



*PREDIS Webinar n.2 on WAC  
Needs, Challenges and  
Opportunities*  
SOGIN view (WMO-Italy)

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Angelo Paratore

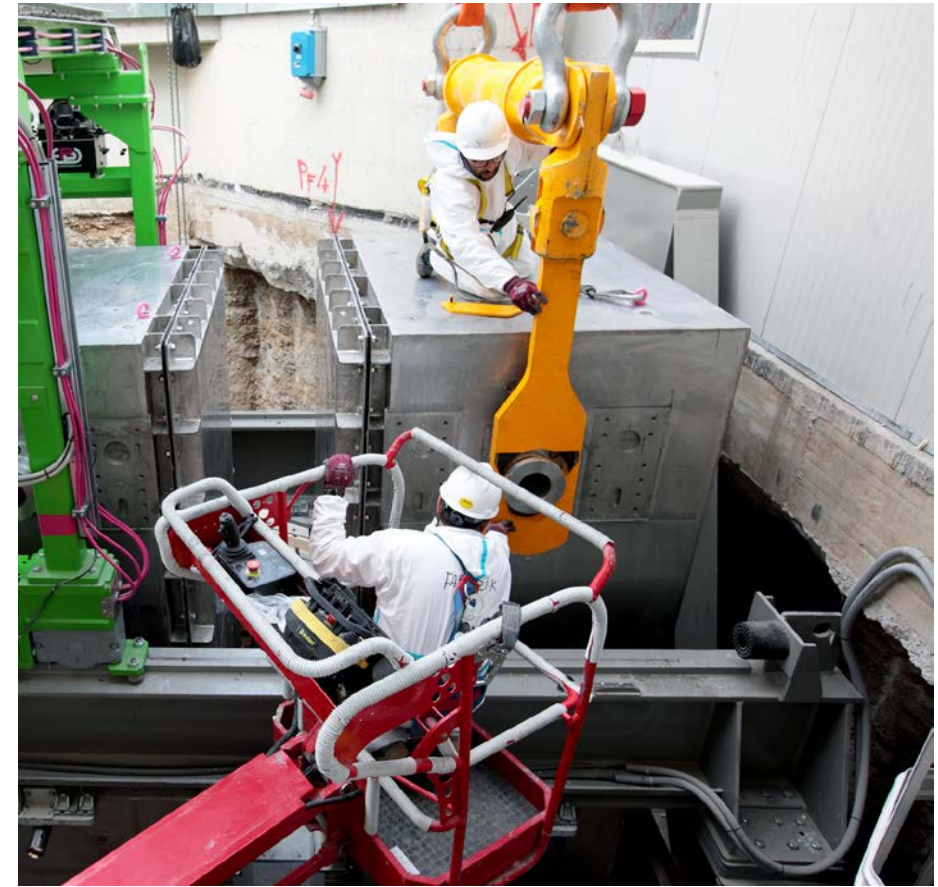
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# SOGIN GROUP

Sogin is the State-owned company responsible for the **decommissioning** of Italian nuclear installations (4 NPP's, 4 Fuel Cycle Facilities, 1 Research Reactor) and for the **management** of **radioactive waste**.

