Disposal Solutions Implemented for Low Level Waste

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Introduction

Safety Objective:

- Protect man and the environment from the harmful effects of ionizing radiation now and in the future.

Solution:

- Collect radioactive waste and isolate it from the biosphere in suitable disposal facilities.
Trench type disposal

Source: http://ohioline.osu.edu/rer-fact/rer_42.html

Vaalputs – South Africa, Photo credit: NECSA

Texas Compact Waste Facility, Photo credit: Waste Control Specialists LLC
Near surface disposal concepts

Source: SKB; International perspective on repositories for low level waste (http://www.skb.se)

France, Spain, UK, Japan, Slovakia, Czech Republic, Sweden, Finland

Photo credit: Enresa, Photo credit: NDA, Photo credit: TVO
Geological disposal concepts

Former mine

Purpose built facility
Borehole disposal concept

Facility siting activities have been initiated in Ghana, Philippines, Malaysia and Iran and several other countries are also considering adopting the concept.

Source: IAEA-TECDOC-1644 (BOSS: Borehole Disposal of Disused Sealed Sources)
Safety Concept

- Multiple safety functions (main functions: containment and isolation)
- Multiple barrier system
  - natural
  - man made
Safety assessment - a key tool

Safety Objective

Site
- Site selection criteria

Design and engineering
- Design requirements

Waste package
- Waste acceptance criteria

Tool: safety assessment, safety case
Compact Waste Facility Texas

• Site:
  – red bed clay
  – arid climate

• Engineered barriers:
  – multi layer lining
  – reinforced concrete disposal cells
  – multi layer final cover and concrete cap

Source: http://www.wcstexas.com/
L’Aube - France

Source: ANDRA (J.L. Tison: 40 Years of operation of Near Surface Repositories, Andra Experience)
Bátaapáti - Hungary

• Site:
  – Granitic site, depth 200 m

• Engineered barriers:
  – Reinforced concrete containers
  – Mortar filling in the containers
  – Concrete backfill,
  – Sealing and plugging

Photo credit: PURAM
Optimization

Results of the optimization

- The radioactive material content (waste ratio) in the gallery increased from 19% to almost 50%.
- With the same level of safety, a more cost effective solution was developed.

Photo credit: PURAM
Conclusions

- Robust, mature, proven systems exist for the safe disposal of LLW
- The adequate solution should be selected by the Member States taking into account national specifics
- The safety case plays an important role during the whole lifecycle of the repositories
- Optimization can be possible for almost every implemented solution
Thank you for your attention!