Disposal Solutions Implemented for Low Level Waste

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International Atomic Energy Agency Scientific Forum
RADIOACTIVE WASTE:
MEETING THE CHALLENGE
Science and Technology for
Safe and Sustainable Solutions
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Introduction

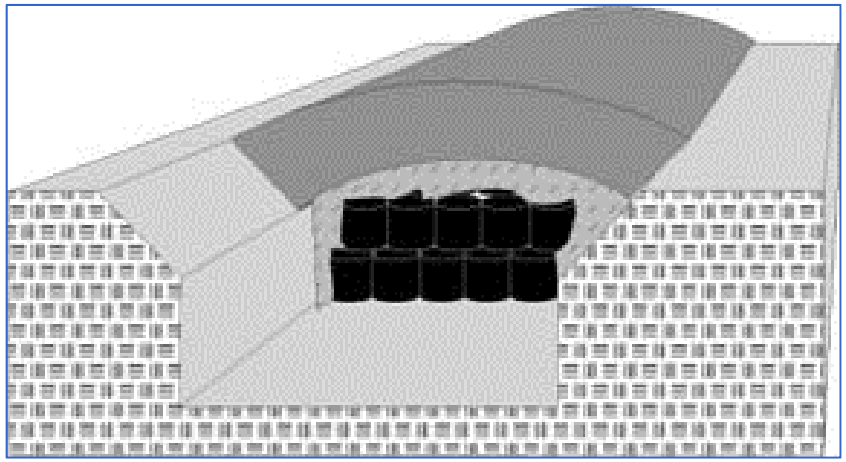
Safety Objective:

- 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

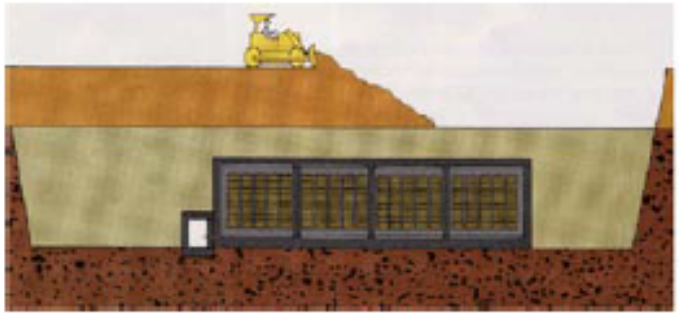
Vaalputs – South Africa, Photo credit: NECSA

