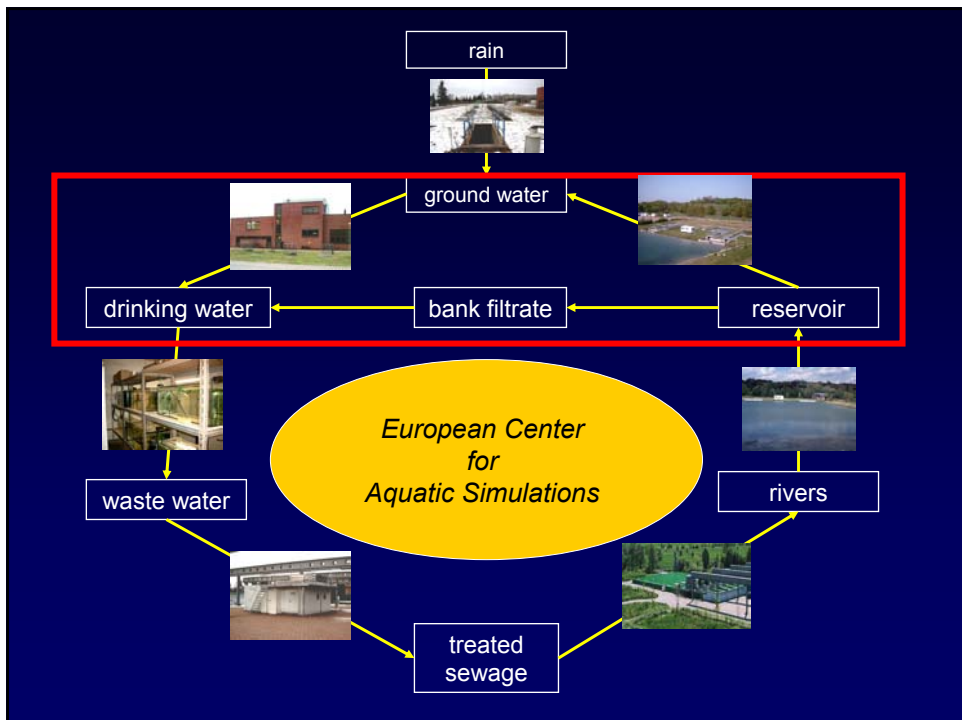
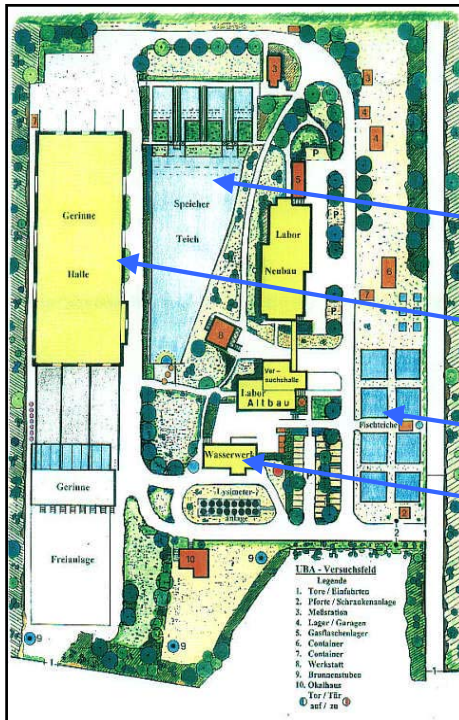


The UBA's Experimental Field in Marienfelde (Berlin)

Bridging the Gap Between Laboratory Experiments and Field Investigations





Main components of the experimental field:

Storage pond and adjacent artificial aquifer

Stream simulation plant

Aqua cultures

Water works

Features (DW-Group)

- 1 storage pond,
- 2 slow sand filters und 2 infiltration ponds (60 m³ each),
- 1 artificial aquifer with bank filtration site (width: 45 m, flow path up to 40 m),
- 1 column arrangement for simulating long term underground passage (aerob/anaerob),
- 3 enclosures with 1 m² filter area each,
- 1 glove box (anaerobic) with small columns,
- 1 drinking water treatment plant for 50 persons (small systems),
- 1 disinfection test site with chlorine-, pH- und redox-measurement, 200 L/h, different water types
- 2 membrane plants for supplying up to 4 Persons with drinking water (privat household systems)

Own Water Works



Water Works (1)

