

# Using Lower Threshold Limits as a Stop Criteria to Prevent Overdoing Remediation: Going for Good Enough Rather than Perfect

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LOWER THRESHOLD LIMITS FOR INSIGNIFICANT  
CONTAMINATION



**COWI**

# My Point

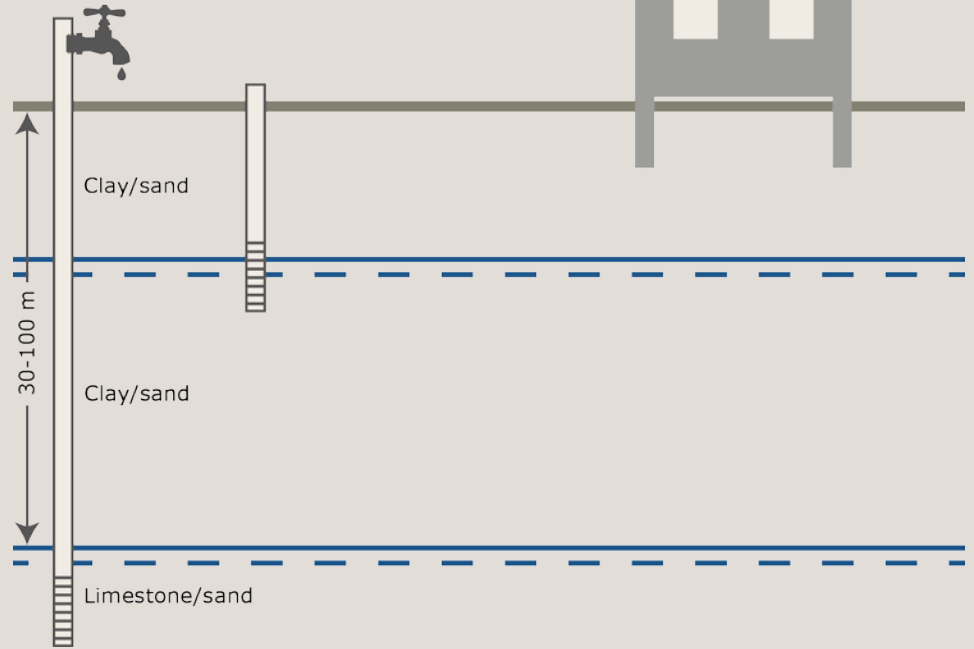
- > Don't overdo it

Tool to avoid overdoing it:

