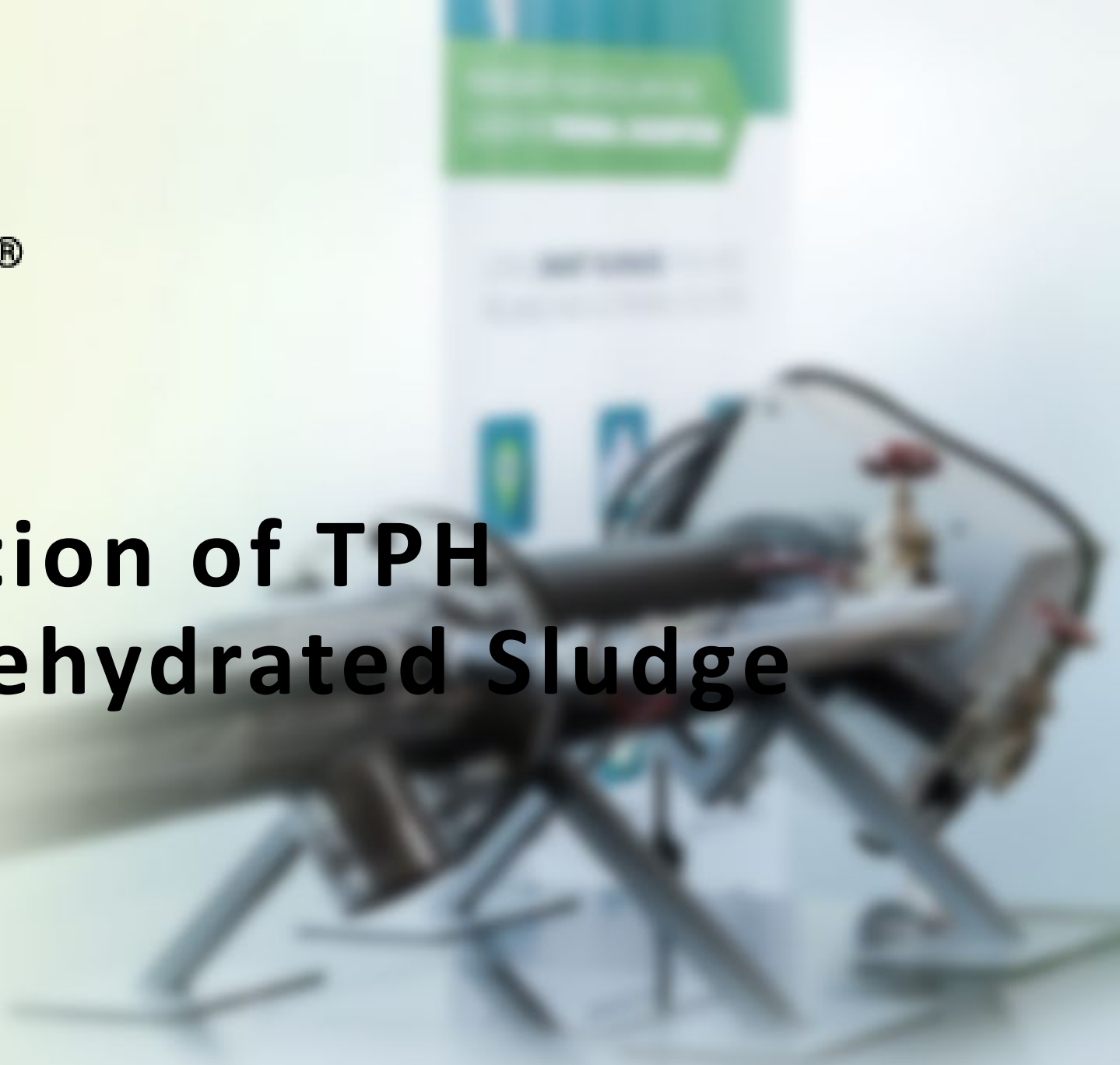




Thermal Desorption of TPH Contaminated Dehydrated Sludge

Intersol, 28 March 2024



SOMMAIRE





01 Company presentation



Our Company

We invent and develop Thermal Desorption Technologies



Award-winning
Technology



Based in Belgium



Own Smart Burners
manufacturing facility



Own Lab and
R&D facility

82

Completed
Projects

43

Staff

17

COUNTRIES
OF ORIGIN

35

Average
Age



