



1



Who are we?

- Grond Recyclage Centrum Kallo
- Joint Venture between DEC & Mourik
- Founded in 1995
- Treatment of contaminated soils, road sweepings, sewage sand
- Process 200.000tons /year - 100.000tons/year Fysico-Chemical treatment
- Located next to the waterway



2

GRC

Basics of physico-chemical treatment: "soilwashing"

- Separation of contaminated soil
 - Clean sand (>63 micron)
 - Clean gravel (2-40mm)
 - Contaminated filtercakes (max 40%)
- Contaminants are not soluble
 - Eg: oil, heavy metals

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3

GRC

First step: lab testing

Typical lab research protocol for soil washing is based on particle (size) separation.

Pollutant are associated with particles, low solubility.

Particle Size	Category	Associated Processes
> 50mm	GRAVEL	gravel wash
2mm - 50mm	SAND	sand wash, upstream classifier
< 0.063mm	FINES	polymer testing, flocculation, dewatering

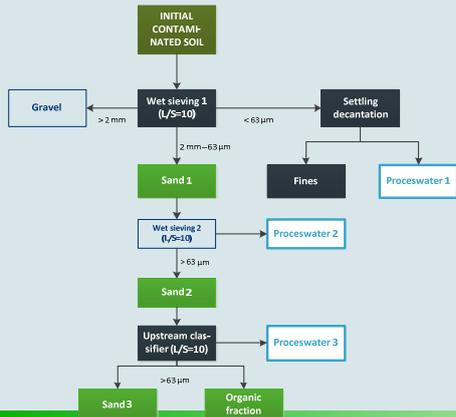
MOURIK

4



First step: lab testing PFOS

For PFAS: Adapted lab research protocol: contaminants shift to process water phase and are highly soluble → focus on water



5



Hybrid soil washing: pilot testing

- Standard soil washing on PFAS
- Need for additional treatment of process water
- Need for rerouting the different flows of process water
- PFOS needs to be captured in GAC filters
- No discharge of process water



6



Hybrid soilwashing experience

- Experience from several petrochemical sites since 2018
- Approx. 7.000 tons treated till now
- Input concentration PFOS: 150 – 1000 µg/kg DM
- Output concentration successful: PFOS: 1 - 60 µg/kg DM
- Concentrations in process water were monitored and successfully reduced by a series of GAC filters



7



Hybrid soilwashing experience

Treatability of PFAS soils

- Maximum 2500 µg/kg DM with soil washing
- Higher: landfill (extra isolation)
- Above 50ppm: hazardous waste incineration (POP)



8

Project Former Opel site



Project Former Opel site, Noorderlaan Antwerp (OVAM, POA):

- Contamination in the proximity of the former fire fighting foam storage tank
- Found “by accident” when a small spill was investigated
- Unique project




GR: 100 – 2.500 µg/kg DM PFOS

GW: 15 – 140 µg/l PFOS



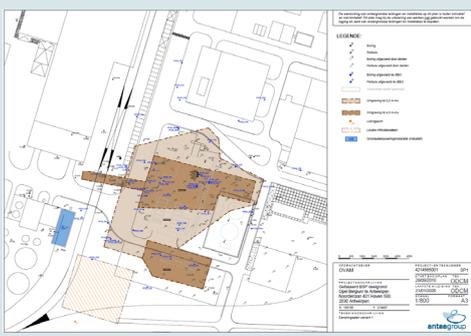
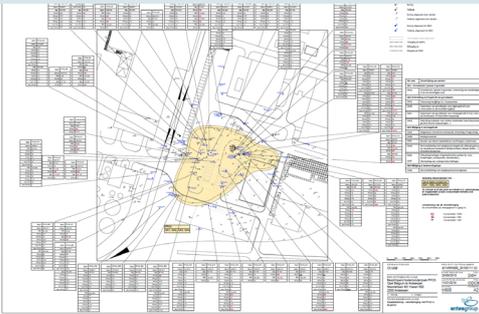



