



Case-study Stuttgart-Feuerbach

Joris Ondreka
ARCADIS Deutschland GmbH

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Overview

- Site
- Concept
- Pilot
 - Installation
 - Operation
 - Monitoring
 - Results
- Conclusions

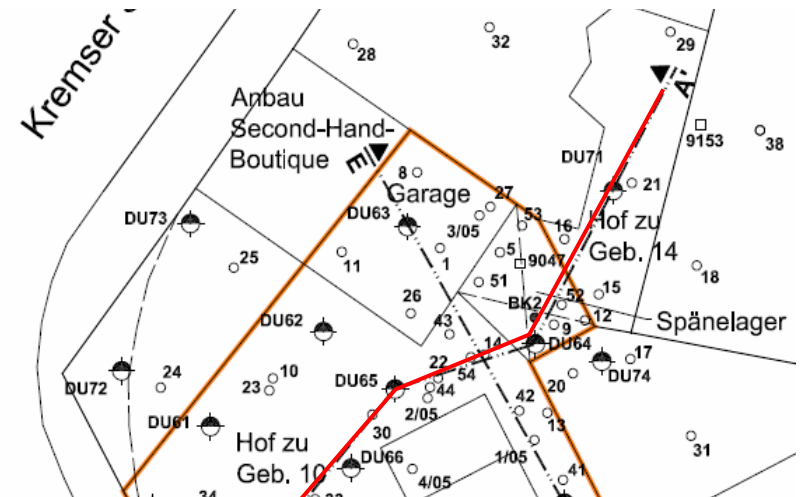
Site Facts

- CHC contamination in soil and groundwater at a former metal working workshop
- Contamination at 120 m²
- Contamination between 3,5 m and 10,5 m below surface
- Contaminants are present in low permeable unsaturated soil and in a fractured rock aquifer with medium permeabilities
- CHC concentrations in soil as high as 2500 mg/kg
- CHC concentrations in groundwater as high as 100 mg/L
- Previous remediation measures haven't been effective

