

DE LA RECHERCHE À L'INDUSTRIE



The French experience in HLW vitrification

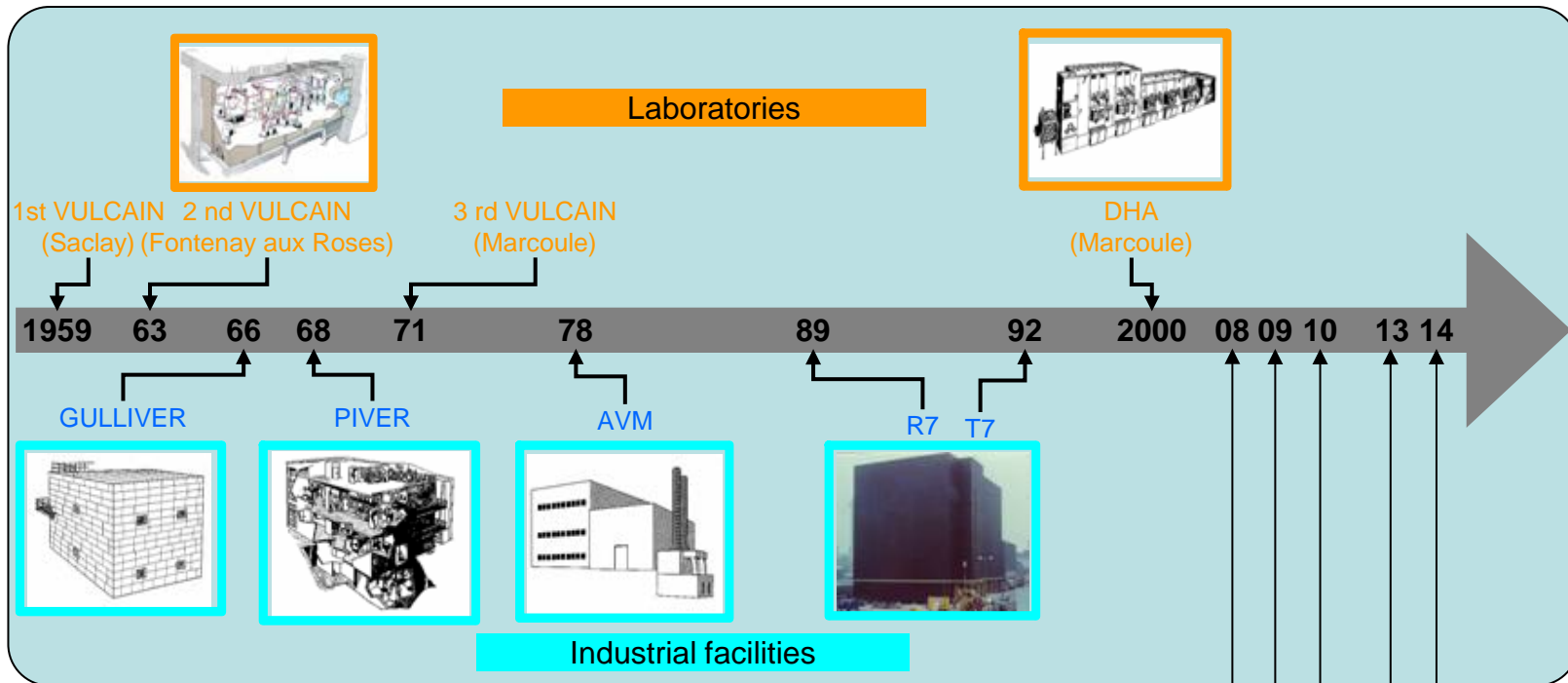
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CEA - Waste Treatment and Conditioning Department
PNNL (08/12 - 07/13)

