



Transboundary safety aspects: Experience from the Czech Republic, Serbia and the Komi Republic

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DEKONTA Company profile

- **Established in 1992**
- **Czech leader in hazardous waste treatment and remediation of contaminated sites**
- **Extensive technical and technological background**
- **Annual turnover over EUR 22,3 million**
- **Over 140 employees**
- **ISO 9001 and ISO 14001 certified company**
- **Central / East European leader in bioremediation**

DEKONTA Environmental services

- Remediation of contaminated sites
- Hazardous waste treatment and disposal
- Emergency response services
- Environmental consulting



DEKONTA Customers

- Industrial and construction companies
 - International organisations
- Ministries, state organizations and municipalities
- Environmental companies



Offices and subsidiaries

CZECH REPUBLIC

- Prague
- Ústí nad Labem
- Ostrava
- Brno
- Dřetovice, Slaný, Čáslav



EUROPE

Belgrade / Serbia and Montenegro

Warsaw / Poland

Kosice / Slovakia

Moscow / Russia (Geolink)

Ploiesti / Romania

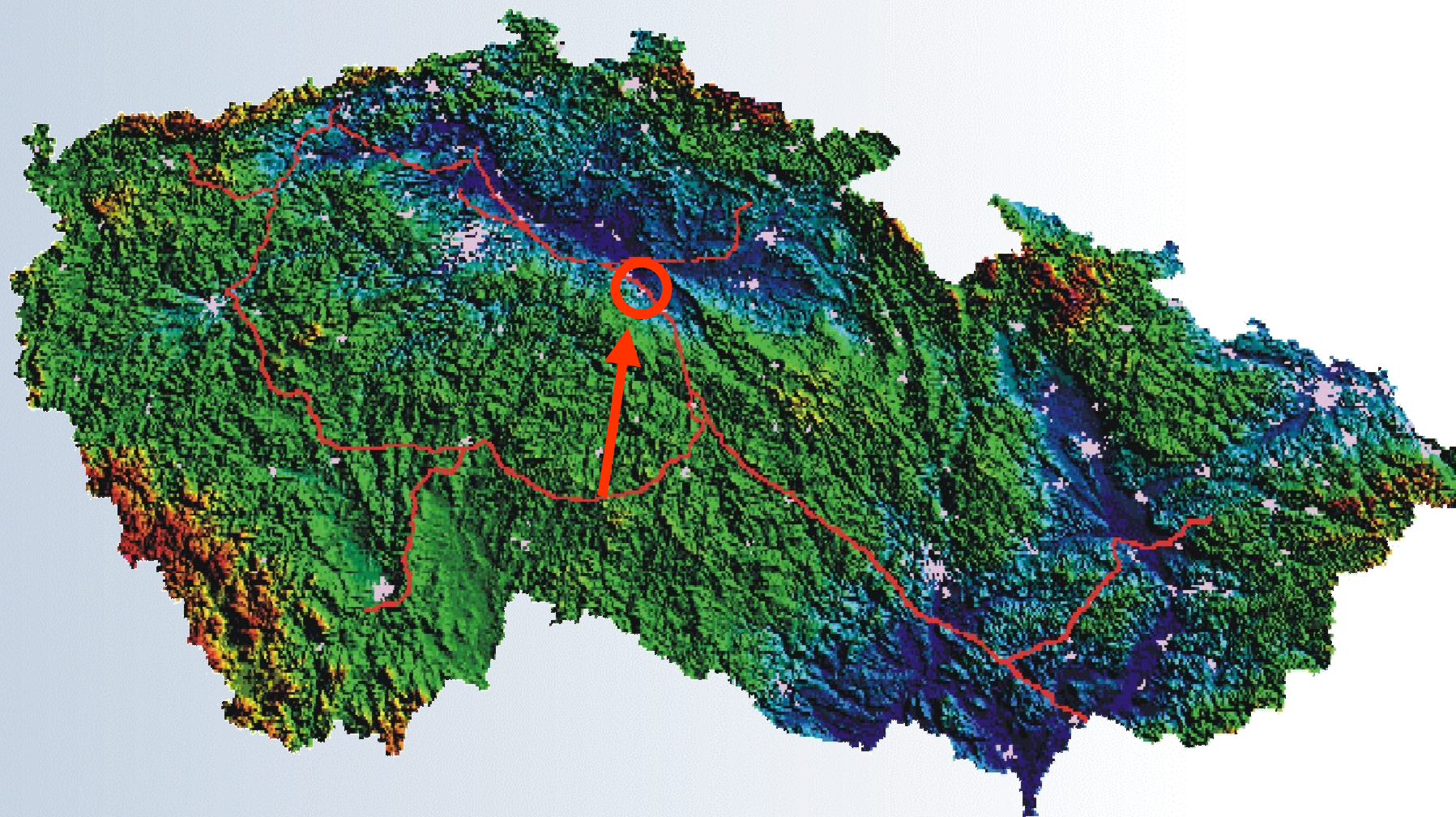
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- 4. Remediation and recultivation of the area in the Komi Republic (Russian Federation)**

