

A Quarter of a Century with Chernobyl Contamination - Norwegian Experiences

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Living with an existing exposure situation due
to accidental contamination:
The need for long-term management and
involvement – for how long?

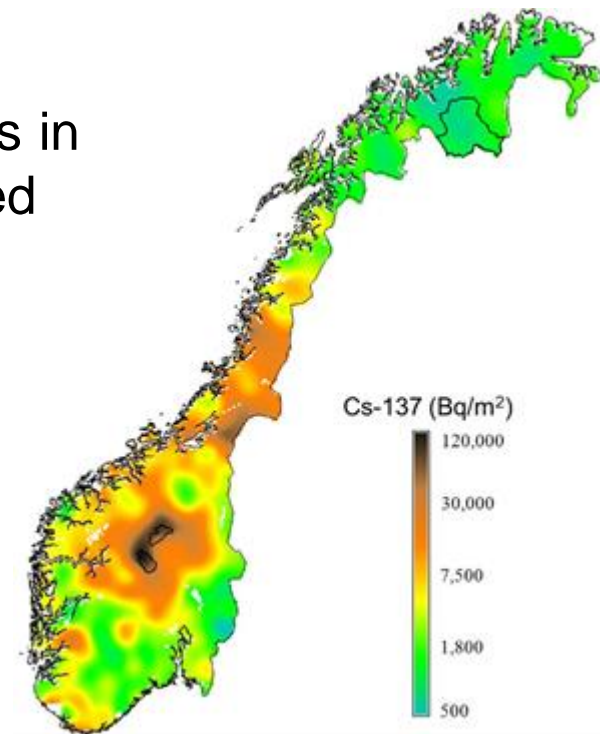
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Why is Norway relevant? (1)

- Norway was one of the Western European countries most affected, with deposition levels in hot spots reaching 500 kBq/m² (non-populated areas)
- Rural areas with vulnerable food production systems (animals grazing unimproved forest/mountain pastures)
- Some max. concentration (¹³⁴Cs+¹³⁷Cs):
 - Sheep: 40,000 Bq/kg
 - Reindeer: 150,000 Bq/kg
 - Goat milk: 2,900 Bq/l
 - Humans (reindeer herders): 4,200 Bq/kg



Why is Norway relevant? (2)

- Current max. levels:
Sheep: 4,500 Bq/kg
Reindeer: 5,000 Bq/kg
Goat milk: 420 Bq/l
Humans (reindeer herders): 290 Bq/kg
- Current trends suggest future contamination levels in animals are determined by the physical half-life (30 years)



What did we learn?

- Food bans and condemnation (mostly the first year) soon proved expensive, not cost-efficient, and very unsatisfactory for the farmers/producers
- Needed methods to sustain food production in the affected areas:
 - Clean feeding
 - Live monitoring of animals: Avoid slaughtering animals above permissible levels – and determine required clean feeding periods
 - Caesium binders (AFCF/Giese salt) in pelleted feed, rumen boli and salt-licks – technology made available to Russia, Ukraine and Belarus
 - Changed slaughter season (reindeer less contaminated in autumn)



And we keep learning!

- Persistent but changing contamination levels results in long-term needs for evaluations of remediation strategies (for optimisation and up-to-date regulations)
- The importance of involving local stakeholders (local authorities, farmers/herders) in the assessment and development of management strategies
- A persistent contamination situation cause continuous information needs (external and internal doses, local environment, remedial actions etc.), e.g. new generations of farmers/herders.
- Still important to provide information and build local competence; gives the population understanding and options for how to manage the situation and helps them cope with it

Other remaining challenges

- Difficult to give satisfactory answers to the affected populations' most important concerns, e.g.:
 - What level of risk am I and my family exposed to?
 - Did I develop cancer because of Chernobyl?
- Still discuss possibilities of meaningful health surveys in small population groups



15-20 min measurement give opportunity to communicate on diets, risks etc.

