

# **Criteria for the Control of Food and Drinking Water in the Recovery Phase after a Nuclear or Radiological Emergency**

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**IAEA**

International Atomic Energy Agency

# Standards for Radionuclides in Food and Drinking Water

The Agency's Radiation Safety Standards Committee (RASSC) requested the Secretariat to develop a discussion paper on the **existing international standards** for the control of radionuclides in food and drinking water, the **radiation protection criteria on which they are based** and the **circumstances in which they are intended to be used**.

A Working Group, comprising representatives of the European Commission (EC), the **Secretariat of the Codex Alimentarius Commission (CAC)**, the **Food and Agriculture Organization of the United Nations (FAO)**, the International Atomic Energy Agency (IAEA), the Nuclear Energy Agency of the Organization for Economic Cooperation and Development (NEA/OECD) and the **World Health Organization (WHO)**, with the International Commission on Radiological Protection (ICRP) as an observer, was established to undertake this work in cooperation with invited international experts.

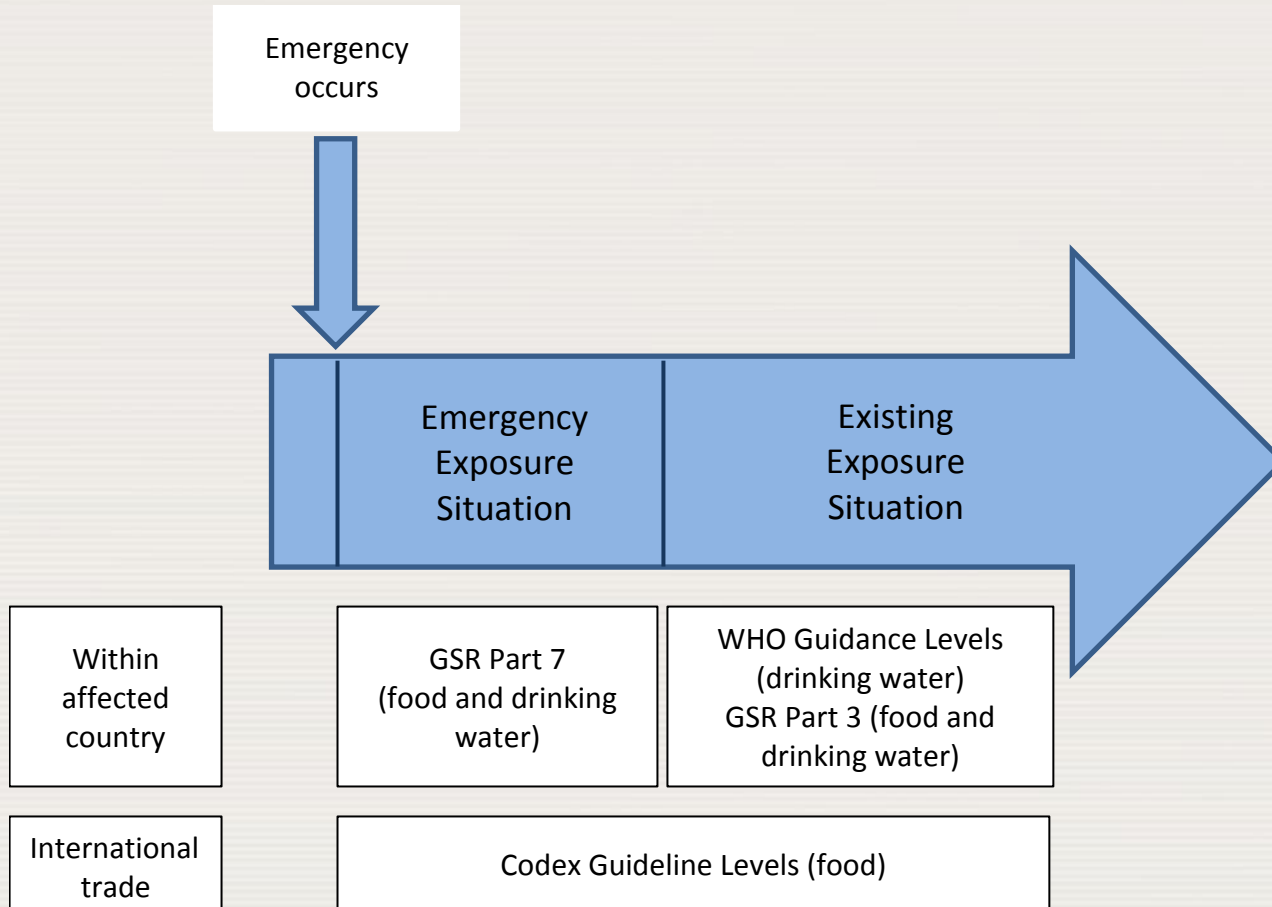
# Existing Exposure Situations

- The situation already exists when we need to decide on the need for control **can I control – do I need to control**
- Dose limits do not apply – instead we used reference levels
- Reference levels are expressed as
  - doses to the “representative person”
  - converted into corresponding measurable quantity (Bq/kg or Bq/L)
- Existing exposure situations may follow an emergency exposure situation, or not.

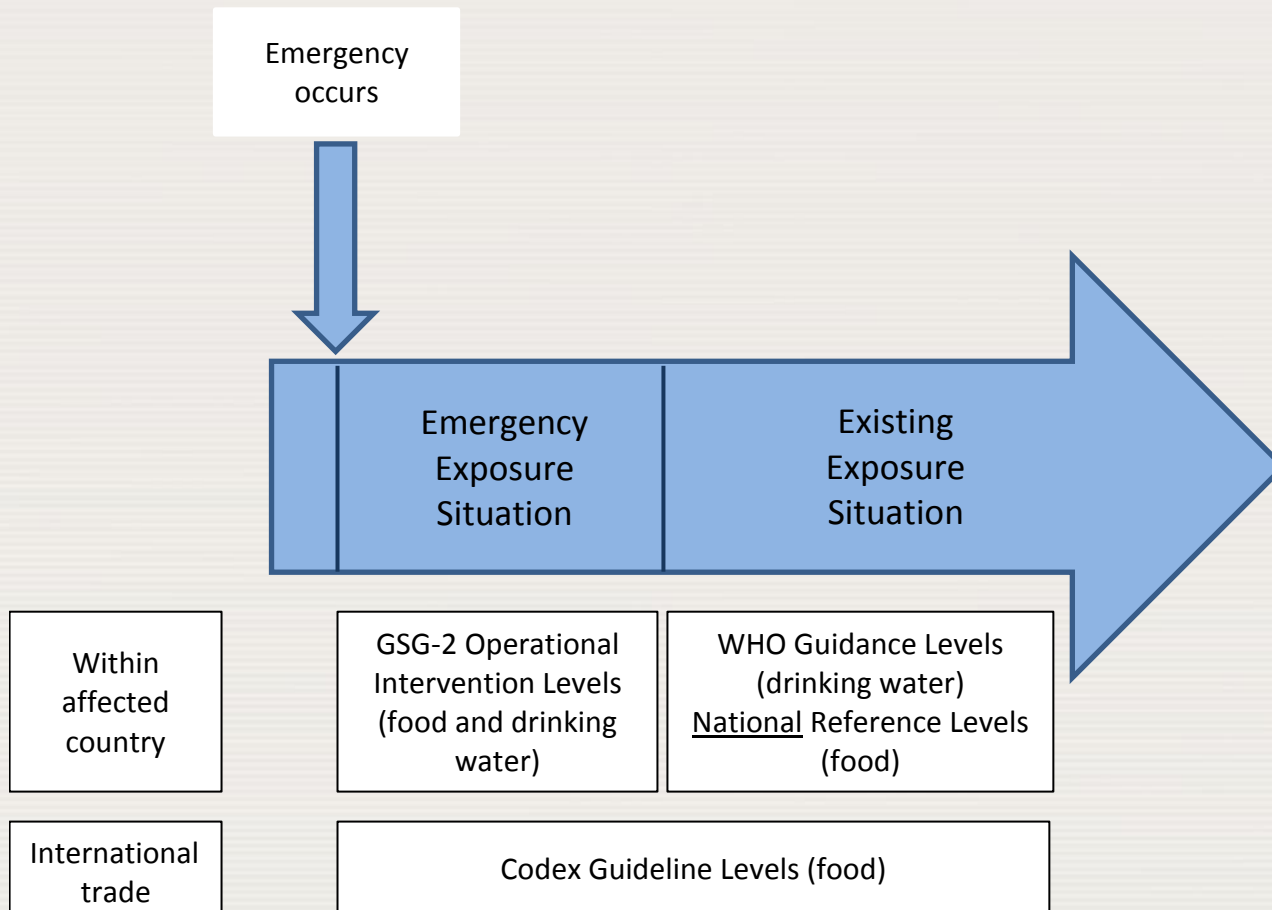
# Reference Levels for Food and Drinking Water