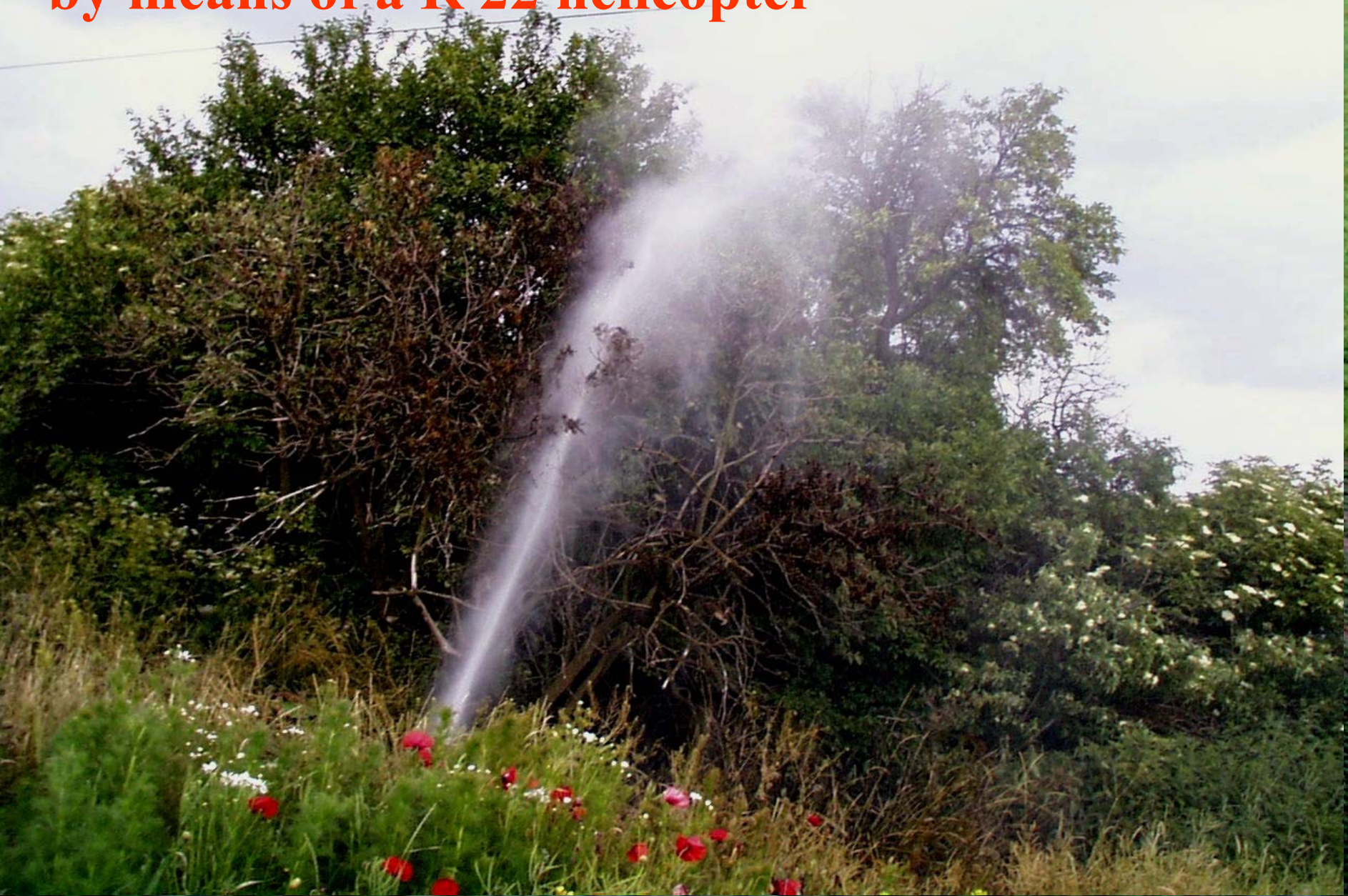
1. Gasoline Pipeline Accident **The Massive Spill of Gasoline near** **Polepy, Czech Republic**

- On 12th June, 2001, 19:40 – CEPRO Co. notified the Central Bohemian Fire Dept., the Police Dept., and DEKONTA Co. as a CEPRO's emergency response partner that a leak occurred on a long distance gasoline pipeline close to the village of Polepy.
- illegal drilling was the source of the spill
- 86,000 litres of the contaminant infiltrated into the underlying soil