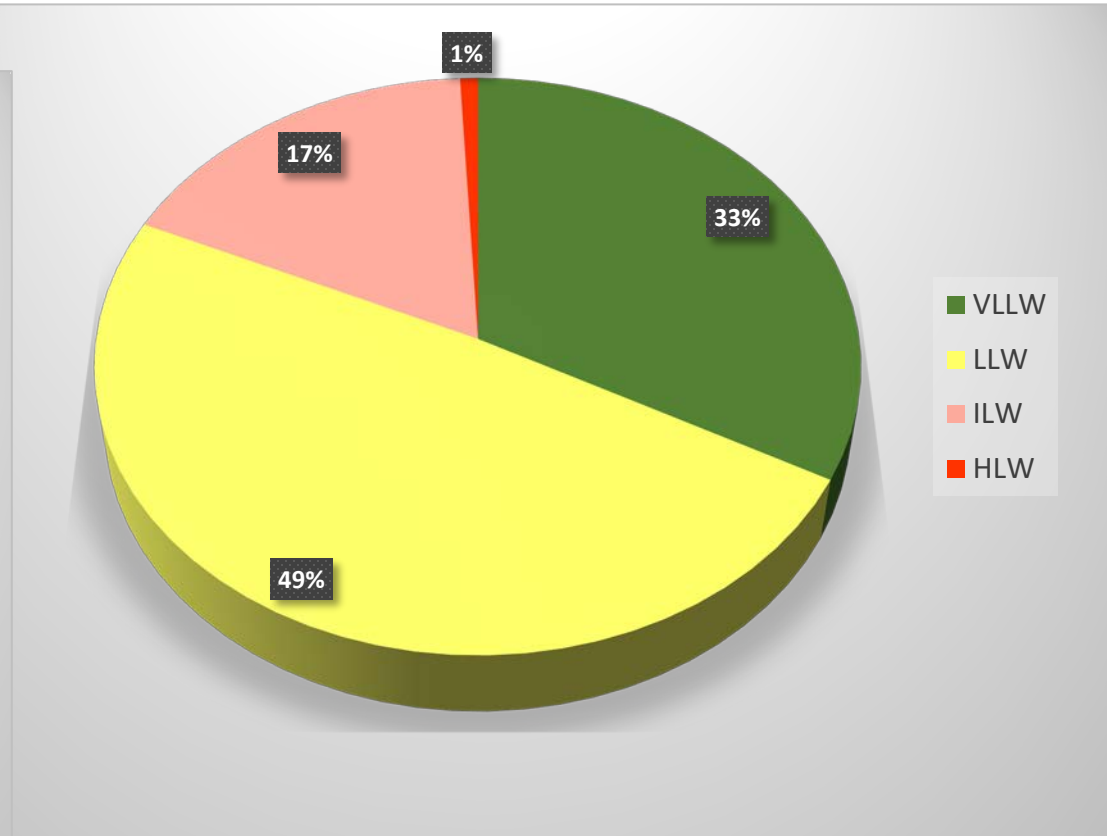
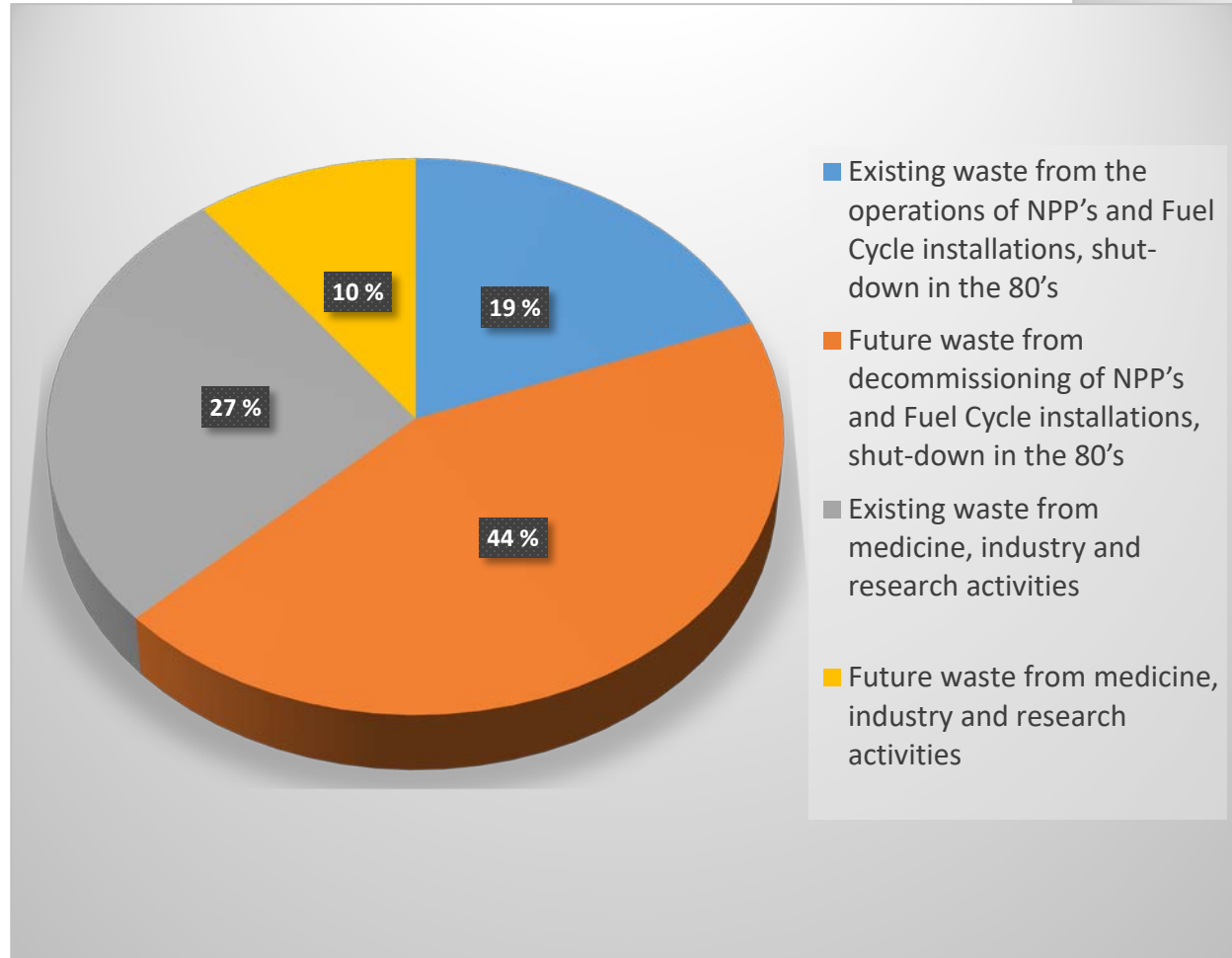
Sogin is also responsible for siting, designing, building and operating the **National Repository & Technology Park**, a near-surface facility for the safe long-term storage and disposal of all Italian radioactive waste.