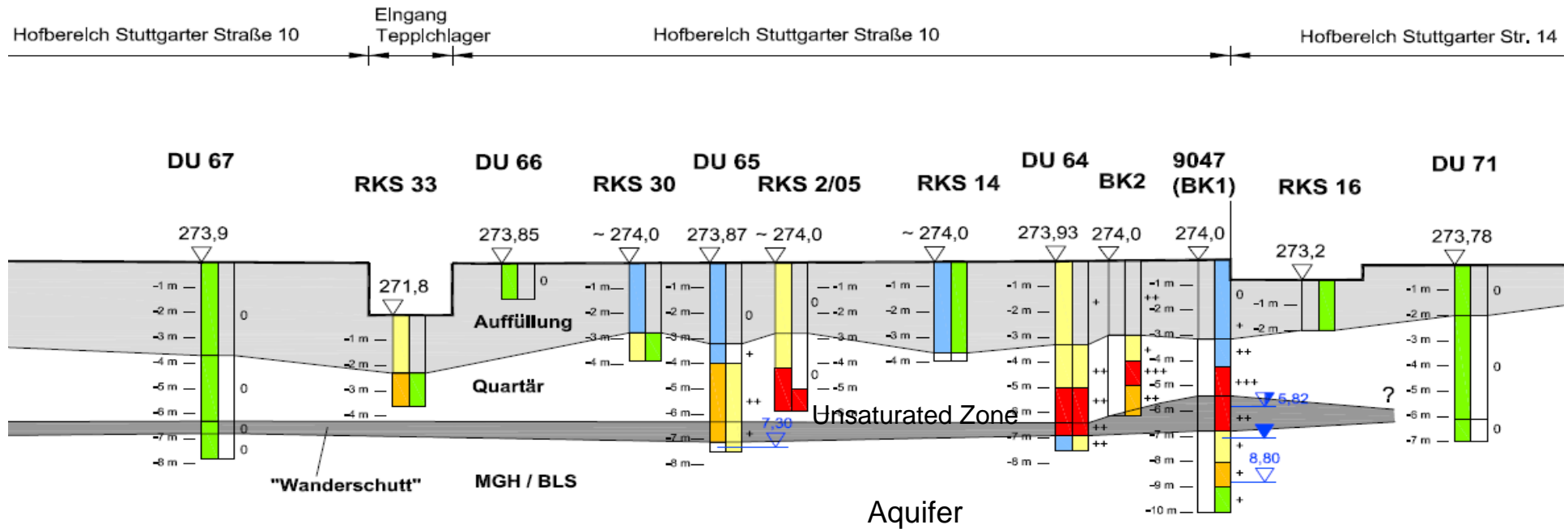


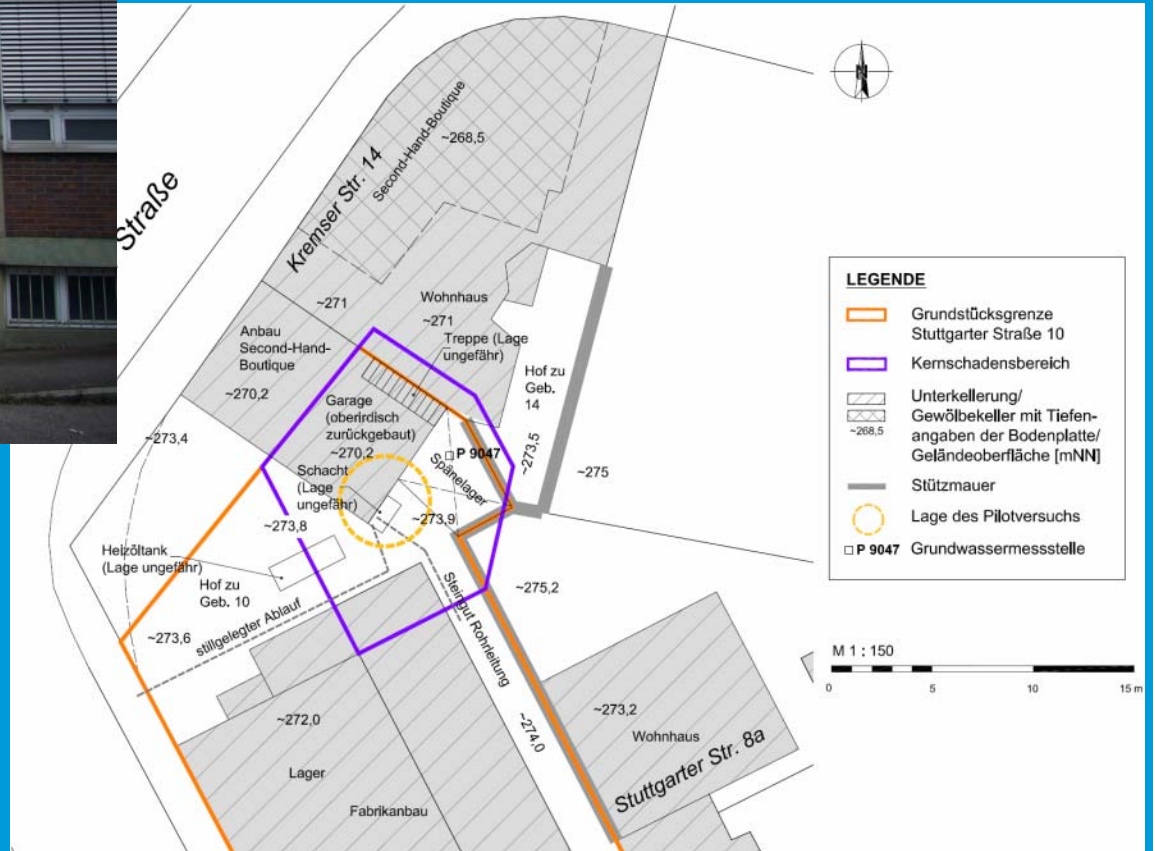
Contamination

LEGENDE	CKW-Gehalt Bodenluft [µg/m³]	CKW-Gehalt Boden [mg/kg]
Orange		



Schnitt A - A'
Maßstab:
M_L = 1:100, M_H = 1:200

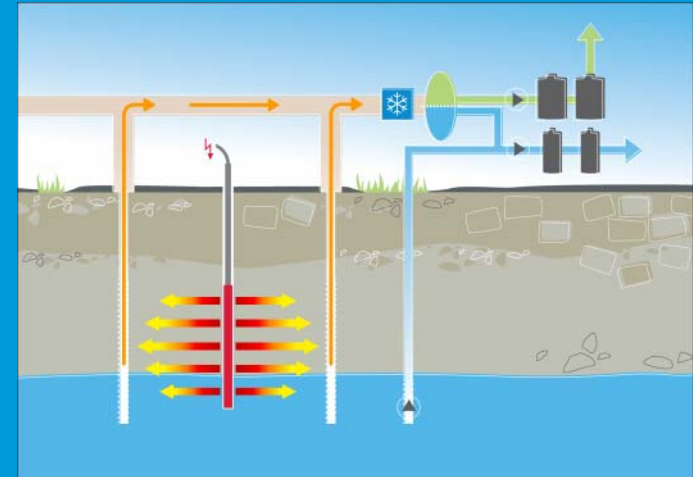




Thermal In-Situ Remediation

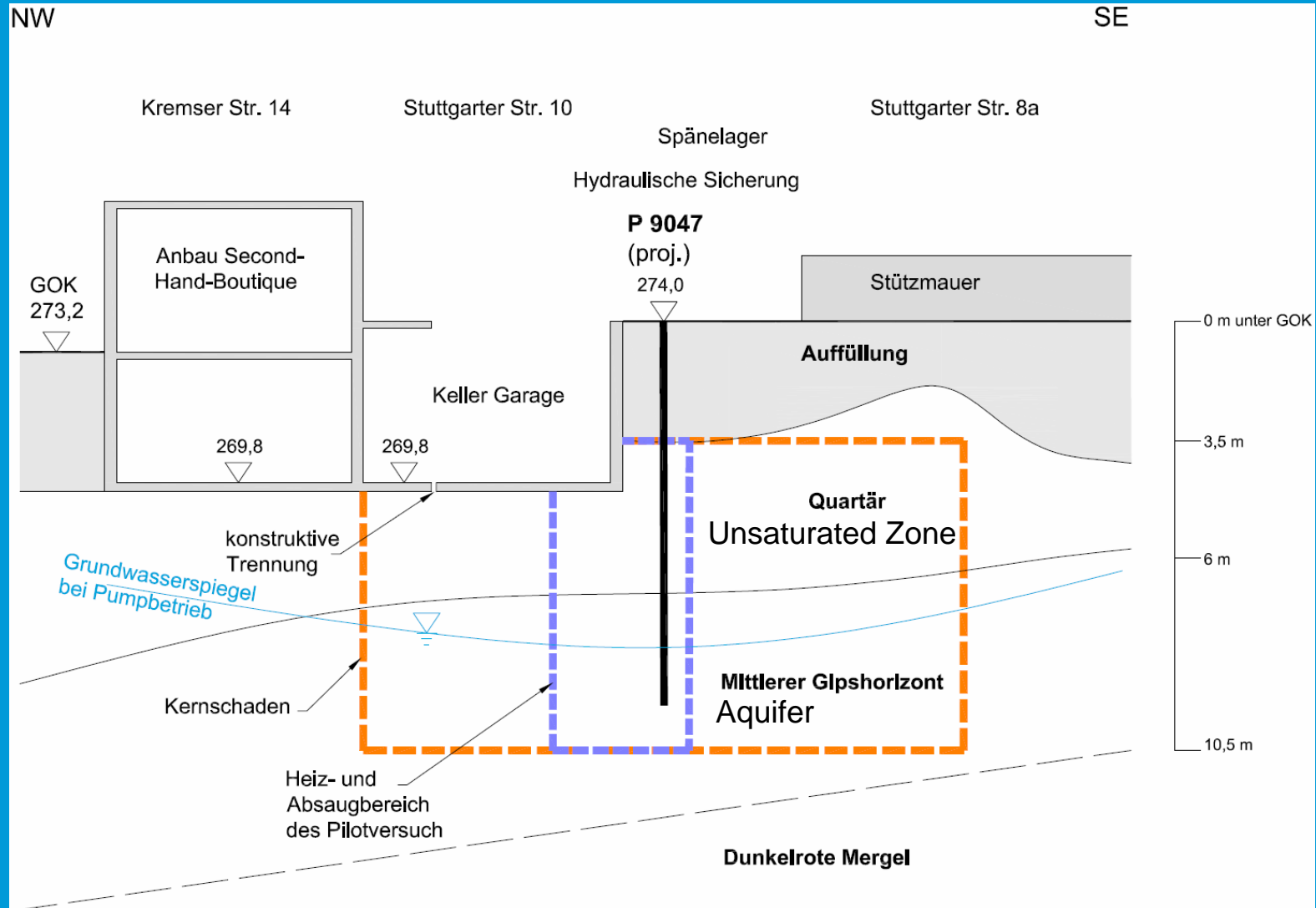
Questions regarding the applicability and efficiency of the method

- How is it done best to decontaminate the low permeable unsaturated zone?
- How is it done best to dewater and decontaminate the aquifer?
- Is the amount of settlement compatible to apply the method right beneath existing building structures?