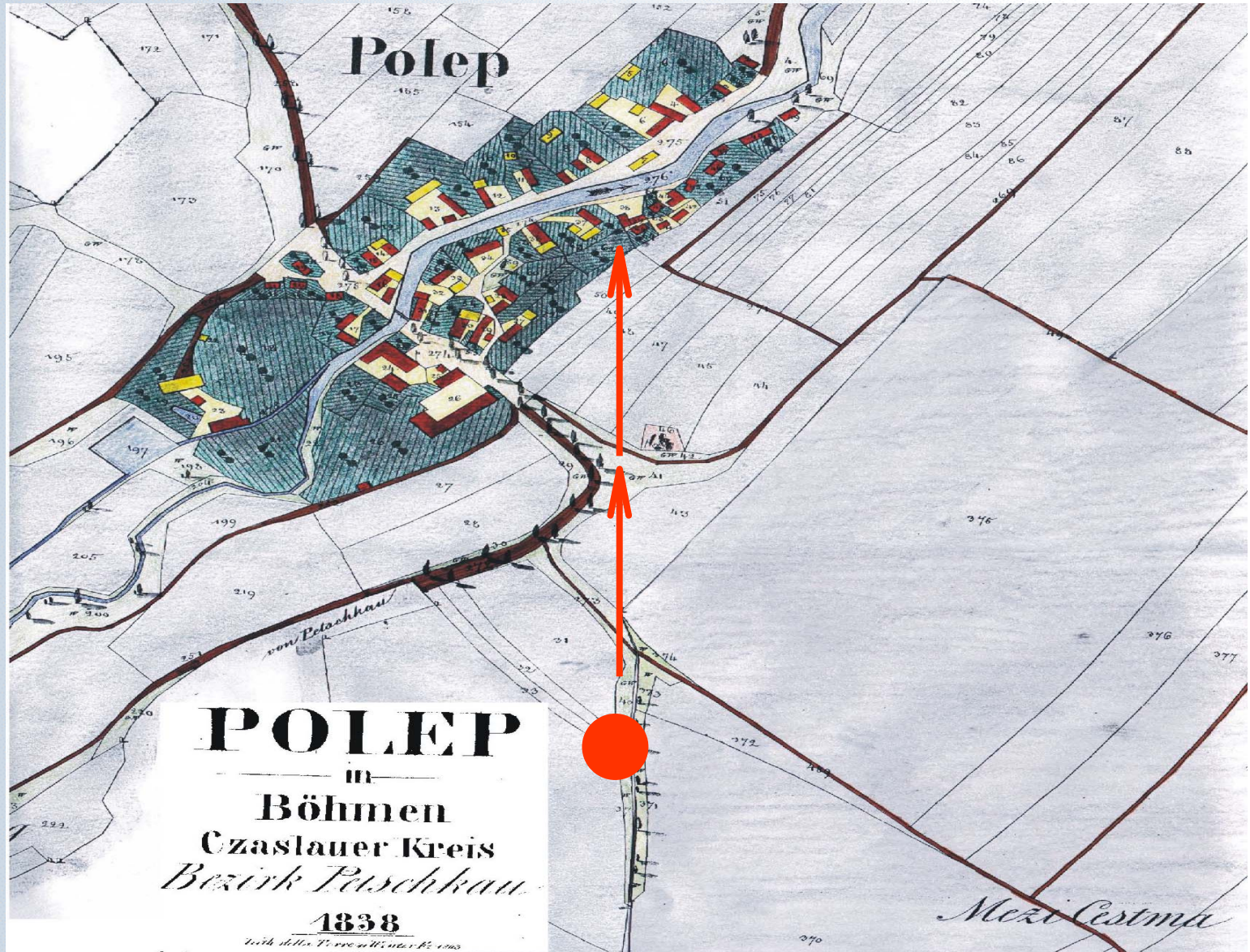
POLEPY - 12.6.2001



The aerial investigation - by means of a R 22 helicopter



The site of the accident is located 400 m south of the village

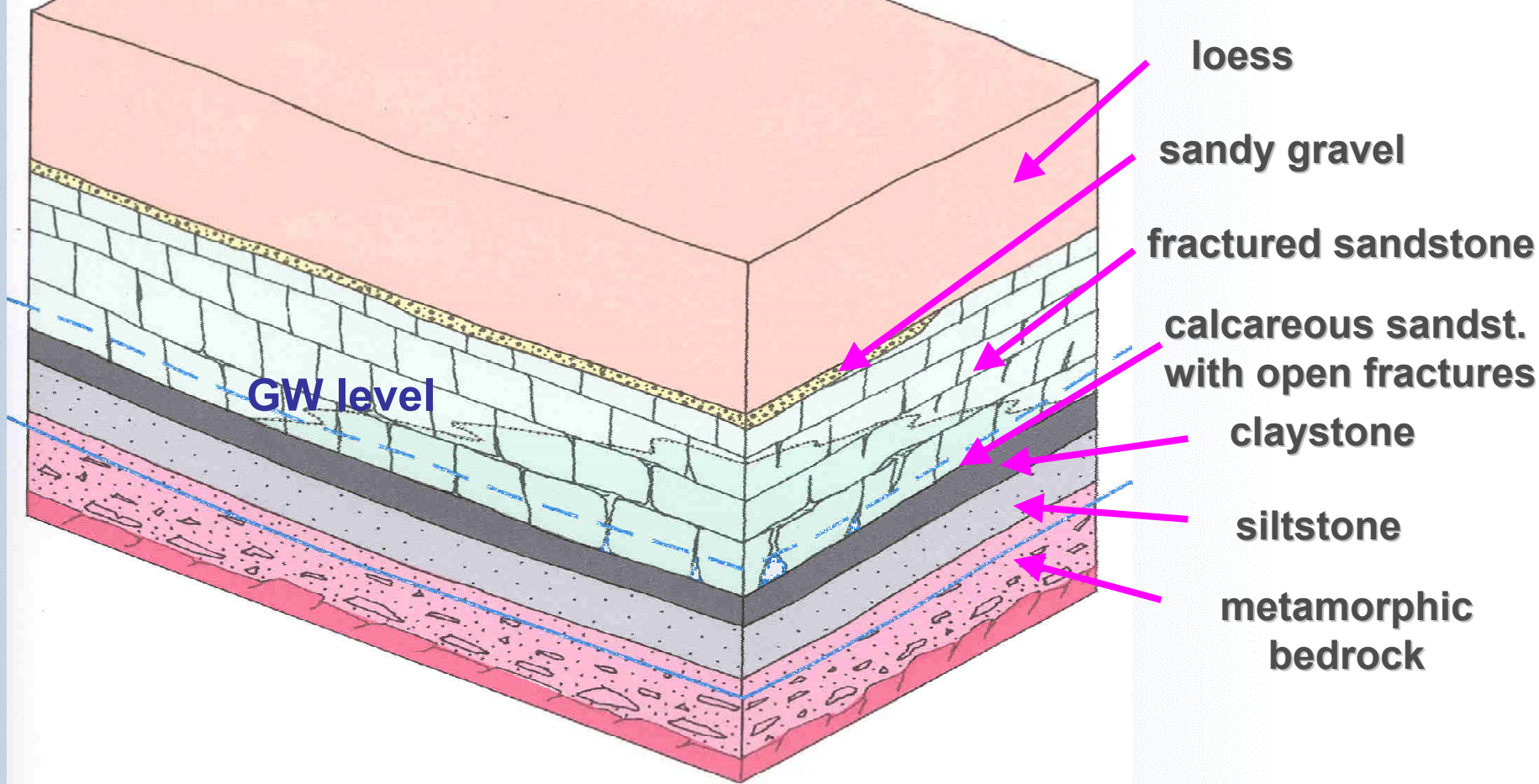


Primary investigation, soil excavation, risk assessment

commenced on June 14, 8:00

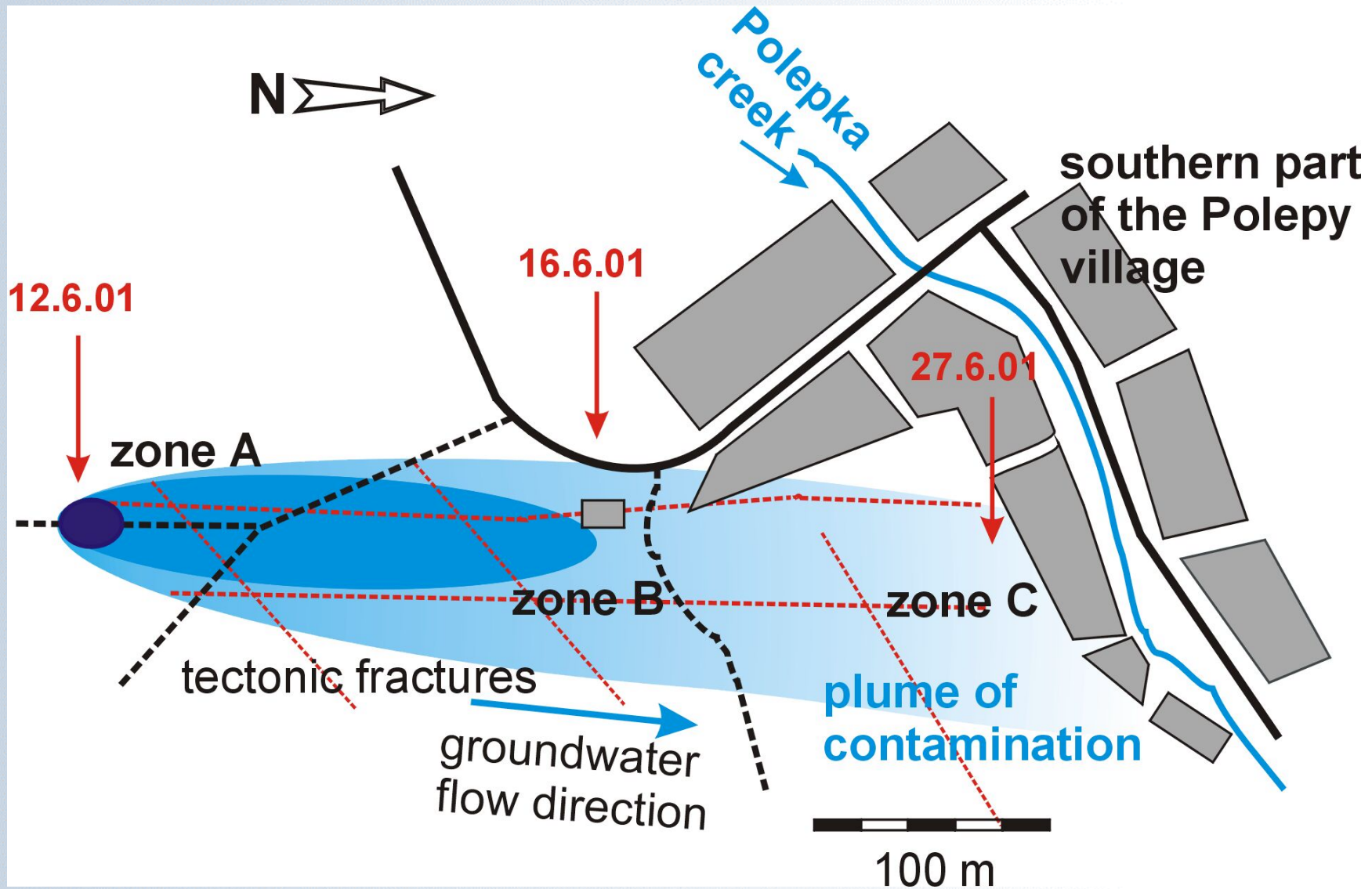


The impact of local geologic conditions



Forms of contaminant migration

- 1) As a **LNAPL** - at shallow groundwater level
- 2) As a **gasoline vapor** (soon recognized as the **most dangerous factor**)
- 3) Dissolved in the groundwater (particularly methyl tertiary butyl ether MTBE appeared to be very mobile component due to its high solubility)



The extent of contamination - a primary assessment

- concentration of gasoline vapor inside buildings exceeded the **Lower Explosive Limit.**
- drinking water in domestic wells was considerably contaminated
- contamination of agricultural production - topsoil
- contamination of surface water – Polepka creek

Remediation technologies

Vadose zone

- Ex situ - contaminated soil excavation and treatment by means of biodegradation
- In situ - soil vapor extraction, using 59 venting boreholes and 2 catalytic incinerators

Saturated zone

- Contaminated water and LNAPL pumping using phase separation and air stripping
- In situ bioremediation

Interiors of affected buildings

- Pumping of gasoline vapor using carbon filters,
- Active venting barrier was developed to protect the village of Polepy



Buildings affected by gasoline vapor (4 days after)



