Setting limits for radionuclides in food: Fukushima and beyond

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ARPANSA
Increased public concern

- what are the radiation levels in foods?
- what is being done to protect people from food contamination?
- why isn’t more being done?

In the year following the Fukushima Dai-ichi NPP accident approximately 40% of enquiries to ARPANSA (related to the accident) were about food or ocean contamination.
Outline

• Existing National and International Guidance

• Two examples:
  – Post-Fukushima Imported Food Monitoring Program (*International Guidance for imported foods*)
  – China’s proposal to set limits for all foods (*challenges associated with setting limits for existing exposure situation*)
Choosing applicable international standards for food and drinking water

**Affected Countries**
- (local food)

**Emergency Exposure Situations**
- IAEA GSG-2 Default OILs for food and drinking water
- Guidance available (OILs) in RPS7

**Existing Exposure Situations**
- None for food
- WHO guidelines for drinking water
- No regulatory limits

**International trade**
- (imported food)

**CODEX Guideline levels**
- No regulatory limits - in most situations apply CODEX Guideline Levels

**International Guidance**

**Australian Guidance**
Food monitoring Program - Overview

The program was implemented as a precautionary measure

- to maintain public confidence in the food supply (demonstrate protection)
- to be able to respond if circumstances in Japan deteriorated

A good example of risk assessment informing policy decisions

- Many agencies involved
  - FSANZ
    - Development and maintenance of food standards
    - Monitor food safety
    - Advise on monitoring and testing imported foods
  - DOA (formerly DAFF)
    - Implementing the program
    - Collecting samples
    - Providing results to the public
  - ARPANSA
    - Analysis of samples (only ‘appointed analyst’ under Imported Food Control Act in 2011)
    - provided regular assessments on the risks to consumers from imported foods
March 2011
ARPANSA provided regular advice to FSANZ on the potential for food contamination

May 2011
I-131, Cs-134, Cs-137
All foods
Targeted prefectures

September 2011
Cs-134, Cs-137
All foods
Targeted prefectures

March 2012
Cs-134, Cs-137
All foods
Targeted prefectures

August 2012
Cs-134, Cs-137
Targeted foods
Targeted prefectures

August 2013
Recommendation to cease program
INTERNATIONAL GUIDELINE LEVEL (1000 Bq/kg)

- March 2011 to August 2011
- September 2011 to July 2012
- August 2012 to January 2014
Ongoing food monitoring

Local seafood
- 5 year program
- Variety of seafoods
- Cs-134, Cs-137 and Po-210

FSANZ Total Diet Study
- Local and imported foods
- Mix of natural and artificial radionuclides

Issues related to setting limits for radionuclides in food and water

- Logistical and Technical issues associated with routinely testing foods
- Graded approach to regulation
- Distinguishing between ‘background’ and ‘non-background’ exposures
- Limits can be distracting (better to focus on optimisation)
Proposed Standard: Concentration Limits for Radionuclides in Food

• Applies to all kind of foods under normal circumstances – Includes imports
• Specifies investigation levels and concentration limits for 19 radionuclides including:
  • 12 artificial radionuclides
  • 7 naturally occurring radionuclides
• For artificial radionuclides, investigation level and concentration limits are 1/10 and 1/3 of the Codex guidance levels
• For natural radionuclides the levels are more complex, but appear to be based on not exceeding an annual dose of 0.1 and 0.3 mSv per year for each radionuclide.
ARPANSA’s Review

Logistical and Technical Challenges

Variety of measurement techniques needed to measure all 19 radionuclides – gamma, beta, alpha).

Very low detection limits required
  - For naturals, detection limits may not be achievable using standard methods
  - Long measurement times
  - Large sample sizes required

Even if additional resources were available, ARPANSA estimated that to process one sample for all 19 radionuclides it would take:
  - about 20 to 35 working days
  - at costs likely to exceed $10k per sample

A guaranteed sample through-put would also be required.
ARPANSA’s review cont.

Limits for natural radionuclides

- Natural radionuclides are ubiquitous
- Vary widely
- Doses from background are not amenable to control
- Exposure to natural background radiation is a potential existing exposure situation

Graded approach

- The level of control applied should be commensurate with the associated risk or risks
- Levels radionuclides (excluding background) in foods produced in Australia are at very low or negligible levels
- The resources that would be required to affect exposures would be out of proportion to the benefits achieved for health
Radiochemistry capacity?

- **19 radionuclides** would need to be tested routinely in all foods imported into China from Australia.
  - significant logistical and technical challenges.

- Results of a recent ARPANSA survey of major radiochemistry laboratories in Australia indicates that currently there are no laboratories that could offer a service to measure all listed radionuclides at the necessary detection limits.

- Incorporating new methods into any laboratory would require significant development time and cost, and would require a guaranteed sample through-put to maintain the service.
Conclusions

Background levels of radionuclides in foods consumed in Australia are very low.

In 2011 ARPANSA was the only DAFF ‘appointed analyst’ in Australia. The food testing program filled our capacity. We need to consider how we would respond if an accident occurred in Australia.

Our approach to guidance and limits for foodstuffs is in line with for existing and emergency exposure situations international recommendations.

Need to think more about how to approach the transition from an emergency situation to an existing situation – future ARPANSA guidance document?
Questions?

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