

For our Environment

Umwelt   
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# Aspects for execution and finalisation of groundwater remediation measures

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# General Assumptions

- **Avoidance of any groundwater pollution**
- **Strengthen precautionary principles (IED, tangible protection targets („marginal“ thresholds) with regard to the circular economy)**
- **No “future use” oriented classification of groundwater in general**
- **But, as exception an acceptance of (temporal) contaminated groundwater plums under specific conditions.**

# Corner stones of groundwater remediation

**A complex process with several sources of error**

**Very site specific**

**Deficits regarding available and reliable data and information**

**Sometimes an unexpected run of remediation measures**

**Legal limitations in order to inject stimulating substances for in situ measures**

# Starting points for the evaluation of groundwater remediation measures

**Temporal and quantitative development of contamination source and plume,**

**Reachability of remediation targets within aquifers**

**State of the art of groundwater remediation  
(in terms of technology and installations and  
in terms of legal acceptance)**

# Regulating screws ...

## **DURING PLANNING AND PREPARATION**

- ...site specific investigation
- ...assessment and prognosis
- ...(theoretical) process understanding
- ...method selection
- ...analogy observation
- ...state-of-the-art of science and technology regarding degradation and/or remediation

# Corrective during groundwater remediation measures

- ... Configuration of the clean-up installations;
- ... Selection of the site;
- ... Operational mode;
- ... Secondary processes;
- ... Effectiveness;
- ... Adjustment of remediation targets.

# What could support the current implementation?

**Reliable legal interpretation (groundwater damage, remediation targets)**

**(Court-resistant) criteria for proportionality approval**

**Better understanding about Soil-Groundwater System**

**Alternative (innovative) remediation measures with sufficient experience and background**

**Experienced and well trained personnel in all parties involved**

**Suitable instruments to predict the course of a remediation measure**

## Wish list from authorities for execution

- ... Criteria for or against a remediation decision;**
- ... Recommendations for investigations and ability tests;**
- ... additional assessment criteria for the stipulation of remedial targets;**
- ... Requirements for the design, implementation and monitoring of groundwater remediation measures;**
- ... Nature and extent of stakeholder participation, legal assessment of the conformity of its recommendations**
- ... setting up criteria for the termination of (active) groundwater remediation.**



# Conclusions

**The Necessity of a minimum of qualified data for any kind of prognosis!**

**A key prerequisite for any remedial decision is the knowledge about the extent of the damage!**

**Residual contamination in the source, whether in the saturated or unsaturated zone, even at low level, practically avoid the achievement of remediation targets!**

**In setting remediation targets, a better understanding about the soil-groundwater system as well as the dimension for potential and transfer factors might be extremely useful.**

# Thank you, any questions?

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