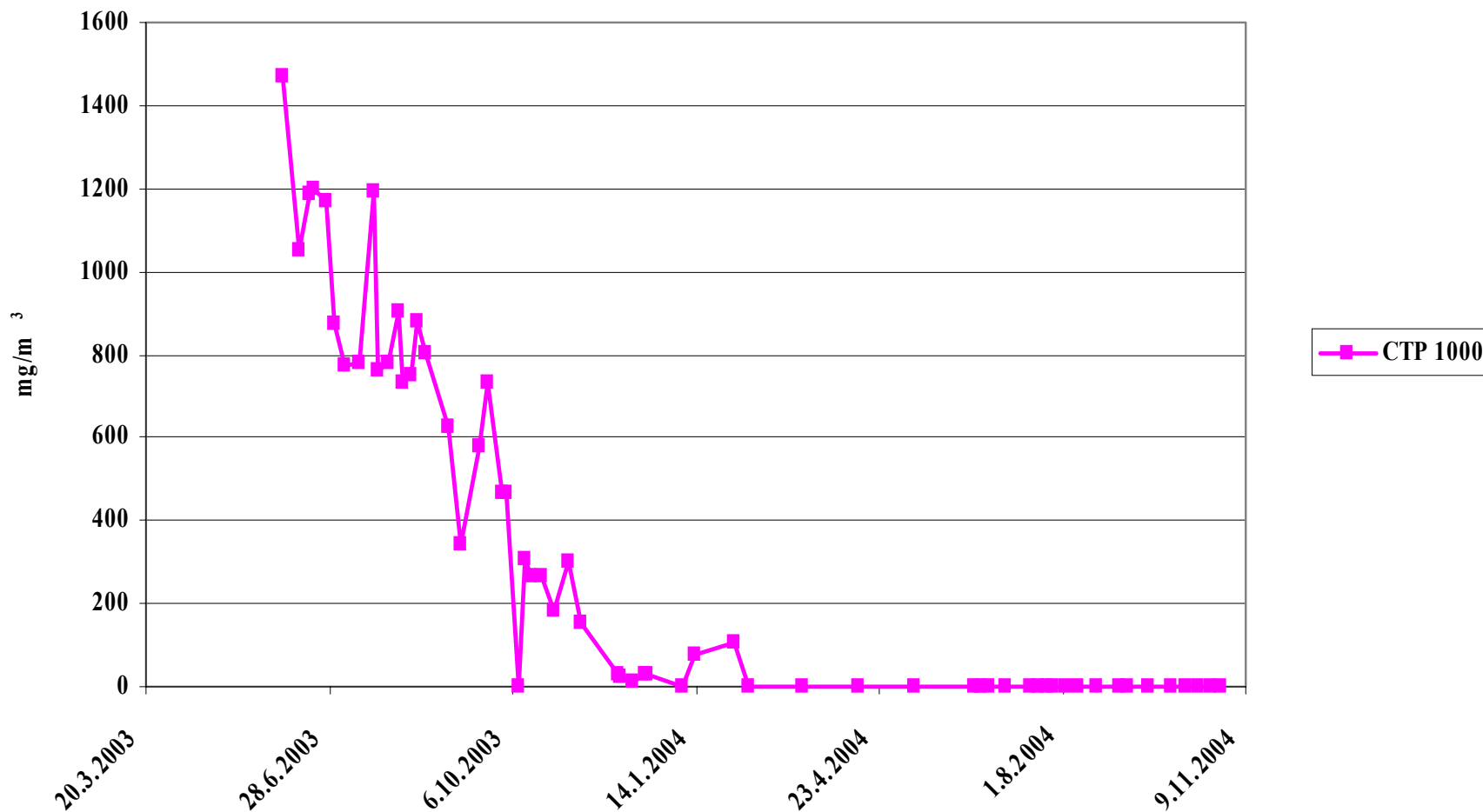
houses

g a

Catalytic incinerators for the remediation of soil gas



The concentration of petroleum hydrocarbons in the soil gas



Effectiveness of applied remediation technologies

(06. 2001 - 06. 2005)

- ❑ Contaminated soil excavation and ex-situ treatment by means of biodegradation – **45,000 litres** of gasoline removed
- ❑ Soil vapor extraction (catalytic combustion) and LNAPL and contaminated water pump and treat – **39,000 litres** of gasoline removed
- ❑ Up until now at least **98 %** of the spilt gasoline has been removed from the saturated and unsaturated zone.

2. Remediation of soil and groundwater in Bogutovac (Serbia and Montenegro)



Project description

- **Implemented within the frame of the Czech Official Development Assistance (ODA)**
- **Dekonta – contractor**
- **Ministry of the Environment of the Czech Republic – client**
- **Project period: 2004 – 2005**

Problem Definition

- the site of the former fuel storage
- bombed by NATO forces – April, 1999
- contamination by more than 600 t of spilled fuels
→ **a serious risk for:**
- Kraljevo public water supply sources
- Potential risk for mineral water sources in near spa Vrnacka Banja



Project Goals

- Prevent from further migration of petroleum hydrocarbons in consequence of groundwater flow towards the Ibar River
- Complete treatment of the excavated soil within the frame of emergency clean-up works realized on the site immediately after the bombing

Realized activities

- **Site Investigation**
- **Site Investigation Report**
- **Risk assessment**
- **Full scale remediation system design.**

Atmogeoechemical measurements by ECOPROBE 5



Drilling of monitoring wells



Soil probes



Results of the site investigation

- Max. concentration of TPH in soil:
 $5\,279,7 \text{ mg.kg}^{-1}$



Results of the site investigation



**Presence of free phase
on the groundwater table**

**Concentration of
benzene: 4 mg.L⁻¹**



3. Remediation of contaminated groundwater in Petrohemija Pančevo (Serbia and Montenegro)



Petrochemical plant in Pančevo **deko**nta

(20 km NE from Belgrade)



Project description

- **Probably the worldwide largest CHC contamination problem**
 - **April - June 1999 - NATO air strikes**
 - **Spillage of 2,000 t of 1,2-dichloroethane (DCE)**
 - **Approx. 1,000 t of DCE infiltrated into groundwater**
- **potential contamination of municipal groundwater sources and the Danube River**