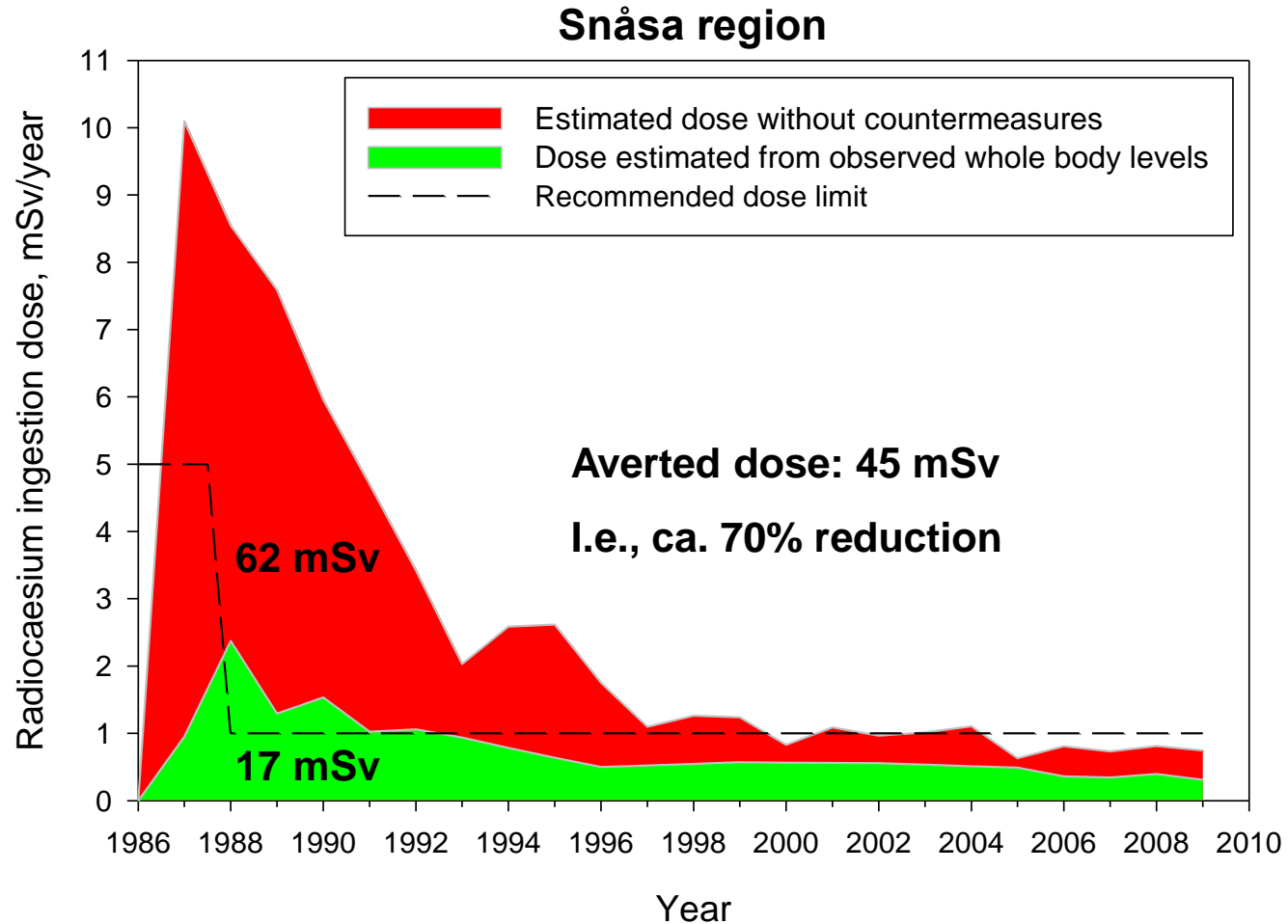
How long will Chernobyl be a challenge?

- Duration determined by:
 - Initial contamination levels
 - Physical half-lives
 - Chosen level of 'food safety' and permissible levels in foods
- With current Norwegian intervention levels (600 Bq/kg in sheep; 3000 Bq/kg in reindeer) countermeasures will probably be needed another ~30 years
- Options:
 - Lift restrictions? (The UK recently decided to lift the remaining restrictions on sheep in Cumbria and Wales (permissible level was 1000 Bq/kg); controls disproportionate to the risk)
 - Gradually lower levels? How low? (Japan has adopted a regulation value of 100 Bq/kg for most foods)

Towards a whole century with Chernobyl?

- Norwegian intervention level of 3000 Bq/kg in ~330 tons/year of reindeer results in additional collective dose of ~3 person-Sv – i.e., ~1 extra case of cancer per 6 year reindeer production
- Lowering the level (e.g., to 1500 Bq/kg) will result in measures, information, associated follow-up etc. being needed another ~60 years? And will be perceived as reintroducing the fallout
- As long as concentrations in reindeer are about 1200 Bq/kg it will be recommended to reduce intake by the reindeer herders (ingestion doses below 1 mSv/year)

Averted ingestion doses after Chernobyl



Thank you for your attention!