Texas Compact Waste Facility ,
Photo credit: Waste Control Specialists LLC

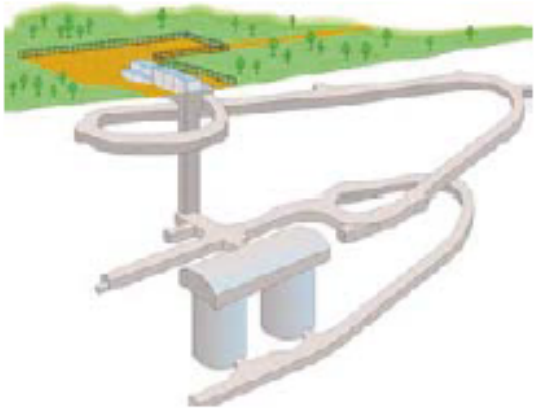
Near surface disposal concepts

a) Vault type, above ground

b) Vault type, below ground



c) Cavity type, underground



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

France, Spain,

Photo credit: Enresa

UK, Japan, Slovakia, Czech Republic

Photo credit: NDA

Sweden, Finland

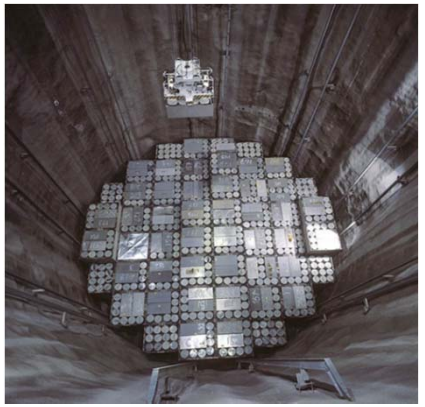


Photo credit: TVO