NWTRB meeting
Richland, WA, April 16th 2013

www.cea.fr

Vitrification development



- 300AQ60 : R7/T7 Glass for higher burnup fuel (C glass)
- **CCIM active commissioning**
- 300AQ61 : D&D Glass in CCIM (ILW glass)
- 300AQ59 : UMo glass in CCIM (legacy waste, ILW glass)
- 300AQ63 : R7/T7 glass (PWR FP) in CCIM (HLW Glass)

Joint vitrification Lab CEA-AREVA (R&D on glass)



Technology

Support current industrial vitrification in la Hague
Hot and cold crucible

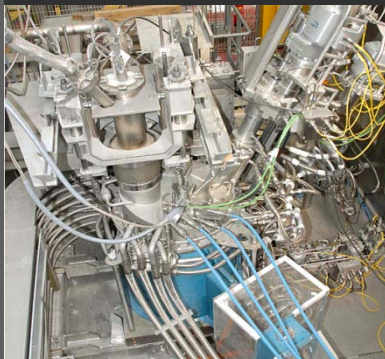


Improvement of current technologies



Development of new technologies

Industrial scale non radioactive laboratory



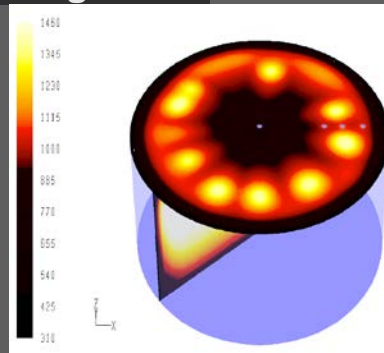
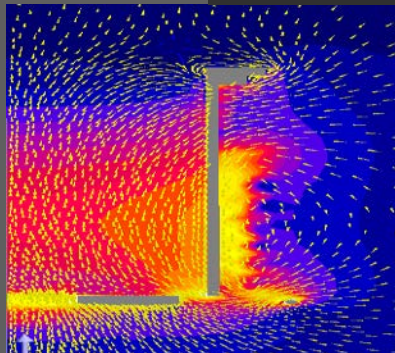
High activity laboratory