Sogin Group includes **Nucleco**, the subsidiary company engaged in the integrated management of radioactive waste and spent sources, in the decommissioning of nuclear installations and in the decontamination of industrial sites.



# RADIOACTIVE WASTE INVENTORY

≈ 95.000 m<sup>3</sup>\*

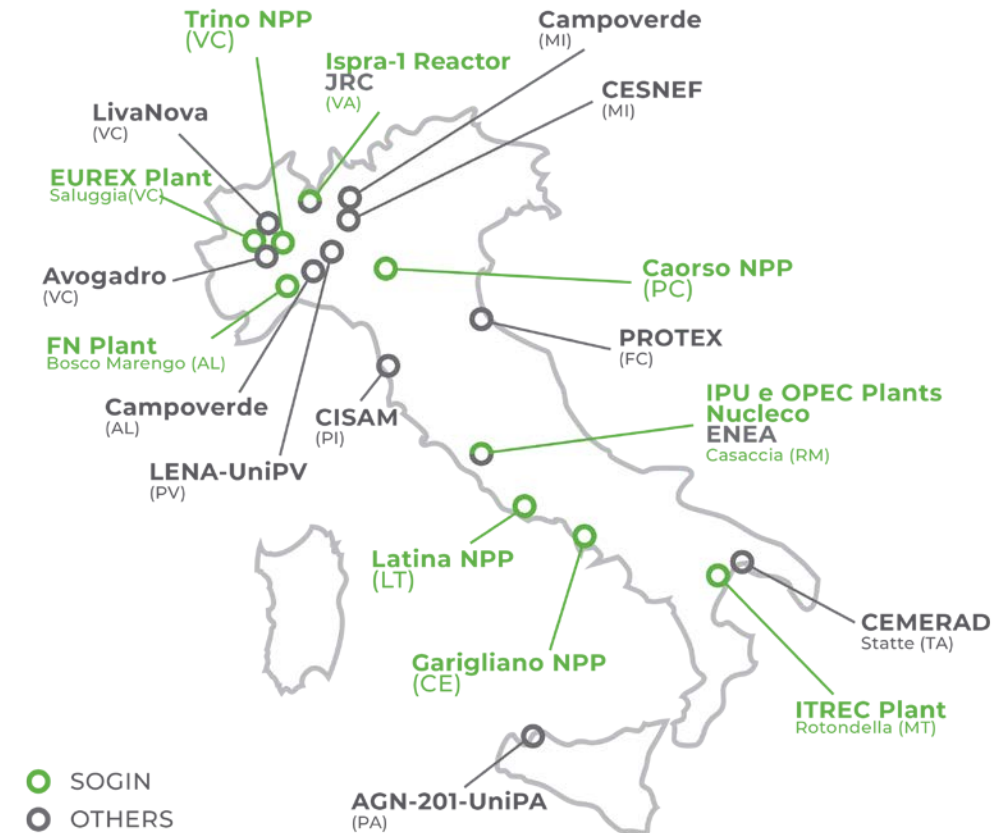


- Forecast of the overall volume of waste to be managed in the National Repository

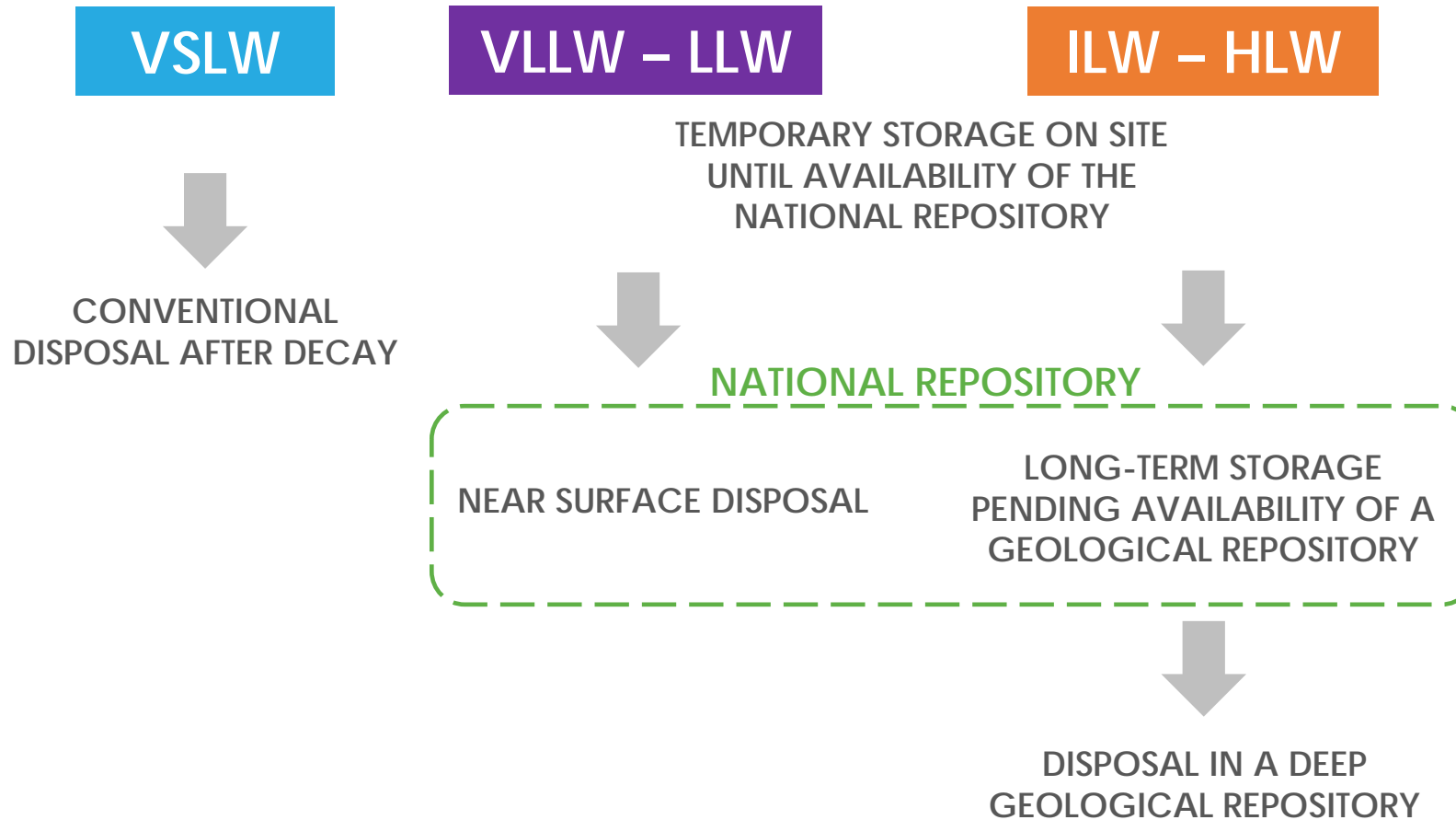
# CURRENT WASTE STORES IN ITALY

Radioactive waste in Italy:

- Waste from medicine, research, industry;** Very Short Lived Waste (VSLW) managed by institutional producers, like hospitals, until natural decay allows their disposal as conventional (special) waste; Very Low Level Waste (VLLW), Low Level Waste (LLW) and Intermediate Level Waste (ILW) collected by the operators of the so called Integrated Service and stored in temporary storage facilities pending availability of the National Repository
- Waste from nuclear power plants, fuel cycle facilities, research reactors and decommissioning:** stored by Sogin in temporary storage facilities at the sites of production pending availability of the National Repository



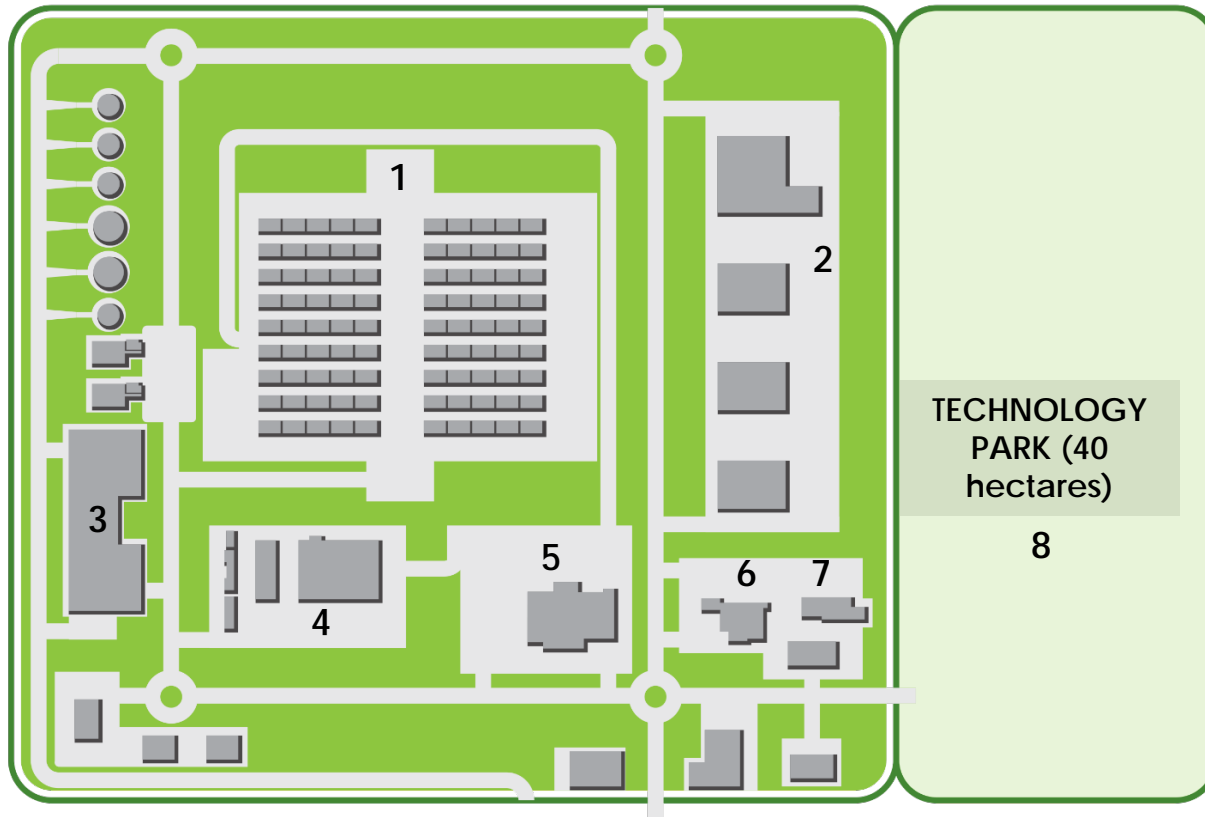
# DISPOSAL STRATEGY IN ITALY



# NATIONAL REPOSITORY PRELIMINARY DESIGN



NATIONAL REPOSITORY  
(110 hectares)