82%



18%

The Team



Our Missions & Values

WE INNOVATE FOR YOUR FUTURE

We are **Committed**



We are **Innovative**
for a cleaner planet



We are **Unique & United**



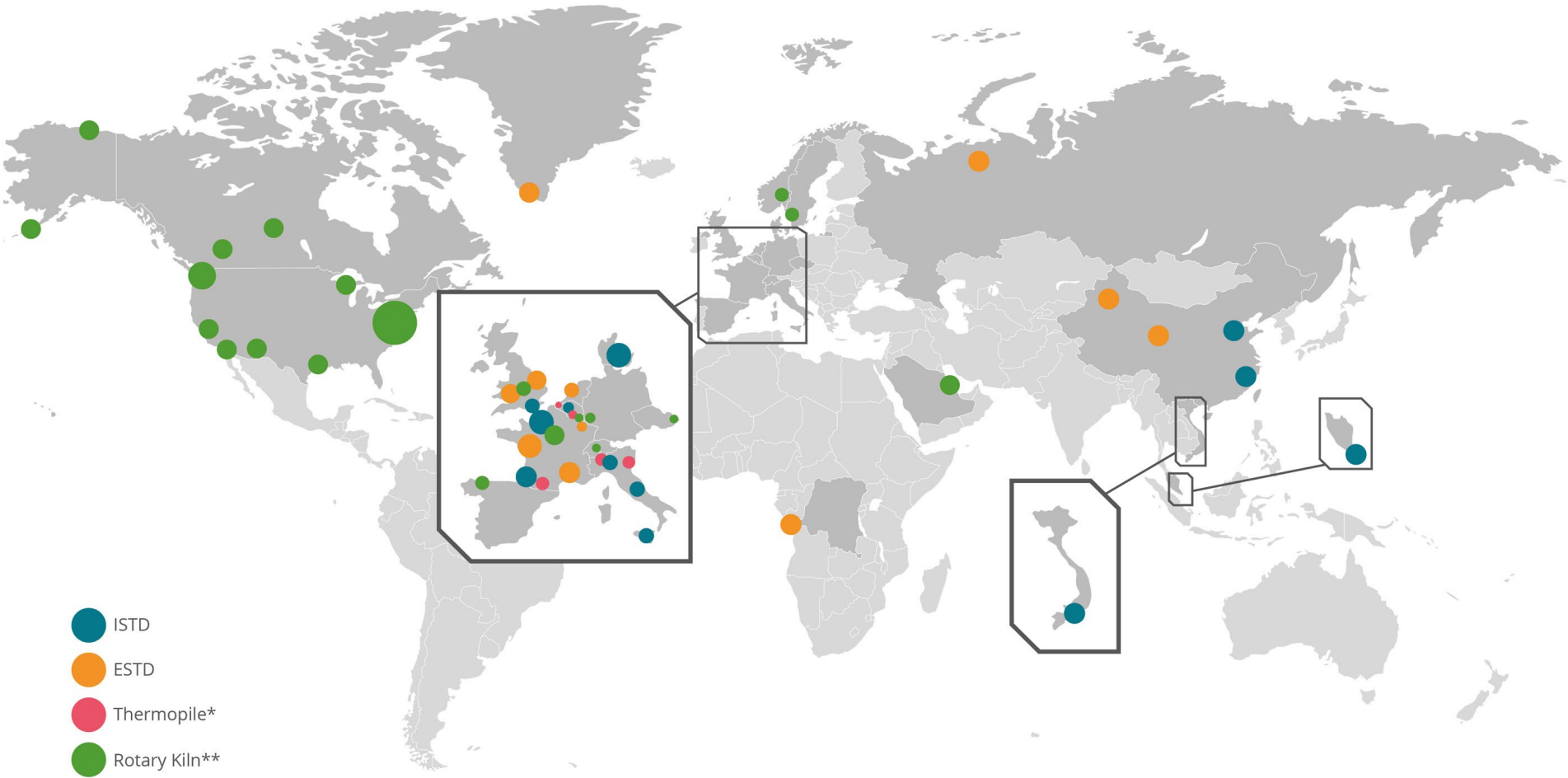
They Trusted us



RioTinto Alcan

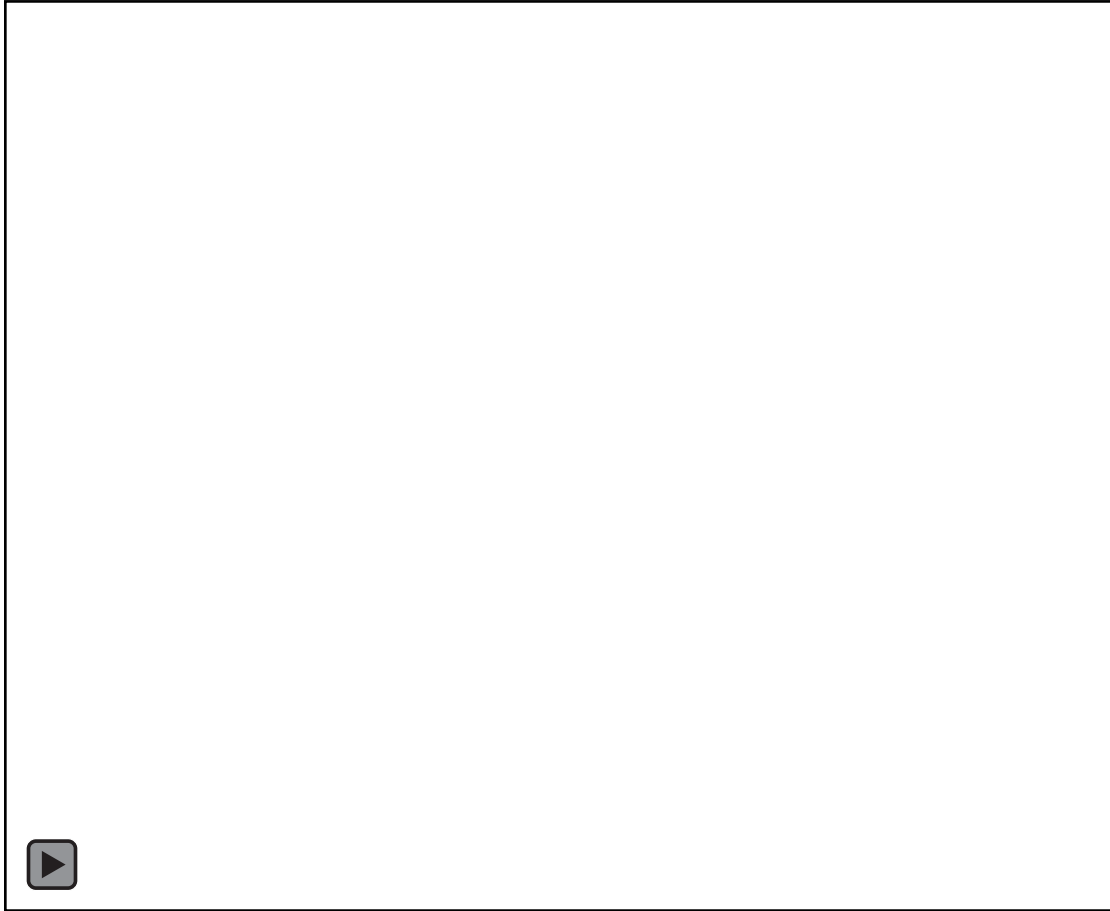


Operations Worldwide



*operated by L&C S.A. until 2010
**operated by TPS Technologies Inc. until 2006

How does Thermal Desorption work?



