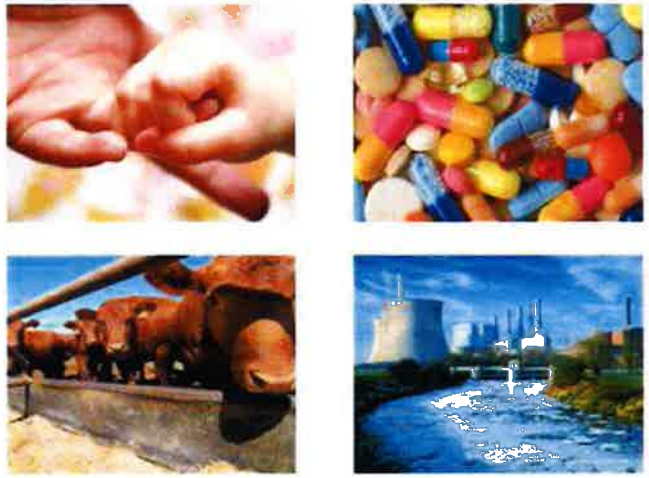
Occupational health & Dioxins / PCBs

8th BioDetectors 2014

"DIOXINs/PCBs/POPs, ENDOCRINE DISRUPTERs (EDCs), OBESOGENS, EMERGING POLLUTANTs and HORMONE RESIDUES"