1. Disposal area for VLLW and LLW
2. Complex for storage of ILW/HLW (Casks and High integrity containers)
3. Area for cell production
4. Module Production Plant
5. Module Loading Plant
6. Solid Waste Treatment Plant
7. Quality Control, Radiochemical Analyses
8. Technology Park with common facilities and R&D labs devoted to D&WM as well as sustainable development activities to be agreed with the local communities

# CURRENT APPROACH TO WAC

- A set of preliminary WAC is defined by the Regulatory Body (ISIN) and the Italian Std; such documents **include the qualification process tests for waste conditioning** (e.g. radiation resistance, fire resistance, thermal cycles, biodegradation, leaching, etc.)
- Sogin defines **additional preliminary WAC** based on waste characterization and dialogue with waste producers, repository preliminary design, preliminary 'site independent' safety assessments, IAEA std (IAEA, SSG 23 – 2012 ), international best practices
- The **Regulatory Body is responsible for approving** the Qualification Process for conditioning specific waste streams; **Sogin is involved in the approval procedure** and is required **to issue** so called '**Letters of Compliance**' (LoC) for the potential disposability of waste conditioned with the approved process (Disposability Assessments)

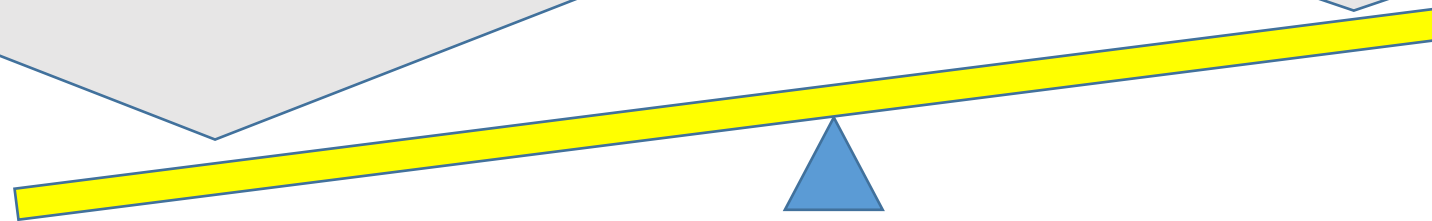


# EARLY OR DEFERRED CONDITIONING?

## Trade-off factors

- Non critical waste complying with preliminary WAC (mainly VLLW/LLW)
- Maturity of the waste treatment /conditioning process
- Safety reasons requiring early conditioning (e.g. liquid waste)

- Challenging waste (mainly solid ILW)
- Need of R&D for defining suitable treatment/conditioning process
- Unavailability of a DGR concept solution



**EARLY CONDITIONING**  
Homogeneous/heterogeneous grouting with qualified process

**DEFERRED CONDITIONING**  
Reversible packaging in High Integrity Containers for safe storage





# EARLY OR DEFERRED CONDITIONING?

## PROs/CONs



**EARLY CONDITIONING**  
Homogeneous/heterogeneous grouting with qualified process



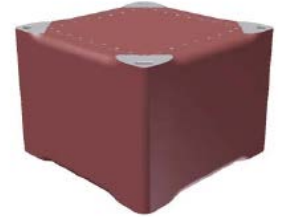
### PROs

- Accelerated decommissioning plans
- Increased short-term safety

### CONs

- Possible need of retrieval and reconditioning upon WAC definition

**DEFERRED CONDITIONING**  
Reversible packaging in High Integrity Containers for safe storage



- More flexibility for aligning waste packages to final WAC
- Benefits from new R&D and alignment to best practices

- More stringent design criteria for interim storage of packaged waste



We protect the present  
We guarantee the future



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