Keynote lecture IRPA 12

Radioactive Waste Management

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Content

- Liquid and gaseous discharges treatment
- Solid waste management and disposal
- Stakeholder involvement
- Conclusions

Liquid and gaseous discharges treatment

Waste or effluent?

- Waste management: to contain and isolate
- Discharge of effluents possible
- Waste or effluent?
  - Integrated approach
  - Case by case approach

The "Best Available Techniques" concept

- Trade-offs made clear between containment and dispersal
- The Best Available Techniques
- According to the IPPC (Integrated Pollution Prevention and Control) directive :

  "best available techniques shall mean the most effective and advanced stage in the development of activities and their methods of operation which indicate the practical suitability of particular techniques for providing in principle the basis for emission limit values designed to prevent and, where that is not practicable, generally to reduce emissions and the impact on the environment as a whole"

The "Best Available Techniques" concept

Main considerations:

- waste production
- substance hazard
- recovery and recycling techniques
- industrialization
- technical and scientific progress
- nature, effects and volume of the emissions
- consumption and nature of raw materials
- energy efficiency
- overall impact to the environment

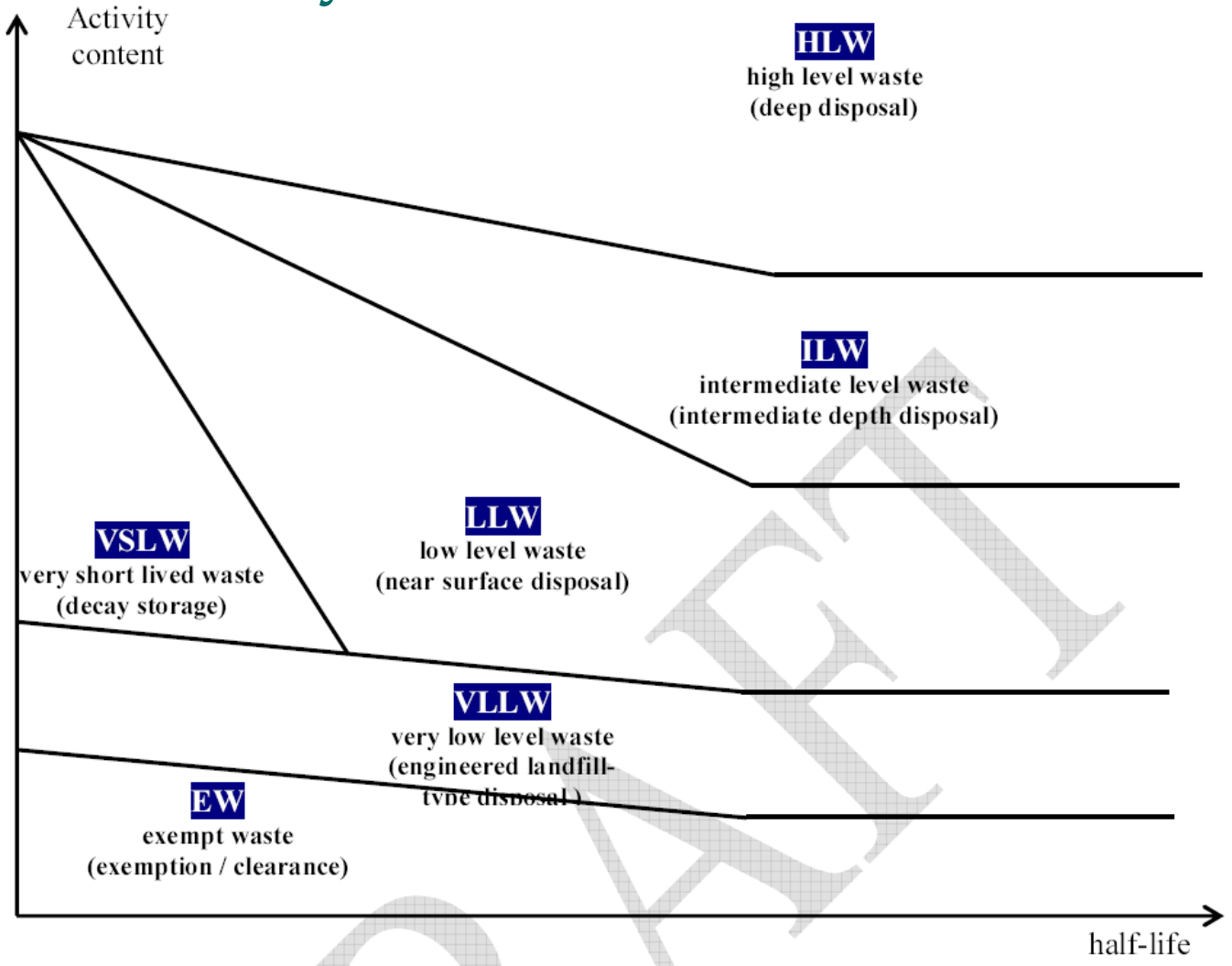
Solid waste management and disposal

General principles

- « The Principles of Radioactive Waste Management » (IAEA, 1995): *"to deal with radioactive waste in a manner that protects human health and the environment now and in the future without imposing undue burdens on future generations"*
- Nine major principles
- Disposal in appropriate safety conditions to be considered as a definitive management option

Classification of radioactive waste

IAEA draft Safety Standard 390



Exempt Waste (EW) / Very Low Level Waste (VLLW)

- Very low level waste: no required radiation protection measures
  - clearance, exemption or exclusion from regulatory control (IAEA Safety Guide RS-G-1.7)
  - no systematic clearance, exemption or exclusion
- For VLLW not cleared, disposal in near surface landfill-type facilities

Very Short Lived Waste (VSLW)

- Very Short Lived Waste:
  - medical uses
  - research facilities
- Storage for decay
- Disposed in conventional waste disposal

Low Level Waste (LLW)

- Mostly disposed of in near surface repositories
- Containment of a few hundred years

- Near surface disposal for some waste (milling, mining waste, …)
  - Long live radionucleids
  - Large volumes

- Other approaches:
  - Storage followed by geological disposal
  - Dependant on national context

Intermediate Level Waste (ILW)

- Waste from:
  - NORM (radium)
  - nuclear industry (graphite)
- Long lived radionuclides content
- Subsurface disposal
- Main principles similar to geological disposal

High Level Waste (HLW)

- Waste from nuclear industry
  - From reprocessing
  - Spent fuel
- Long half-life radionuclides, in particular alpha emitters
- Most accepted approach: deep geological disposal
  - combination of engineered and natural barriers
  - no obligation for future generations to actively monitor the facility
  - regulatory criteria established or discussed

High Level Waste (HLW)

- The Safety Requirements N° WS-R-4 of the IAEA mentions

  "the aim of geological disposal is not to provide a guarantee of absolute and complete containment and isolation of the waste over all time but to ensure that any levels of radionuclides eventually reaching the biosphere are such that possible radiological impacts in the future are acceptably low."

- Application of ICRP 103 recommendations to disposal of HLW to be explained by ICRP

Stakeholder involvement

Stakeholder involvement

- Management of radioactive waste:
  - a major concern for public
  - a major issue for the nuclear industry

- Highly important to take into account the concerns of the public

- Some principles for decisions:
  - public involved
  - information to be understood
  - not consensus but participation and influence
  - balance between stakeholders

Conclusions

Road map to radioactive waste treatment

- Classification of waste
- Identification of treatment pathways
- Clear, broad and open decision process