



ESV EURIDICE GIE

European Underground Research
Infrastructure for Disposal of Nuclear Waste
in Clay Environment

15th Exchange Meeting

EUROBITUM and the Safety & Feasibility Case 1

Wednesday 24 March 2010 – 13:30

Place: Auditorium Club House SCK•CEN

Agenda:

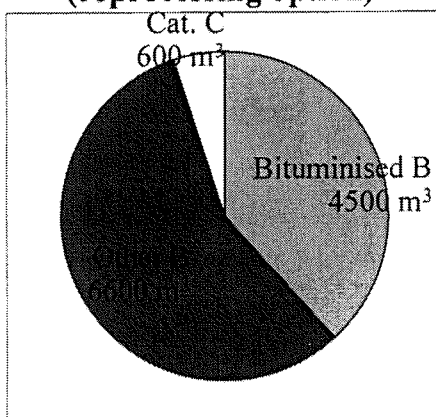
- 13:30 Welcome & introduction – Peter De Preter (EIG EURIDICE)
- 13:40 General aspects – D. Boulanger and X. Sillen (ONDRAF/NIRAS)
- 14:10 Overview of the processes related to the disposal of Eurobitum – E. Valcke (SCK•CEN)
- 14:50 The geo-mechanical perturbation by water uptake – An Mariën (SCK•CEN)
- 15:30 *Coffee break*
- 16:00 The geo-chemical perturbation by NaNO_3 – Nele Bleyen (SCK•CEN)
- 16:40 Concluding remarks – Maarten Van Geet (ONDRAF/NIRAS)
- 17:00 *Closure drink*

Concluding remarks EUROBITUM and the SFC 1

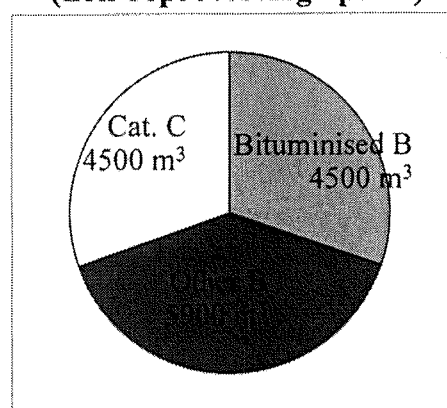
Maarten Van Geet

Bituminised waste is an important volume of waste for geological disposal in Belgium

Closed cycle
(reprocessing option)

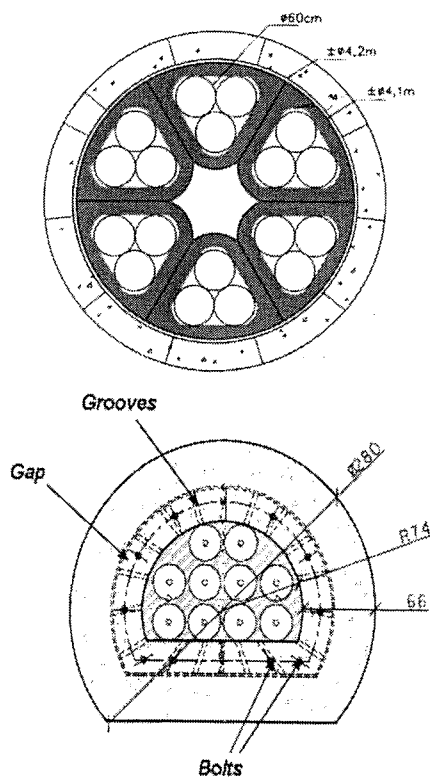


Closed cycle
(non-reprocessing option)



- This corresponds with nearly half of the actual total volume of B-waste to consider in Belgium

Former designs

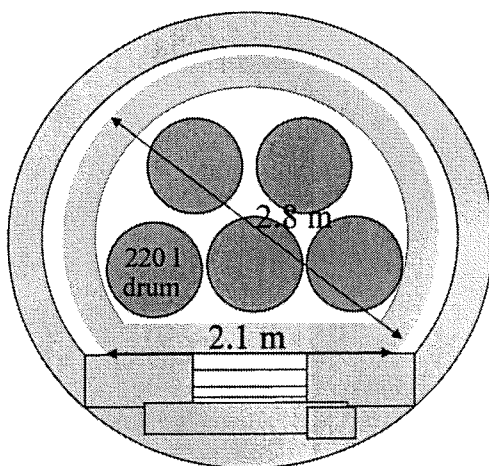


- Based on radiological impact, compared to HLW and SF, it was assumed to put many drums per cross-section
- The last formal safety assessment illustrated that operational aspects (large diameter disposal galleries) and non-radiological phenomena undermines the proposed design

ge Meeting: Eurobitum and the Safety & Feasibility Case 1

18-3-2010

Current reference design



- Iterative interaction between pheno – safety – design has led to the current reference design, considering operational safety aspects, and current phenomenological understanding
- It seems that the physico-chemical conditions of this type of waste are more penalizing towards long-term safety than the radiological aspects sensu stricto

Phenomenological aspects that are considered

- Ageing of EUROBITUM
- Swelling by water uptake and its geomechanical consequences
- NaNO_3 release and its geochemical consequences
- Microbiological interactions and its related consequences
- Gas production due to radiolysis, corrosion, and microbiological activity

Major progress has been made the last years

- Swelling can have enormous effects, but
 - with 3 drums per cross section, the major barrier (Boom Clay) will not be affected
 - Good prospects that the current reference design with 5 drums per cross section will neither affect the major barrier
- Geochemical changes occur, but are mainly limited to cation exchange
- Microbiological activity cannot be excluded
 - Especially towards gas production, we currently need to consider conservative values
- Gas production
 - As the transport of gas at high gas pressures through the Boom Clay is not well known, an optimisation of design might be needed

Ongoing and future research

- Increase process understanding of the water uptake and swelling in order to confirm or further optimise the current reference design
- Increase process understanding of geochemical perturbations, with a main focus on the microbiological effects
- The gas issue (not only for EUROBITUM)
 - Transport of gas through the Boom Clay
 - Evaluate possible changes in design
 - Impact of microbiological activity