Answering these questions are the main pilot objectives

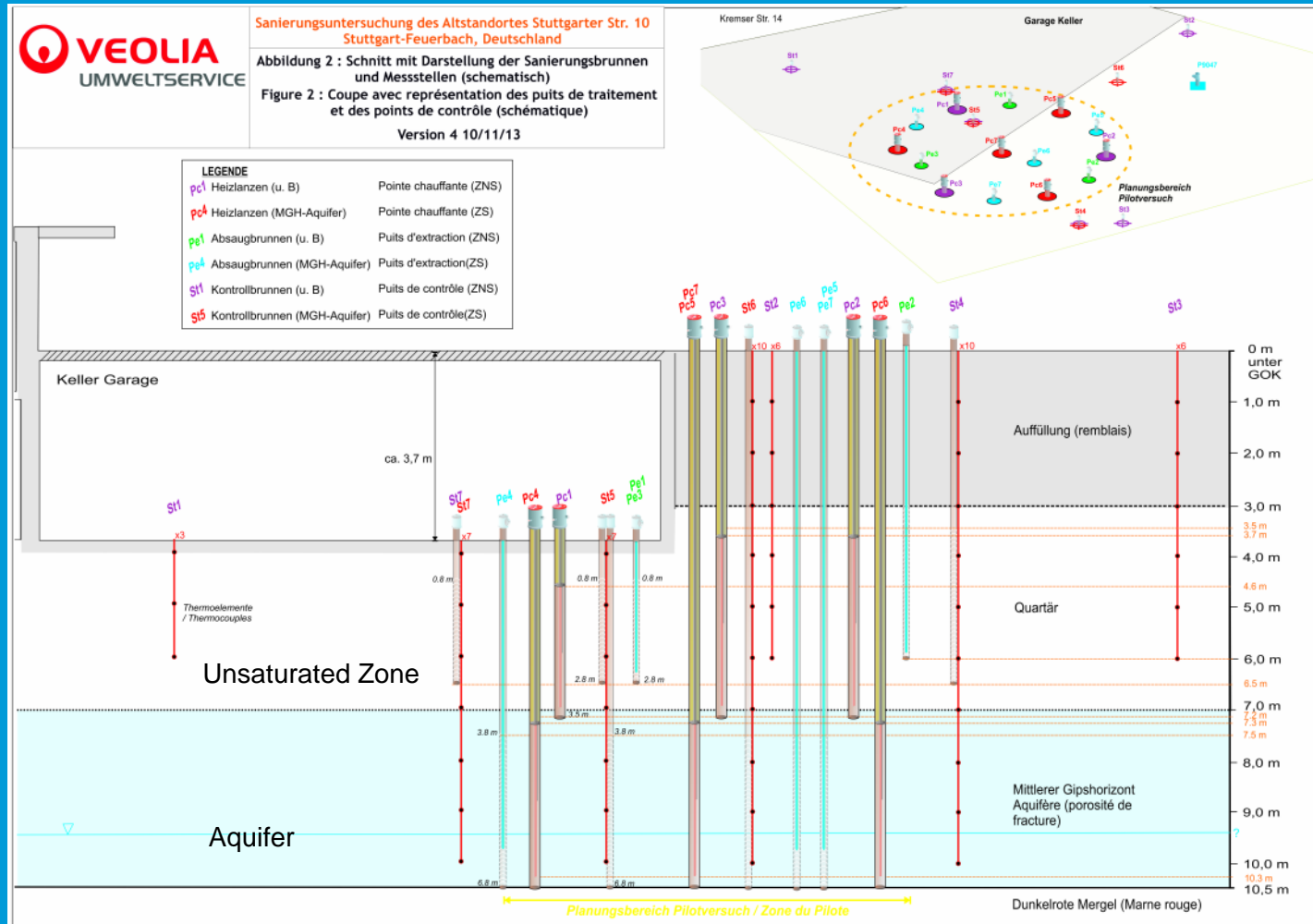
Concept – Pilot zone





Pilot - Installation

Subsurface Infrastructure



Installation of a heating rod





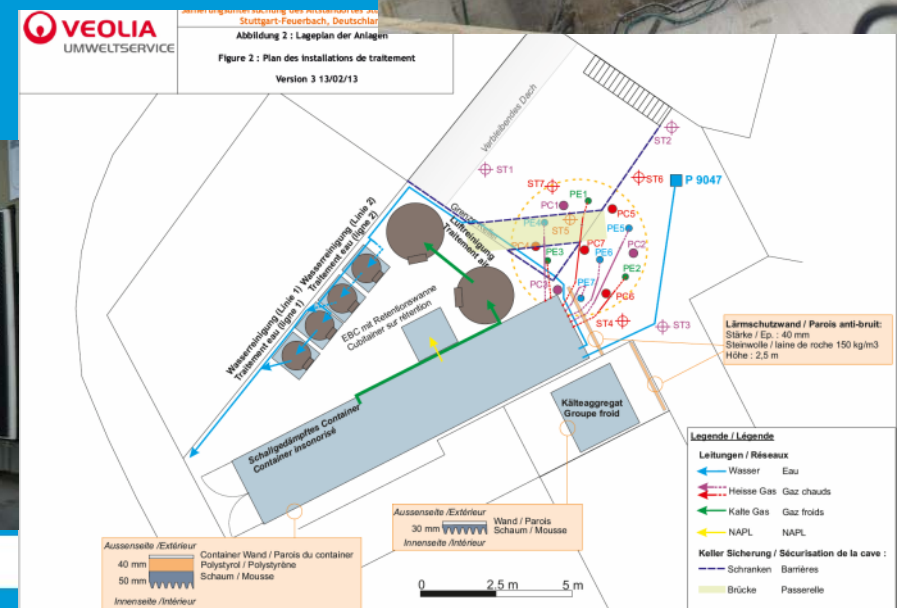
