The role of the expert laboratories

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Role of expert laboratories

- Technical advice
- Interlaboratory assessments
- Training, mirror analysis
- Communication

Expert laboratories for global assistance in GMP projects

CVUA (Germany)	MTM (Sweden)	IVM VU (Nether-lands)	Recetox (Czech R)	CSIC (Spain)
Human milk	dl-POPs, PFOS Water	OCPs, PCB, BFR	PAS/ PUFs preparation distribution	GRULAC

Recetox

RESEARCH CENTRE FOR TOXIC COMPOUNDS IN THE ENVIRONMENT (RECETOX)
Masaryk University, Brno, Czech Republic
Stockholm Convention Regional Centre in the Czech Republic (SCRC)

Kateřina Šebková, Director of the SCRC, sebkova@recetox.muni.cz

Stockholm Convention
Regional Centre for Capacity Building
and the Transfer of Technology

Interlaboratory assessment

Interlaboratory assessment: Set-up

- Coordinators:
  - Jacob de Boer, Ike van der Veen – IVM VU University
  - Heidi Fiedler – MTM Research Centre, Örebro University
- Content:
  - Invitations for registration open until 15 April 2016
  - Samples to be sent until mid July 2016
    (from IVM VU University or MTM Research Centre)
  - Results due (in MsExcel sheet): not later than 9 September 2016
- Conditions:
  - Free of charge for laboratories from developing countries

Coordinators

Institute for Environmental Studies
VU University Amsterdam
The Netherlands

Dr. Jacob de Boer

http://www.ivm.vu.nl

Örebro University
School of Science and Technology
Man-Technology-Environment
Research Centre (MTM)
Sweden

Dr. Heidi Fiedler

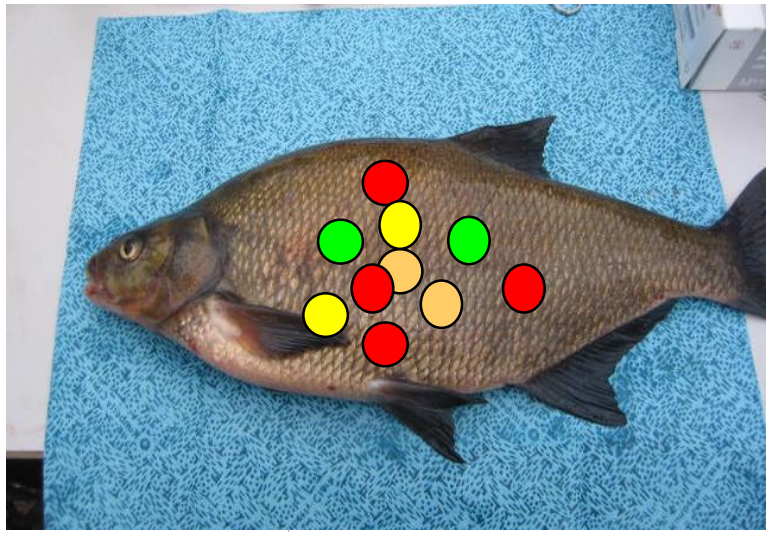
https://www.oru.se/english/research/research-environments/ent/mtm/research/?rdb=g203
https://www.oru.se/english/research/research-projects/rp/?rdb=p1639

Test solutions and test samples

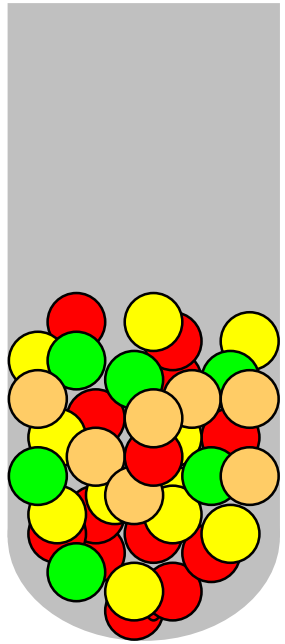
My laboratory is interested in analyzing the following matrices and POPs and provide the analytical results according to the reporting scheme and timetable (latest submission of results on 9 September 2016):								
Standard solution								
OCP	PCB_6	PCDD/PCDF	dl-PCB	PBDE	HxBB	Toxaphene	HBCD	PFAS
Sediment								
OCP	PCB_6	PCDD/PCDF	dl-PCB	PBDE	HxBB	Toxaphene	HBCD	PFAS
Fish								
OCP	PCB_6	PCDD/PCDF	dl-PCB	PBDE	HxBB	Toxaphene	HBCD	PFAS
Human milk								
OCP	PCB_6	PCDD/PCDF	dl-PCB	PBDE	HxBB	Toxaphene	HBCD	PFAS
Air extract								
OCP	PCB_6	PCDD/PCDF	dl-PCB	PBDE	HxBB	Toxaphene	HBCD	PFAS
Human blood								
PFOS	PFAS							
Water								
PFOS								

