



# Waste Management

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## **OECD-NEA National-Level Guidance on Building a Framework for Post-Nuclear Accident Recovery Preparedness**

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# Content

- **Waste generated in nuclear or radiological emergencies**
- **National policy, strategy, legislation and planning**
- **Modelling tools**
- **Radiological criteria**



# Waste generated in emergencies

- Nuclear and radiological emergencies can generate **large volumes of radioactive waste** (contaminated waste).
  - Large amounts of waste generated from applying **remedial protective actions off-site**.
  - **Secondary wastes** created through treatment and reprocessing of contaminated waste.
- Contamination entering **conventional waste streams** (municipal/industrial waste etc.).



## Waste generated in emergencies

- ... may be more heterogeneous and voluminous than waste arising from routine operations,
  - ... will have **activity concentrations** depending on initial level of contamination in the environment
    - larger volumes of lower activity waste (remedial measures)
    - smaller volumes of higher activity waste (e.g. secondary waste)
  - ... may quickly **exceed the existing capacity** for management of radioactive waste from routine operations.
- **Preparedness for waste management in emergencies is important.**



# National policy, strategy, legislation & planning

- The national framework for waste management should...
  - distinguish between waste management during routine operations and during emergencies,
  - apply a **graded approach** that accounts for different amounts and types of waste from a **range of emergency scenarios**,
  - adequately cover the surge in capacity that is likely to be required in severe emergencies.

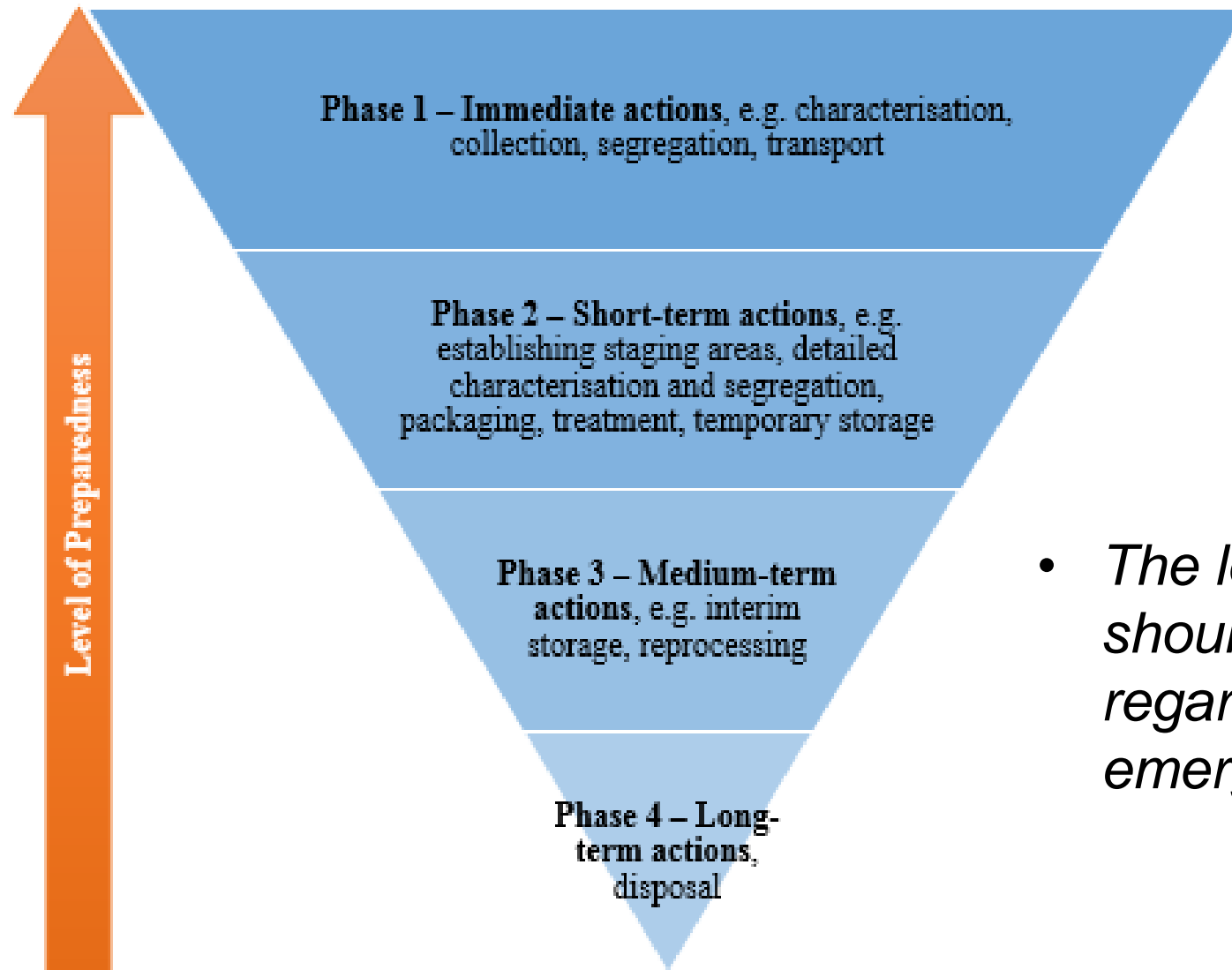


# National policy, strategy, legislation & planning

- Is there a need for modified or additional legal frameworks?  
(incl. framework for conventional waste management)
- Consider remediation and decontamination strategies.
- Consider application of (modified) **waste hierarchy** encouraged by the IAEA for radioactive waste from routine operations.
  - reduce waste generation → reuse/recycle → dispose as waste



