

Development of Recommendations for Protective Actions in Nuclear Detonation Scenarios

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Background

- Rising geopolitical instability increases the plausibility of nuclear detonation scenarios
- Existing European emergency planning, response and recovery is largely based on NPP accident assumptions, leaving critical gaps



NPP accidents vs. Nuclear detonations

	NPP accidents	Nuclear Detonations
Location & predictability	Fixed, well-characterised locations, warnings likely	Locations unpredictable; little to no warning
Community preparedness	Surrounding communities informed of hazards; preplanned measures understood	No localised preplanning; civilian baseline knowledge low
Infrastructure & communication	Infrastructure largely intact; communication lines available	Potential widespread damage and communication disruption.
Dose rate dynamics	Dose rates are generally lower and relatively more uniform, changing gradually over hours to days	Dose rates likely to be very high close to ground zero and change rapidly over minutes to hours due to short-lived radionuclides

Key aims of the PREDICT project

- Improve and better understand modelling of fallout
- Use the modelling to investigate different scenarios
- Use this information to explore questions that decision-makers, planners and public likely to want addressed
- Stakeholder workshop 26th May to explore operationalisation of protective strategies with stakeholders
- Produce set of recommendations

More on PREDICT after lunch

Session 2: EPRR in armed conflicts, nuclear detonations (2)

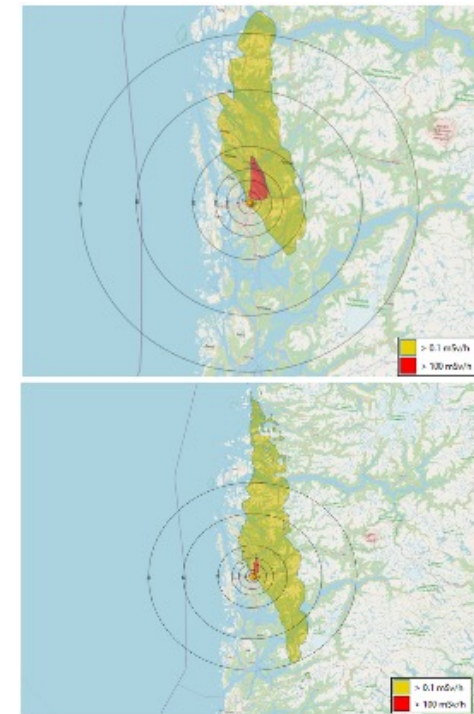
Advice about extent and impact

- Use of stable potassium iodine tablets
- Sheltering advice - duration and accounting for building damage
- Evacuation
- Duration of food bans
- Duration of access denial

Use of scenarios

Provide an insight into:

- Spatial and temporal evolution of dose rates
- Sensitivity to meteorological conditions
- Impacts on population groups
- Time windows for effective protective actions



6 hours

12 hours

Source: DSA (Norway)

Development of dose criteria

Needed to guide decisions on sheltering and evacuation

Established criteria for NPPs – for nuclear detonations they vary from country to country

Advice is likely to change over time as the dose rates decrease

How to adapt for nuclear detonation events

Stable iodine

- Important for operating NPP accidents to protect thyroid from inhalation of radioactive iodines
- However very unlikely to be useful in a nuclear detonation scenario as doses are dominated by external radiation
- What is the best way to communicate this information to decision-makers?



Sheltering

- Protection given by sheltering is the main driver of resulting dose from nuclear fallout
- Sheltering effectiveness may be reduced by blast damage
- Explore different sheltering protection factors to explore impact

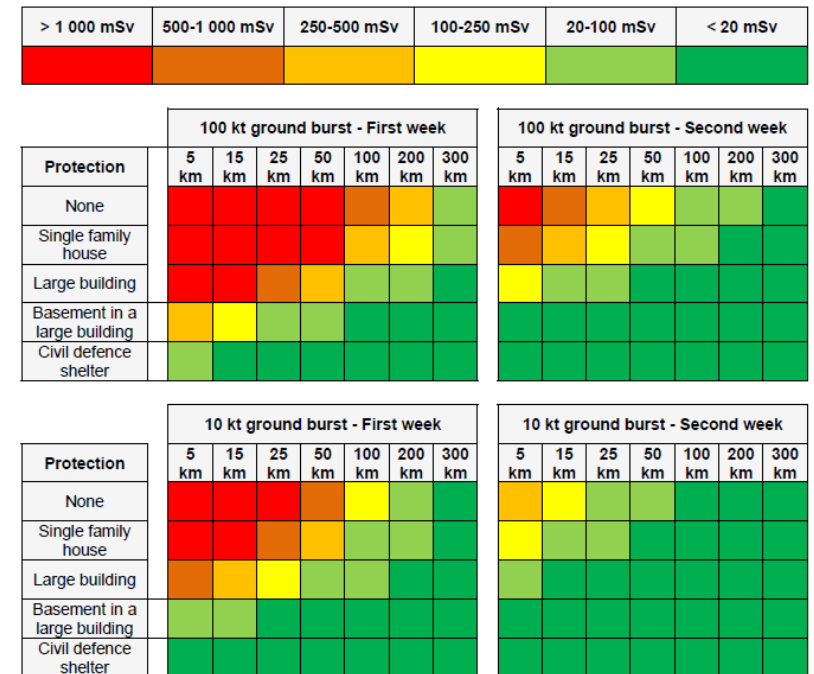


Figure 2. Residual effective doses to a one-year-old child during the first (left) and second (right) week following a nuclear explosion as a function of distance for a 100 kt (top) and 10 kt (bottom) ground burst.

