REDEVELOPMENT OF OLD LANDFILLS

Some examples

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OVERVIEW

- VALORISATION OF LANDFILL MATERIAL
  - *Fuel (4)*
  - *Building material (1)*
  - *Ore*
- REDEVELOPMENT
  - *Nature reserve (4)*
  - *Industrial area (4)*
  - *Forest area (6)*
  - *Energy (1)*
  - *Recreatian area(2)*
  - *Storage area (1)*
- INTEGRATION IN INFRASTRUCTURE PROJECT (2)

WAY OF REDEVELPMENT
Name of village where the landfill is located
Type of landfill or dumped material
Surface of landfill (in ha)
Year of redevelopment
Way of redevelopment
Some specific points of attention

FUEL

WINTERSLAG

Coal mining tip – coal mining waste

46 ha

1990-2000

Recuperated coal as fuel for powerplants

The older the coal mining waste, the higher the remaining coal content (up to 20 %);

Valorisation of coal mining tips : of frequent occurence

FUEL

BERINGEN

Coal mining tip – coal mining waste

15 ha

1985-1992

Raw coal mining waste used as fuel for fluidised bed boiler (electricity)

- **Ashes valorized as adsorbent for heavy metals**
- **Stopped at the closure of the coal mine**

FUEL

WILLEBROEK

pitch and soot

0,4 + 1 ha

1991

Fuel for a power plant

Dried by mixing with lime

B U I L D I N G MATERIAL

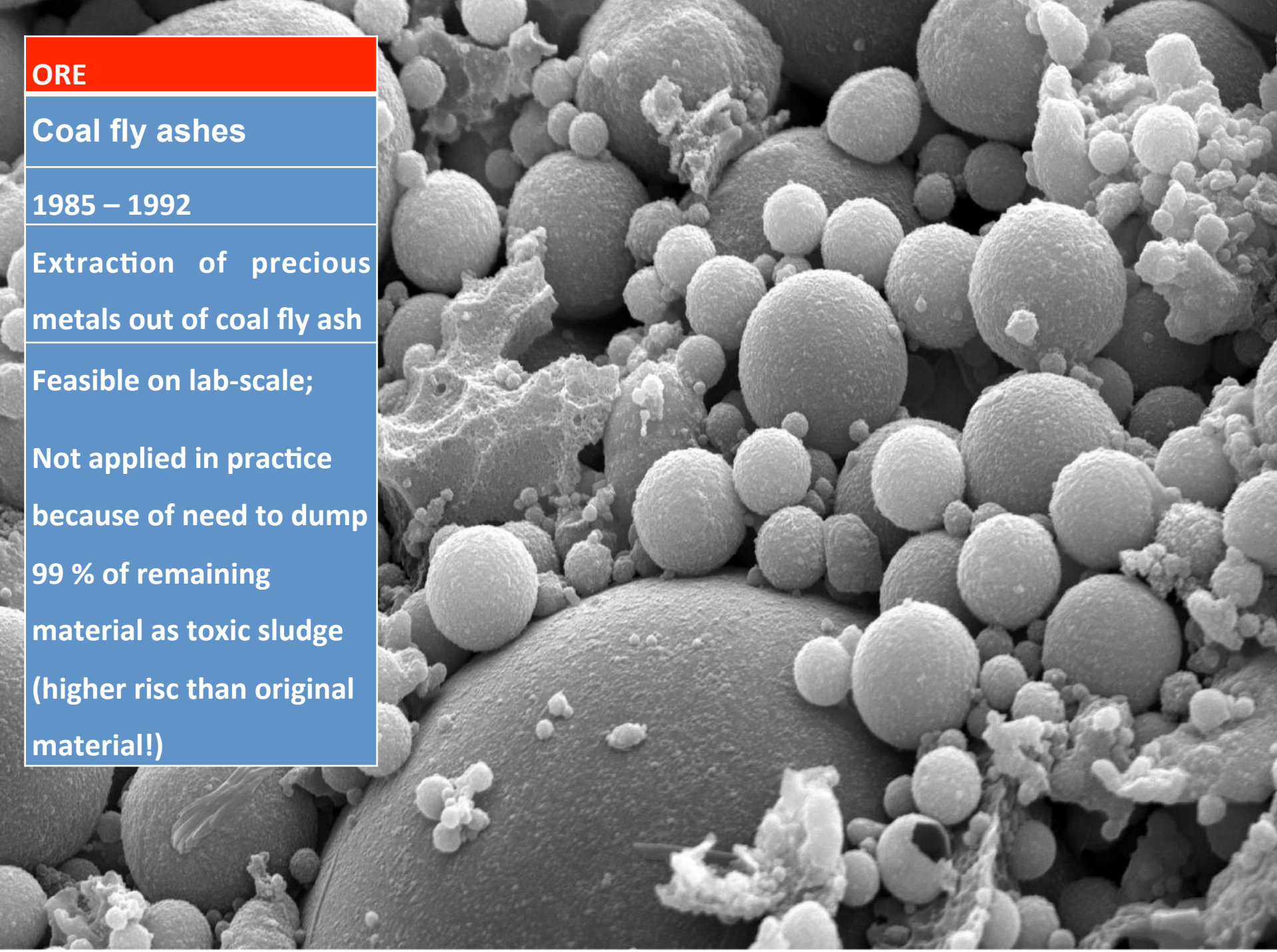
EISDEN

B u r n i n g c o a l mining waste

+/- 20 ha

Red loose stones used for trails and squares; grinded stones used for tennis courts