Laboratory training

Analysis

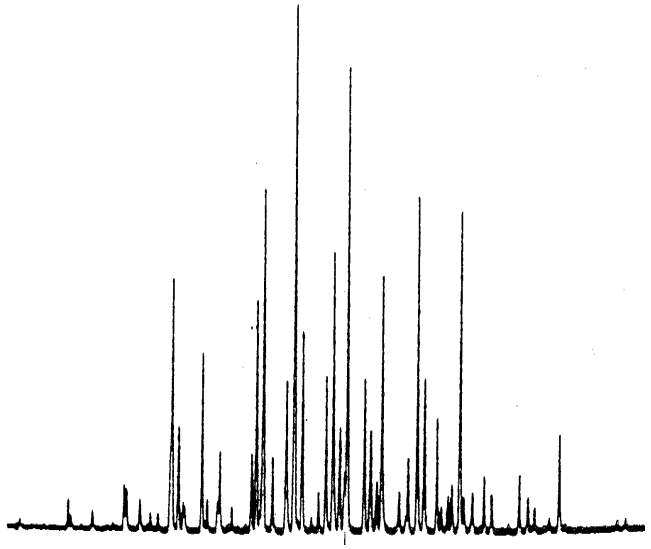


Extraction



Analysis

Identification
Quantification



Courtesy, Jacob de Boer

Training

- On-site training (with view on future role in the GMP long-term):
  - needs-oriented
  - based on existing equipment
- Mirror analyses:
  - your choice
- Advise on laboratory infrastructure:
  - Provision of some consumables
- Background information, literature

More detailed laboratory assessment

Check List[1]

Prepared by: [Name], [Institution]

Date the form was filled out:

1 GENERAL

Name of Laboratory:	
Address of Laboratory:	
E-mail:	
Phone:	
WebPage:	
Contact person:	

2 TECHNICAL PART - EXISTING CAPACITY TO ANALYZE POPS

2.1 Description of the Laboratory:

- In English, French, and Spanish:
- Dialogue between to be trained laboratory and training laboratory.
- Here: MTM Örebro MTM Research Centre, Örebro, Sweden

ÖREBRO UNIVERSITY
SCHOOL OF SCIENCE AND TECHNOLOGY

Provision of spares and consumables

- Tailored according to needs (determined by analytes and equipment);
- Chemical analytical standards for:
  - GC/ECD laboratories + OCPs/PCB_6/HxBB
  - GC/(LR or HR)MS laboratories + chlorinated/brominated POPs
  - (HP or UP)LC/MS-MS or TOF laboratories + PFAS
- Analytical columns (including ferrules, liners, syringes):
  - PCB column; dl-POPs
  - LC column
- Other

Ambient air sampling PAS/PUFs

Important facts

- Passive air samplers (PAS) provided to all countries (from Recetox)
- PAS equipped with PUFs (polyurethane foam disks) to capture POPs from air
- 2 years of sampling: each sampling period for 3 months → 8 samplings
- Sampling starts on 1 July 2016

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and the Transfer of Technology

Analytical laboratories

IVM VU University

For:

- OCPs
- PCB_6
- PBDE, HxBB, HBCD

MTM Research Centre

For:

- dl-POPs (PCDD, PCDF, dl-PCB)
- PFOS and precursors

USP/IAS: National samples for OCPs, PCB_6 and PFOS and precursors

Ambient air sampling: Set-up

- Recetox (CZR) will ship to each country:
  - Passive air samplers (PAS) and 10 pre-cleaned PUFs per sampler

PAS No.	Pre-cleaned with	Analysis for	Analysed by	Summary
PAS-1	dichloromethane	OCPs	IVM VU	5x9 PAS = 45 PAS for 9 countries; 450 PUFs
PAS-3	dichloromethane	PCB_6	IVM VU	
PAS-5	toluene	dl-POPs	MTM	
PAS-9	dichloromethane	PBDE, HxBB, HBCD	IVM VU	
PAS-11	methanol	PFOS	MTM	
PAS-2	dichloromethane	OCPs	USP/IAS	3 PAS in Fiji = 30 PUFs
PAS-4	dichloromethane	PCB_6	USP/IAS	
PAS 12	methanol	PFOS	USP/IAS	