Introduce a lower threshold limit for insignificant contamination

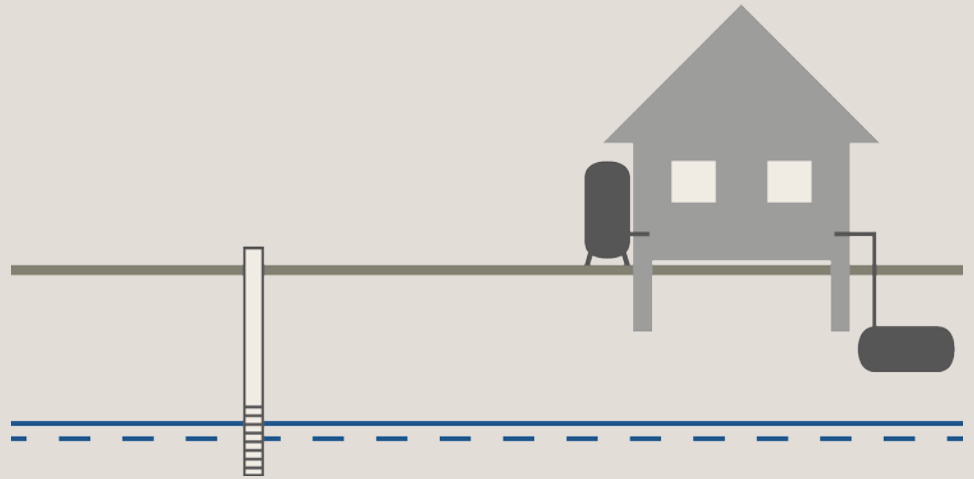
# Background

- > Denmark:  
Our groundwater is high quality drinking water



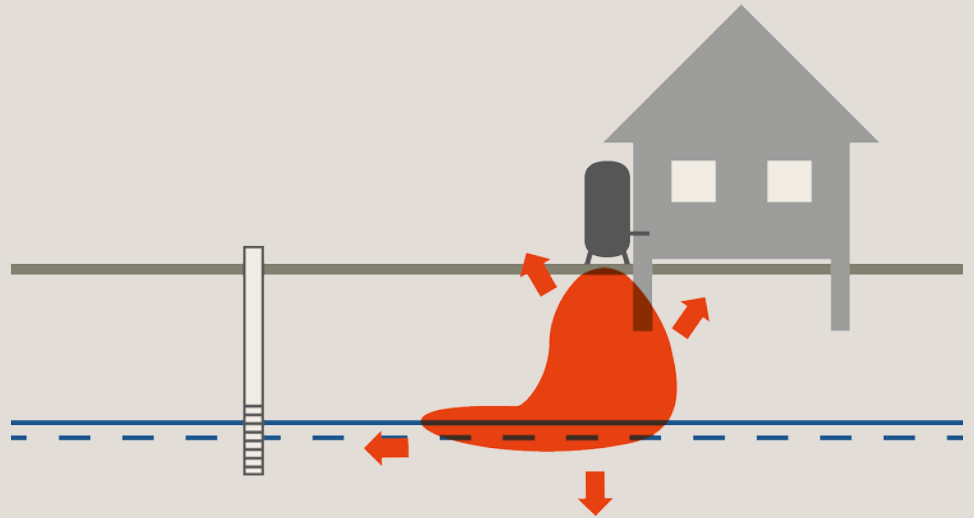
# Background

- > Heating oil:  
mandatory insurance  
(since year 2000)



# Background

- > Overall rule:  
Full remediation
- > Or at least:  
No risk to groundwater,  
recipients,  
physical contact or  
vapour intrusion



# Sustainable?

- › Good for the owner, employment and the groundwater
- › Sometimes less could be enough
- › Remember: Any clean up effort is in itself polluting
- › The last few kilograms of contaminants can be very hard to remove

# Example

- › Leaking storage tank  
- old fragile building



# Example

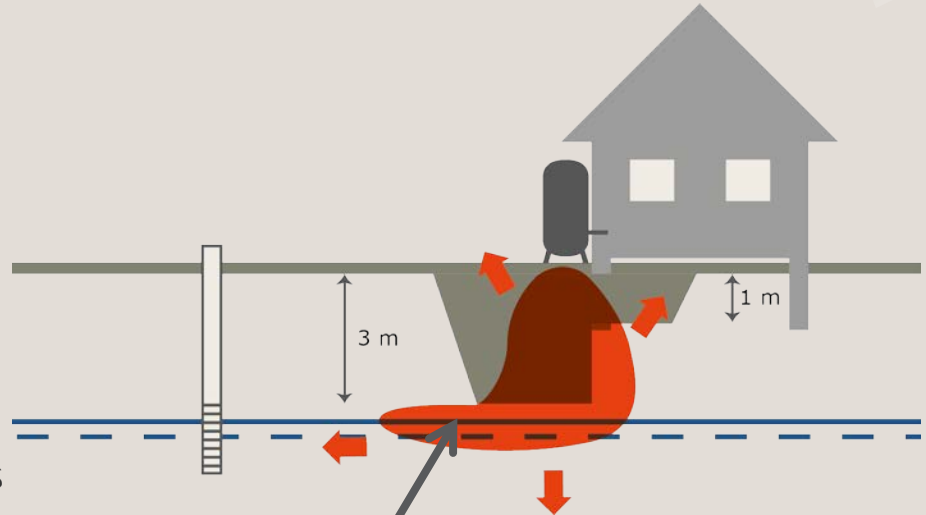
- › Same site – bold clean up strategy
- › Almost full remediation achieved