1

HEATING THE SOIL

Objective : Vaporise contaminants

2

RECOVER CONTAMINANTS

3

TREAT THE CONTAMINANTS

As fuel (in the burners) or
as liquid product (after condensation)

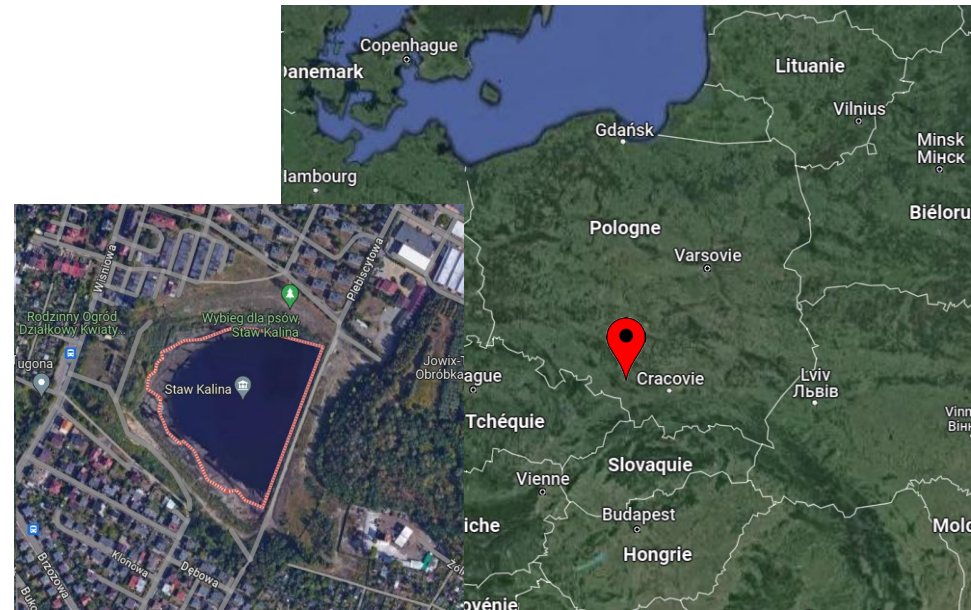


02 Site presentation



LOCATION AND HISTORY

- Location : Świętochłowice, Poland
- Kalina Reservoir : 5 hectares
- History



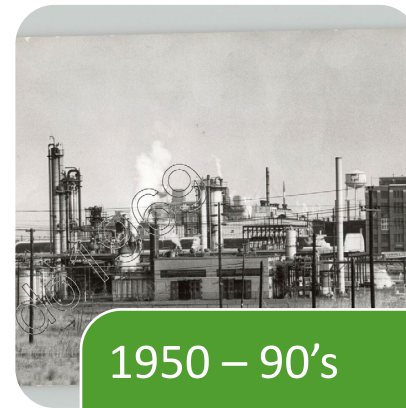
Before 1914

- Shallow hard coal mining
- Use : fishing area



1928 - 1950

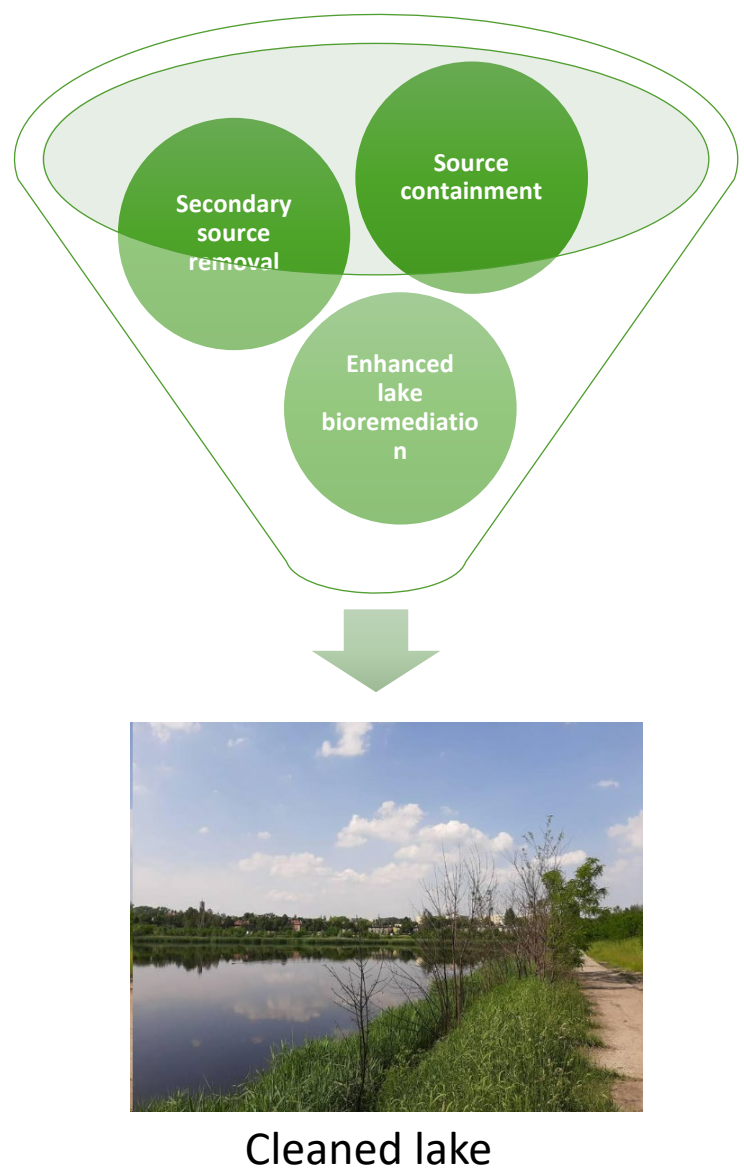
- Swimming area
- Clean lake




1950 – 90's

- Chemical plant
- Wastes stocked in Pile next to the lake
- Contamination of lake sediments

GLOBAL REMEDIATION STRATEGY



