

# BeNeKempen

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## Brownfield management of the Kempen area

Management of contamination in a diffuse polluted area

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**23 april 2008**



## Objectives of the presentation

- ◆ Situate the problem (heavy metal mega site)
- ◆ Actions on the field
  - Until now, no new techniques
- ◆ Risk ↔ Quality of soil
  - Organising soil related aspects of life/economy

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- Projectgebied Nederland
- Projectgebied Vlaanderen

- Provincie
- Gemeente

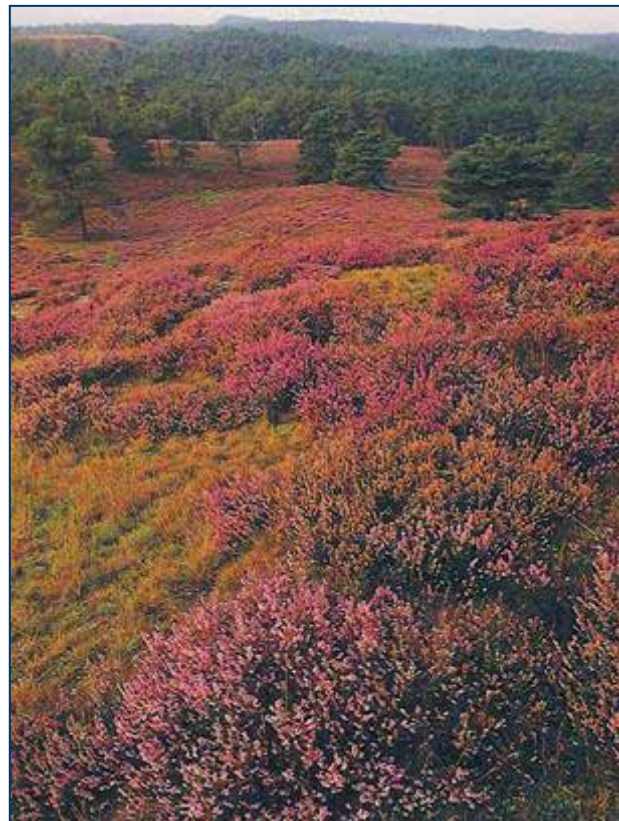


## Kempen area

- ◆ Low population density in the past
- ◆ Sandy soils, low agricultural value
- ◆ Presence of coal
- ◆ Several channels connection main industrial area's (Antwerp, Liège, Germany)

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## Non-ferrous industry

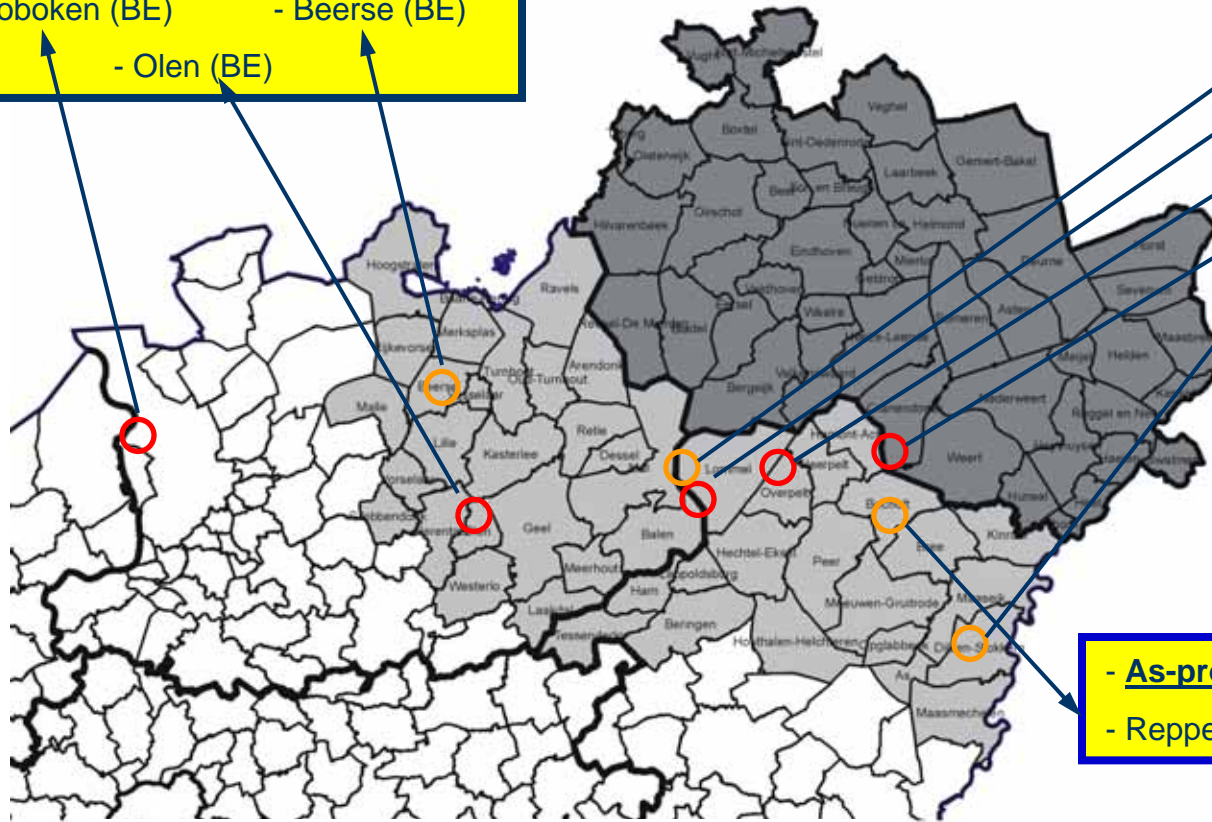
- ◆ End of 19<sup>e</sup> century
  - ⇒ concentration of non-ferrous industry (mainly Zinc smelters)
- ◆ Well considered choice
  - Emission related problem of SO<sub>2</sub>
  - Technology was non existing