# Danish EPA introduced Guidelines in 2009

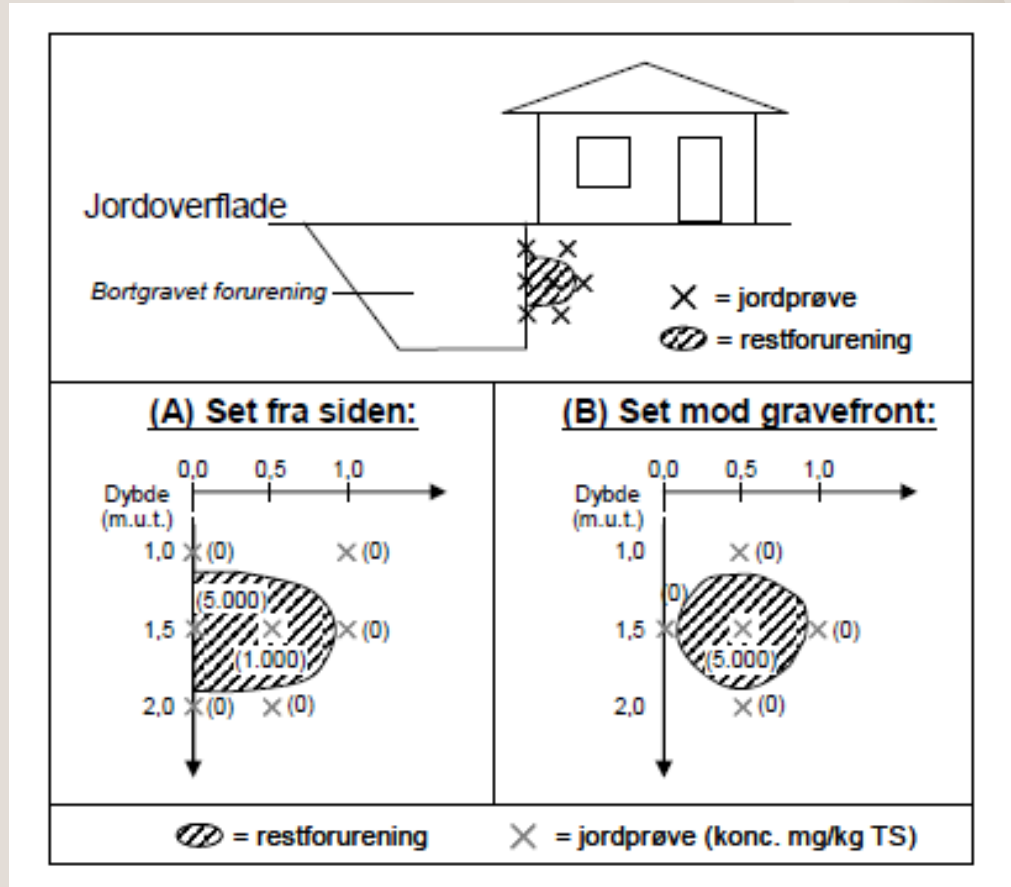
- > Best practice and lessons learned from 1,400 previous cases
- > No risk of contact and vapour intrusion, if the soil is clean 3 m below surface and 1 m below the floor
- > Short decreasing plumes
- > Aerobic degradation are occurring
- > Lower threshold limit based on mass



- > Less than 10 kg: No risk
- > More than 10 kg: Impact on groundwater and vapour intrusion must be documented