Attempt to extinguish burning coal mining tip with water :



ORE
Coal fly ashes
1985 – 1992
Extraction of precious metals out of coal fly ash
Feasible on lab-scale; Not applied in practice because of need to dump 99 % of remaining material as toxic sludge (higher risc than original material!)

NATURE RESERVE

ZOLDER, WATERSCHEI, BERINGEN

Tips and sludge basins of coal mining waste

279 ha

1990 – 1996

Nature conservation in view of the conservation of the remediation infrastructure

- Remediation in view of stability, reduction of infiltration of rain water and improved drainage
- Nature conservation = site conservation
- Coal mining waste = specific substrate = specific species of

NATURE RESERVE

H O U T H A L E N - HELCHTEREN

Domestic and industrial waste

140 ha

1975 until now

Nature conservation in view of the integration of the landfills in the natural environment; reconstruction of natural vegetation (heath)

INDUSTRIAL AREA

HOUTHALEN and ZWARTBERG

Coal mining tip

+/- 100 ha + 60 ha

1980 – 1995

Building of industrial area on leveled coal mining tip

- Large amounts of maetrial moving

INDUSTRIAL AREA

EISDEN

Coal fly ash

10 ha

2009-2010

- Parking of shopping center
- Construction of shops

- Subsidence (8 m !) area of coal mining
- Filled with coal fly ash
- Attention point : stability of hydraulic dumped sludge