Experimental Field Marienfelde

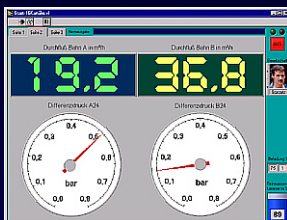
- Treatment: biological removal of iron and manganese,
- Raw water: three deep wells with 60 m³/h each: **180 m³/h**
- two channels with two closed rapid filters with 120 m³/h each: **240 m³/h**
- softening over Ca/Na – ion exchange **2 m³/h**
- Desalting by reverse osmosis < 20 µS/cm **0,8 m³/h**

Water Works (2)

- Production of 350.000 m³ water per year for use on the test site Marienfelde
- Experiments on drinking water treatment (e.g. arsenic- und uranium-removal)
- Development of technical standards for small drinking water treatment systems (e.g. DIN 2001-Part 1)



II 3.3 Grützmacher



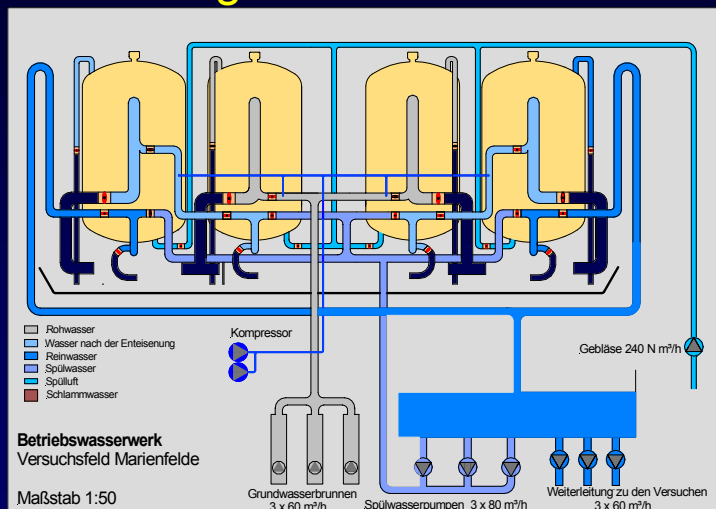
- Online control
- On-call duty with automatic SMS activation on weekends.



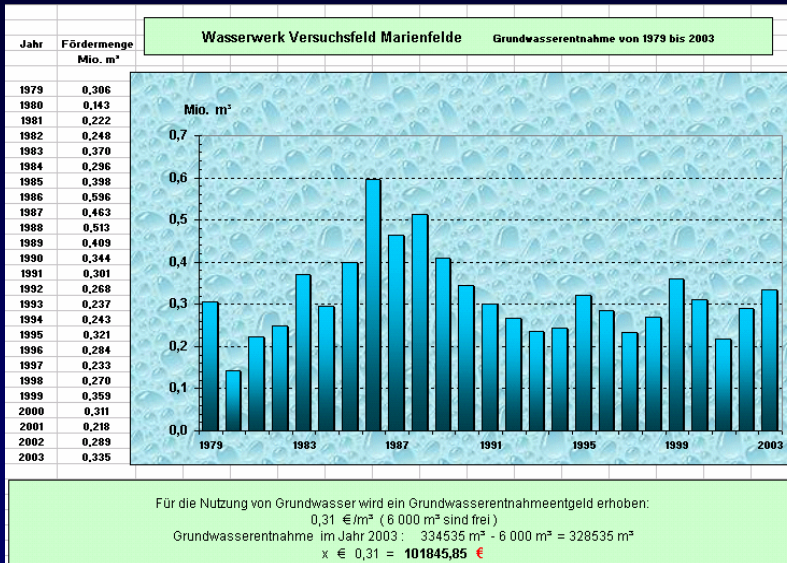
Technical Facilities



Biological Treatment for Iron and Manganese Reduction



Waterproduction



Testsfacility for Disinfection (II 3)

- Testing the efficacy of drinking water disinfection (according to § 11 TrinkwV 2001 und EU guideline for biozidal products) and comparing different methods
- Development of international standards for testing the efficacy of drinking water disinfection