Pilot - Installation

Plant

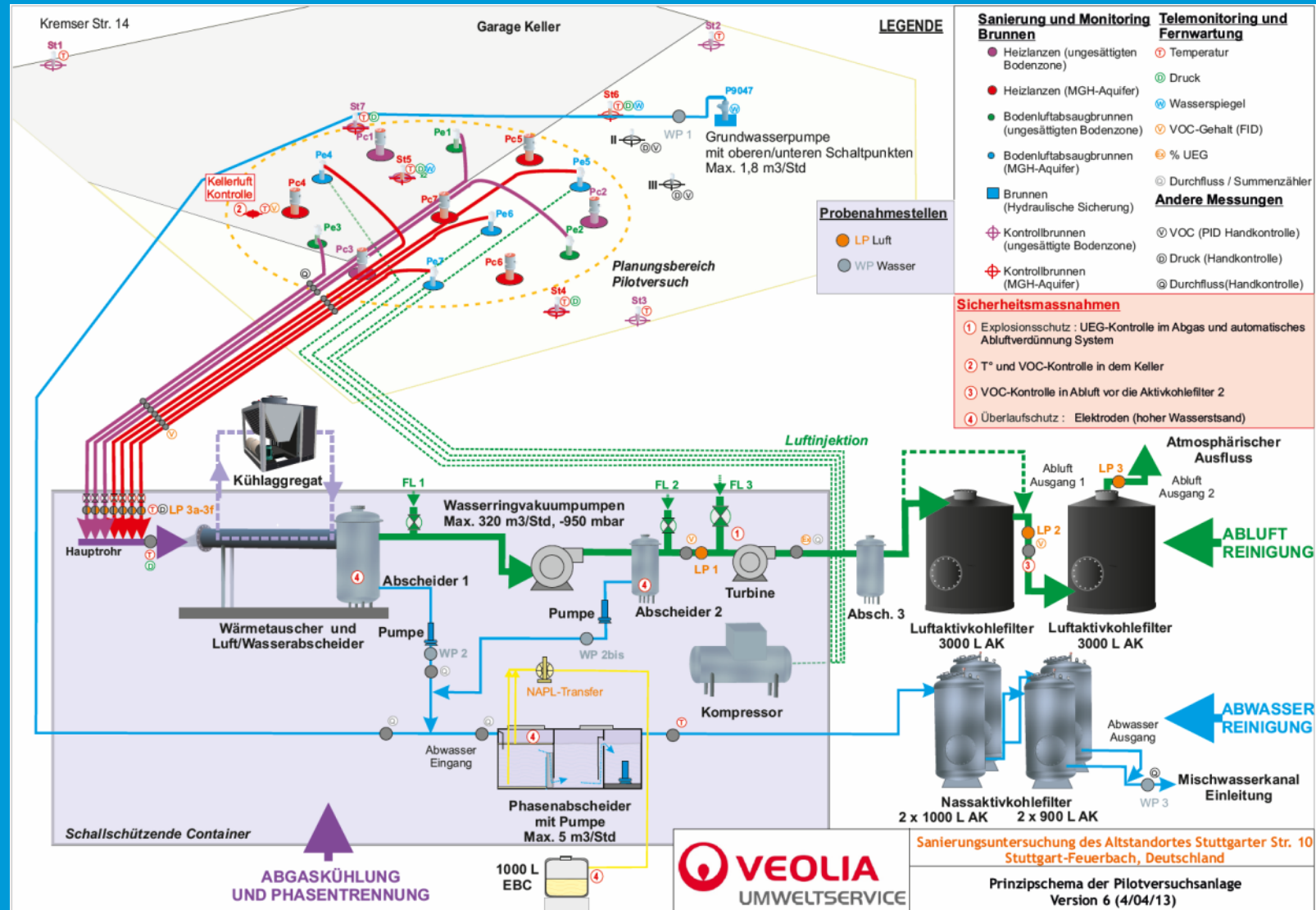
- Test field
- Container
- Filters



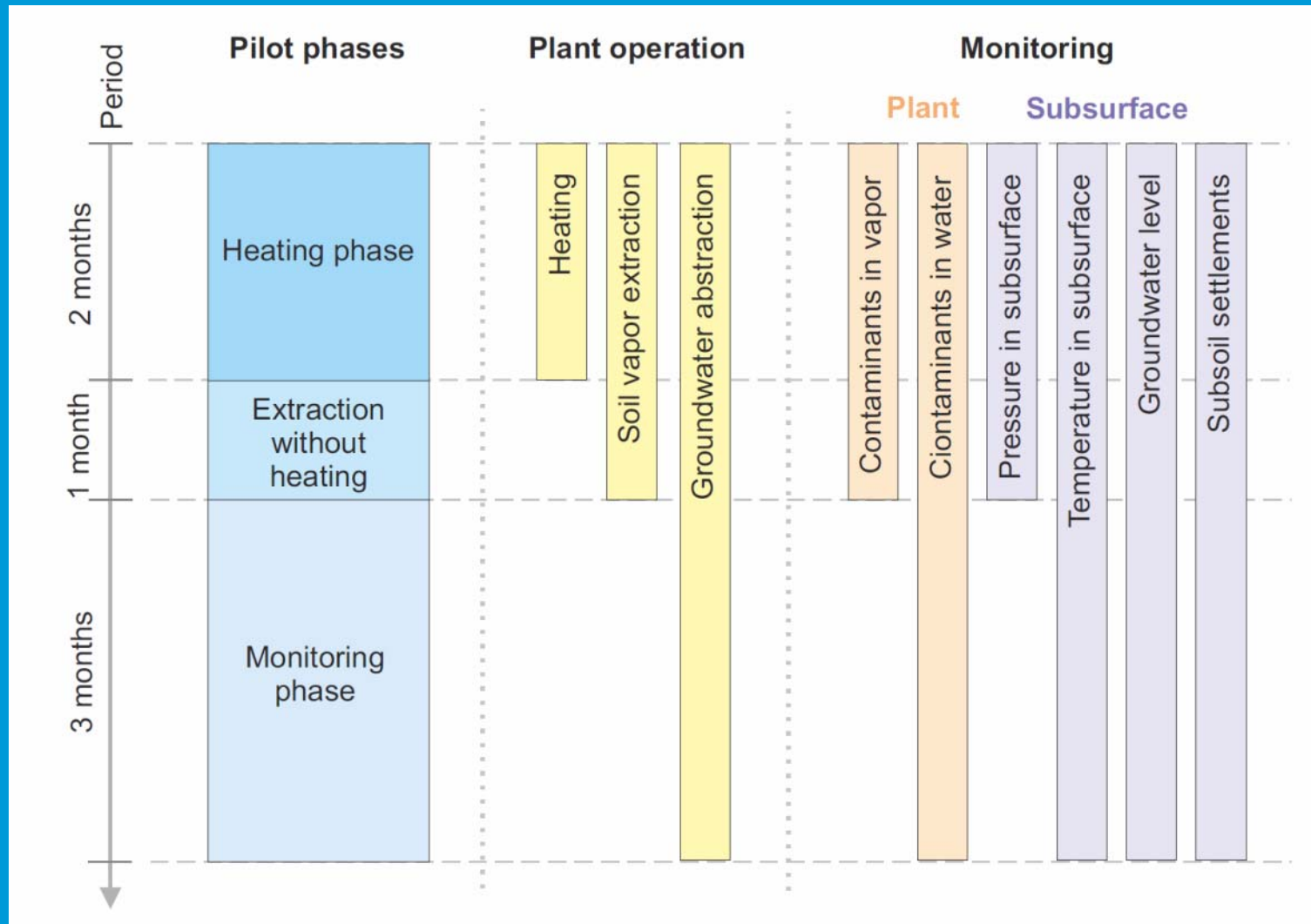
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Pilot – Plant scheme