Geological disposal concepts

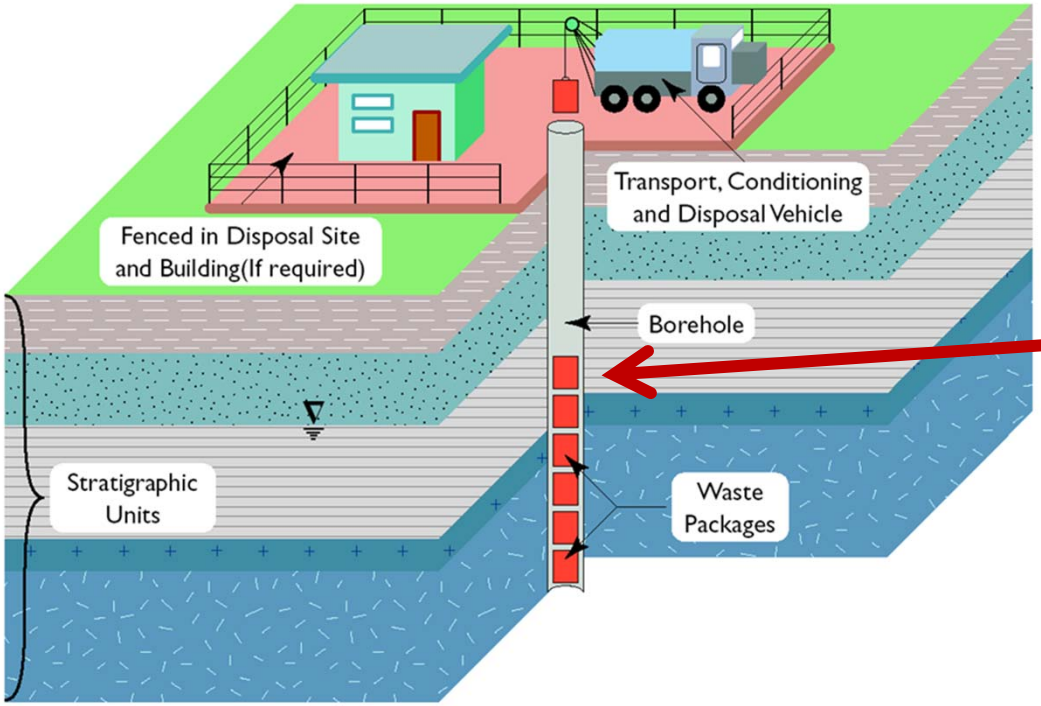
Photo credit: BfS

Former mine

Photo credit: PURAM

Purpose built facility

Borehole disposal concept

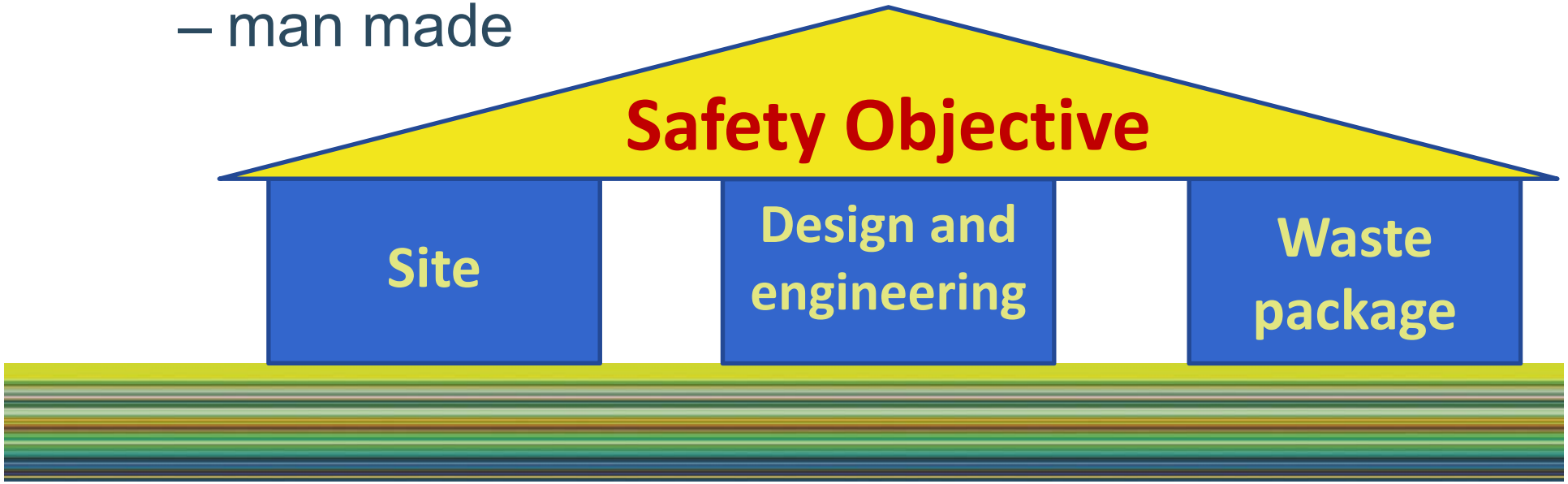


Facility siting activities have been initiated in Ghana, Philippines, Malaysia and Iran and several other countries are also considering adopting the concept.

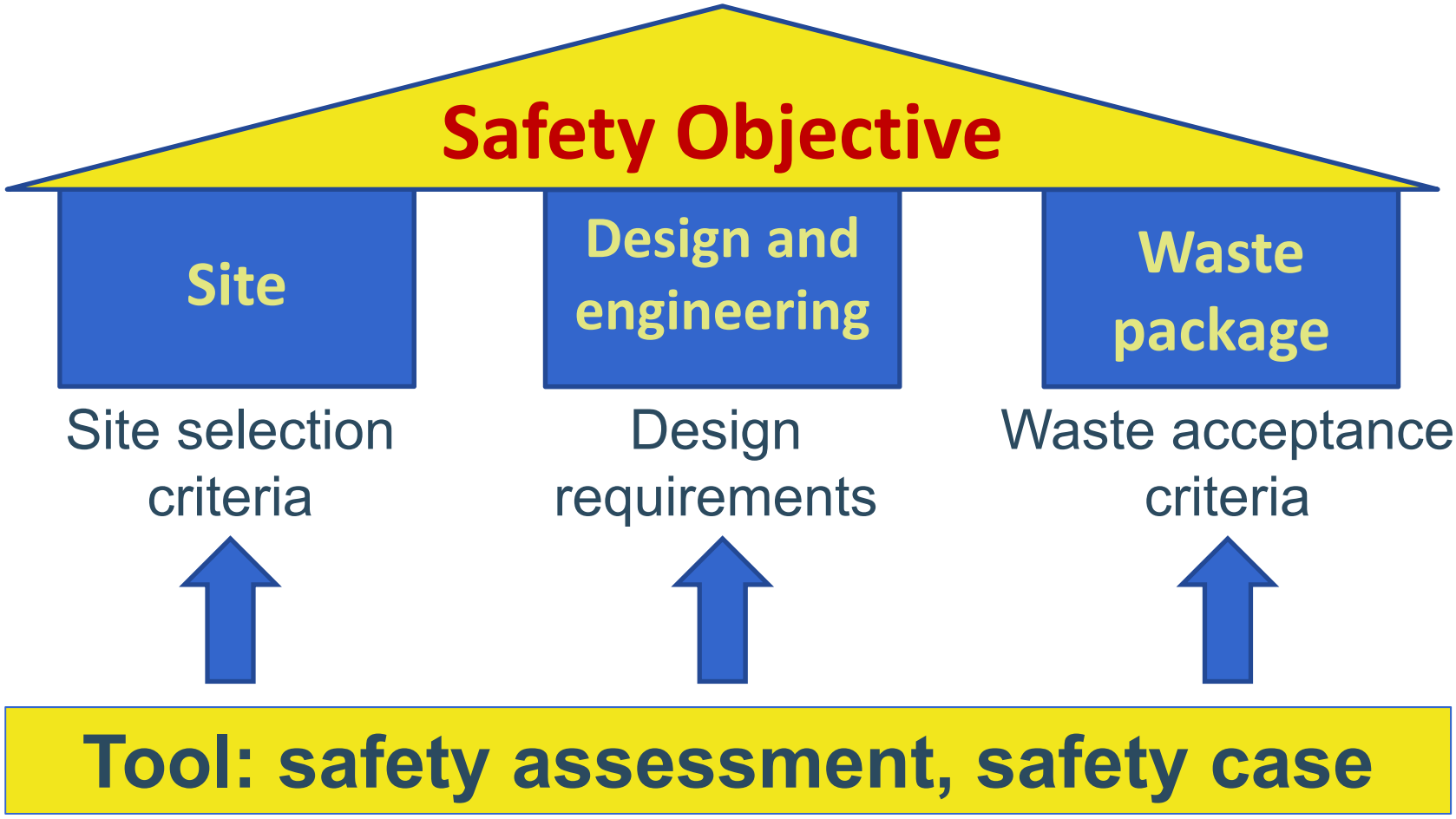
Source: IAEA-TECDOC-1644 (BOSS: Borehole Disposal of Disused Sealed Sources)

