

# Transport of PCBs in the environment

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# Presentation INTERSOL 2005

- Introduction to the project
- Objectives
- Principles of transport
- Description of testing sites
- Results of monitoring
- Discussion

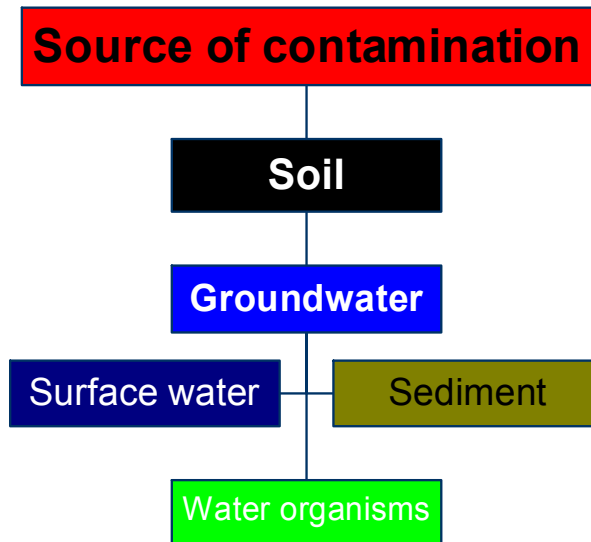
# Project

The project „The transport of PCBs in the environment and its accumulation in organisms“ was performed within the framework of Research Program of Czech Ministry of Environment as project No. VaV/730/01/03 by company AQUATEST a.s. and Research Institute of Fish Culture and Hydrobiology in years 2003 and 2004

# Objectives

- to gather the information on the transport and accumulation of PCBs in the water and aquatic organisms based on the review of available data,
- to complete the information about the state of the contamination of the environment at the selected testing sites,
- the comparison of results of analyses of the individual media of environment from the testing sites with results obtained in the past,
- comparison of the results between the monitored sites.

# Distribution of PCBs in the environment



# Distribution coefficients

- Soil / Groundwater

$$K_d = K_{oc} \cdot f_{oc}$$

- Water / Organism

$$K_B = c. K_{ow}$$

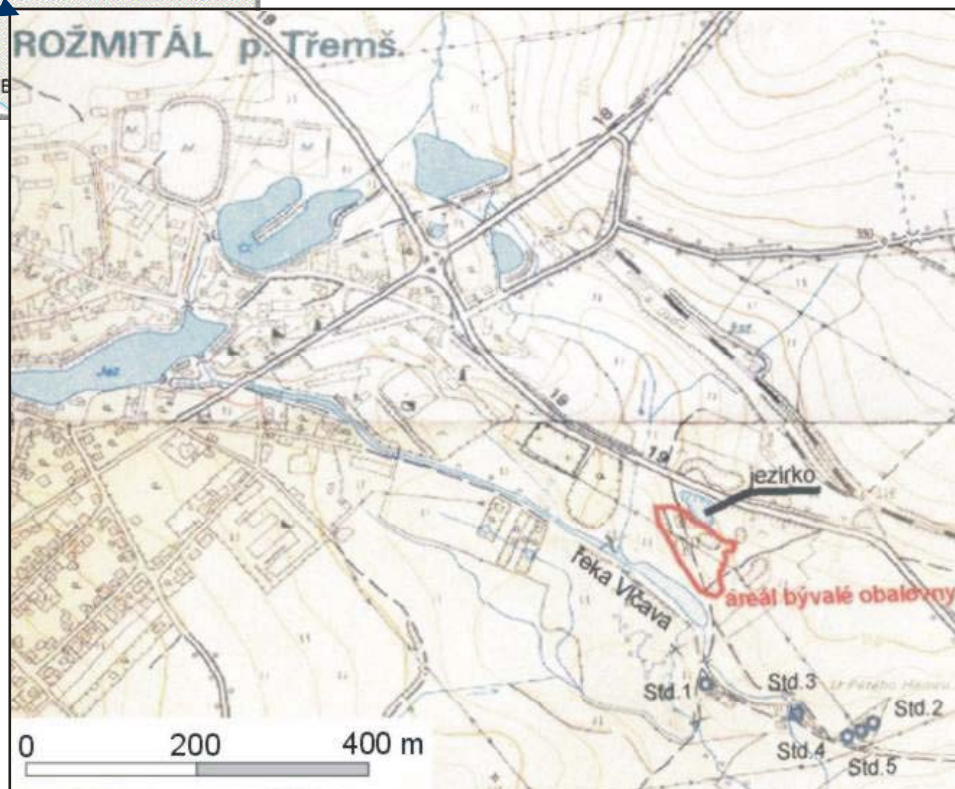
- Groundwater / Surface water

$$C_{sw} = C_{gw} \frac{Q_{gw}}{Q_{gw} + Q_{sw}}$$

# Testing sites

- 4 sites
  - Rozmital
  - Holostrevy
  - Milevsko
  - Lhenice
- PCB used as a thermal medium for wrapping of grit by asphalt for road construction