Stage	Method	Waste
Source containment	Waterproof barrier around the mound	
Secondary source	<ul style="list-style-type: none">- Removal of most contaminated lake sludges- Flocculation / sedimentation- Dehydration through press filter	Contaminated sludges with 50% DM 
Enhanced lake bioremediation	O2 injection	



Thermal Treatment of contaminated sludges



CONTAMINATED SLUDGES

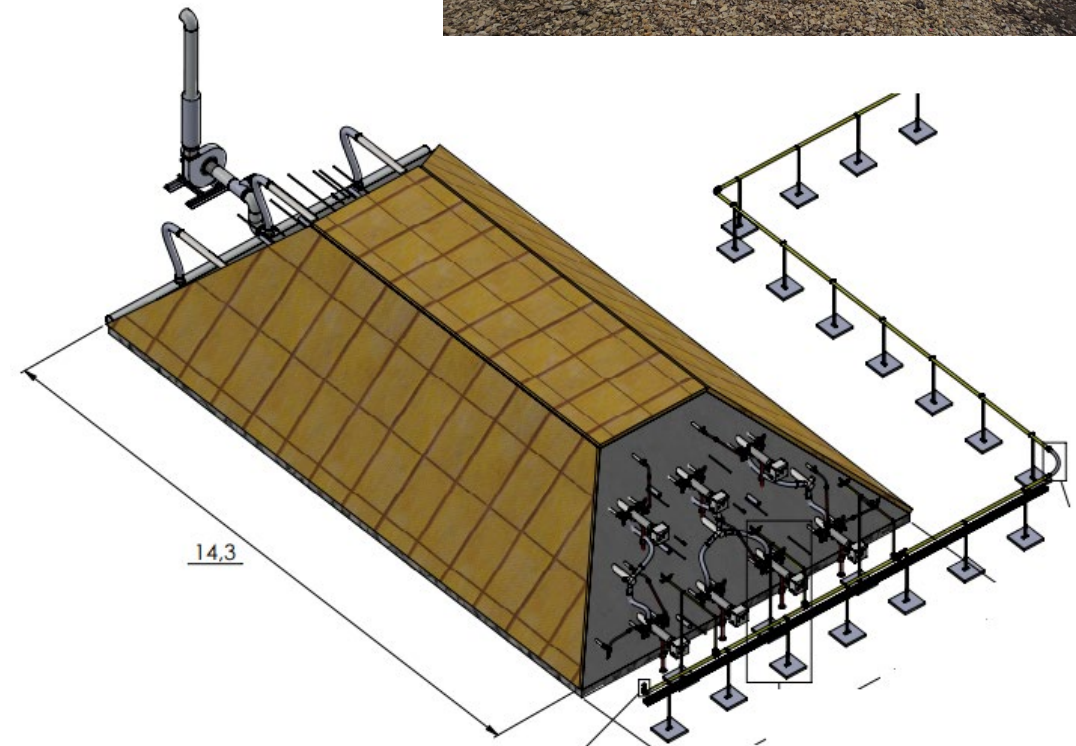
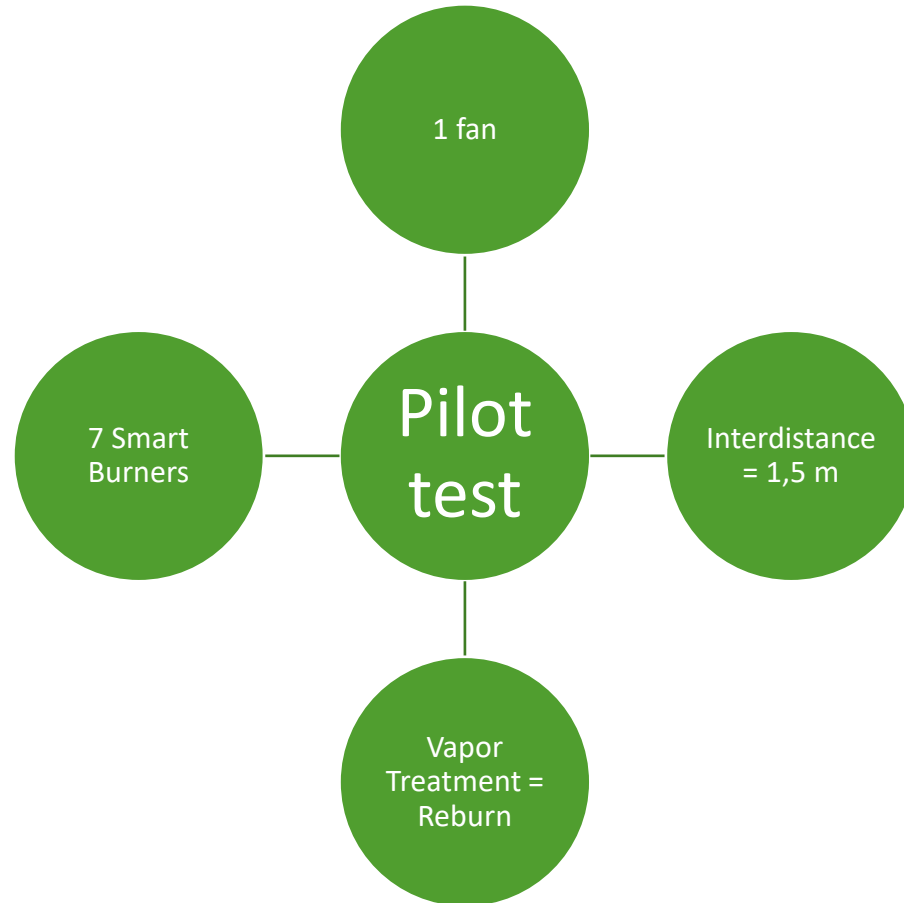
- Volume : 2.800 m³ of contaminated sludges
- Technology : Ex Situ Thermal Desorption - ESTD
- How : 1 Pilot Test : 200 m³
 - Pile 1 : 1.000 m³
 - Pile 2 : 1.600 m³
- Contamination & targets