Reference Levels or other Guidance	International Organization	
	Emergency Exposure Situations	Existing Exposure Situations
<u>Food</u>		
Individual dose	IAEA	IAEA
Activity concentrations	IAEA Codex Alimentarius *	Codex Alimentarius *
<u>Drinking Water</u>		
Individual dose	IAEA	IAEA WHO
Activity concentrations	IAEA	WHO
* Joint FAO/WHO Codex Alimentarius Commission [CODEX STAN 193-1995]. Guideline Levels (activity concentrations) - for foods traded internationally, following a radiological or nuclear accident .		

# Reference Levels - Individual Dose



# Reference Levels – Activity Concentrations



# Codex Alimentarius Guideline Levels

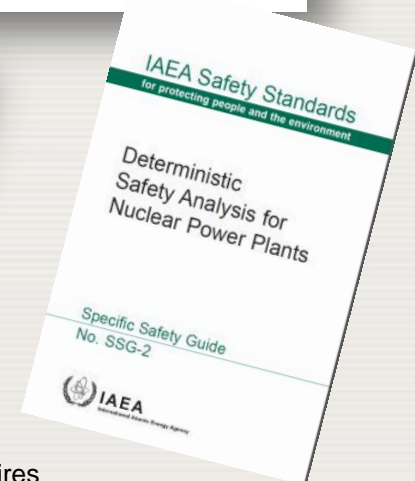