Safety Concept

- Multiple safety functions (main functions: containment and isolation)
- Multiple barrier system
  - natural
  - man made

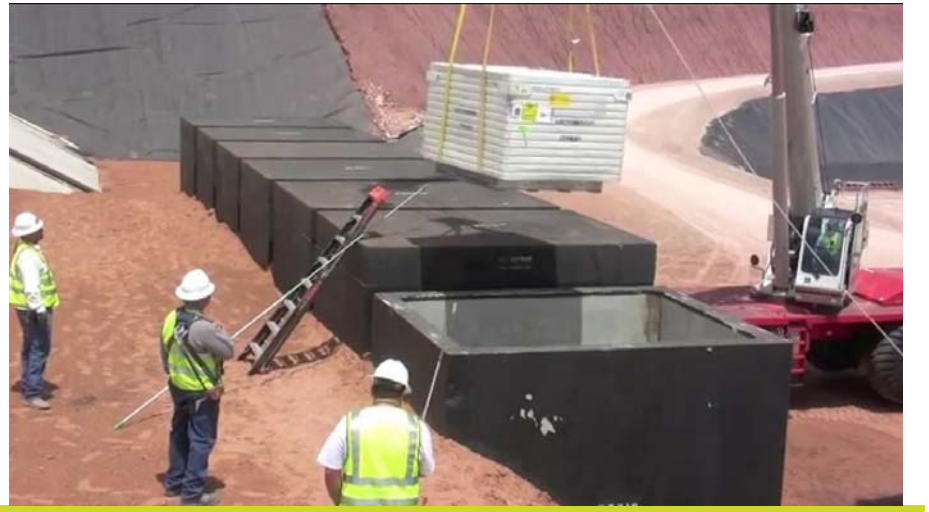


Safety assessment - a key tool



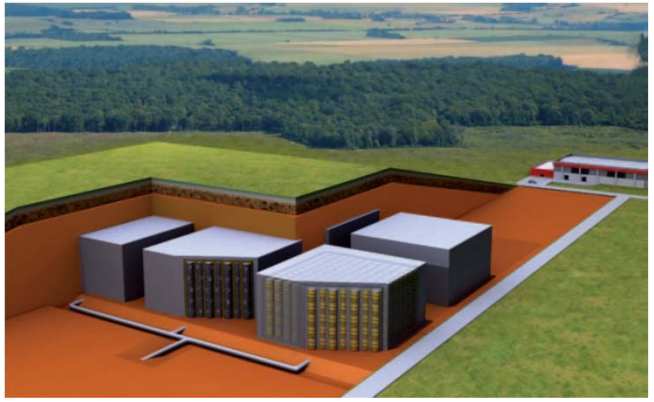
Compact Waste Facility Texas

- **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



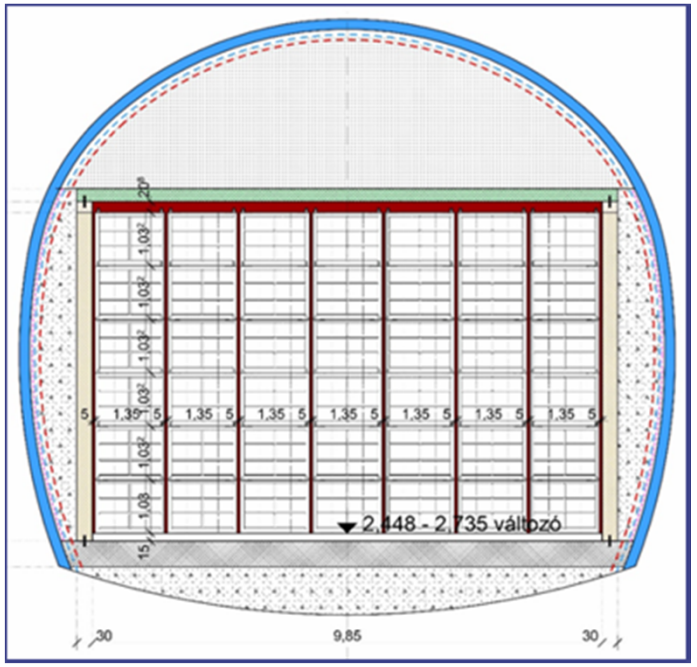