Project has up to 58 PAS ⇒ 10 PAS to be placed in other countries ⇒ national analysis (includes UQ)

Nomenclature for PAS and PUFs

Country name	ISO-3
Fiji	FJI
Kiribati	KIR
Marshall Islands	MHL
Niue	NIU
Palau	PLW
Samoa	WSM
Solomon Islands	SLB
Tuvalu	TUV
Vanuatu	VUT

Country: Full country name and ISO-3 code

Sampler (PAS)-ID = name plate on the sampler: ISO-3 – PAS#;
Example: FJI-1

Time code is as follows:

i. Year in Arabic numbers (2016, 2017, 2018)
ii. Seasons are assigned in Roman numbers

I	Jan-Mar
II	Apr-Jun
III	Jul-Sep
IV	Oct-Dec

Time code: 2016-IV ??

PUF exposed from 1 October 2016 until 31 December 2016

Laboratory that receives the PUF for analysis (IVM or MTM)
Lab analysis code Example: SLB-7 (2017-II) (IVM)

PUF from Solomon Islands, exposed 1 April to 30 June 2017 to be analyzed for PBDE by IVM

Results code: KIR-11 (2018-I)

Kiribati: result for PFOS for period 1 Jan to 31 Mar 2018

Last sample will be: KIR-11 (2018-II)

Set-up of PAS and exchange of PUFs (1)