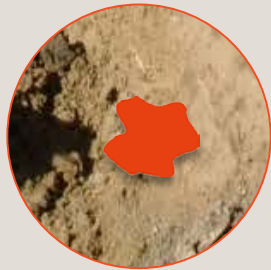
# Example from the EPA Guidelines

- > How to document an insignificant contamination level



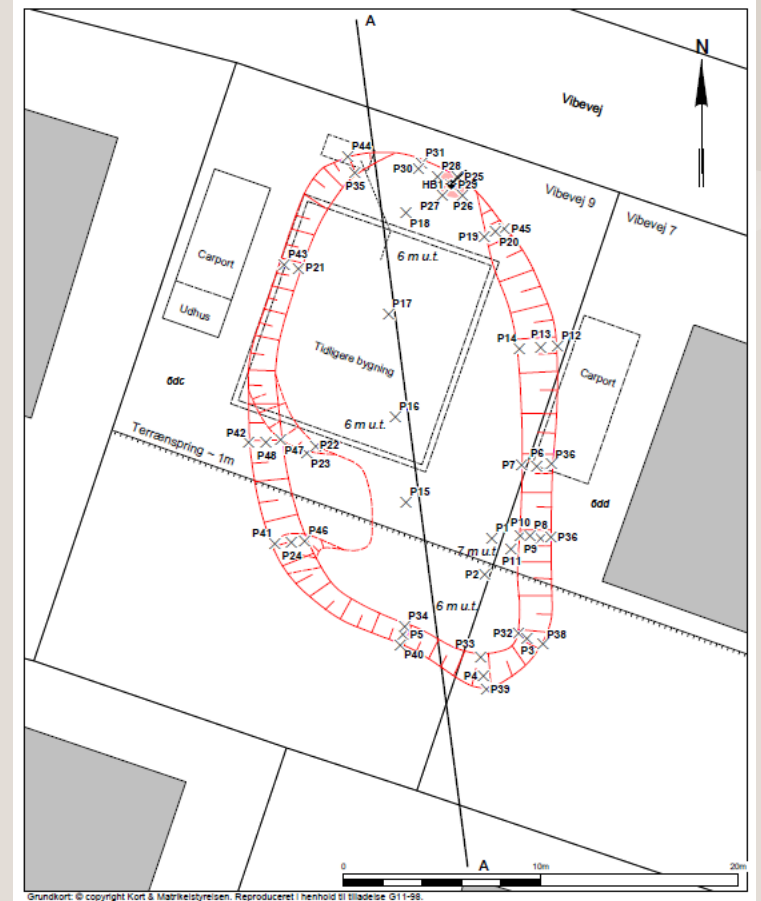
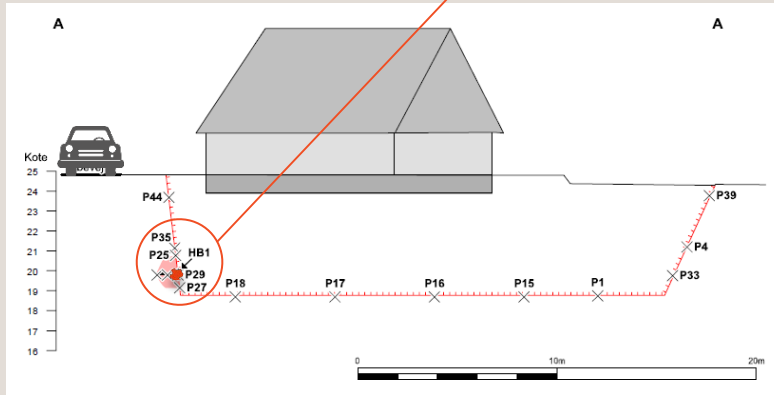
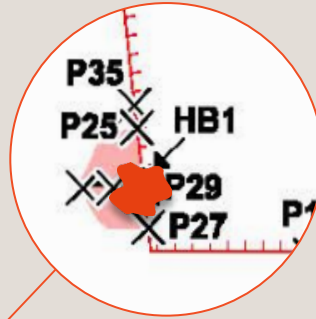
# Examples

## > Insignificant contamination



# Examples

- > Same site:  
Transection and plan



# Examples

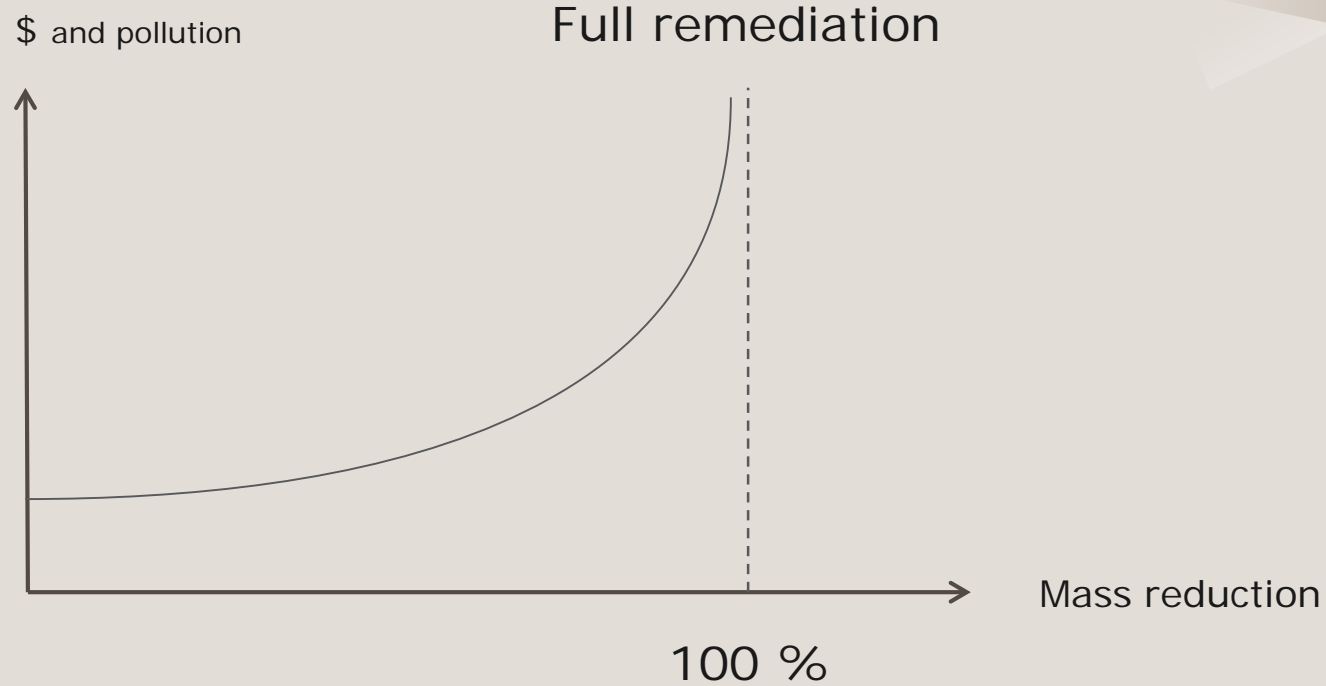
- › Insignificant contamination under a house
- › Reinforced foundation
- › Samples from horizontal and vertical drillings