Non radioactive laboratory



Modeling



Material

Glass waste form optimization



Long term behavior



New glass matrix development



LCV

Joint Vitrification Lab

Staff:100

Objective : Industrial glass waste vitrification



Radioactive waste specification
Composition, quantity, activity
→ Waste loading

Vitrification
Incineration
Process



Optimal
compromise

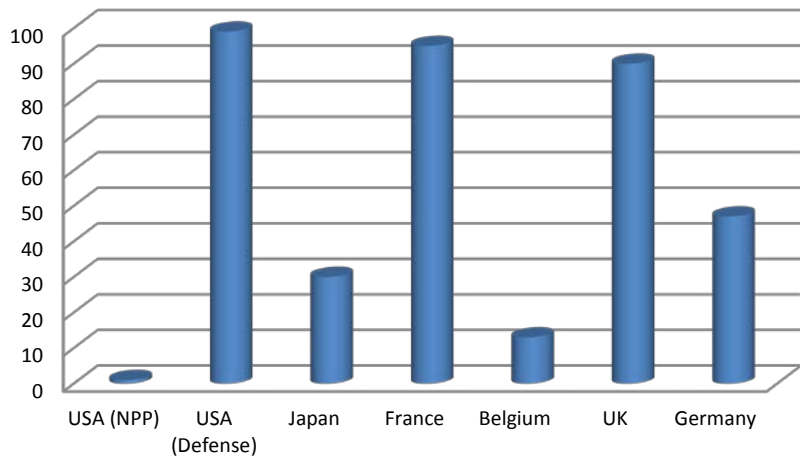
Glass
waste form



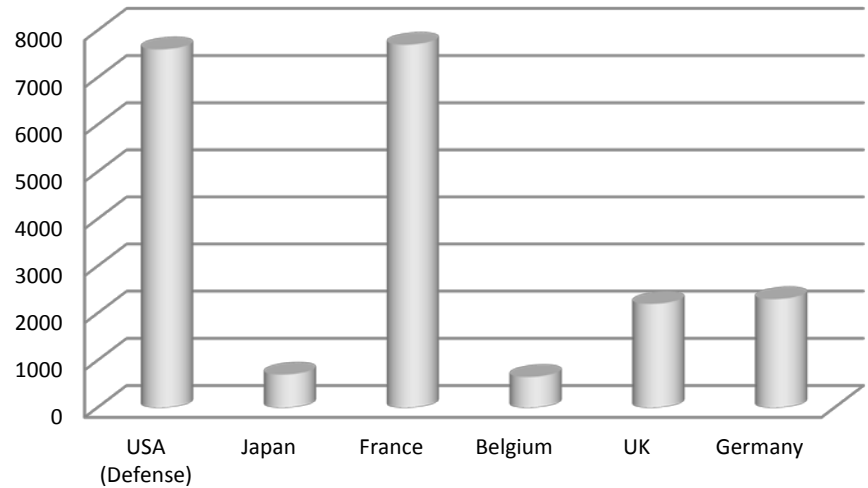
Find the best process
(robustness, maintainability,
best elaboration conditions, low
corrosion, volatility)

Optimize the best containment
matrice
(glass feasibility, quality, long
term behavior)