INDUSTRIAL AREA

ZWIJNAARDE

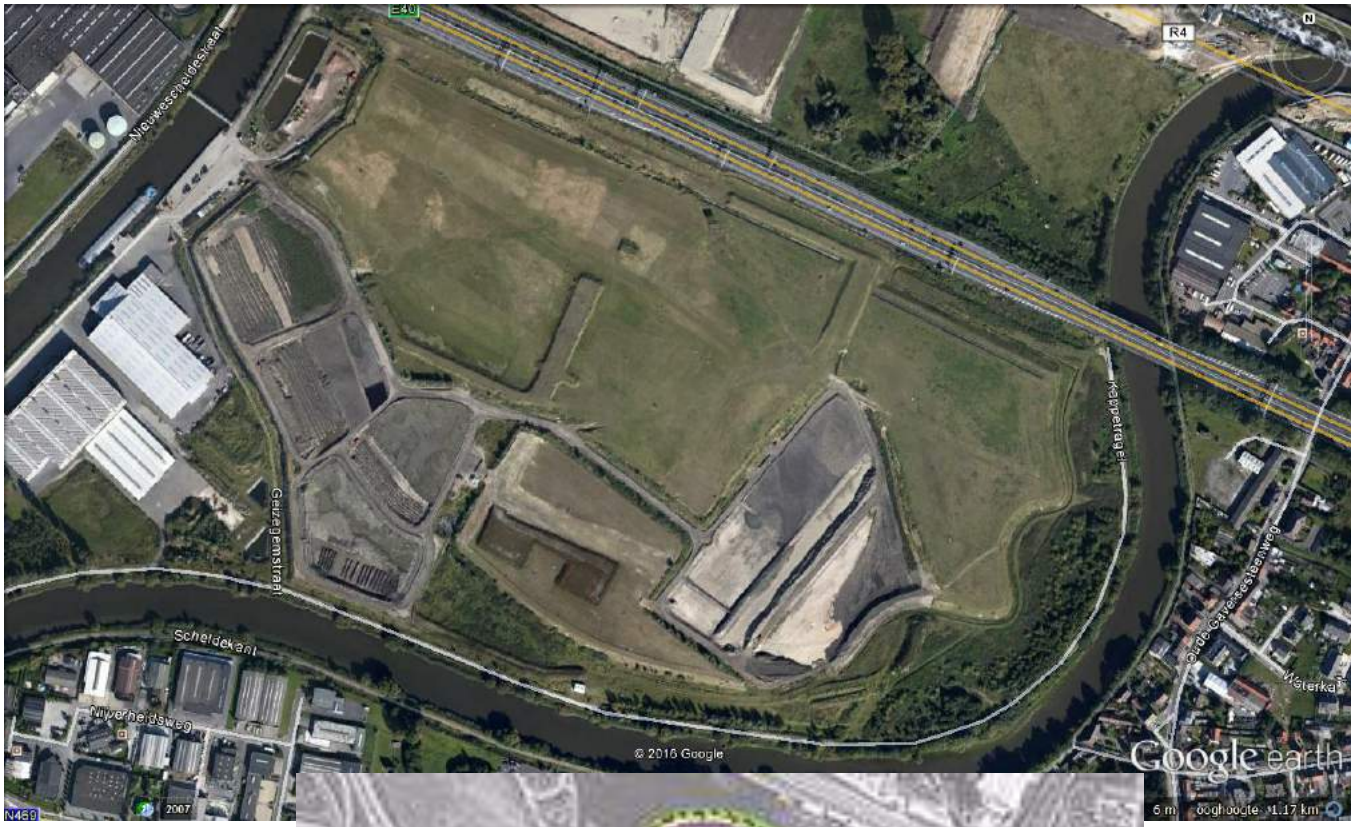
Dredging sludge

30 ha

2016 – 2018

Construction of industrial area for high-tech companies

Industrial destination known before construction landfill



FOREST

LANGERBRUGGE, WILLEBROEK, HARNONCOURT

Paper mill sludge

several ha

1970's

Afforestated with poplars

Dewatering and improvement of sludge with low soil stability

FOREST

LANGERBRUGGE, RODENHUIZE, LANGERLO, MOL

Coal fly ash

30 ha

1980's

Hydroseeding and afforestation with poplars and several forest trees

Evolution of 'young' fly ash dump with growth disorders to an healthy 'old' fly ash dump

ENERGY

ZOLDER

Sludgebasins of coal mine

14 ha

2009

Solar park

- **Soil stability**
- **Conservation of landfill cover**
- **‘new’ energy on ‘old’ energy**

RECREATION AREA

BERINGEN

Coal mining tip

15 ha

2016

mountainbike trail

RECREATIAN AREA

SINT GILLIS WAAS

Industrial waste

6 ha

2016

Golf

Site modulation (golf) with low permeable material in view of improved rain water drainage

STORAGE AREA

DESTELDONK

Coal fly ash

4 ha

2008

Storage area

Cover layer of landfill (claylayer + HDPE-liner + drainagelayer) = floor of storage area

INTEGRATION IN HIGH-SPEED-LINE (TRAIN)
BRASSCHAAT EN LEUVEN
Brasschaat : landfill of construction waste; Leuven : landfill of paint factury
8 + 0,8 ha
2001-2002
Brasschaat : displacement as dike between HSL and living area; Leuven : subsoil insulation wall of landfill used as foundation
Creative in situ use in stand of dumping

Some considerations (1)

- Probably there are in Flanders - at this moment - little or none landfills where financial revenues from 'reclamation', through existing techniques, cover the costs of that 'reclamation‘
- 'Reclamation' implies in most cases the re-deposition of part of the landfill/waste material
- Practical knowledge/experience concerning 'reclamation' and 'landfill construction/ exploitation' is disappearing

Some considerations (2)

- Landfill redevelopment requires fundamental knowledge of soil physical and chemical properties of the waste material and the landfill
- Landfills are 'young soils': in comparison with natural soils (Flanders: +/- 10,000 years old) they are very reactive and there is a rapid evolution of soil physical, chemical and biological properties
- Besides description of actual impact, prediction of future impact is necessary

Some considerations (3)

- Most landfills with 'real' toxicity problems have probably already been tackled in Flanders
- Most of the abandoned / finished landfills can probably be used in one way or another for destinations for which there is a shortage in Flanders: forest, nature, industry, solar panels ...

LANDFILLS AND FIRE (1)

Coal mining waste :

- See slide ‘building material’
- Self-ignition : only if temperature >>> 40O°C
- Mostly set on fire by coal miners who made fire to heat themselves when working on a coal mining tip
- In view of ‘production’ of ‘building material’ out of coal mining waste : not easy to put fire and maintain fire in a coal mining tip !!!

LANDFILLS AND FIRE (2)

Former coal mine site covered with 5 m thick layer of coal mining waste :

- Incident : burning wood deriving of demolition of power plant
- After several months : notice that 0,5 ha in fire
- Way of being extinguished :
  - Not by infiltration of water : danger for vapor-explosion
  - By excavation and dumping underwater in waterbasin

LANDFILLS AND FIRE (3)

Domestic and industrial mixed waste :

- Due to heterogenity of dumped material : it's difficult to trace the cause of the fire
  - as well self ingnition as set on fire is possible
  - often the cause of fire is dumping of not fully extinguished material deriving from incinerators
- Attempts to extinguish with water mostly fail;
  - infiltrating water = source of oxygen !
- Best solution : stop oxygen supply by covering with soil