# Rožmitál p. Třemšínem

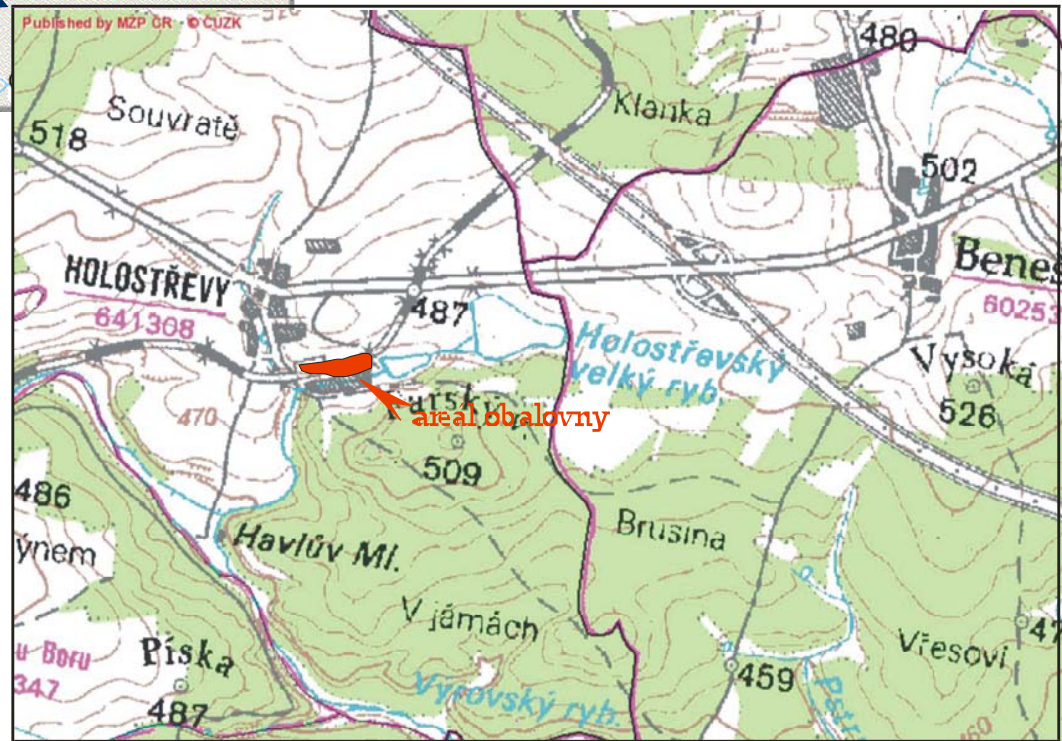




# Rožmitál

- Geology: granodiorite and its elluvium
- HG: shallow unconfined aquifer, fractured
- Vicinity of surface water body (river Skalice)
- Accidental release of PCB in 1986
- Remediation from 1988 (excavation of contaminated soil, pump&treat, hydraulic barrier)