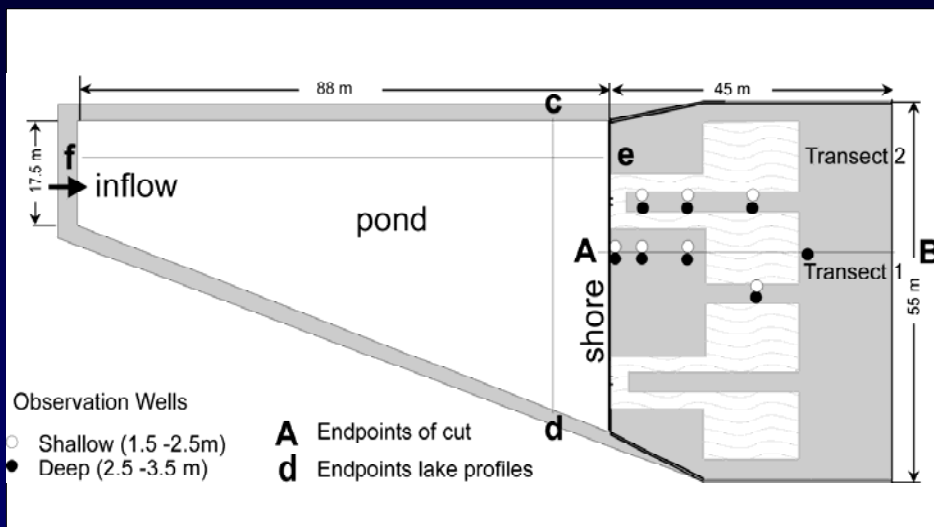
Slow Sandfilter System

- Experiments on the behaviour of problematical particles and substances during slow sand and bank filtration
- Substances investigated so far:
 - Viruses and bacteria
 - Cyanobacterial toxins (Microcystins)
 - Organic trace substances (e.g. pharmaceutically active compounds)