Item	Value	Units
Average Soil Density	1.400	kg/m ³
Average Porosity	0,3	V _v /V _T
Moisture Content	50%	W _{water} /W _{soil}

Contaminant Pile 2	Average Conc. In Soil [mg/kg d.m]	Max Conc. In Soil [mg/kg d.m]	Target [mg/kg d.m]
BTEX	408	720	20
PAHs	7.065	12.500	20
Phenol	4.11	5.18	20
C12-C35	6.985	12.500	N.A.

PILOT DESIGN



PILOT TREATMENT

- 69 days of treatment
- Sludges treatment



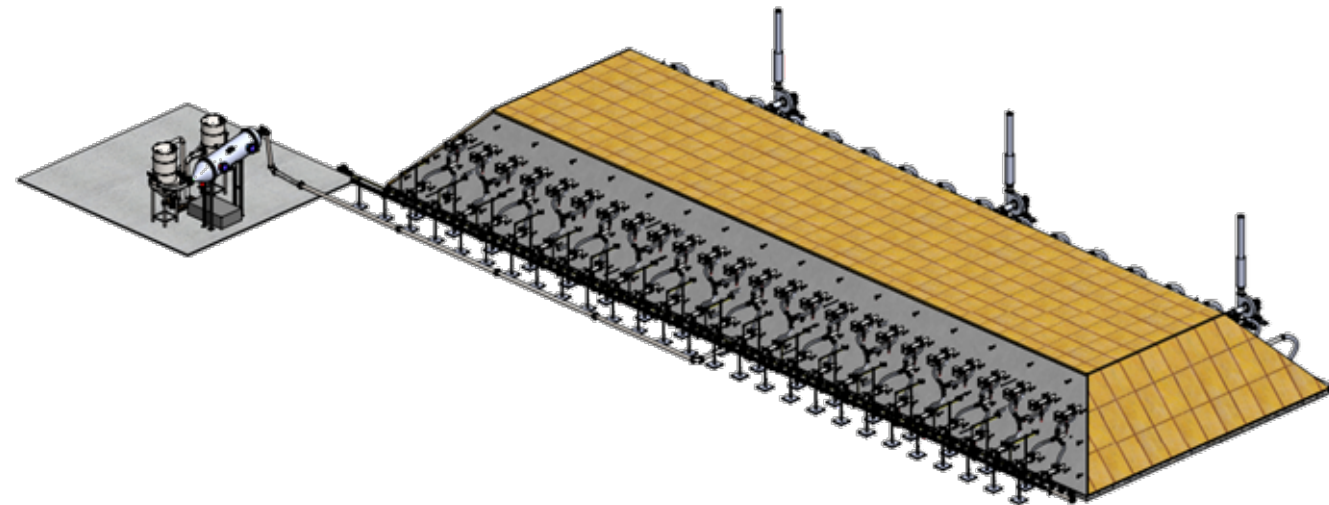
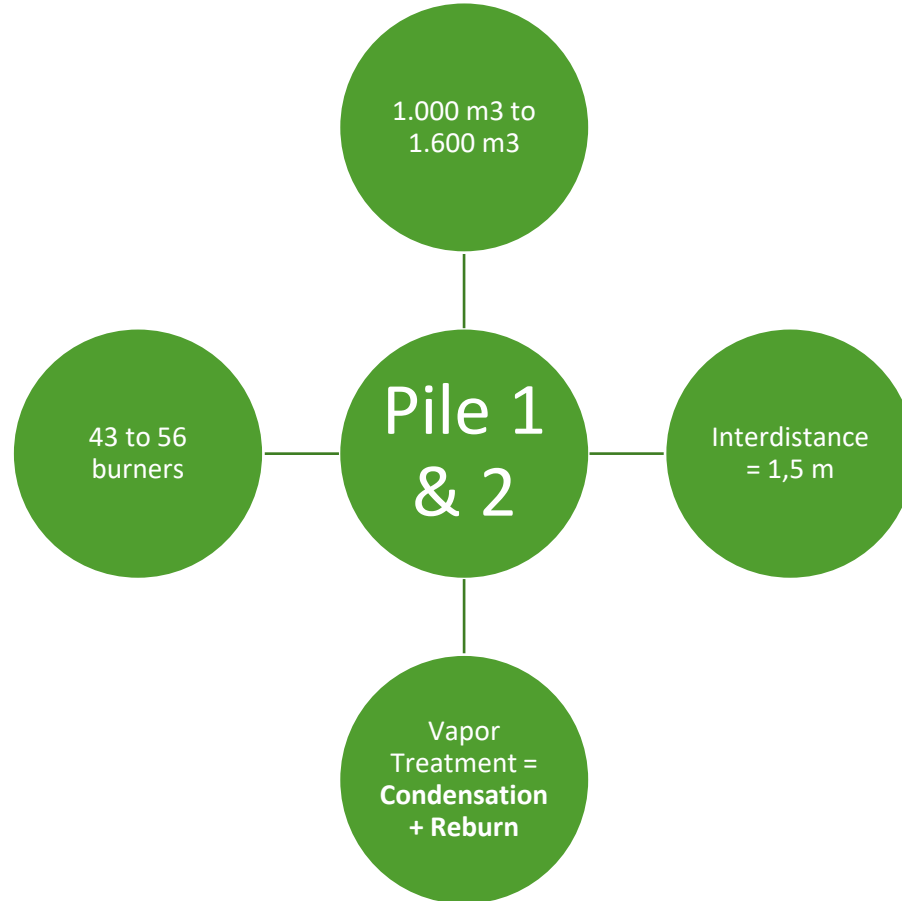
■ Pilot Results