9

Project Former Opel site: treatment

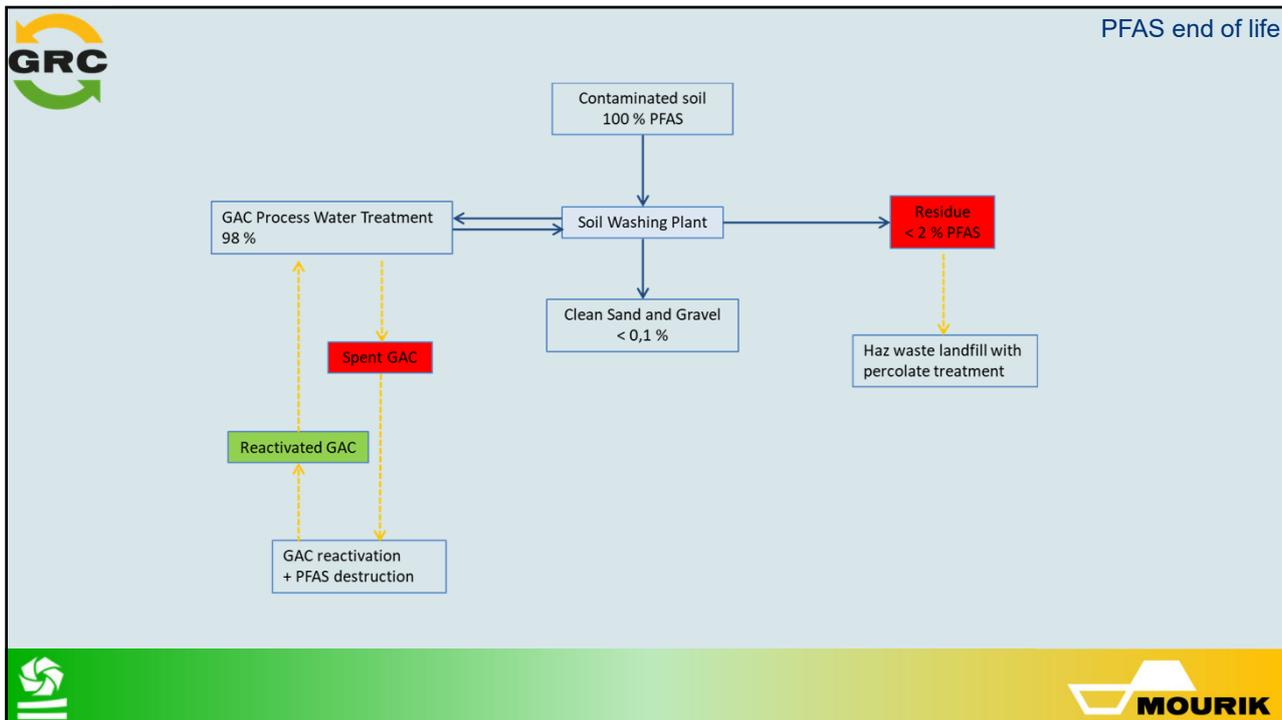


- 23.000 ton to treat
- First batch of 4000 tons finished
- Input concentration PFOS: 150 µg/kg DM
- Output concentration PFOS: 1 - 5 µg/kg DM
- Concentrations in process water under control
- Cleaned sand returns to the original site
- Project runs till end of august
- Challenging deadline!

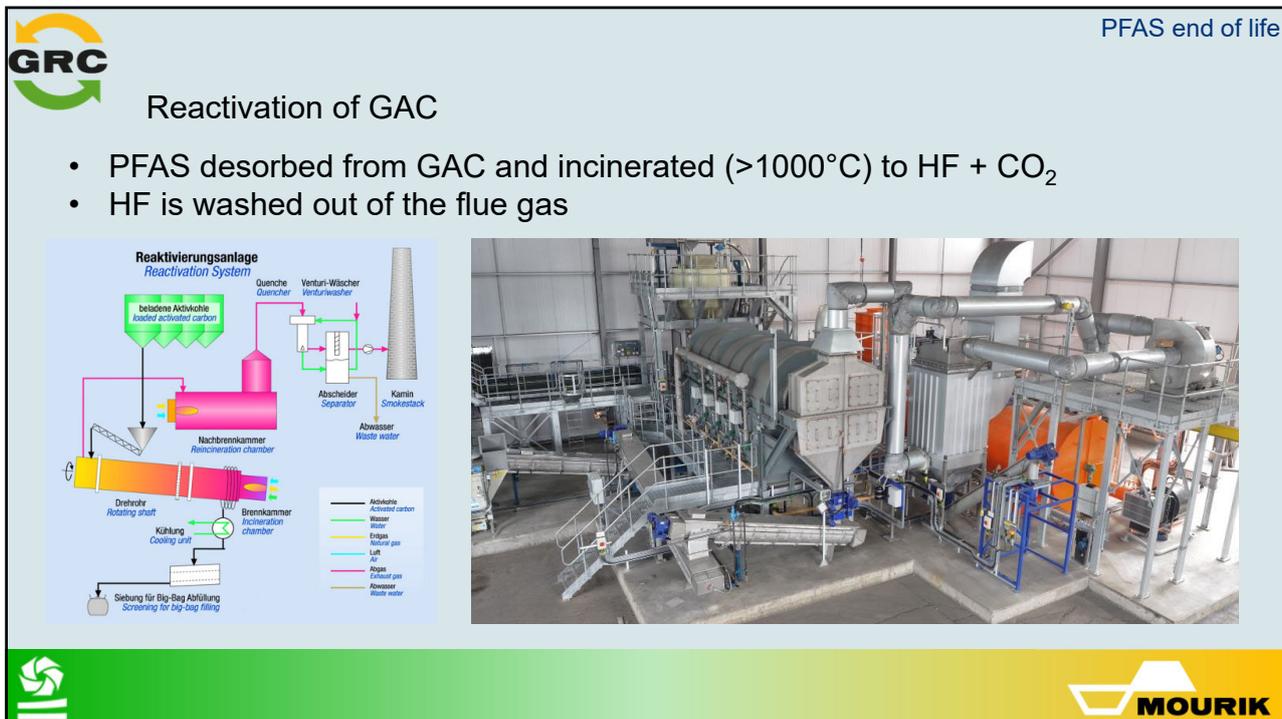






10



11



12



Cost drivers



- Standard Fysico-Chemical treatment price + additional charges
- Sludge residu: < 63micron: landfill + extra isolation chamber HDPE
- Amount of GAC use determined by:
 - PFAS concentration
 - Other contaminants
 - PFOS or shorter molecules (PFBA)
- Case by case approach – lab research before each project



13



14