# National policy, strategy, legislation & planning



- *The level of preparedness should follow a graded approach regarding the phase of the emergency response.*



# Modelling

- Modelling allows to **estimate** potential **types**, **activity levels**, and **volumes** of waste that could be generated in a nuclear or radiological emergency.
- Modelling can be used
  - in the **preparedness phase** to support planning for waste management,
  - in an **emergency** or during **recovery** to support decision making (→ remedial actions).
- Several **modelling tools** have been developed, such as:
  - CONDO, ERMIN, RODOS, WEST





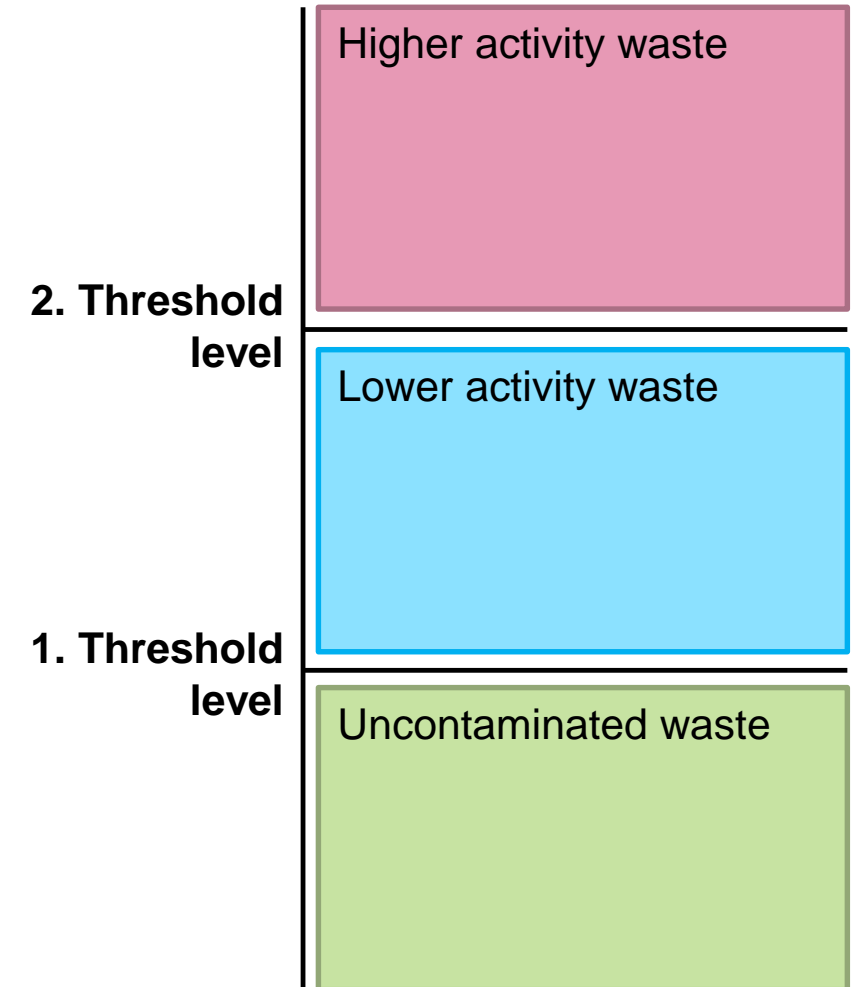
# Radiological criteria

- Establishing **radiological criteria** is highly important to support the **specification or classification of waste**.
  - Important for reducing the amounts of waste that have to be treated as radioactive or contaminated.
  - Where possible, **uncontaminated or lightly contaminated** waste should be segregated and dealt with using appropriate waste routes.



# Radiological criteria

- Nuclide specific threshold values for the **activity mass concentration** (Bq/kg).
  - Threshold values may function **similarly to clearance and exemption levels** for normal operations (IAEA GSG-11),
  - Additional higher threshold levels may support graded treatment and disposal schemes.
- See Annex B of EGRM-report for national examples.





# Thank you!

## Further existing guidance (non-exhaustive):

- IAEA (2009), *Pre-disposal Management of Radioactive Waste*, Safety Standards Series No. GSR Part 5, International Atomic Energy Agency, Vienna
- CODIRPA (2012), “Policy elements for post-accident management in the event of nuclear accident”, Steering Committee for the Management of the Post-Accident Phase of a Nuclear Accident (CODIRPA)
- STUK et al. (2014), “Protective Measures in Early and Intermediate Phases of a Nuclear or Radiological Emergency”, STUK – Radiation and Nuclear Safety Authority, Finland (Nordic Flag Book)
- IAEA (2014), *Radiation Protection and Safety of Radiation Sources*, International Basic Safety Standards, Safety Standards Series, No. GSR Part 3, International Atomic Energy Agency, Vienna
- IAEA (2017), *Management of Large Volumes of Waste Arising in a Nuclear or Radiological Emergency*, IAEA-TECDOC-1826, International Atomic Energy Agency, Vienna
- IAEA (2018), *Arrangements for the Termination of a Nuclear or Radiological Emergency*, IAEA Safety Standards Series No. GSG-11, International Atomic Energy Agency, Vienna
- MoE (2018a), “Decontamination projects for radioactive contamination discharged by Tokyo Electric Power Company Fukushima Daiichi Nuclear Power Station Accident”, Ministry of the Environment, Japan, Tokyo
- NEA (2019a), *Challenges in Nuclear and Radiological Legacy Site Management: Towards a Common Regulatory Framework*, OECD Publishing, Paris
- NEA (2021c), “Characterisation Methodology for Unconventional and Legacy Waste”, OECD Publishing, Paris