Vincent PERRET

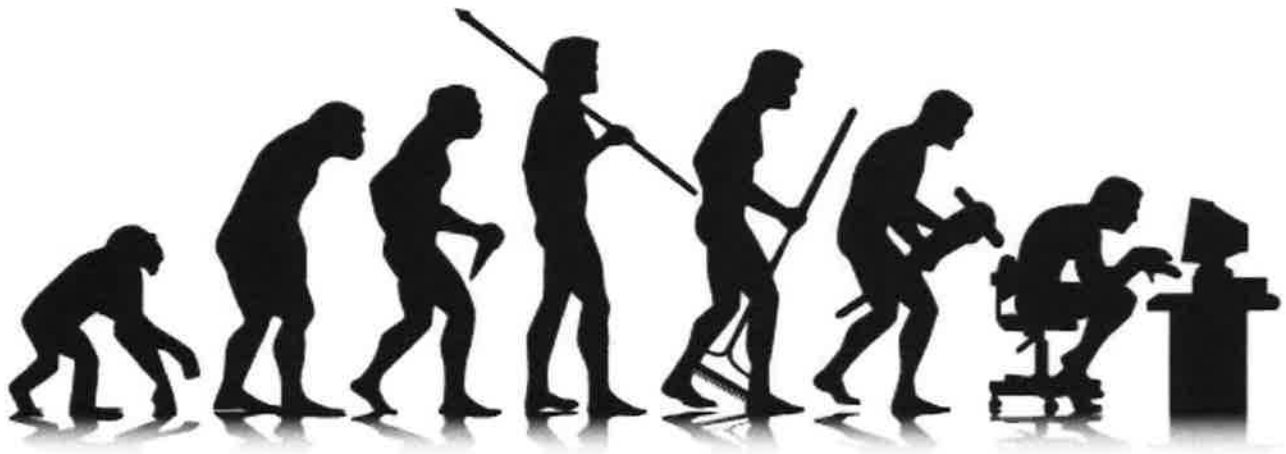
TOXpro SA
Geneva, Switzerland



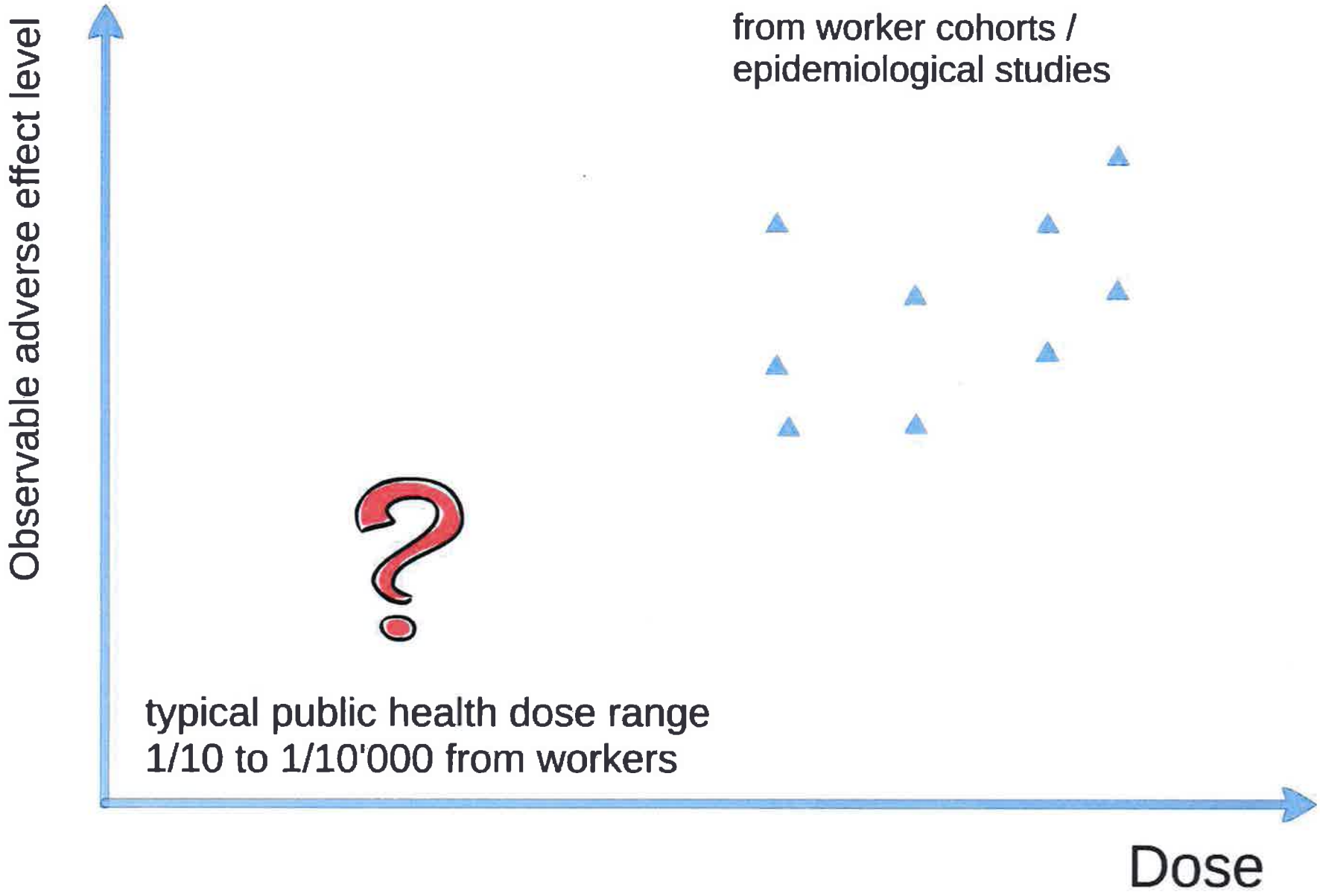
Venue:
Istituto Zooprofilattico Sperimentale del Piemonte, Liguria e Valle d'Aosta, Via Bologna 148 - 10154 Torino, Italy.
Date: 25-26th Sept 2014

Homo sapiens laboris

WORKERS



HUGE


Observable adverse effect level
from worker cohorts /
epidemiological studies
?
typical public health dose range
1/10 to 1/10'000 from workers
Dose

Workplace surfaces contamination to dioxins compounds in a municipal incinerator

Wipe testing of representative surfaces

Technical surfaces

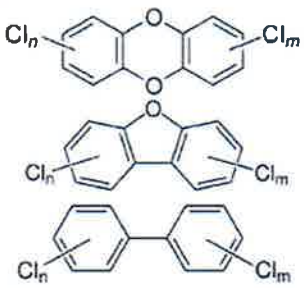
Administrative surfaces

Fly ash transport

Skin contamination

T_{eq} TCDD pg/m^2 evaluation using DR-CALUX

Positive result confirmation and PCDD, PCDF, PCB-dl distribution using GC-HRMS



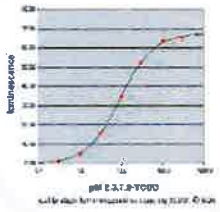
Dioxines (75)

Furanes (135)

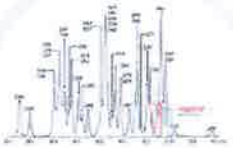
PCBs-dl (12)

pg eq TCDD / gr sample

DR CALUX



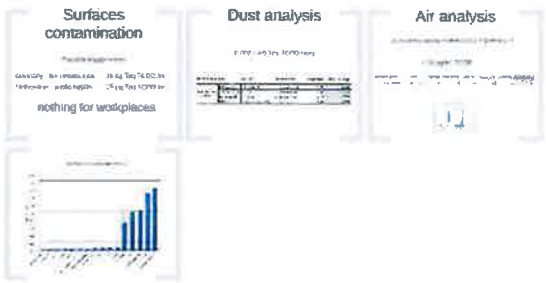
GC-HRMS



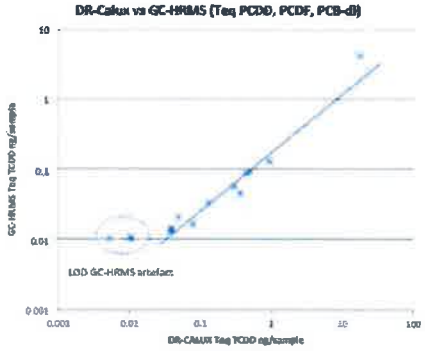
T_{eq} TCDD pg/m^2 evaluation using DR-CALUX

Positive result confirmation and PCDD, PCDF, PCB-dl distribution using GC-HRMS

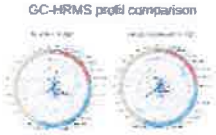
CALUX results



DR-CALUX vs GC-HRMS



Source identification



CALUX results

Surfaces contamination

Possible trigger values

Germany - fire remediation : 10 ng Teq TCDD /m^2

Netherland - public health : 25 pg Teq TCDD /m^2

nothing for workplaces

Dust analysis

0.002 - 3.9 Teq TCDD ng/g

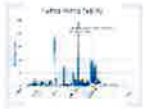
Localisation globale	local N°	surface testée	sample type	Teq TCDD ng/g
Salle des fours SBA	CV Chaudière	[illegible]	dust	0.180
	CV électrofiltre	[illegible]	dust	0.160
	Fine sous grille	[illegible]	dust	3.926
	[illegible]	[illegible]	dust	0.002