Project goals

- ***DNAPL – Dense Nonaqueous Phase Liquid***
- **Start-up DNAPL extraction from the saturated zone ASAP (simple, cheap & effective)**
- **Reducing horizontal & vertical migration of DNAPL**
- **Maximising the total DCE extraction rate**
- **Step-by-step optimisation and expansion of the installed system**



Project results

**421.7 t of DCE extracted from saturated zone
out of which:**

- **81.0 t as DNAPL**
- **340.7 t dissolved**



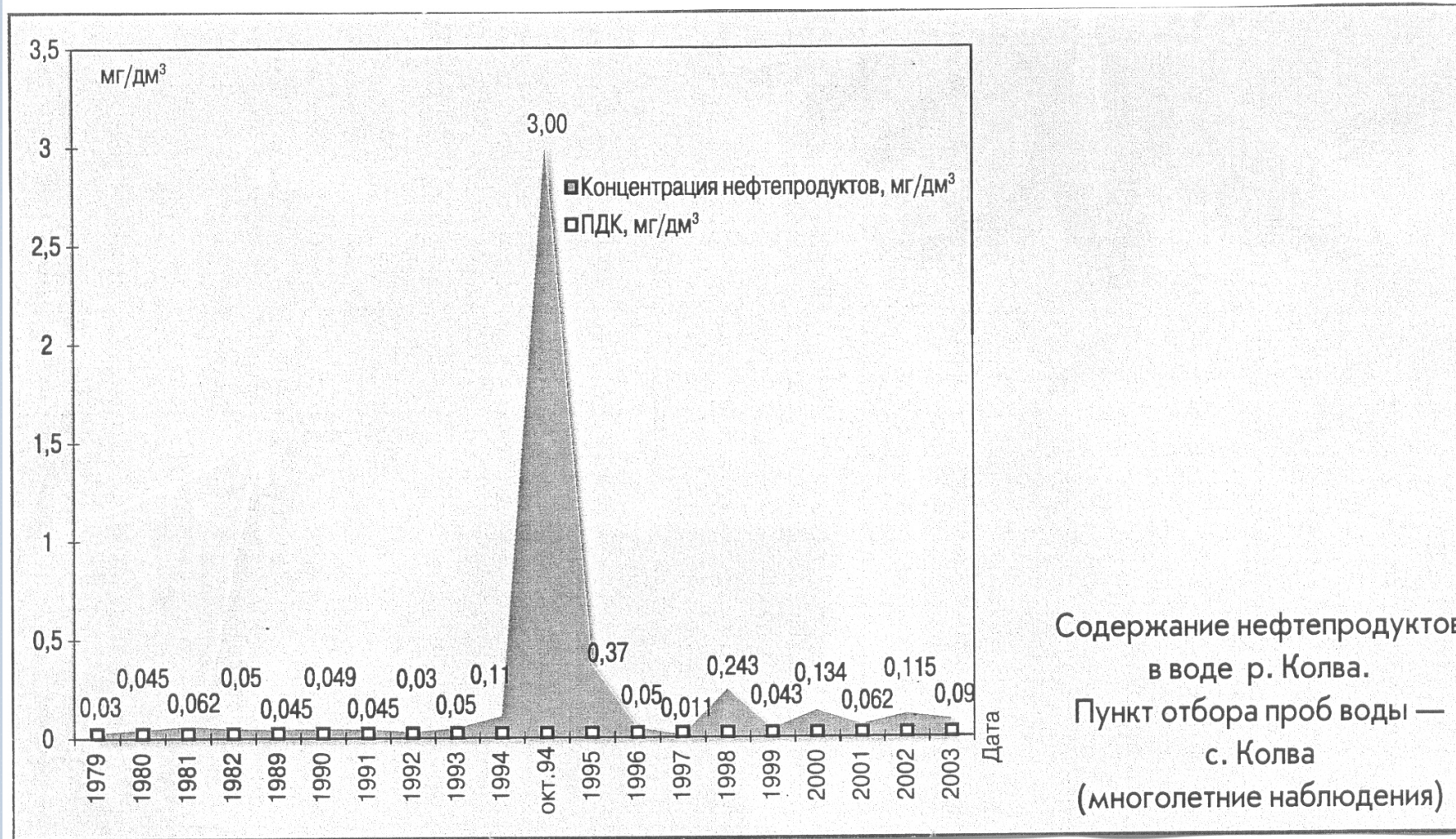
4. Remediation and recultivation of the area in the Komi Republic (Russian Federation)



Project description

- **Accident (1994) registered in the Guinness book of records as the biggest one**
- **Release of 100,000 t of crude oil resulting:**
 - **15.8 ha of soil covered by spilled crude oil**
 - **164.6 ha of contaminated soil**
 - **more than 200,000 t of contaminated waste**