Source: ANDRA (J.L. Tison: 40 Years of operation of Near Surface Repositories, Andra Experience)

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

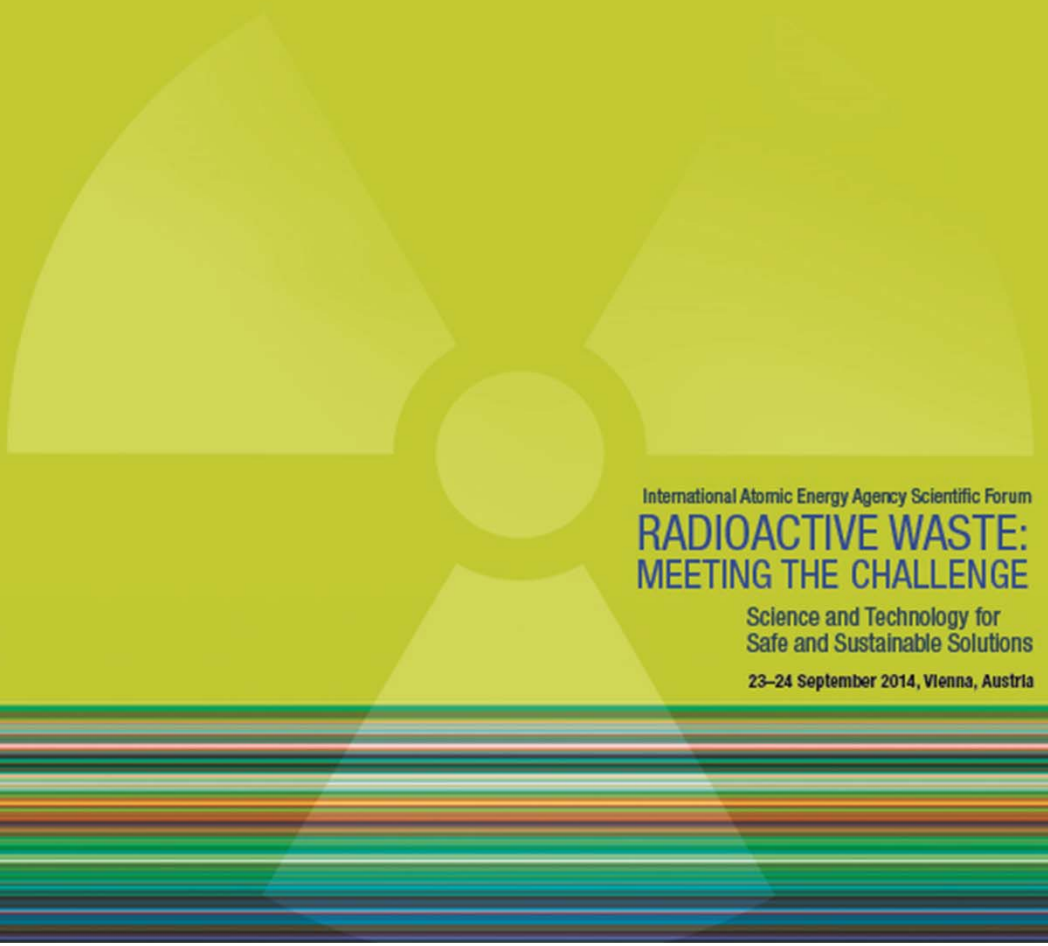
- The radioactive material content (waste ratio) in the gallery increased from 19% to almost 50%.
- With the same level of safety, a more cost effective solution was developed.

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!



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