Air analysis

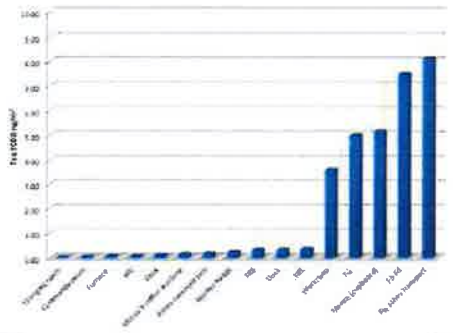
Occupational exposure limit (OEL) in Switzerland

< 10 pg/m^3 TCDD

Localisation globale	local N°	sample type	Débits (l/min)	Durée (min)	Volume (m³)	Teq TCDD ng	Teq TCDD pg/m³
[illegible]	[illegible]	air	5	300	1.41	100	< 5



Surface contamination results



Surfaces contamination

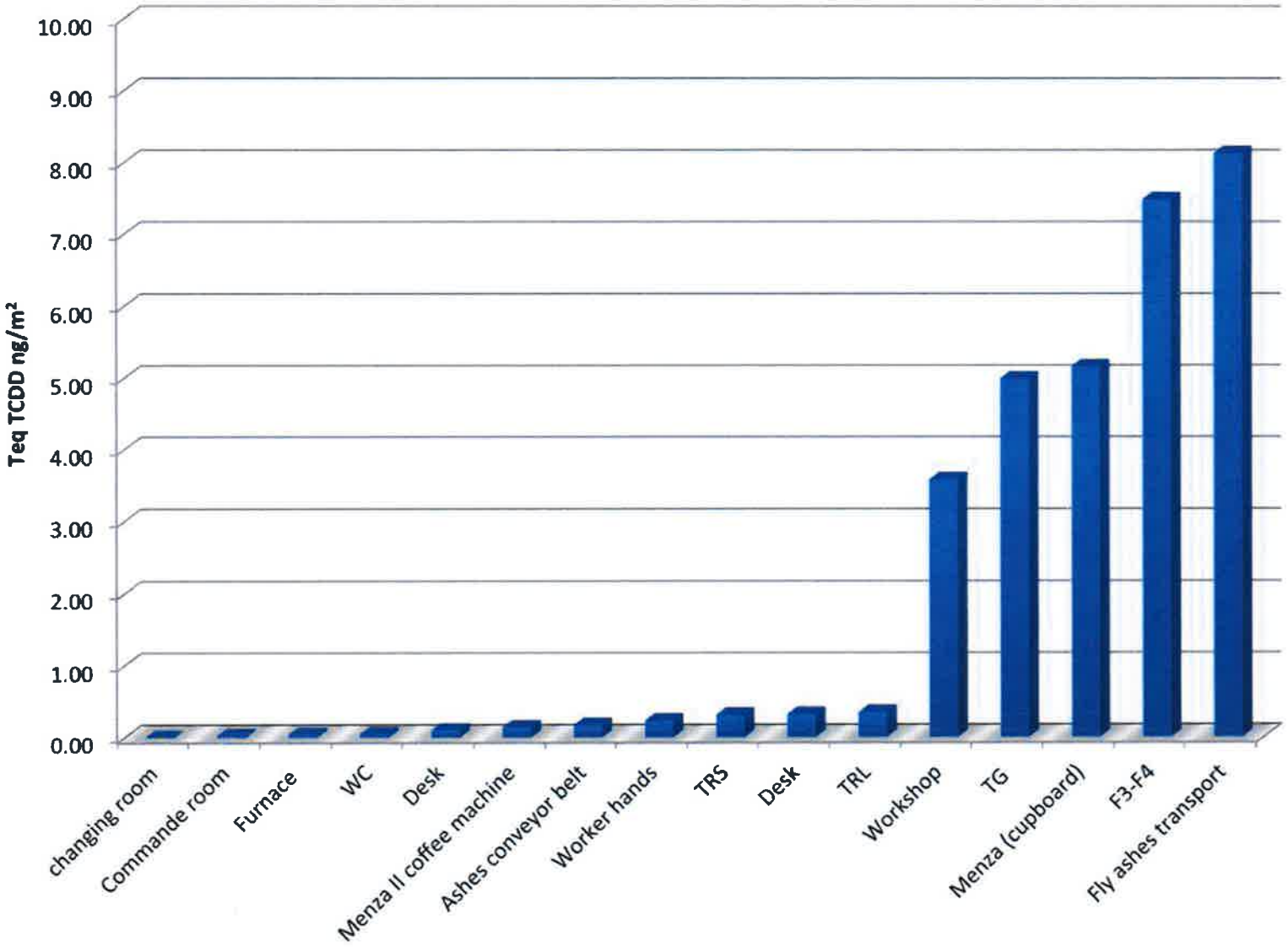
Possible trigger values

Germany - fire remediation : 10 ng Teq TCDD /m^2

Netherland - public health : 25 pg Teq TCDD /m^2

nothing for workplaces

Surface contamination results



Dust analysis

0.002 - 3.9 Teq TCDD ng/g

Localisation globale	local N°		surface testée	sample type	Teq TCDD ng/g
Salle des fours 5&6	CV Chaudière	+ 0.00 m four 5	cendre dans le regard	dust	**0.190**
	CV électrofiltre	+8.00 m four 5	cendre electrovanne	dust	**0.160**
	fine sous grille	+ 8.00 m four 5	cendre sur le regard	dust	**3.926**
	Mâchefers	+0.00m cendre Mâchefers	cendres / regard fours 5	dust	**0.002**

