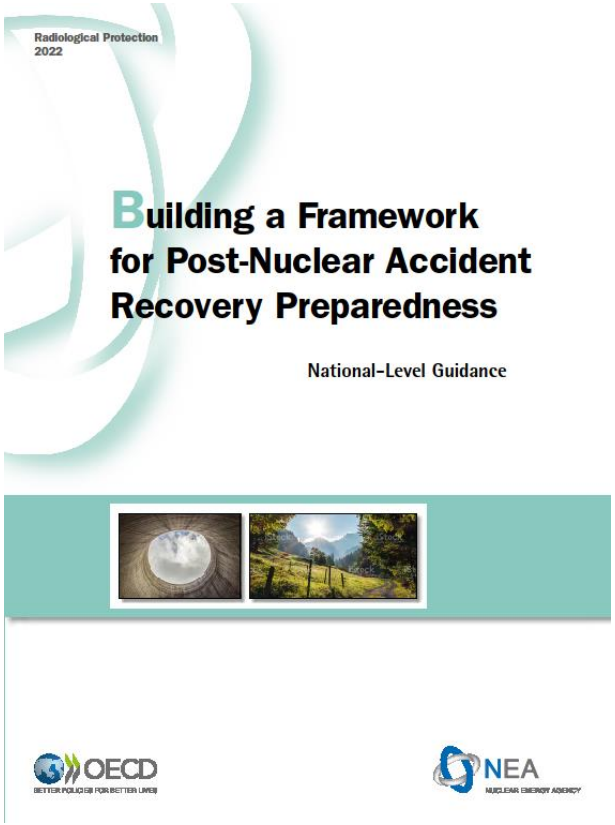

NEA Workshop on Preparedness for Post-Nuclear Accident Recovery

EGRM Report Findings

Environmental Monitoring & Human Dose Assessment

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Chapter 10.

Environmental Monitoring, Human Dose Assessment

Outline

- Introduction
- Environmental Monitoring
- Setting out a Monitoring Programme
- Human Dose Assessment
- Planning for a Dose Assessment Programme

Introduction

- **Environmental monitoring** refers broadly to the measurement of radionuclide concentrations in the environment.
- **Human dose assessment** is the process by which estimated doses or doses calculated from measurement results are applied at individual or population levels.
- These strategies and tools are strongly related and must begin early in the ***emergency response phase***.
- Must be considered and planned for as part of ***preparedness***.

Environmental Monitoring

- Following a nuclear accident, a comprehensive environmental monitoring programme will confirm details about the radioactive contamination.
- Enhanced non-routine environmental monitoring will commence in the *response phase* and continue long into the *recovery phase*.
- The monitoring programme in the recovery phase will evolve as the radiological situation and the needs of stakeholders change.

Setting out a Monitoring Programme (1/2)

Scope of Monitoring Programme

- A *generic monitoring strategy* should be developed in *preparedness*, details will need to be adapted to the accident-specific situation.
- During preparedness we must understand how the monitoring programme will evolve into an *existing exposure situation*.
- The report lists some items the generic monitoring strategy may include:
  - Definitions of measurement objectives, priority areas, and rationales
  - Continuous mapping and identification of hot spots
  - Sampling of lands beyond contaminated area for reassurance
  - Need for, and effectiveness of, decontamination

Setting out a Monitoring Programme (2/2)

Data Sharing and Responsibilities

- Transparent accessibility of monitoring data will build trust, foster scientific research, and reduce duplicity of efforts.

Self-help Actions

- Direct involvement of individuals, communities, and local professionals empowers those impacted.
- Equipment used should be simple and intuitive.

Ongoing Re-evaluation and Exit Strategy

- Inform decisions on lifting or modifying restrictions.
- How monitoring programmes will be terminated needs careful consideration during *preparedness*.

Human Dose Assessment (1/2)

- Dose assessment cannot be considered in isolation from monitoring.
  - Available dose assessment methodologies will depend on the established monitoring programme.
- Individual dose can be estimated using dosimeters (external dose) and whole-body counting (internal dose).
- Population doses can be modelled or estimated based on environmental monitoring data.
- The balance of estimated vs direct assessments will depend on economic and population specific factors.

Human Dose Assessment (2/2)

Importance of data collection in the early emergency phase

- Monitoring data collected in the emergency phase are crucial for an adequate dose assessment.
- Measurements of radionuclides from the emergency phase can greatly reduce uncertainties in dose estimation.

Heterogeneous dose distribution

- In an existing exposure situation the level of exposure is driven by individual behaviour and may be very diverse.
- It is important to assess individual doses, especially for vulnerable persons (e.g., children).

Planning for a Dose Assessment Programme (1/2)

Reference Levels

- An annual dose value “above which it is generally judged to be inappropriate to allow exposures to occur”.
  - Recovery phase reference levels are provided as a range by the ICRP (between 1 and 20 mSv) and should be defined during preparedness.
- Continual optimisation and justification.
- Preparedness must include the development of information materials to explain the purpose of a reference level to the population.

Exposure Pathways

- Collecting community information allows for the evaluation of exposure pathways and how lifestyle factors affect exposures.
  - E.g., population density, food supply, activities, general demographics

Planning for a Dose Assessment Programme (2/2)

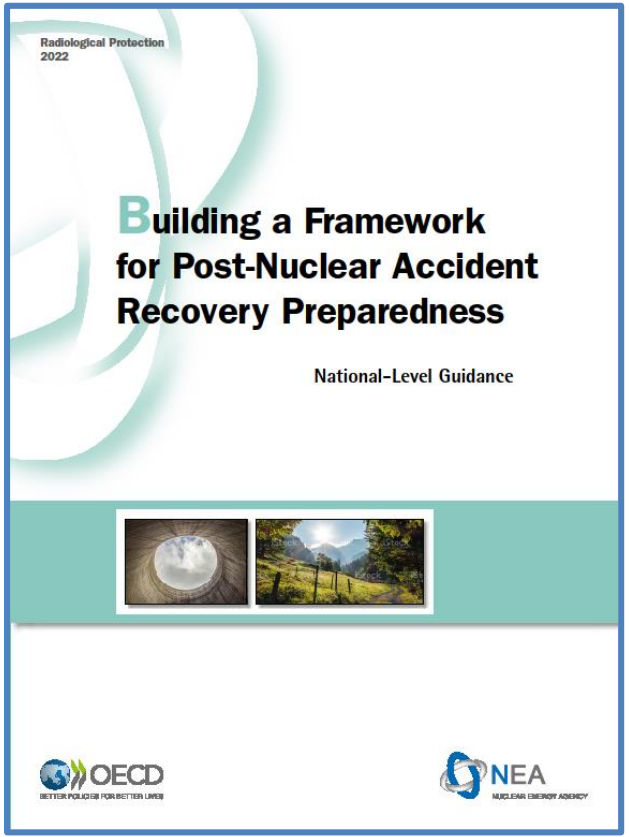
Dose Assessment Based on Modeling

- Useful for determining the suitability of lifting restrictions on an area.
- Data required to run dose assessment models should be considered in preparedness and be linked to the monitoring strategy.
- Must consider what aspects of dose assessment will be modelled in recovery and for what purpose.

Other Considerations

- How dose assessment tools will be used and fit in with the wider recovery effort, such as the use of personal dosimeters.
- How and when individual dose assessments will be conducted using in-vivo and in-vitro monitoring.

Thank You!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