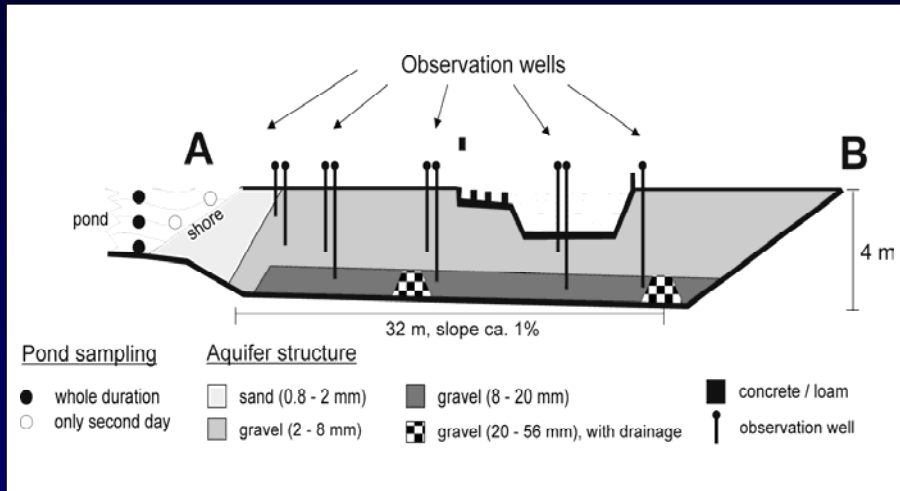
II 3.3 Grützmaier

Storage Pond with Artificial Aquifer



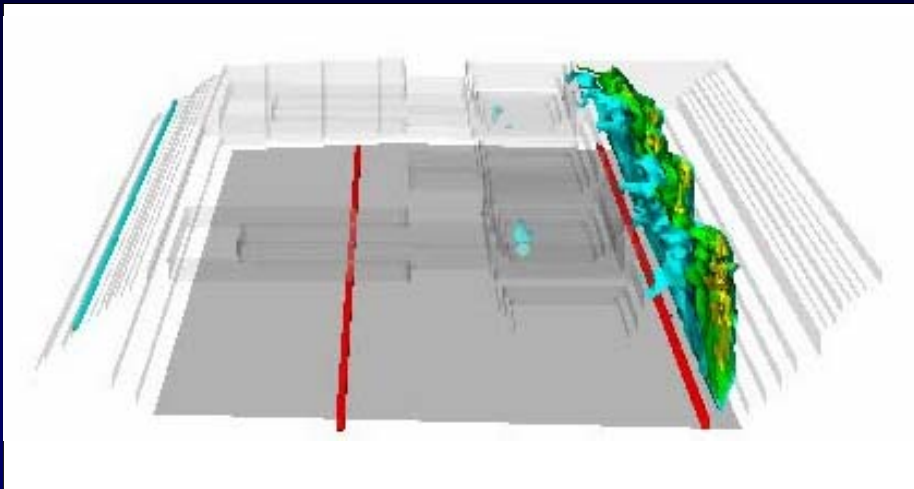
with courtesy of B. Wiese, IGB, Berlin

Cross Section of the Artificial Aquifer



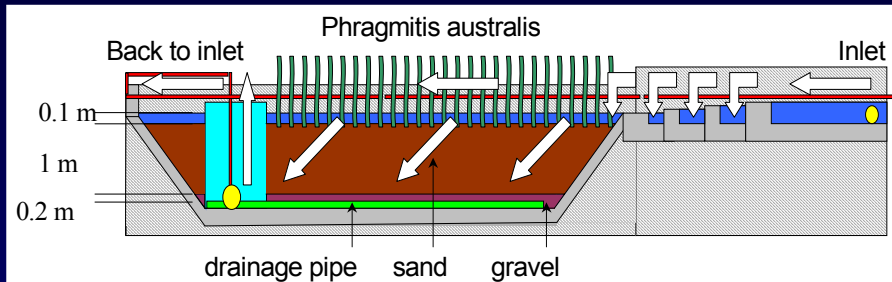
with courtesy of B. Wiese, IGB, Berlin

Results of Tracer Experiment Modelling



with courtesy of B. Wiese, IGB, Berlin

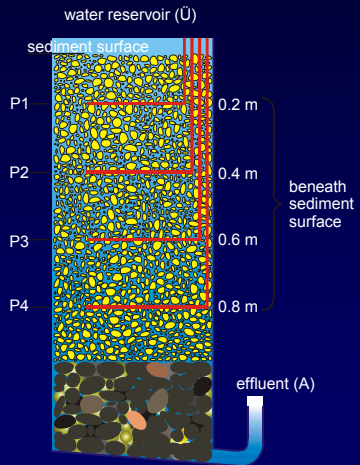
Schematical cross section of sand filter with reed cover



Sand filter with reed cover



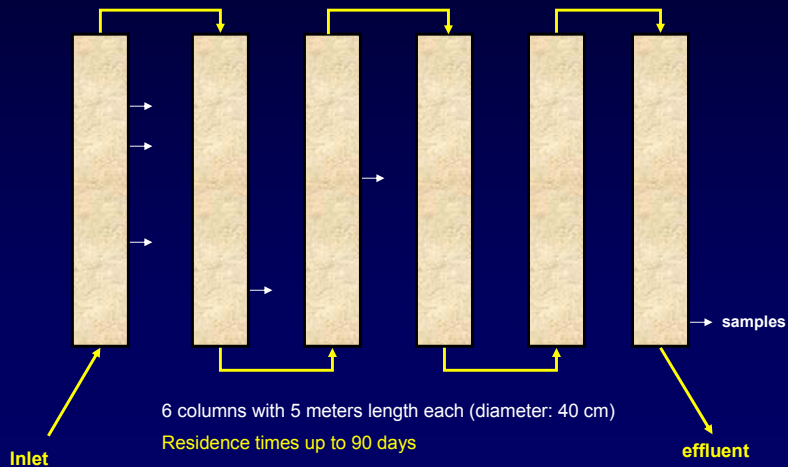
Enclosures (1)



Enclosures (2)



Long Term Underground Passage



Mass Cultivation of Cyanobacteria



- volume up to 8 m³
- light and temperature controlled
- Microcystin concentrations up to 300 µg/L
- value: about 1.2 Mio Euro

Simulation on a semi-technical scale: why?

Advantages:

- Simulation under natural conditions,
 - Seasonal influence of temperatures on degradation rates,
 - Influence of light depending on day and year,
 - Natural biodiversity due to large water volume,
 - Biologically stable against short-term disturbances,
- Closed system: application of hazardous substances possible,
- Possibility for calibrating mathematical models, balancing possible.

Disadvantage:

A lot of work!

Use for scientific purposes

until summer 2005

- Bank filtration site NASRI
- 1 SSF NASRI
- 2 Enclosures NASRI
- Large columns NASRI
- 1 SSF Ger. Fed. Health Ministry
- Mass culture* UBA/KIWA, Netherlands
- Membrane plant Cent. f. Wat. Techn., Dresden



* permanent reference culture

Thank you