Source: SSM (Sweden)

Evacuation

- Evacuation is not recommended in immediate phase due to:
 - High external dose rates
 - Infrastructure disruption
 - Practical challenges
- Key question is timing of evacuation and how to carry out effectively
- Likely to be people on foot and large numbers affected



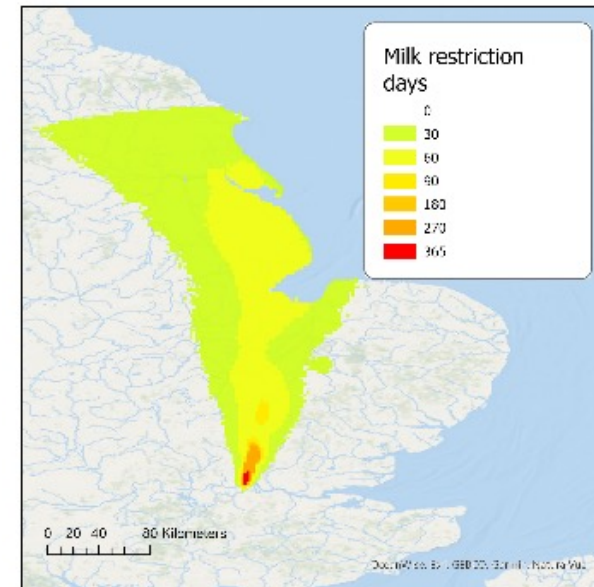
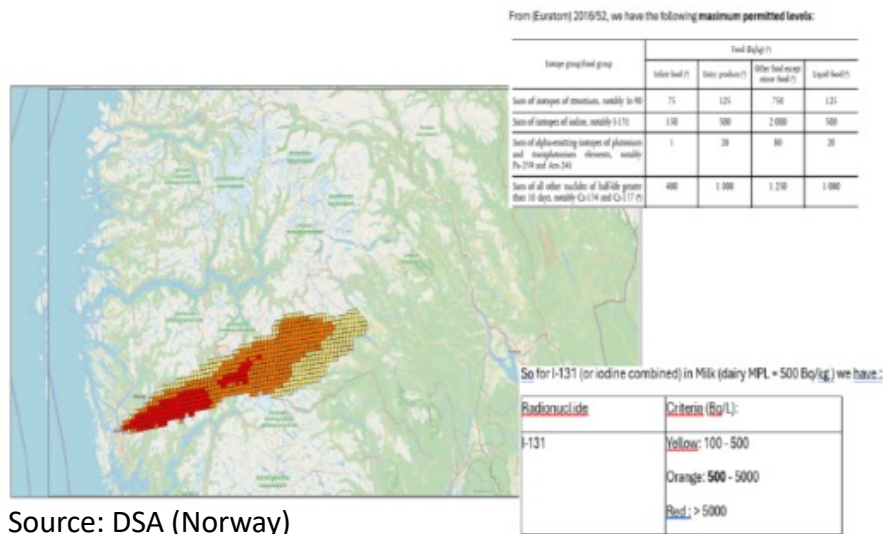
Evacuation from Kharkiv by train 2022



Photo: Ed Edahl / FEMA

Food bans

- Likely duration and extent of food bans depending on different yields



Ongoing work

- What further modelling is required to inform sheltering /evacuation timing?
- How best to present information to stakeholders
- Is additional modelling required following feedback from stakeholder workshop
- Collating information and preparing reports



**NERIS workshop, Paris
28-30th April 2026**



**Stakeholder workshop on
protective action strategies
for nuclear detonations**

Aix-en-Provence, France
26 May 2026



**Co-funded by
the European Union**

Ongoing work (cont.)

- How best to present information to stakeholders
- How to communicate with the public about nuclear detonation and related protective actions
- How to take into account country specifics in communicating protective actions

Advice for the Public on Protection in Case of a Nuclear Detonation





Bundesamt
für Strahlenschutz



National Institute for Public Health
and the Environment
Ministry of Health, Welfare and Sport

PDC-ARGOS
CBRN Crisis Management



UK Health
Security
Agency



Environmental Protection Agency

Technical
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Big thanks to all the partners!



Karlsruher Institut für Technologie



Strål
säkerhets
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