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- **Pb-production**
- Hoboken (BE)
- Beerse (BE)
- Olen (BE)

- **Zn-production**
- Lommel (BE)
- Balen (BE)
- Overpelt (BE)
- Budel (NL)
- Rotem (BE)



- **As-production**
- Reppel (BE)

- Project area in the Netherlands
- Project area in Flanders
- Provincial border
- Communal border

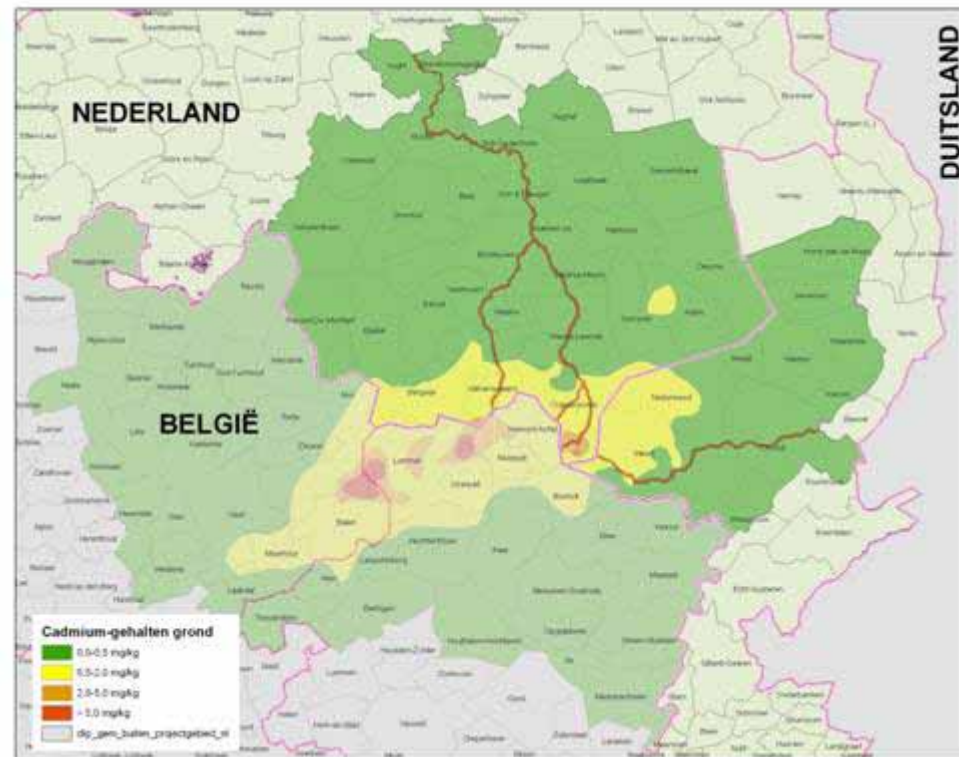


## Contamination

- ◆ Zn, Pb and Cd
- ◆  $> 350 \text{ km}^2$
- ◆ Beginning of the 1970 people became aware of possible negative effects
- ◆ Bio-monitoring studies around 1980