Contaminant Type	S2	S3	S7	S8	Targets
Phenol (mg/kg)	<0.2	<0.2	<0.2	<0.2	20
BTEX (mg/kg)	< 6.0	< 6.0	< 6.0	< 6.0	20
PAHs (mg/kg)	< 0.80	<0.8	1.01	2.83	20



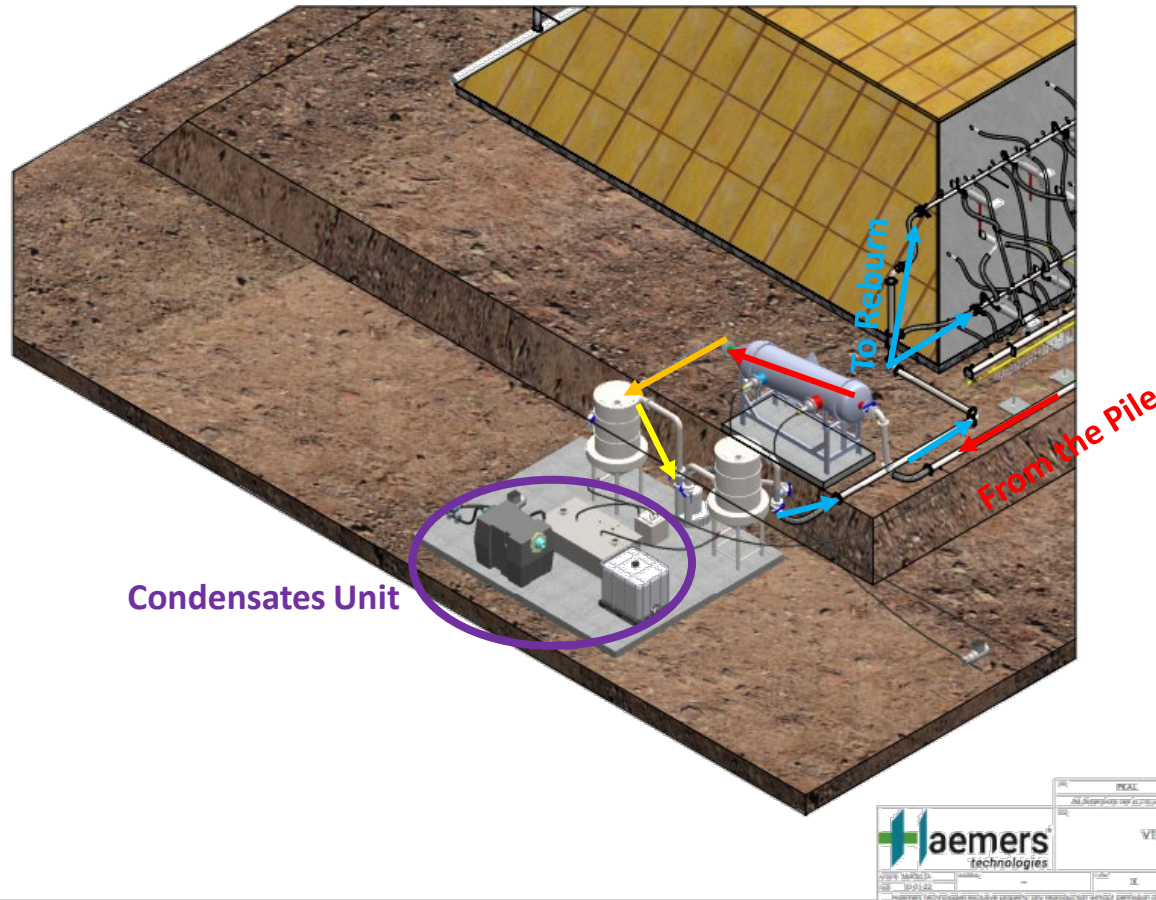