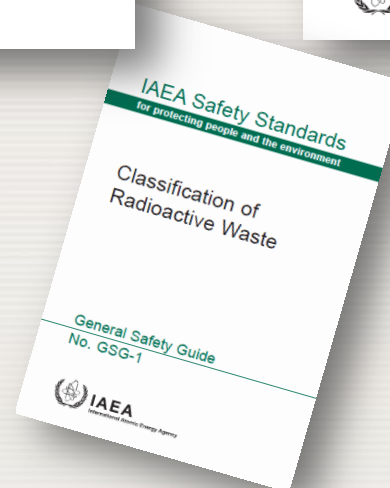
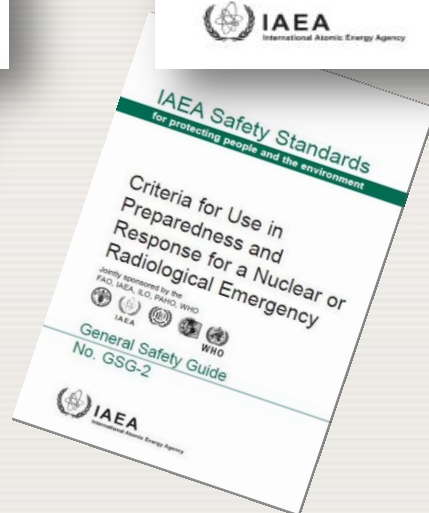
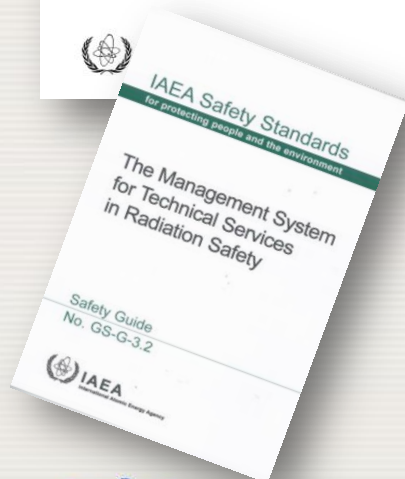
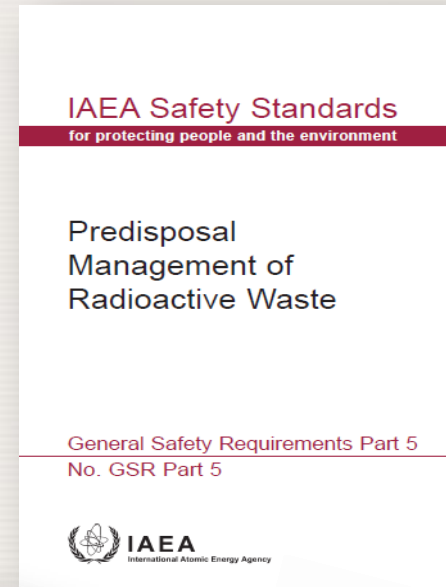
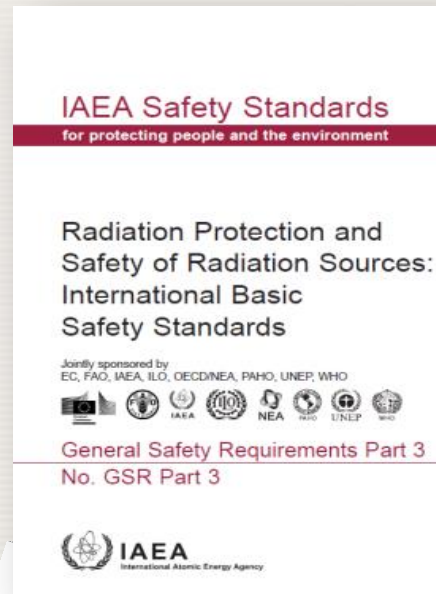
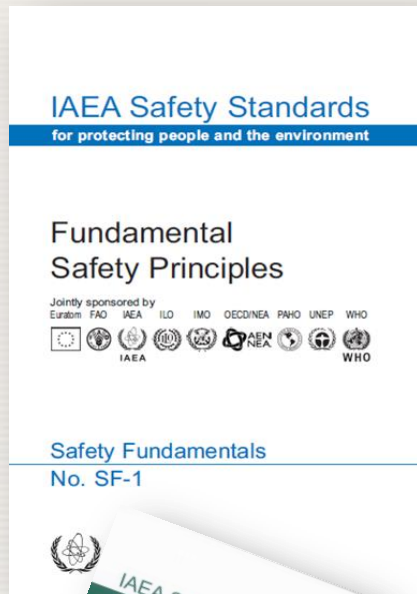
- Apply to food in international trade destined for human consumption
- Developed for the first year after an accident

Based on  $GL \cong 1$  mSv and assumes it is difficult to replace foods in 1<sup>st</sup> year

- For use also in subsequent years
  - expect lower concentrations
  - expect less food contaminated (in supply chain)
- Assume 10% of food supply is contaminated at Guideline Level
  - experience shows that this is highly conservative