# Holostřevy

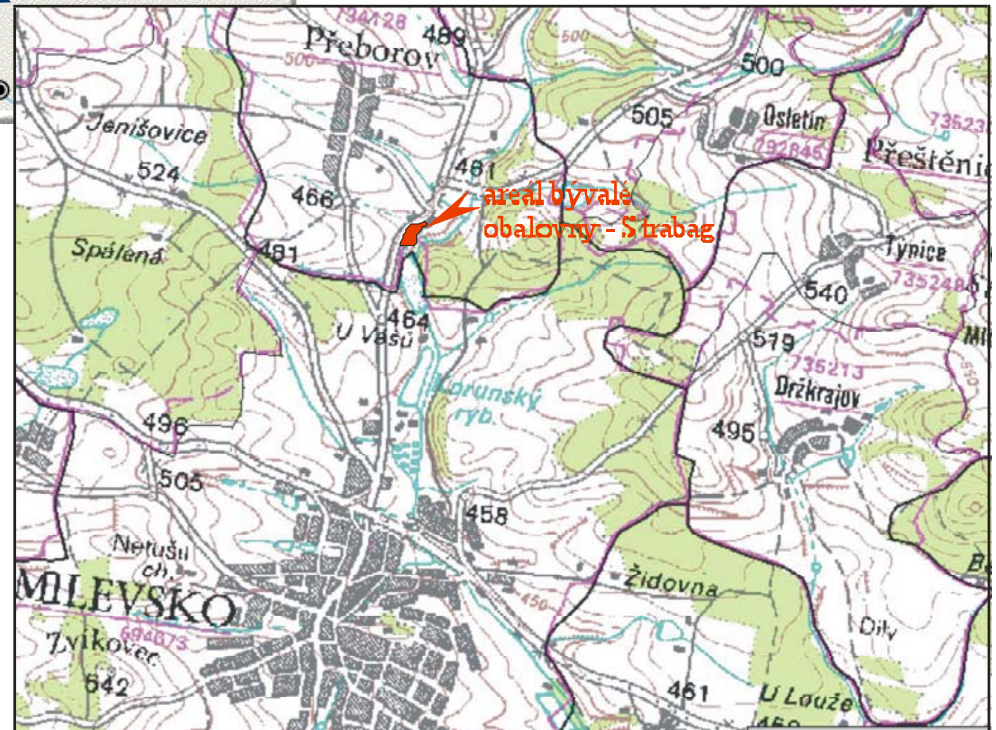


# Holostřevy

- Geology: fyllite, deluvial and alluvial sediments
- HG: shallow unconfined aquifer
- Vicinity of surface water body (Stary creek)
- First investigation in 1993
- Impermeable cover of contaminated soil



# Milevsko



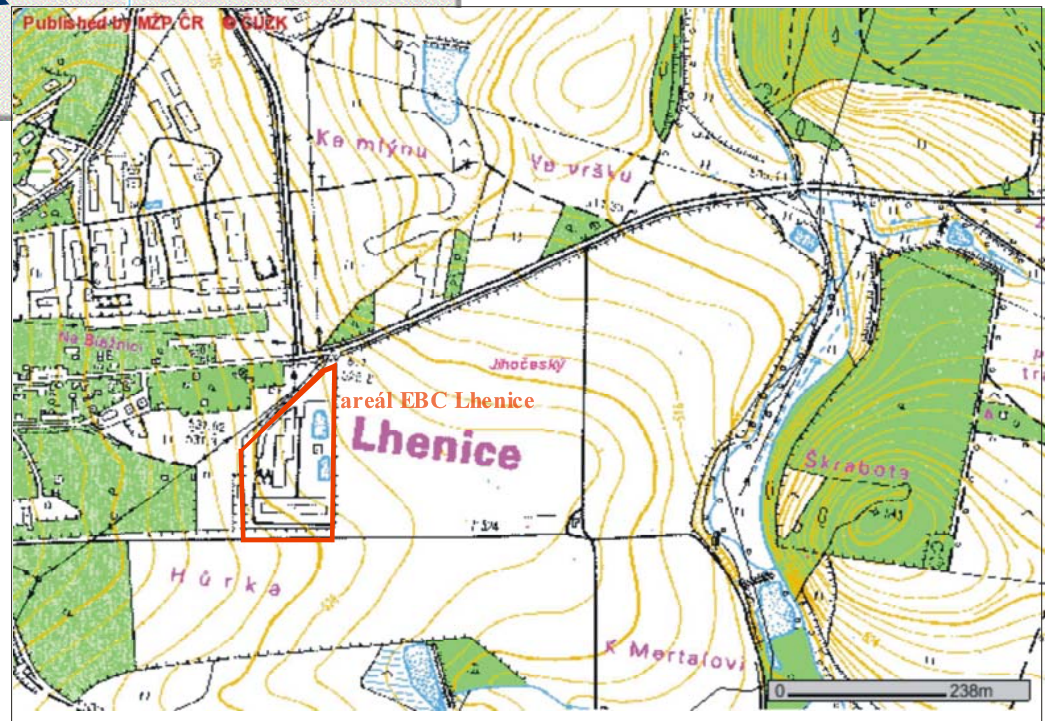
# Milevsko

- Geology: fluvial sediments (loamy sands and gravels)
- HG: shallow unconfined aquifer
- Vicinity of surface water bodies (Milevsky creek, ponds Váša and Tovaryš downstream)
- First investigation in 1992
- Remediation in 2003 (excavation of contaminated soil, pump&treat)





# Lhenice



# Lhenice

- Geology: gneiss and its elluvium
- HG: shallow unconfined aquifer
- Vicinity of surface water body (reservoir fed by storm water sewage system)
- Landfarming of soil contaminated by PCBs

