

Management of non-food manufactured products in post-accident situations

NERIS Workshop, 9th October 2023

Context

- Support of IRSN in the development of the national action plan to respond to a major nuclear or radiological accident.
 - Support from CEPN to provide a state of the art on international feedback concerning the management of non-food manufactured products in such situations

Objectives

- International feedback on management of non-food goods:
 - Post-Chernobyl : Ukraine, Belarus, Russia
 - Post-Fukushima
 - Recent reflections on non food goods management in post-accidental situation from HERCA, OECD-NEA, the Commission, IAEA, PREPARE...
- Identification of reference levels, maximum allowable levels for the use of materials, products, and raw materials

- 1) Review of literature and feedback from publications, government guidance,, proceedings etc.
 - 2) Completed by contact with international stakeholders
- Focus on Post-Fukushima feedback
 - Screening thresholds;
 - Customs controls on exported products;
 - Regulatory constraints on companies' manufactured products;
 - Admissible levels;
 - Guide values, etc.

- Controls implemented on a limited number of manufactured products: wood, medicinal raw materials, furniture, etc.
- For timber, extensive controls because of domestic use. Former USSR countries developed guide values for trade between them of industrial, civil works and domestic timber.
- Intra-CIS trade guide values for ^{137}Cs and ^{90}Sr (Bq/kg) based on a criteria of $10 \mu\text{Sv}/\text{year}$

- Ukraine: guide values for annual effective dose $< 1\text{mSv}/\text{year}$:

Wood for domestic use	^{137}Cs (Bq/kg)	^{90}Sr (Bq/kg)
Firewood, logs	600	60
Fences	1000	
Wooden souvenirs	740	
Consumer products	740	

- No details found in the regulatory texts on the exposure scenarios for workers/public (exposure time, etc.).



Controls of non food goods traded in Japan

- No systematic controls on chains of products, rather on « hot spots » and case by case.
- On case-by-case basis, setting of thresholds in line with those used to manage other types of situation (transport, release, exemption).
- Controls were carried by few industries : wood, used cars, electronic components and cosmetics.
- Some companies introduced « radiological quality certifications » to demonstrate the safety of their products through measurements carried out by independent third parties.
 - Principles of characterisation are not available, nor are they known or validated by local or national authorities.



- Controls on few types of exported non food products.
 - Wood sector: specific management criteria due to the possibility of large scale domestic use.
 - Other sectors: some checks by authorities or producers when contamination was detected at customs

- Examples of guide values used:

Products	¹³⁷ Cs
Firewood, logs *	40 Bq/kg
Building materials (from quarries) **	100 Bq/kg
Automotive ***	0,3 μSv/h

- * From the rate of reconcentration of contamination after incineration for a resulting ash < 8,000 Bq/kg.
- ** Following detection of contamination in a residential building in Nihonmatsu in December 2011, ensuring < 1 mSv/year
- *** Batches of used cars received in Russia in 2012



Export/import controls on non-food goods transported by sea

- On export from Japan (local customs): dose rate checks on containers
 - Decontamination if dose rate $> 3 \times$ background (IAEA-TECDOC-1162)
 - If dose rate $> 5 \mu\text{Sv/h}$, report to the Ministry and information to the relevant organisation before any decontamination operation (IMDG).

- On import from Japan (overseas customs): checks on surface contamination and dose rate of containers, on arrival at ports
 - Criteria for transport/detection of radioactive material in normal situations:
 - 4 Bq/cm^2 (β, γ)
 - 0.4 Bq/cm^2 (α)
 - In Europe: dose rate criterion of $0.2 \mu\text{Sv/h}$ above background.



Controls on non food goods transported by plane

- DGP ICAO guidelines in 2011 for the transport of equipment and personnel working at Fukushima site: 0.4 Bq/cm² (β, γ) and 0.04 Bq/cm² (α).
- Some examples of international controls in airports
 - USA: sampling of air cargo, alert thresholds at 0.4 Bq/cm² or 4 Bq/cm²;
 - China: inspection of containers, for dose rate and contamination following DGP ICAO guidelines
 - Hong Kong: surface contamination checks on all cargo from Japan.
- Aircraft: AEA procedure from 2002 still in force, with 3 alert thresholds depending on the level of contamination measured (300 cm² at engine level), at 4-10-40 Bq/cm²



Reflections from experts / international perspective (1)

- CRIEPI (2013): proposal of an unconditional release criteria of 10 Bq/cm² based on scenarios of use and transformation of goods. *Not implemented.*
- Article 31 (2011) Position on control criteria for non-food articles: ships, containers and non-food articles from Japan.
 - Criterion of 4 Bq/cm² (β , γ).
 - Radiation protection objectives to limit the spread of contamination.
 - A release criteria of 10 μ Sv/year would be acceptable as it is much lower than levels applicable in a post-accident situation.
- HERCA (2015): Position on current non-food management regulations.
 - Shows that no existing regulatory mechanism would allow for timely exemptions at either European or international level.
 - Regulations do not take into account accident scenarios such as Fukushima, and their application could hinder trade.
 - A major accident in Europe would bring trade to a regulatory standstill. The conclusion is that more work needs to be done on this issue.

Reflections from experts / international perspective (2)

- IAEA: Proposal to limit the use of goods, whatever their nature, to 10 μ Sv/year (DS500)
 - Concept of release of materials and waste, with 3 cases of transfer of a contaminated material:
 - outside & inside the site
 - from the site to the outside
 - Development of recommendations for international trade in non-food products containing radionuclides.
- Update of the methodology and implementation of reference levels (DS527): generic criteria and operational criteria applied in particular to manufactured goods.

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IAEA SAFETY STANDARDS
for protecting people and the environment

Status: STEP 8: Soliciting comments by Member States

- Draft developed through 4 CS meetings and one TM (2018-2019)
- IAEA internal review/revision January-February 2020
- Coordination Committee review and approval March-April 2020
- SSC's comments – received in May-June 2020, resolution in July-August
- Discussed in a Joint WASSC/RASSC/TRANSSC session in November 2020 and in 3 WG's meetings in Nov-Dec 2020; approved for submission to MS in February 2021

Application of the Concept of Clearance

Draft Safety Guide
DS500 (Revision of Safety Guide RS-G-1.7)



IAEA
International Atomic Energy Agency

- Japan doesn't have a generic regulatory framework for the management of non-food products.
 - Also true on international level
- Coexistence of several sets of values depending on:
 - Changes in health policies, origin of products, actual or potential consumption,
 - Radionuclides to be considered and capacities for control,
 - Local considerations...
- ... Making them hard to understand for decision-makers and exposed populations, in addition to their temporal and spatial evolution.
- Recommendations :
 - To not establish criteria in advance, since it is likely that assumptions won't match the reality of the situation : economics, social and health issues, observed severity of the accident...
 - Focus on the process of rehabilitating the living conditions of the affected population and restoring economic activity in the affected area (see PREPARE project recommendations).

Questions