Contamination in 1994



Treatment of the contamination

1st phase of the accident treatment - by 1999

- Kominěft' (today Lukoil Kominěft') treated the site (124 M \$) → removing of oil phase

2nd phase of the accident treatment 1999-2001

- In general 745 ha of the affected area was treated
- In 2000 recultivation started
- Finance sources: state means, Lukoil Kominěft'
- Peat soil - petrol products were degraded

Treatment 2001

Programme for testing biotechnologies

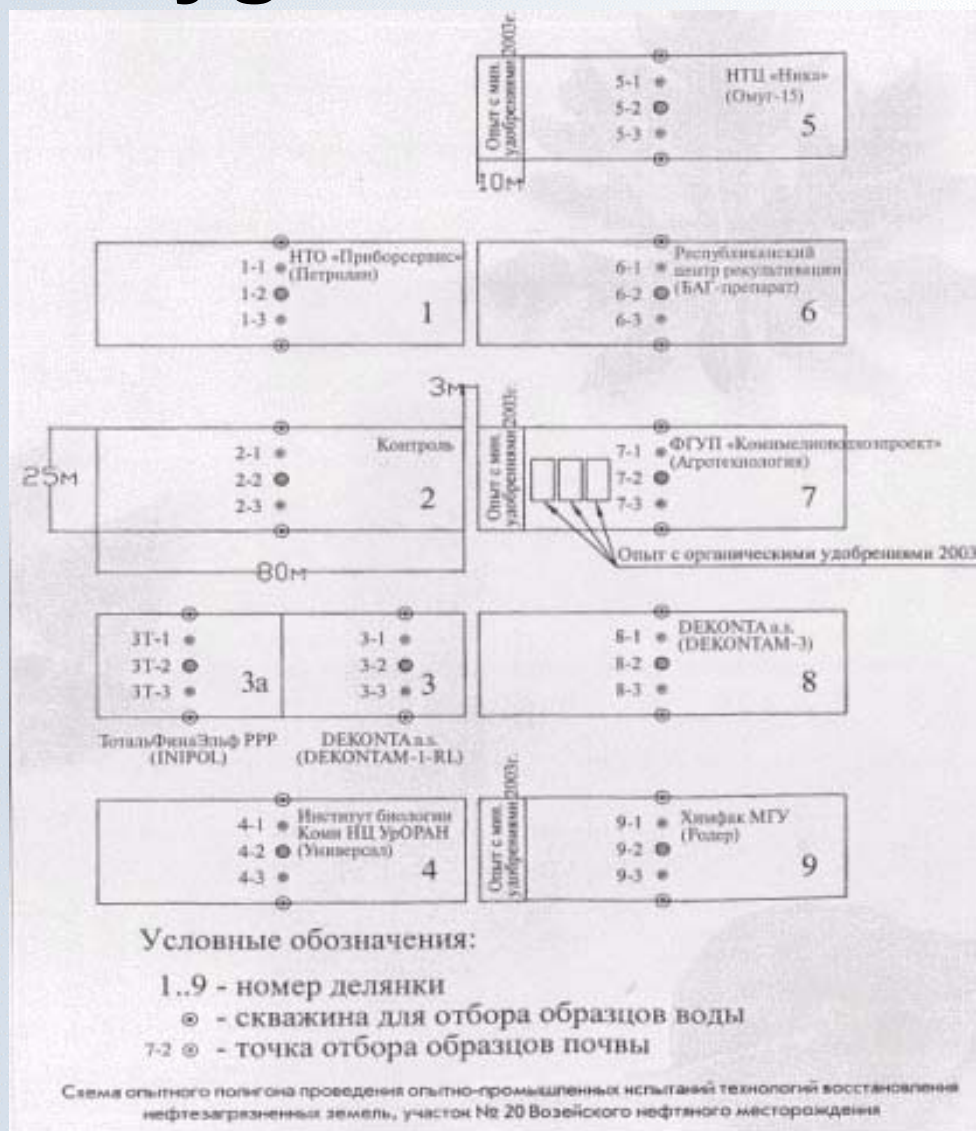
- 8 companies (2 from abroad) - polygons
(8x25 m = 1 polygon)
- every polygon was planted by oat

DEKONTA tested:

- Dekontam 1-RL – chemical oxidation
- Dekontam 3



Polygons 8 x 25 m



DEKONTA's activities

- **Hazardous and difficult climatic conditions (behind the Arctic Cycle → 9 months freezes, only 3 months – temperature above the freezing point)**

DEKONTA – one of the principal position

→ **efficient decrease of contamination**

→ **revegetation**

→ **life comeback within the frame of 1 year**