Pilot - Operation



Pilot - Monitoring

Subsurface

- Temperature
- Pressure
- Groundwater Level
- Settlement

Plant

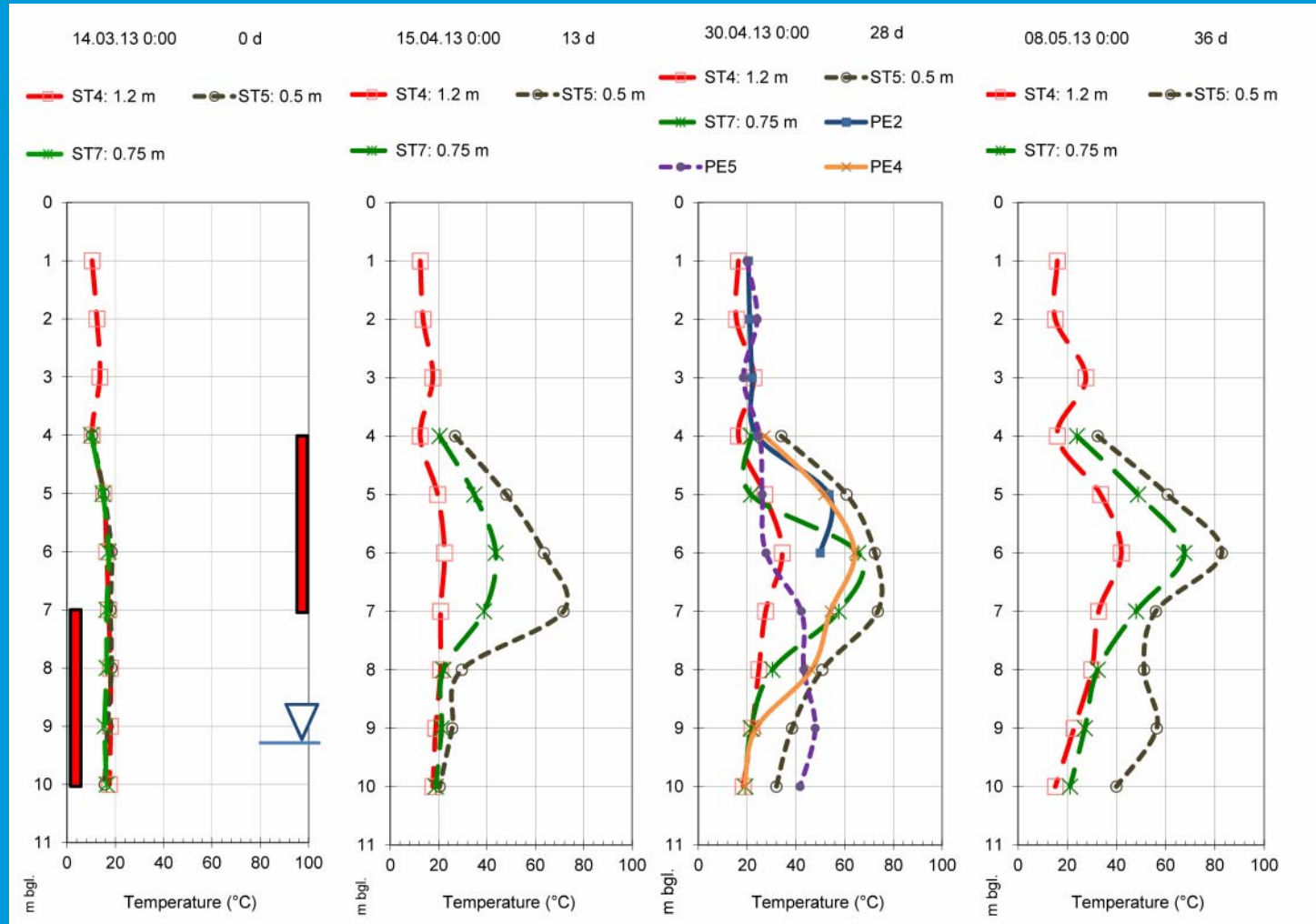
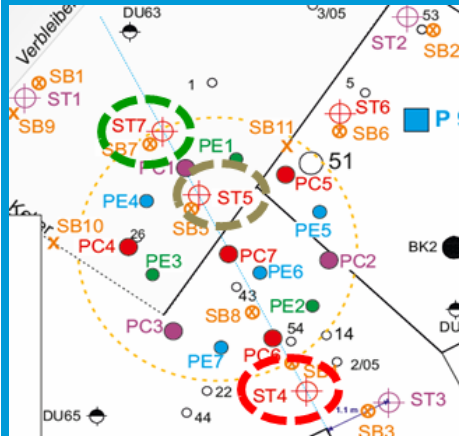
- Mass Flux of Air
- Mass Flux of Water
- Mass Flux of Contaminants in Water and Air