Remediation > 99%

FULL SCALE DESIGN



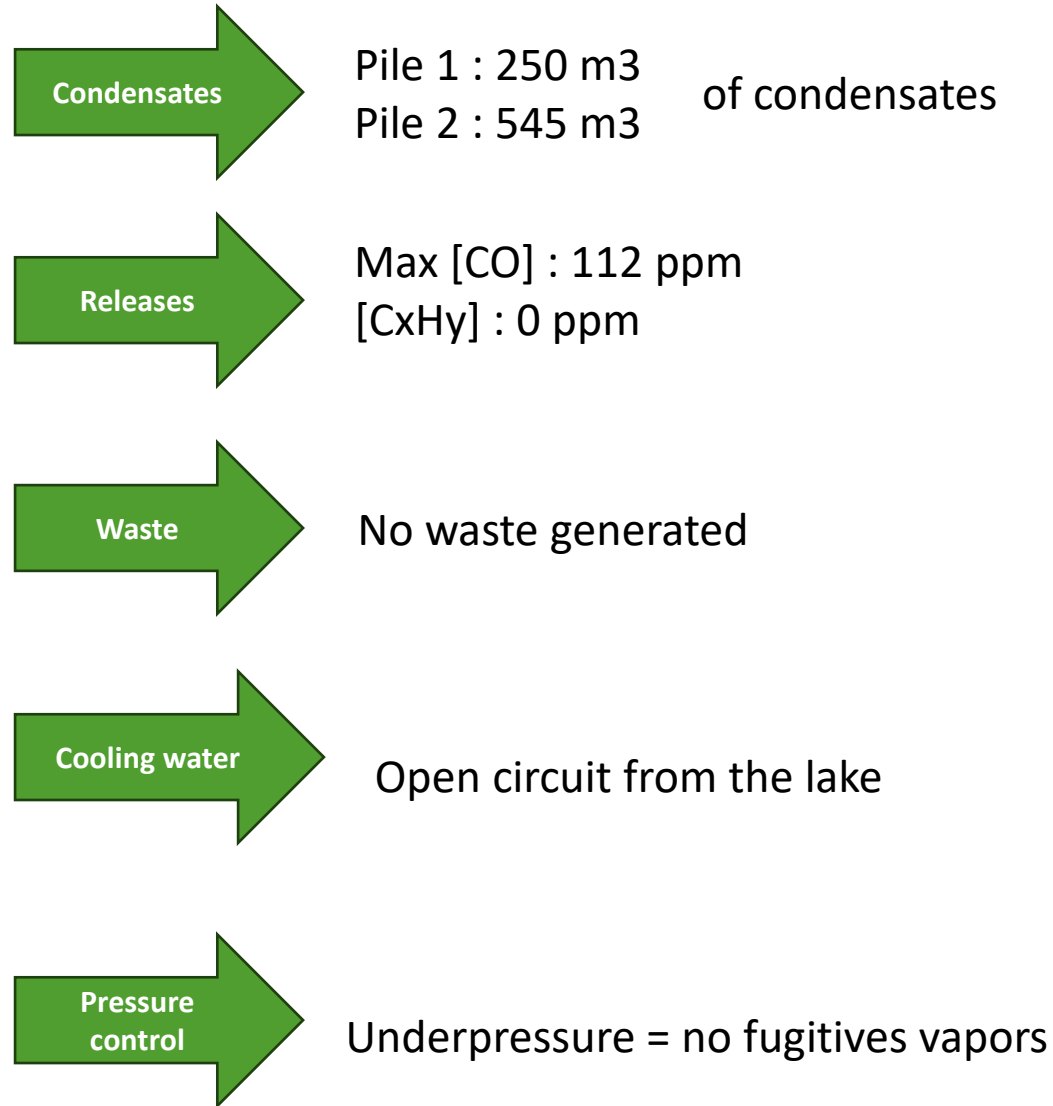
CONDENSATION & REBURN

- Why ? Increase vapor extraction
Better atmospheric releases control
- How ?