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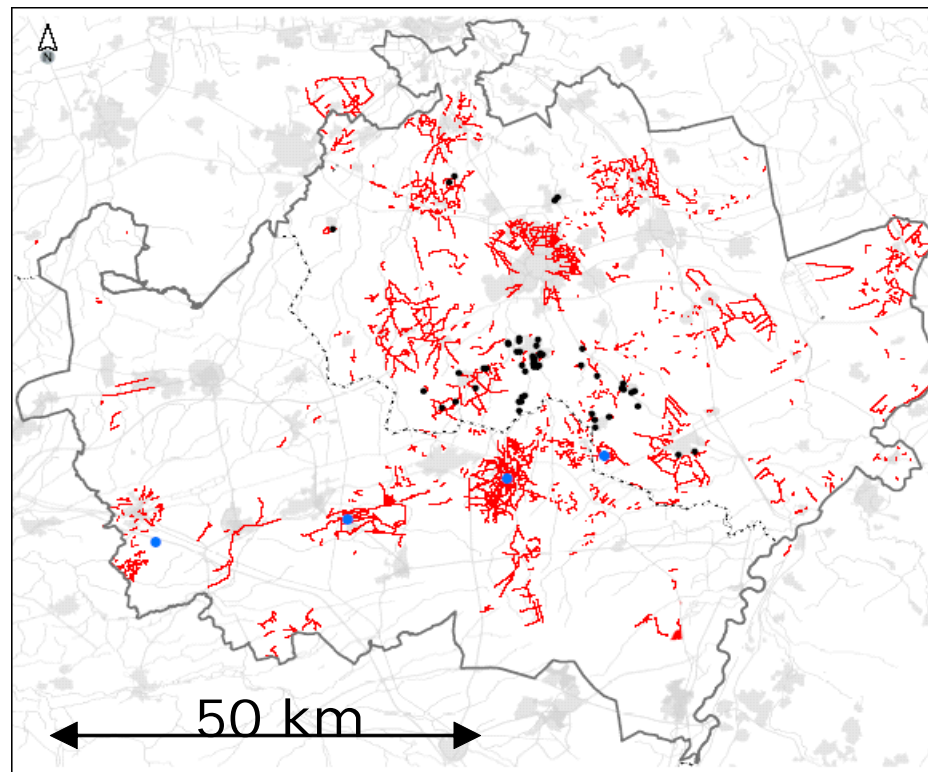


## Zinc ashes

- ◆ Besides the diffuse pollution
- ◆ Wide spread use of zinc ashes  
area > 3000 km<sup>2</sup>

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## Major change

- ◆ Around 1970 change in production technology (pyro → hydro)
- ◆ Closure of some plant sites