Hole from  
horizontal  
drilling

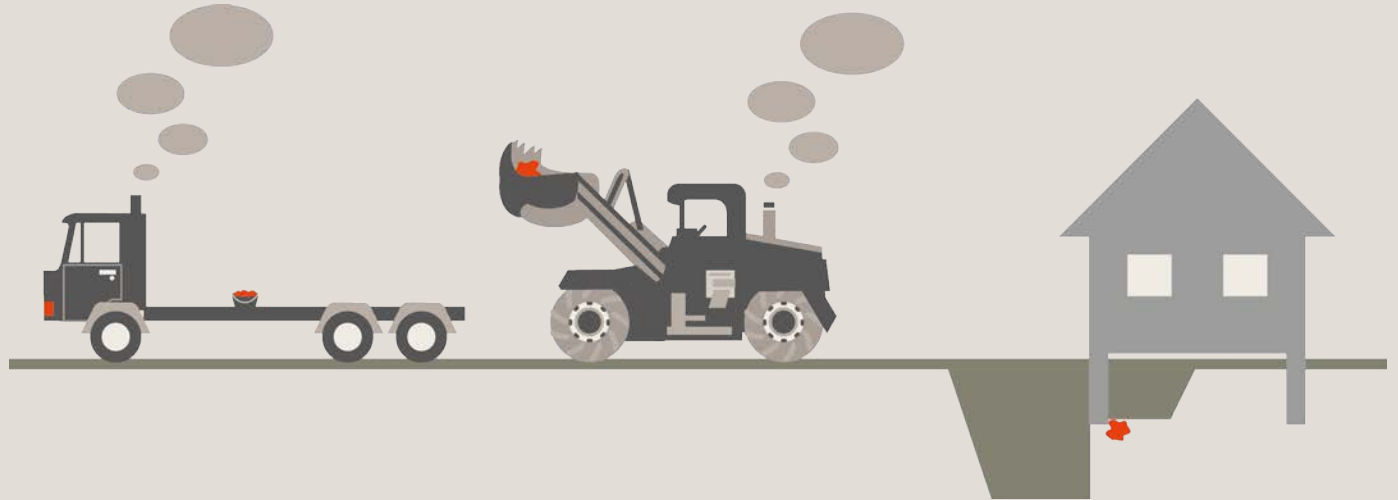
# Cost/Benefit

- > The last few kilos can be very expensive



# Cost/Benefit

- > \$ = CO<sub>2</sub>, fuel, traffic and other resources/carbon footprint



# Sustainable Remediation (please)

- › Always ask:
  - › Can this clean up effort be justified from an environmental point of view?
  - › Is the gain larger than the loss?
- › If this assessment is difficult, at least agree on a lower threshold limit. There must be a "good enough"



# Summary

- > Go for "good enough" rather than perfect!
- > Don't overdo it!
  
- > Thank you

Please contact me at: [JAHC@cowi.com](mailto:JAHC@cowi.com)