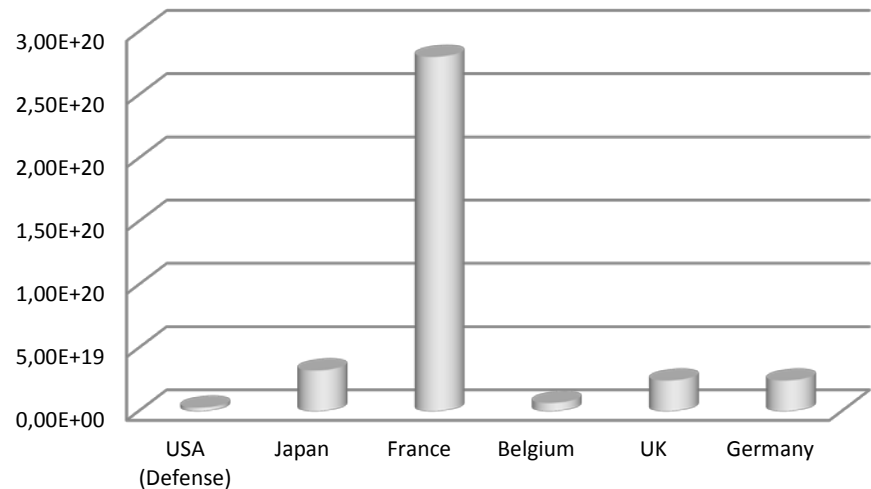
Fraction of SNF reprocessed



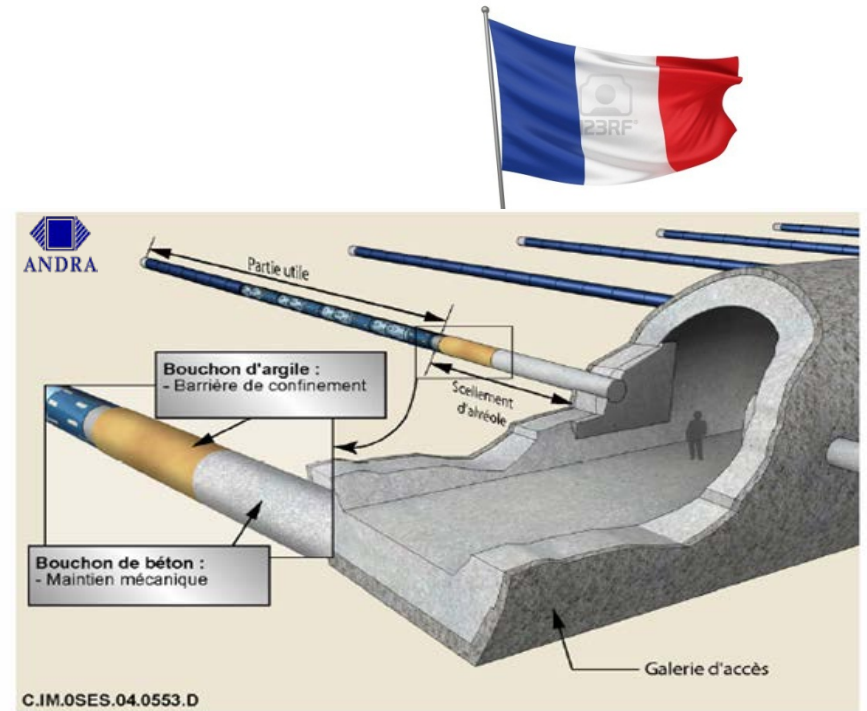
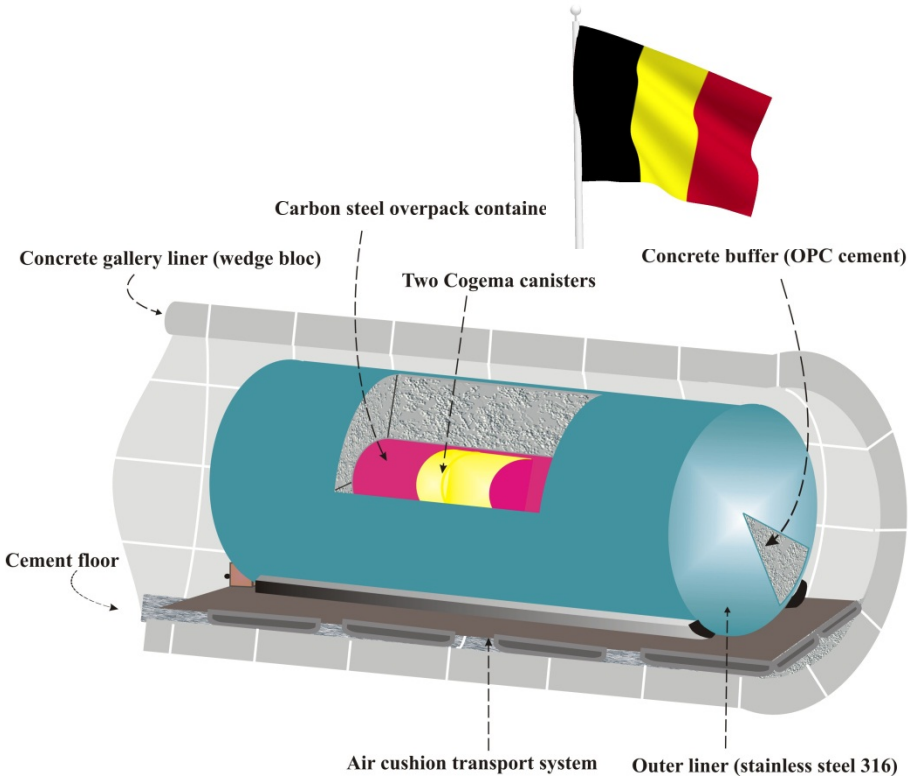
HLW glass produced (until 2012, in t)



Total activity confined (until 2012, in Bq)



Various situations but a common need of geological repository, a smart multi-barrier design and reliable predictions of the fate of RN over the next million years



- Glass lifetime strongly depends on glass properties & on the disposal concept
- In France two key milestones: 2015 (licencing), 2025 (beginning of the disposal of ILW)

International initiative on glass corrosion

Workshops

Seattle (2009), Warrington (2010), Savannah (2011), Saint Louis (2012), San Diego (2013)

Goals

Achieve a consensus on rate-limiting mechanisms

Improve predictive models

Publications

General paper submitted to Materials Today

Special issue of IJAGS (by the end of 2013)

International Simple Glass (6 oxide borosilicate glass)

Bilateral collaborations

Other

Visit of scientist, project of CEA/PNNL thesis, Coordinated Research Project