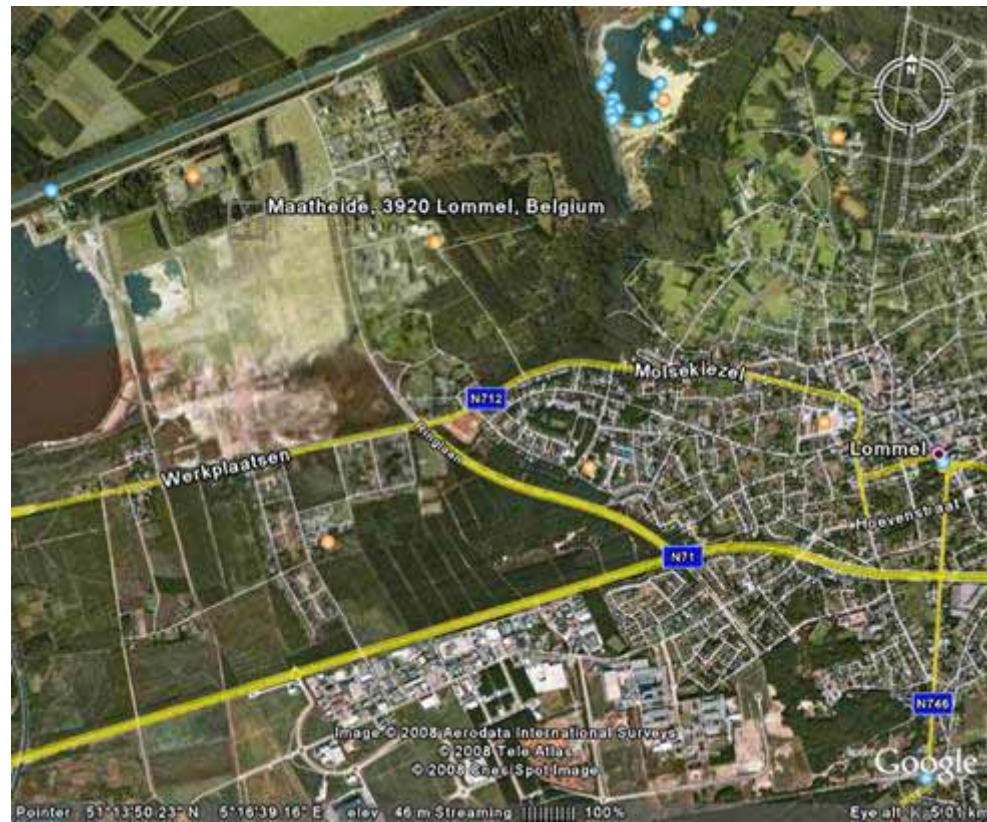
## First actions

- ◆ 1990s start cleaning up historical pollution
  - plant site
  - surrounding

## Other conditions

- ◆ Not that less populated anymore
- ◆ Residential areas close to plant sites
- ◆ Agriculture (root-vegetables)
- ◆ Other industry
- ◆ Nature

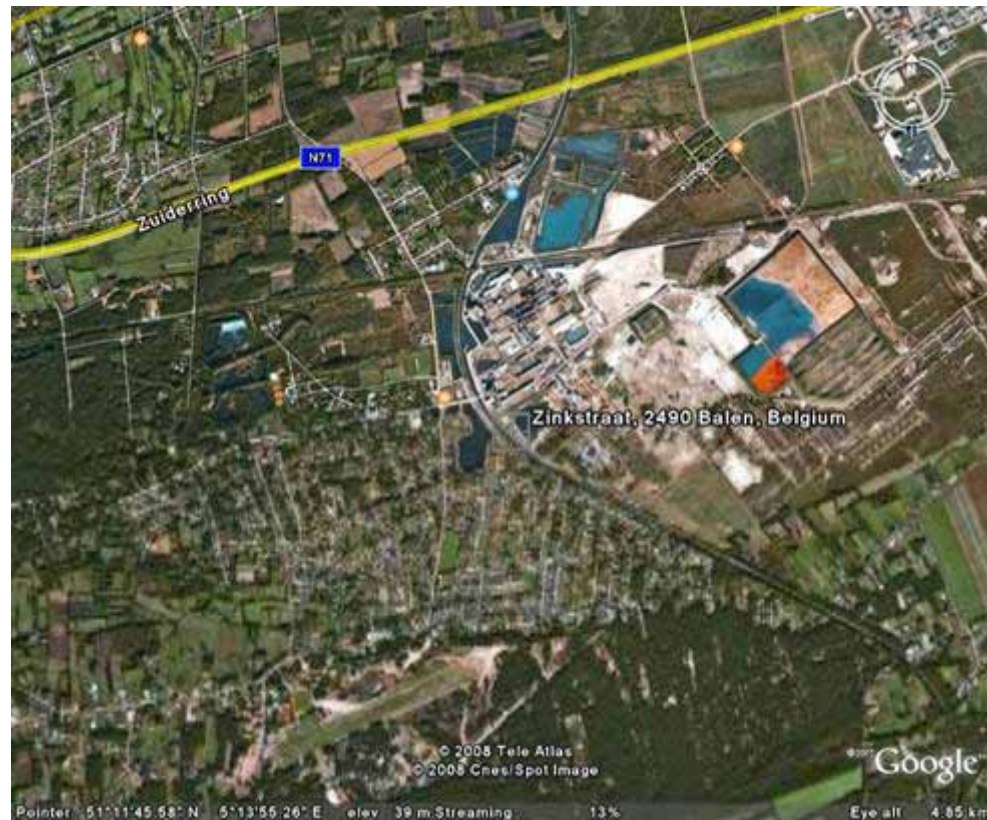
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## Action based on risks

- ◆ Human risks limited to residential area's
  - Cd: vegetable consumption
  - Pb: soil/dust ingestion

## Point of discussion

- ◆ Including vegetable consumption in risk assessment are not

## Excavations

- ◆ On the plant site
  - Always landfilled are used on site
- ◆ Residential area's close to plant site
- ◆ Removal of zinc ashes on private properties

## Communication

- ◆ Vegetable consumption
  - Crop selection
  - pH control
- ◆ Inside (house) dust control measure
  - Wet cleaning

## Agriculture

- ◆ Crop advise taking EU limit values in to account
- ◆ Economic evaluation
- ◆ Energy crops

## Nature

- ◆ Offering solution for practical problems
  - Removal of greenery
  - Restoring land dunes
  - Soil/sludge removal by landscaping



## Infrastructure

- ◆ Controlled re-use of zinc ashes in road construction
- ◆ Controlled re-use of contaminated soil
- ◆ Well equipped locations for safe handling of zinc ashes and contaminated soils



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