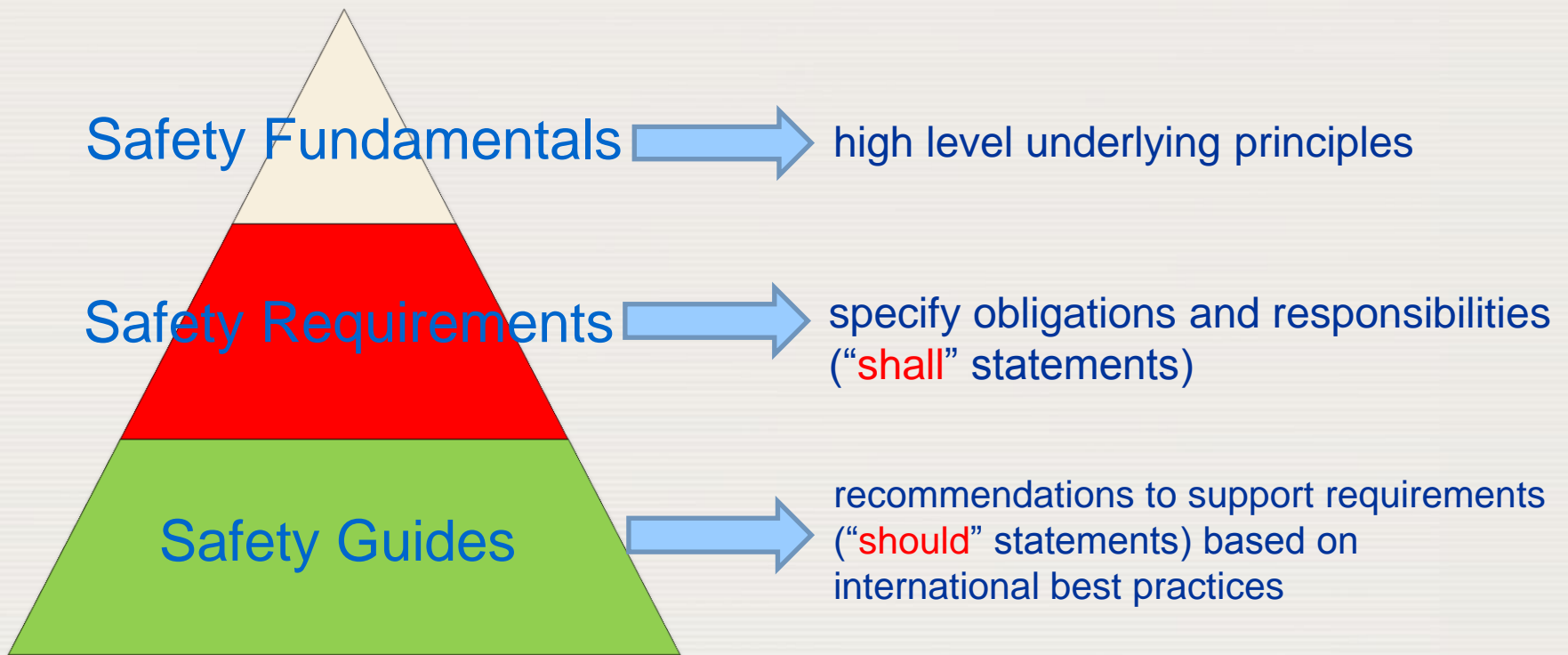
The fraction of contaminated food on the market decreases even though specific foods, such as “wild” products, may have persistent or even increasing radionuclide concentrations.

# IAEA Safety Standards





# IAEA Safety Standards



# IAEA TecDoc

## Title: **Guidance on Radionuclide Activity Concentrations for Food and Drinking Water**

- Reviews existing international standards
- Summarizes how they should be applied
- Recommends adoption of Reference Levels = Codex guideline levels, but for nationally produced and consumed food
- Recognizes need for exceptions in some extreme situations (e.g. wild foods) **BUT**

approach can be similar to that used by Codex Alimentarius Commission

# Calculation of National Reference Levels

$$\text{NRL}(\text{A}) = \frac{\text{E}}{\text{M}(\text{A}) \times \text{e}_{\text{ing}}(\text{A}) \times \text{F}}$$

where

**NRL(A)** is the national Reference Level (Bq/kg) for age group A

**E** is the national dose criterion for ingestion (mSv/y)

**M(A)** is the age-dependent mass of food consumed per year (kg/y)

**e<sub>ing</sub>(A)** is the age-dependent dose coefficient for ingestion (mSv/Bq)

**F** is the assumed contamination fraction.

*Round calculated National Reference Level to an appropriate whole number !*

# Thank you!