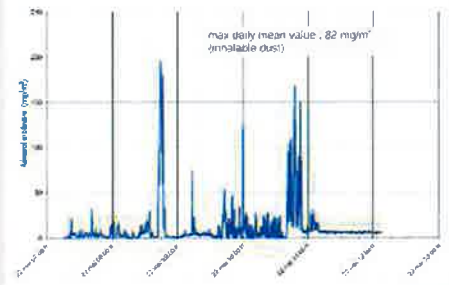
Air analysis

Occupational exposure limit (OEL) in Switzerland

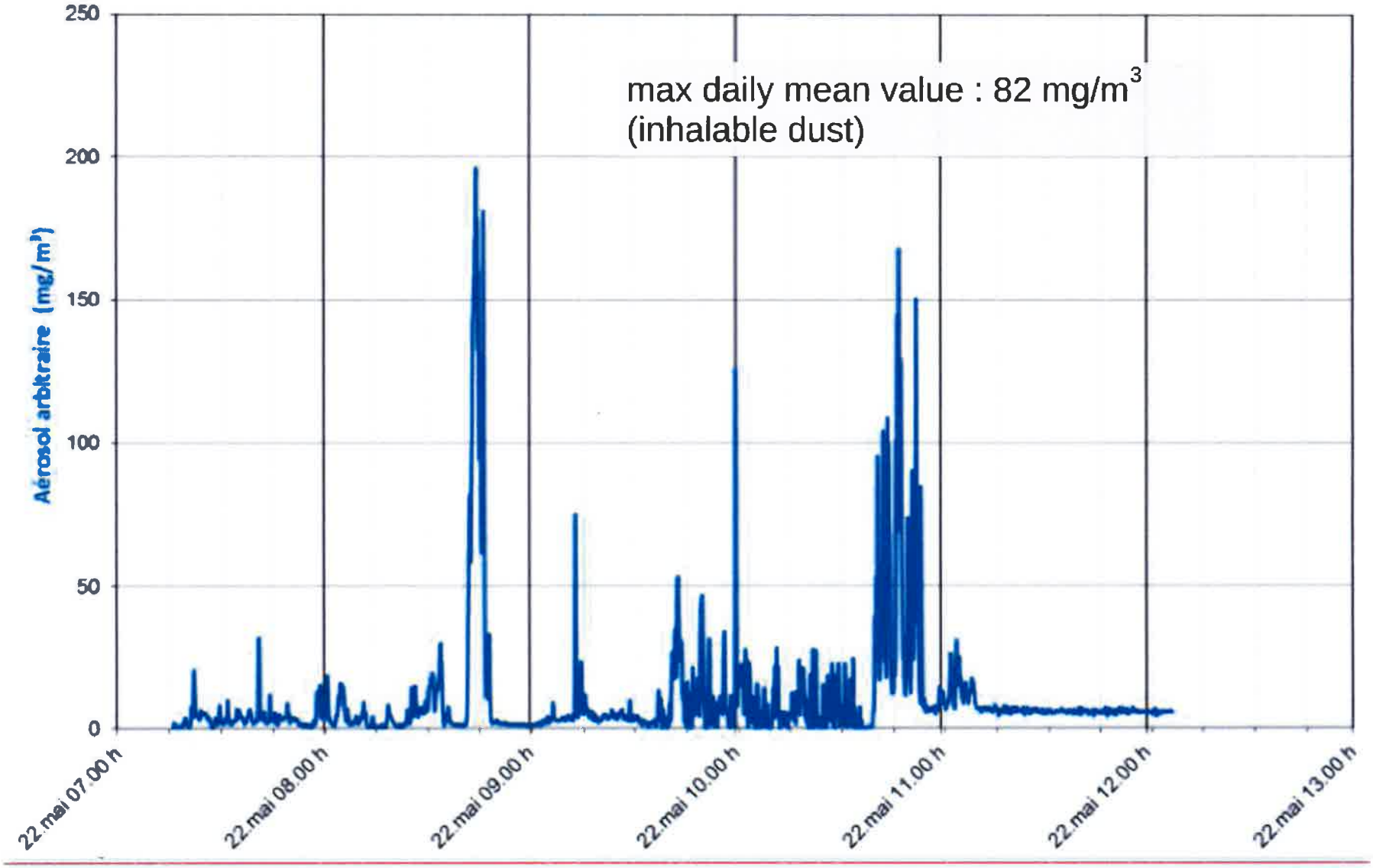
< 10 pg/m^3 TCDD

Localisation globale	local N°	sample type	Débits (l/min)	Durée (min)	Volume (m^3)	Teq TCDD ng	Teq TCDD pg/m^3
Salle des fours 5&6	+8.00 m four 5	air	8	300	2.40	LOQ	< 1