# Scope of monitoring

- Soil (new borings at all sites)
- Leachate test on taken soil samples
- Groundwater
- Surface water
- Sediment
- Water organisms
  - Different species
  - Different age



# Czech standards - PCBs

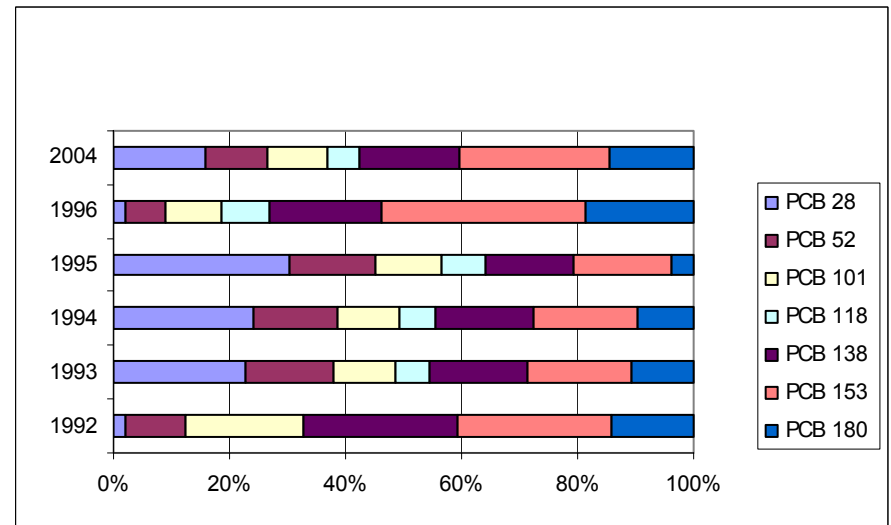
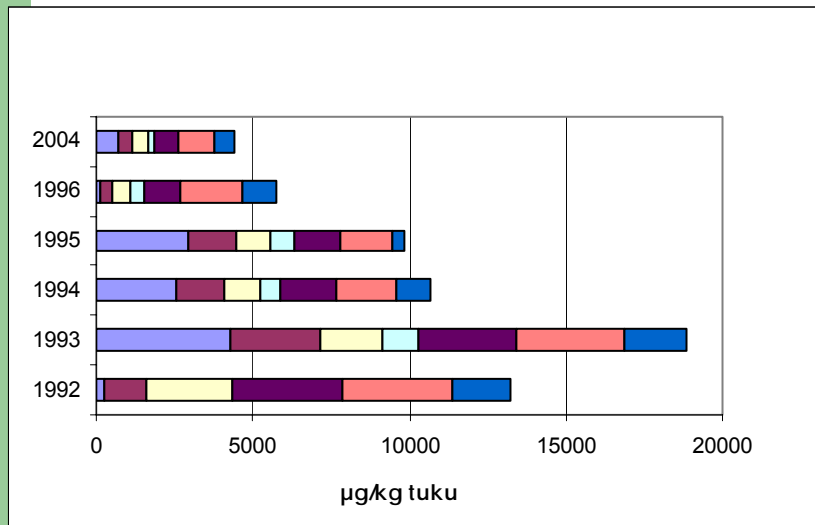
- Soil 30 mg/kg d.w.
- Groundwater 1 ug/l
- Surface water 12 ng/l
- Diet - fish 2 mg/kg