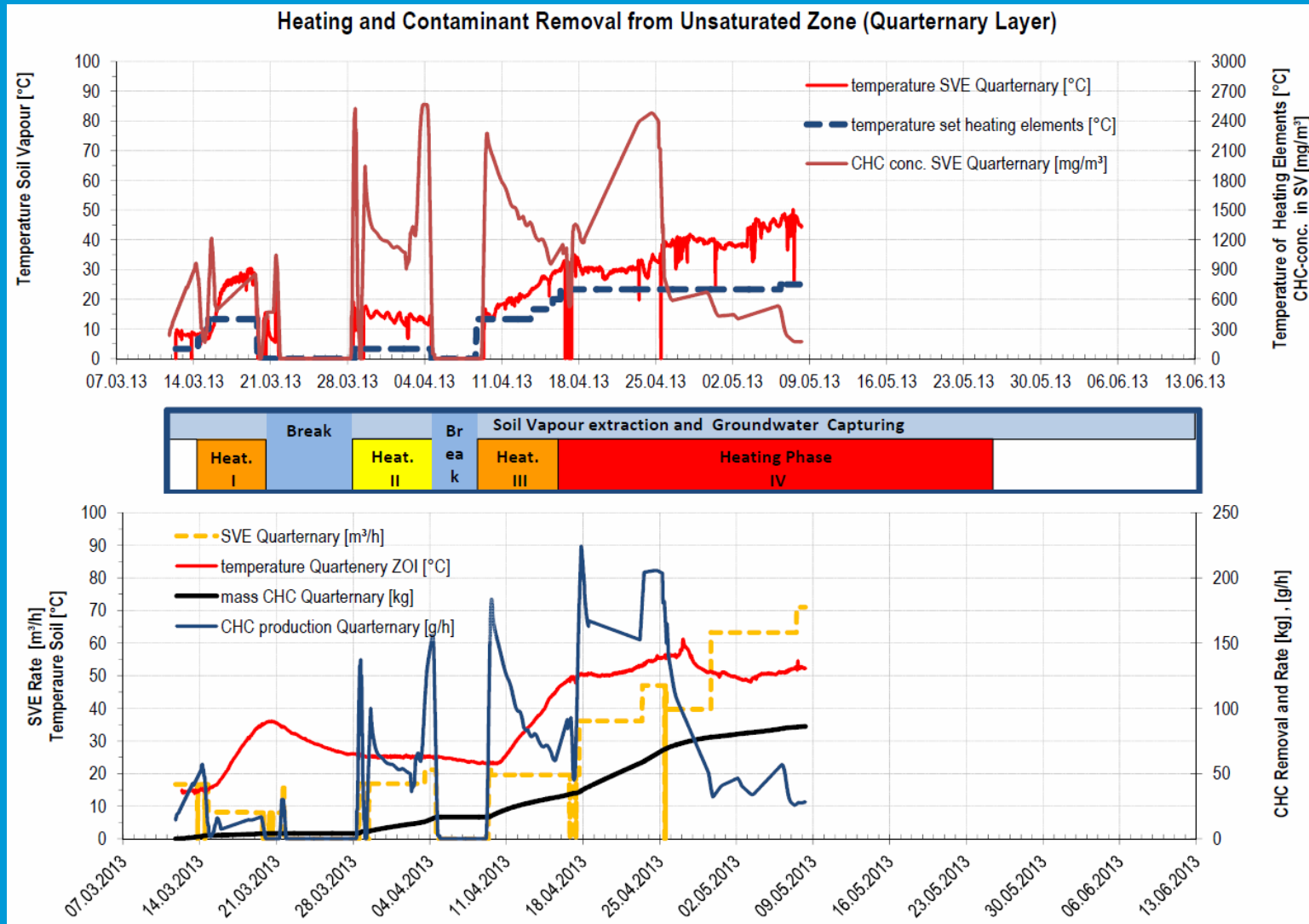
Buildings

- Conservation of Evidence
- Surveying of Measuring Marks



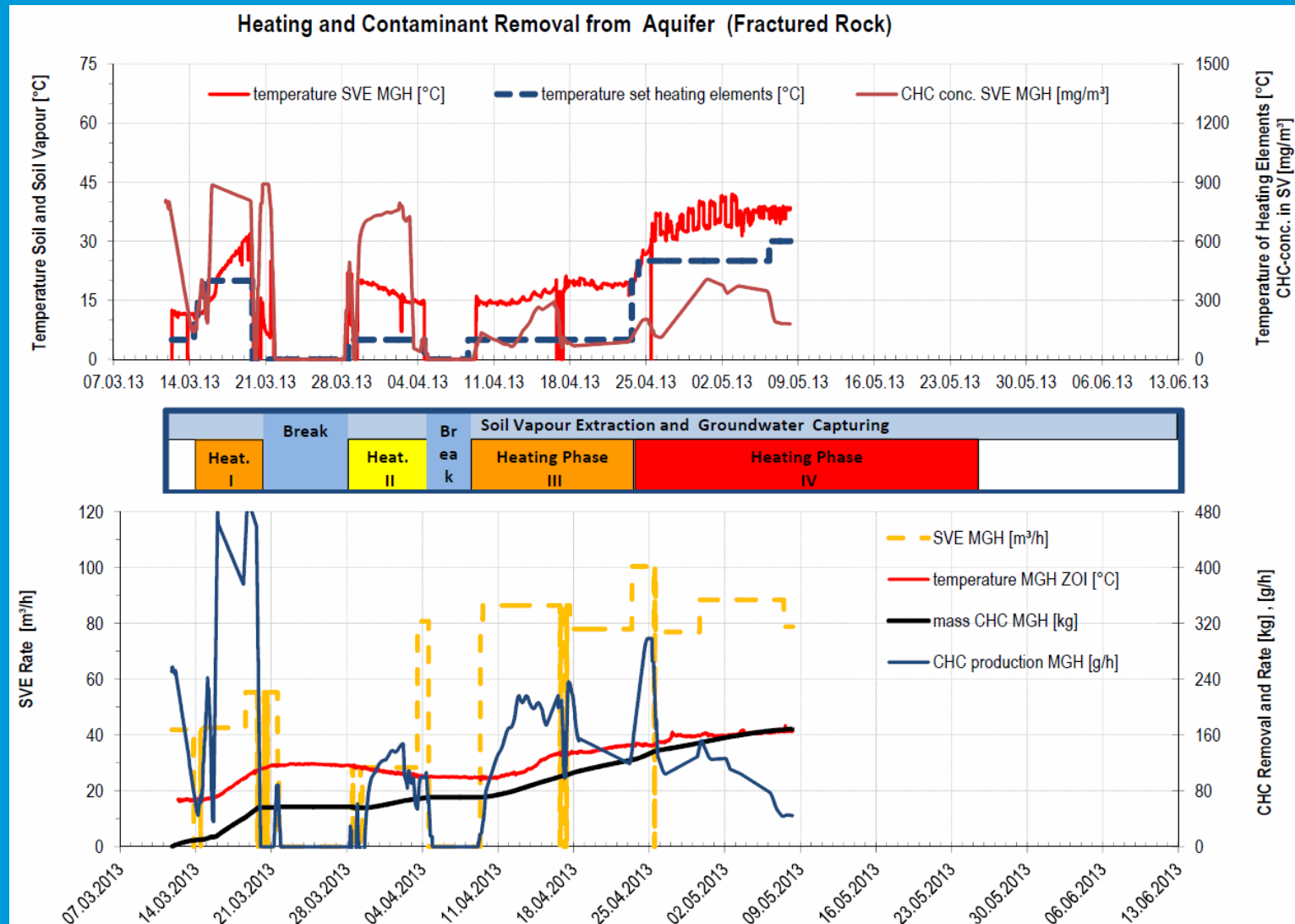
Vertical temperature profiles





Pilot – Results

Fractured rock aquifer: Heating and mass removal



Conclusions

- Decontamination of unsaturated zone works well
- Decontamination of dewatered part of the fractured rock aquifer is on a good way
- Complete dewatering of the aquifer is still a challenge
- Subsoil settlements have been minimal until now
- Data are subject to further evaluation but it can already be said
 - Pilot is basis for effective and safe application in full-scale at the site
 - Pilot shows that technique can be applied in urban environment

In-situ thermal remediation

Experience exchange day and site visit

- Location: Stuttgart
- Date: 19.06.2013
- Contact: Peter.vonSchnakenburg@stuttgart.de



Imagine the
Result

**Thank you for your
kind attention and
have fun with the
movie clip!**

j.ondreka@arcadis.de



STUTTGART