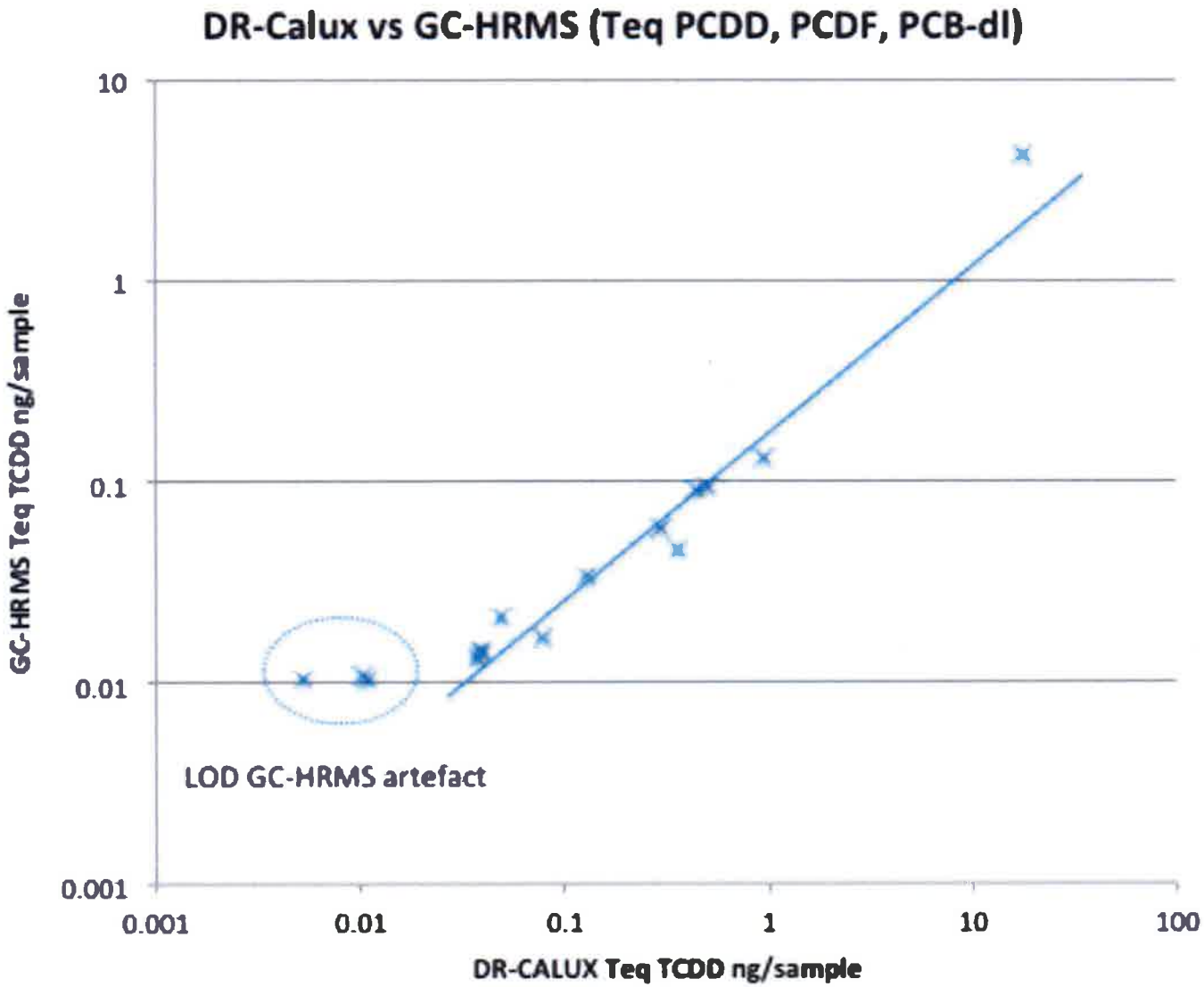
Ashes dump facility



Ashes dump facility

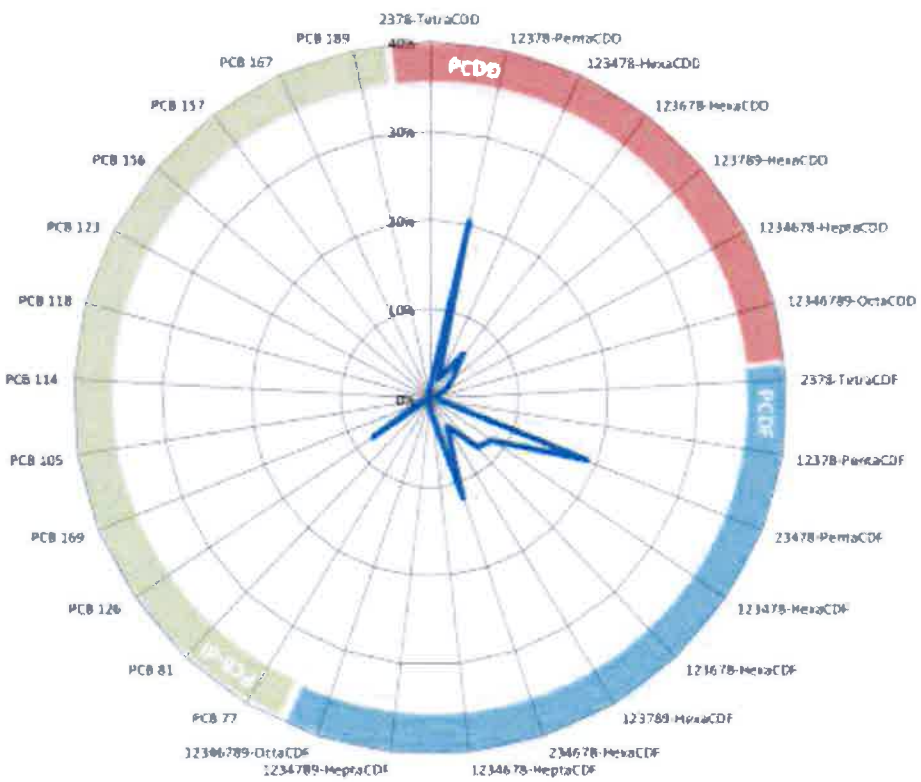


DR-CALUX vs GC-HRMS

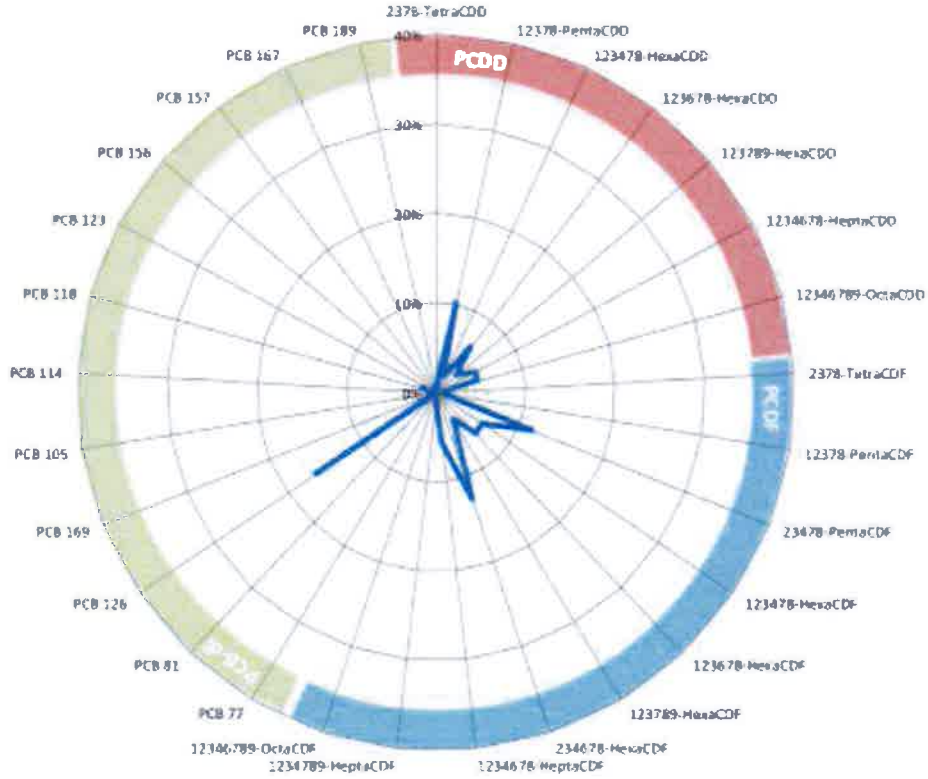


GC-HRMS profil comparison

fly ashes % TEF