Sum of PCBs – sum of congeners 28, 52, 101, 118, 138,  
153 and 180

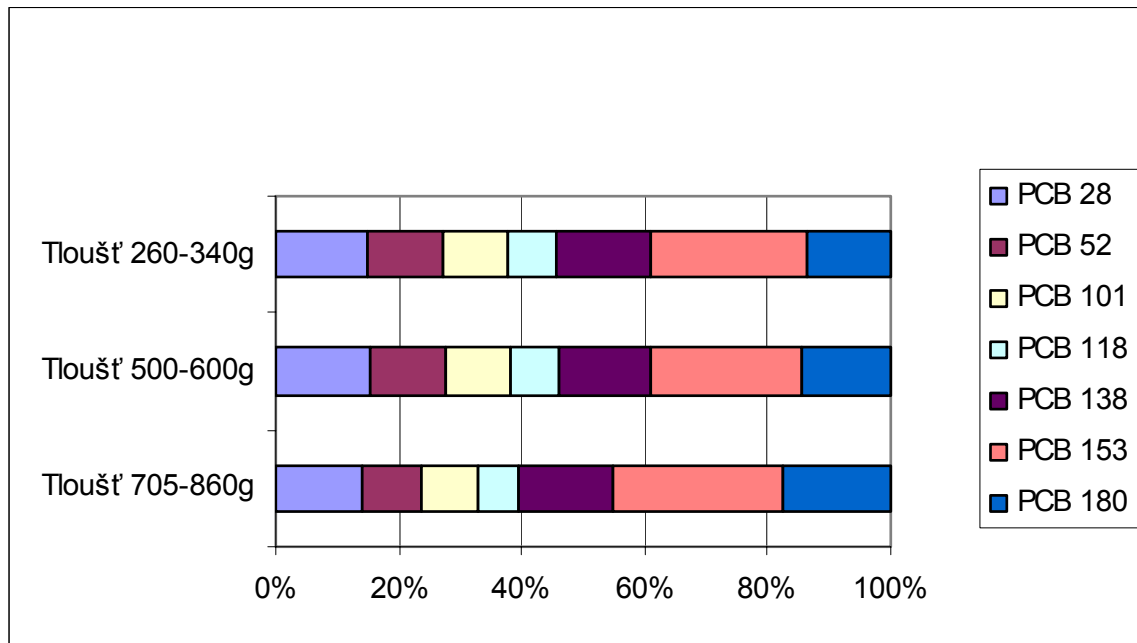
# Results (1)

Medium	Rožmitál	Milevsko	Holostřevy
soil	< 10 mg/kg	< 10 mg/kg	< 10 mg/kg
groundwater	1 ug/l	< 0.5 ug/l	< 0.1 ug/l
surface water	Below d.l.	Below d.l.	Below d.l.
sediment	0.15 mg/kg	0.025 mg/kg	0.2 mg/kg
Fish (in fat)	To 5 mg/kg	To 5 mg/kg	Below 0.1 mg/kg

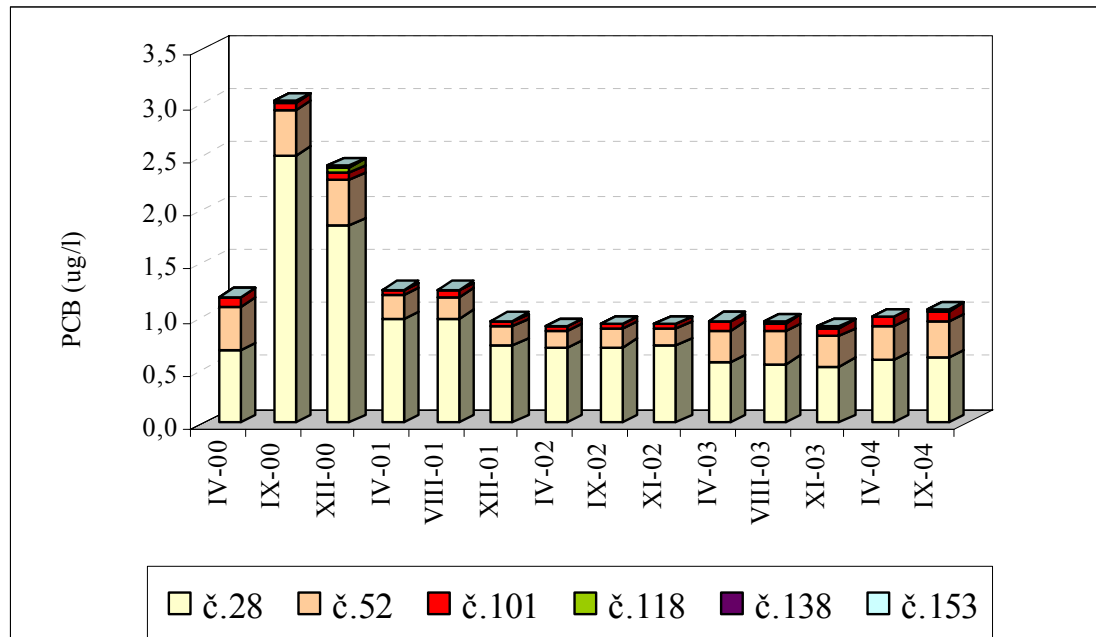
# Results (2), evolution of PCB in fish



# Results (3), distribution of congeners vs. weight of fish



# Results (4) evolution of PCB in the groundwater



# Discussion

- Reclamation of sites – improved state of contamination
- No significant changes in distribution of congeners within time
- Certain changes of distribution of congeners in individual media
- Sensitivity of water organisms – good test parameter

# Thank you

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