetric quantity</th>
<th>Projected dose in the first year for food, milk and drinking water restrictions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effective dose</td>
<td>10 mSv</td>
</tr>
<tr>
<td>Equivalent dose in fetus or embryo (for period of (in utero) development)</td>
<td>10 mSv</td>
</tr>
</tbody>
</table>

- Considers only the ingestion pathway
  - Applicable once sampling and analysis is carried out
    - Providing also a basis for discontinuing restrictions imposed on food, milk and drinking water as a precaution
- For use within affected areas
Important notice

• Restrictions on food, milk and drinking water based on the criteria are implemented only if they are non-essential and if replacements or other alternatives are available.
Restrictions on food, milk and drinking water intended for international trade

<table>
<thead>
<tr>
<th>Dosimetric quantity</th>
<th>Projected dose in the first year for food, milk and drinking water intended for international trade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effective dose</td>
<td>1 mSv</td>
</tr>
<tr>
<td>Equivalent dose in fetus or embryo (for period of in utero development)</td>
<td>1 mSv</td>
</tr>
</tbody>
</table>

- International trade expected to be governed with criteria that take account of Codex General Standard for Contaminants and Toxins in Food and Feed (CODEX STAN 193-1995)
  - Applicable after the emergency irrespective of exposure situation (covering food only)
Operational Intervention Levels (OILs)

- GSG-2 provides OILs for triggering food, milk and drinking water restrictions within affected areas
- GSG-2 does not contain OILs for restrictions on international trade
  - Guideline Levels of Codex Alimentarius Commission can be used as OILs regarding food restrictions in international trade ultimately (GSR Part 7)
- Provided for infant and non-infant foods intended for trade
## Default OILs in GSG-2

<table>
<thead>
<tr>
<th>OIL3</th>
<th>Measured value of <strong>ground contamination</strong> to indicate where immediate restrictions on food, milk and drinking water are warranted</th>
</tr>
</thead>
<tbody>
<tr>
<td>OIL5</td>
<td>Measured values of <strong>radionuclide concentration</strong> in food, milk or drinking water to indicate where restrictions on food, milk and drinking water are warranted</td>
</tr>
<tr>
<td>OIL6</td>
<td></td>
</tr>
</tbody>
</table>

**OIL**
Default OILs based on ground contamination (OIL3)

– **OIL3**: Assessing immediate need to restrict food, milk and drinking water before any sampling and analysis is possible
  - Ambient gamma dose rate [\(\mu\text{Sv/h}\)] at 1m above ground
  - Beta and alpha surface contamination measurements

– To be used to expand or lift the restrictions imposed as a precaution based on observable or plant conditions
Default OILs based on samples’ analysis (OIL5 and OIL6)

- **OIL5**: Gross beta and alpha measurements of samples
- **OIL6**: Radionuclide specific measurement of samples [Bq/kg]

*FIG. 5. Process of assessing radionuclide concentrations in food, milk and water.*
Exceeding OIL6:

- Stop consumption and distribution of non-essential food, milk or drinking water
- Replace essential food, milk and drinking water as soon as possible or relocate people if replacements are not available
- For iodine contamination consider providing iodine thyroid blocking if replacement of essential food, milk or water is not immediately available
- Estimate dose of those who may have consumed food, milk and drinking water from the area where restrictions were implemented to determine if medical actions are warranted
Restrictions on food, milk and drinking water
Effective implementation (cont’d)

• Detailed arrangements in place specifying what will be implemented in the strategy, when (under what conditions) and how
  – Documented in emergency plans and procedures
  – Covered with training and exercise programmes

• Public reassurance calls for evidence in food safety such as:
  – Publishing monitoring results with health hazards being placed in perspective
  – Certification
Plain language explanations

• Use of simple and easily understandable language when communicating with the public on how criteria and associated response actions provide for food safety for all members of the public
  – GSG-2 contains example plain language explanations to complement to GC and OILs and set of response actions to be implemented
  – Technical guidance is also available
Restrictions on food, milk and drinking water after emergency is declared ended

• Governed by the radiation protection frameworks applicable for existing exposure situation
Thank you!