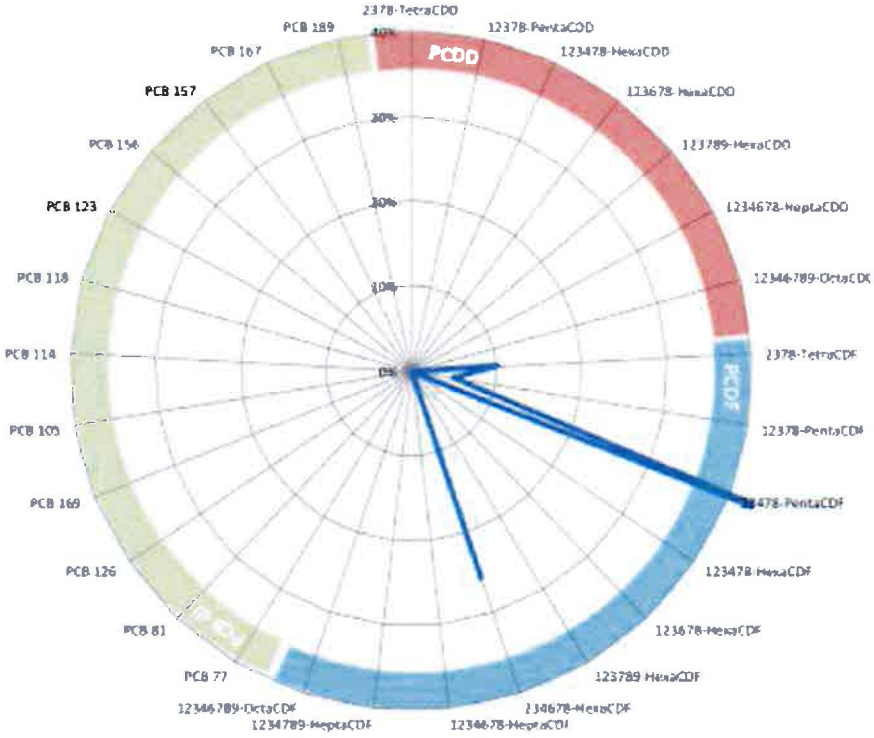


Menza (cupboard) % TEF

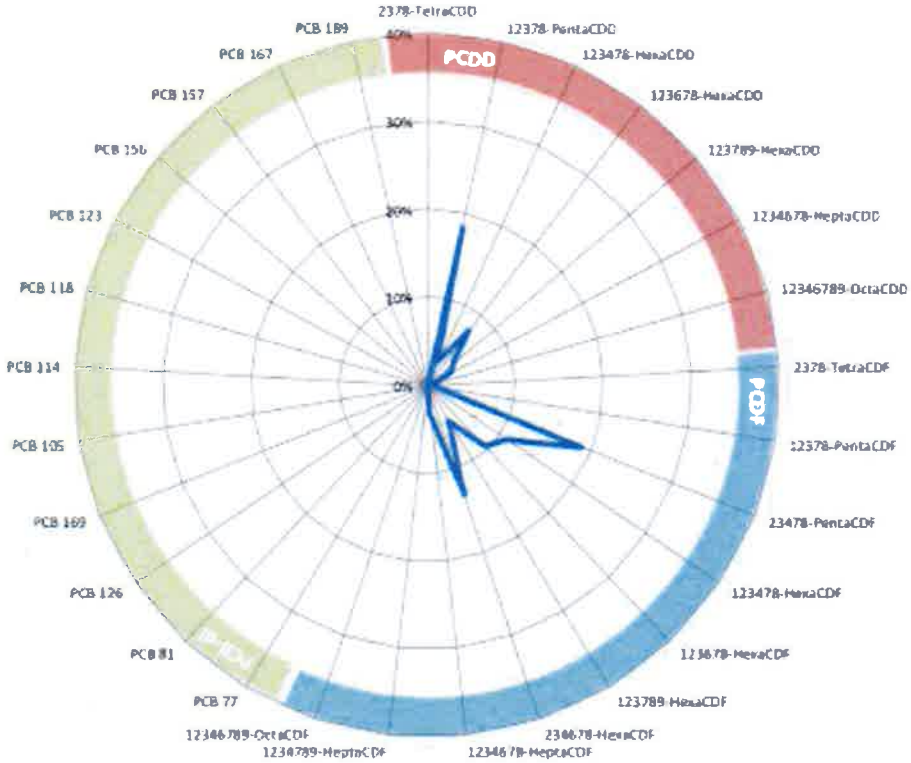


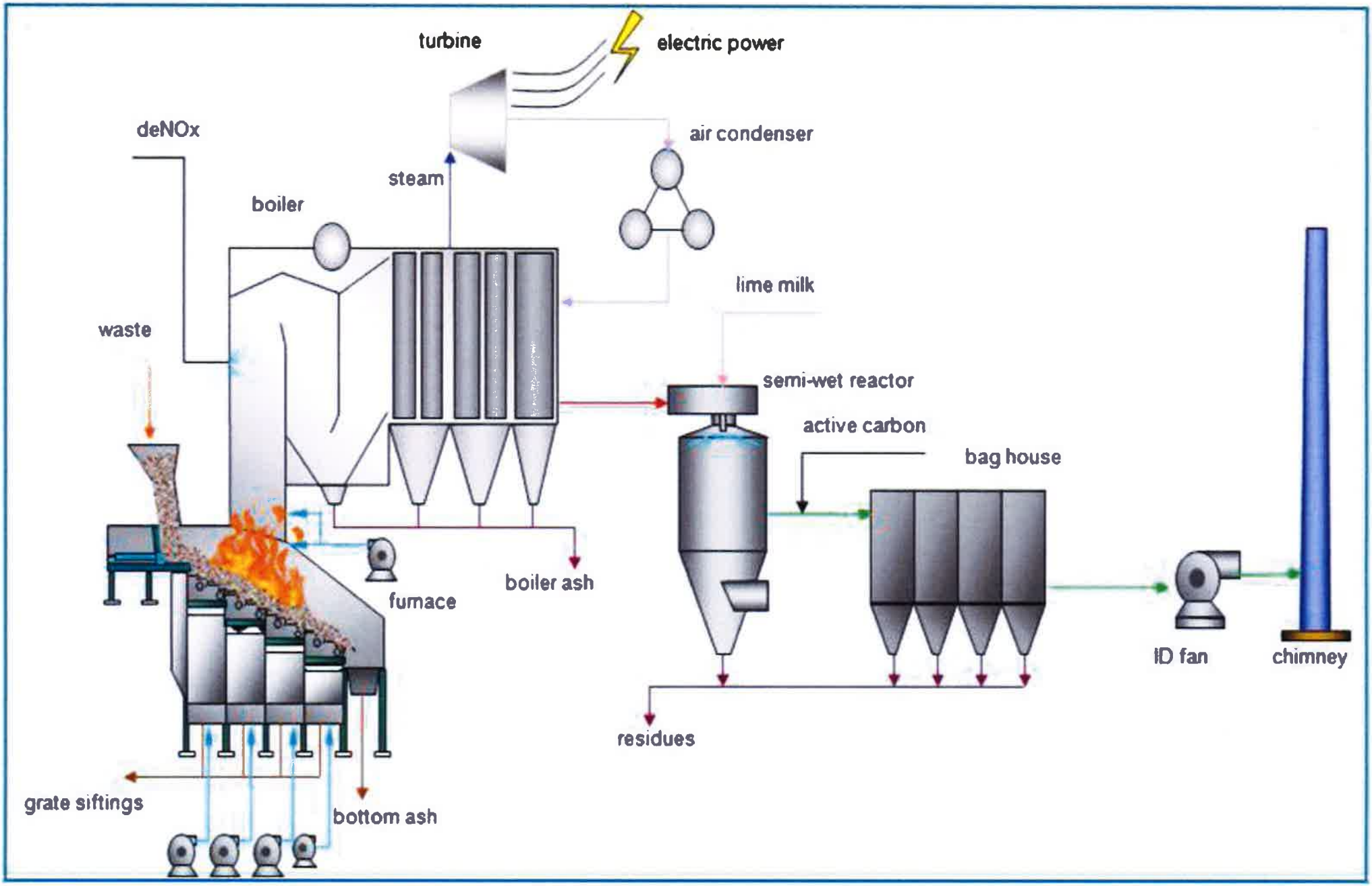
GC-HRMS profil comparison

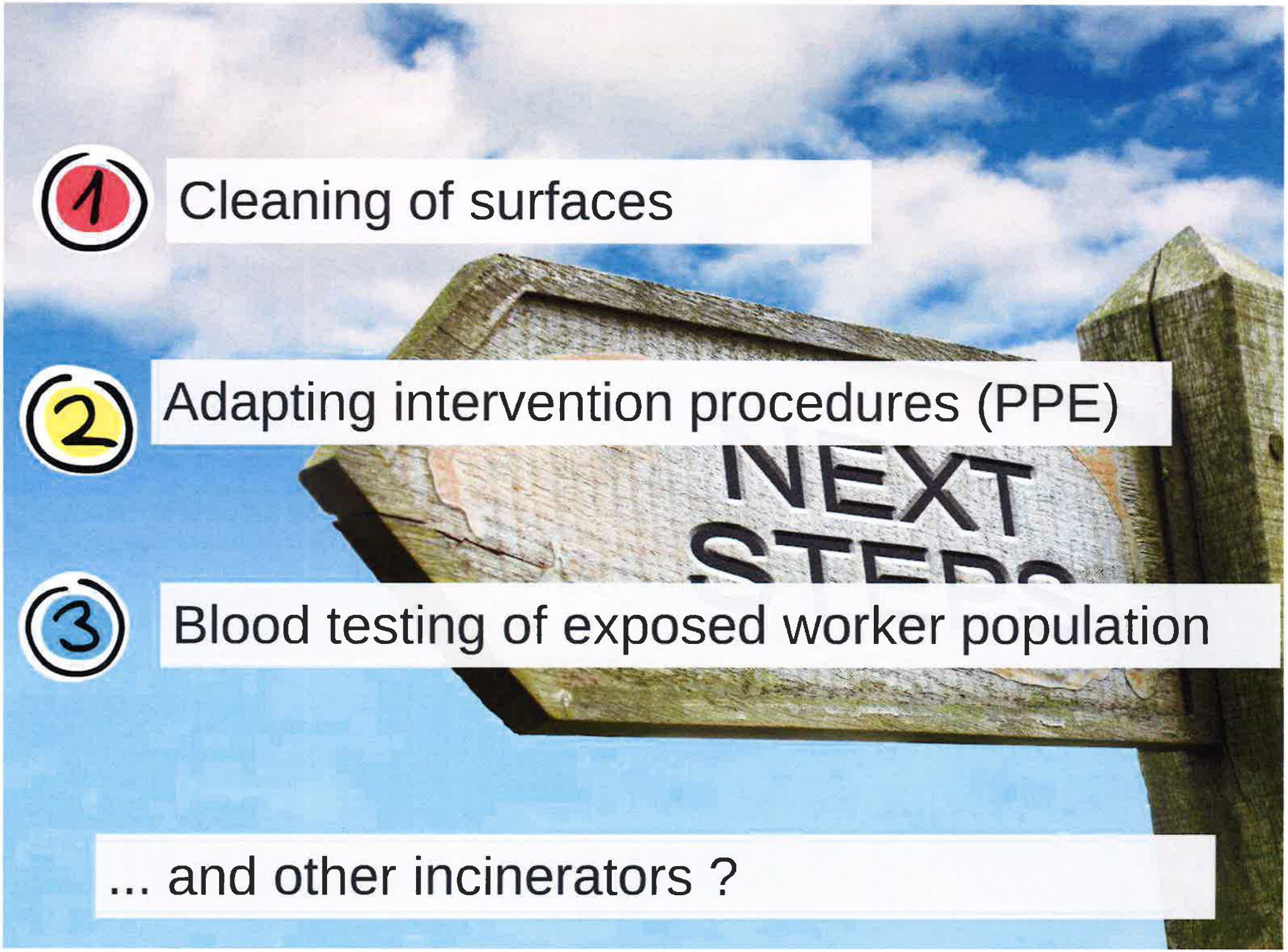
Ashes out oven % TEF



Ashes conveyor belt %TEF




turbine
electric power
deNOx
air condenser
steam
boiler
lime milk
waste
semi-wet reactor
active carbon
bag house
furnace
boiler ash
ID fan
chimney
residues
grate siftings
bottom ash


1 Cleaning of surfaces
2 Adapting intervention procedures (PPE)
3 Blood testing of exposed worker population
... and other incinerators ?
NEXT

obrigado
Dank U
Merci
mahalo
Köszi
спасибо
Grazie
Thank you
mauruuru
Takk
Gracias
Dziękuję
Děkuju
danke
Kiitos