



## Modified surface sealing for landfills adjusted to local conditions

*Test fields at the old Kuhstedt landfill – district of Rotenburg (Wümme), Germany*

Surface sealing systems adjusted to the local landfill conditions may be designed in such a way that they are more cost-effective with regard to investment and maintenance costs than conventional surface sealing systems (composite liner). Within the scope of a BMBF project, three surface sealing systems were investigated in test fields on the old Kuhstedt landfill. They were different and site-specifically designed as to increase the water storage capacity in the cover soil which results in higher evaporation and evatranspiration rates. This way, the climatic leachate formation is reduced for the long term.

### Aims and requirements

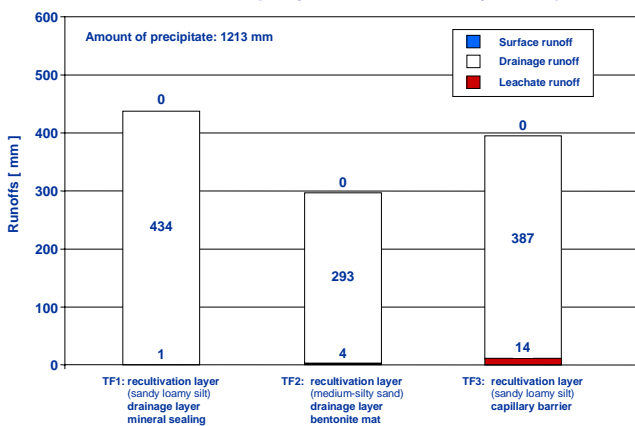
- Optimum water storage and evaporation and evatranspiration in the top soil
- Long lasting systems with low climatic leachate formation
- Systems enable microbiological methane oxidation
- Site-adjusted sealing elements (e.g. capillary barrier)
- Cost reduction with regard to construction and maintenance

### Test fields on the old Kuhstedt landfill



- a: Test fields with weather station and monitoring container, gas probes (at the front) for the investigations of methane oxidation  
 b: Devices for monitoring the surface, drainage and leachate runoff  
 c: Probes for soil-hydrological measurements (water content (TDR), water tension (tensiometer))

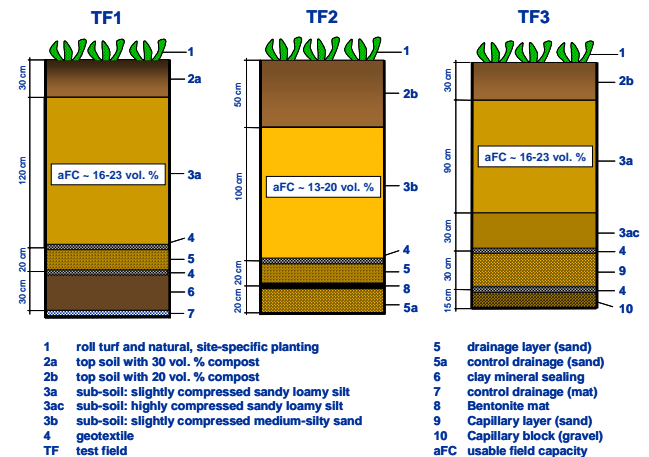
### Water balance (May 2002 – January 2004)



### References

- UBA/BMBF project "Aerobic in situ stabilisation of the old landfill Kuhstedt (Lower Saxony, Germany) to reduce the expense of costs and aftercare" - 1999-2004
- Development of alternative surface sealing/cover systems for the old Feilheck deposit (Office for Waste Management and Municipal Sanitation, City of Heidelberg) - 2000
- Operation, closure and aftercare of the Münster landfill construction stages 1 and 2, taking into consideration alternative, equivalent sealing systems (City of Münster, waste management companies Münster, Germany) – 2000-2003
- Concept for closure and aftercare of the Mechernich landfill (District of Euskirchen, central waste management, Germany; 2003-2004)

### Surface sealing systems in the test fields



### Site-adjusted surface sealing

*Basic strategy: low risk and emission potential*

- Landfill body low in emissions, in situ-stabilized, if required
  - Low gas production
  - Low fraction of water-mobilizable substances
  - Largely decayed settlements
- Installation of a surface sealing adjusted to the local conditions, designed for long-term use

### Characteristic design features

- Recultivation layer (at least 1.5 m)
  - Water reservoir
  - Passive poor gas treatment, methane oxidation layer
  - Vegetation and protective layer
- Alternative sealing elements
  - Tested materials, taking into consideration site-specific material resources, e.g. capillary barrier
  - Minimization of climatic leachate formation
  - Minimization of uncontrolled gas emissions