CONDENSATION & REBURN

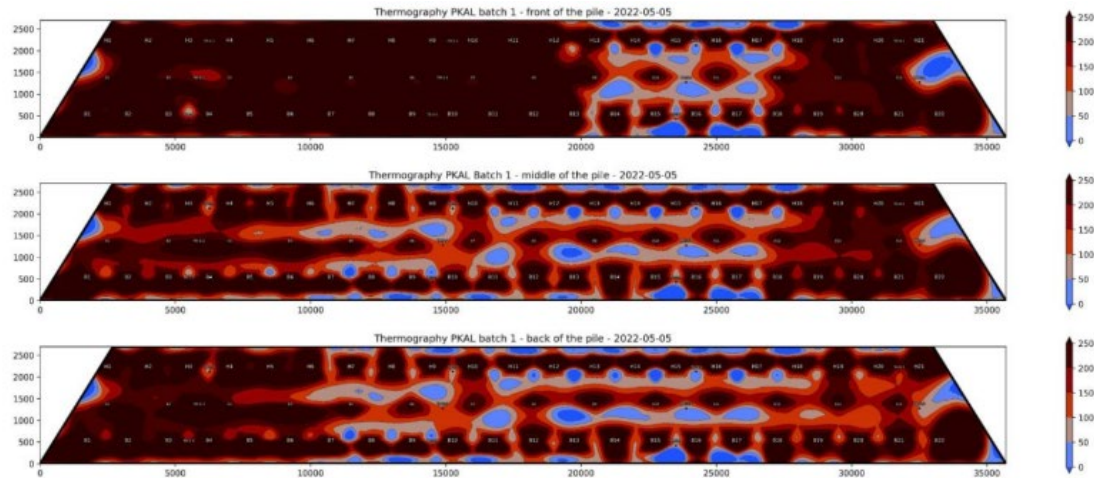
CONDENSATION + REBURN



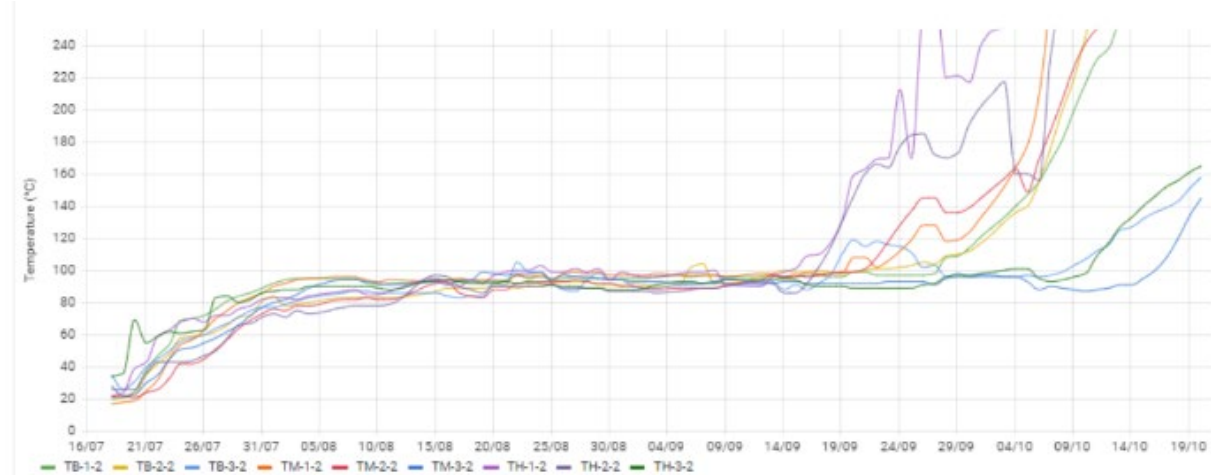
TEMPERATURE REPRESENTATION

- Two representation ways used to determine treatment end : **thermographies** & temperature **curves**

Pile 1 Example
Thermography
End of Treatment



Pile 2 Example
Temperature curve



REMEDIATION RESULTS

- Total treatment time

	Pile 1	Pile 2
Humidity	50%	50%
Treatment time	104 days	74 to 94 days
Energy consumption	850 kWh/T	875 kWh/T

- Contamination & targets

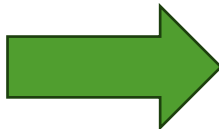
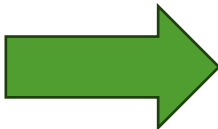
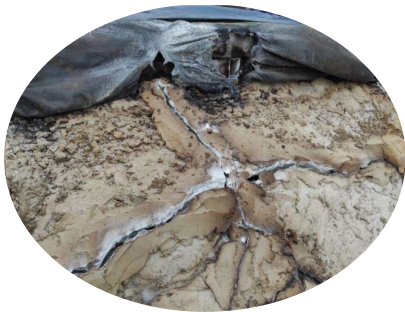
Contaminants	S1	S2	S3	S4	S6	S7	S8
PAH	< 0,8	< 0,8	< 0,8	6,48	33,2	< 0,8	17,2



Remediation > 99%



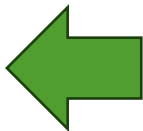
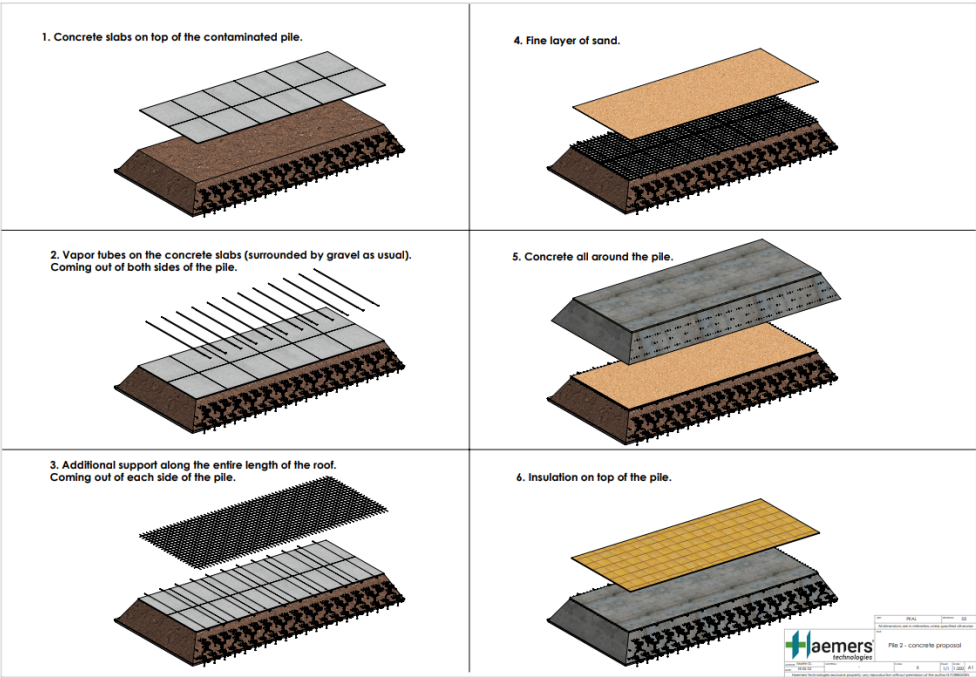
VOLUME REDUCTION



Make concrete great again !



50% volume reduction → cracks → fugitives vapors





04 Conclusion



CONCLUSION

- Treatment of 2.800 m³ of contaminated sludges
- Remediation rate > 99% (from [HAP] = 14.000 mg/kg)





Thank you for your attention!