Country (full name)	ISO_3	Sampler/ PAS no	Sampler-ID	PUF cleaning solvent 1	PUF cleaning solvent 2	Year	Season	Time code	Sampling code	Analytes	Laboratory	Lab analysis code	Results code
Fiji	FJI	1	FJI-1	acetone	dichloromethane	2016	III	2016-I	FJI-1 (2016-I)	OCPs	IVM	FJI-1 (2016-I) (IVM)	FJI (2016-I)
Fiji	FJI	1	FJI-1	acetone	dichloromethane	2016	IV	2016-II	FJI-1 (2016-II)	OCPs	IVM	FJI-1 (2016-II) (IVM)	FJI (2016-II)
Fiji	FJI	1	FJI-1	acetone	dichloromethane	2017	I	2017-III	FJI-1 (2017-III)	OCPs	IVM	FJI-1 (2017-III) (IVM)	FJI (2017-III)
Fiji	FJI	1	FJI-1	acetone	dichloromethane	2017	II	2017-IV	FJI-1 (2017-IV)	OCPs	IVM	FJI-1 (2017-IV) (IVM)	FJI (2017-IV)
Fiji	FJI	1	FJI-1	acetone	dichloromethane	2017	III	2017-I	FJI-1 (2017-I)	OCPs	IVM	FJI-1 (2017-I) (IVM)	FJI (2017-I)
Fiji	FJI	1	FJI-1	acetone	dichloromethane	2017	IV	2017-IV	FJI-1 (2017-IV)	OCPs	IVM	FJI-1 (2017-IV) (IVM)	FJI (2017-IV)
Fiji	FJI	1	FJI-1	acetone	dichloromethane	2018	I	2018-I	FJI-1 (2018-I)	OCPs	IVM	FJI-1 (2018-I) (IVM)	FJI (2018-I)
Fiji	FJI	1	FJI-1	acetone	dichloromethane	2018	II	2018-II	FJI-1 (2018-II)	OCPs	IVM	FJI-1 (2018-II) (IVM)	FJI (2018-II)
Fiji	FJI	3	FJI-3	acetone	dichloromethane	2016	III	2016-III	FJI-3 (2016-III)	PCB(6)	IVM	FJI-3 (2016-III) (IVM)	FJI (2016-III)
Fiji	FJI	3	FJI-3	acetone	dichloromethane	2016	IV	2016-IV	FJI-3 (2016-IV)	PCB(6)	IVM	FJI-3 (2016-IV) (IVM)	FJI (2016-IV)
Fiji	FJI	3	FJI-3	acetone	dichloromethane	2017	I	2017-I	FJI-3 (2017-I)	PCB(6)	IVM	FJI-3 (2017-I) (IVM)	FJI (2017-I)
Fiji	FJI	3	FJI-3	acetone	dichloromethane	2017	II	2017-II	FJI-3 (2017-II)	PCB(6)	IVM	FJI-3 (2017-II) (IVM)	FJI (2017-II)
Fiji	FJI	3	FJI-3	acetone	dichloromethane	2017	III	2017-III	FJI-3 (2017-III)	PCB(6)	IVM	FJI-3 (2017-III) (IVM)	FJI (2017-III)
Fiji	FJI	3	FJI-3	acetone	dichloromethane	2017	IV	2017-IV	FJI-3 (2017-IV)	PCB(6)	IVM	FJI-3 (2017-IV) (IVM)	FJI (2017-IV)
Fiji	FJI	3	FJI-3	acetone	dichloromethane	2018	I	2018-I	FJI-3 (2018-I)	PCB(6)	IVM	FJI-3 (2018-I) (IVM)	FJI (2018-I)
Fiji	FJI	3	FJI-3	acetone	dichloromethane	2018	II	2018-II	FJI-3 (2018-II)	PCB(6)	IVM	FJI-3 (2018-II) (IVM)	FJI (2018-II)
Fiji	FJI	5	FJI-5	acetone	toluene	2016	III	2016-III	FJI-5 (2016-III)	dl-POPs	MTM	FJI-5 (2016-III) (MTM)	FJI (2016-III)
Fiji	FJI	5	FJI-5	acetone	toluene	2016	IV	2016-IV	FJI-5 (2016-IV)	dl-POPs	MTM	FJI-5 (2016-IV) (MTM)	FJI (2016-IV)
Fiji	FJI	5	FJI-5	acetone	toluene	2017	I	2017-I	FJI-5 (2017-I)	dl-POPs	MTM	FJI-5 (2017-I) (MTM)	FJI (2017-I)
Fiji	FJI	5	FJI-5	acetone	toluene	2017	II	2017-II	FJI-5 (2017-II)	dl-POPs	MTM	FJI-5 (2017-II) (MTM)	FJI (2017-II)
Fiji	FJI	5	FJI-5	acetone	toluene	2017	III	2017-III	FJI-5 (2017-III)	dl-POPs	MTM	FJI-5 (2017-III) (MTM)	FJI (2017-III)
Fiji	FJI	5	FJI-5	acetone	toluene	2017	IV	2017-IV	FJI-5 (2017-IV)	dl-POPs	MTM	FJI-5 (2017-IV) (MTM)	FJI (2017-IV)
Fiji	FJI	5	FJI-5	acetone	toluene	2018	I	2018-I	FJI-5 (2018-I)	dl-POPs	MTM	FJI-5 (2018-I) (MTM)	FJI (2018-I)
Fiji	FJI	5	FJI-5	acetone	toluene	2018	II	2018-II	FJI-5 (2018-II)	dl-POPs	MTM	FJI-5 (2018-II) (MTM)	FJI (2018-II)
Fiji	FJI	9	FJI-9	acetone	dichloromethane	2016	III	2016-III	FJI-9 (2016-III)	DE, HBCD, Hx	IVM	FJI-9 (2016-III) (IVM)	FJI (2016-III)
Fiji	FJI	9	FJI-9	acetone	dichloromethane	2016	IV	2016-IV	FJI-9 (2016-IV)	DE, HBCD, Hx	IVM	FJI-9 (2016-IV) (IVM)	FJI (2016-IV)
Fiji	FJI	9	FJI-9	acetone	dichloromethane	2017	I	2017-I	FJI-9 (2017-I)	DE, HBCD, Hx	IVM	FJI-9 (2017-I) (IVM)	FJI (2017-I)
Fiji	FJI	9	FJI-9	acetone	dichloromethane	2017	II	2017-II	FJI-9 (2017-II)	DE, HBCD, Hx	IVM	FJI-9 (2017-II) (IVM)	FJI (2017-II)
Fiji	FJI	9	FJI-9	acetone	dichloromethane	2017	III	2017-III	FJI-9 (2017-III)	DE, HBCD, Hx	IVM	FJI-9 (2017-III) (IVM)	FJI (2017-III)
Fiji	FJI	9	FJI-9	acetone	dichloromethane	2017	IV	2017-IV	FJI-9 (2017-IV)	DE, HBCD, Hx	IVM	FJI-9 (2017-IV) (IVM)	FJI (2017-IV)
Fiji	FJI	9	FJI-9	acetone	dichloromethane	2018	I	2018-I	FJI-9 (2018-I)	DE, HBCD, Hx	IVM	FJI-9 (2018-I) (IVM)	FJI (2018-I)
Fiji	FJI	9	FJI-9	acetone	dichloromethane	2018	II	2018-II	FJI-9 (2018-II)	DE, HBCD, Hx	IVM	FJI-9 (2018-II) (IVM)	FJI (2018-II)
Fiji	FJI	11	FJI-11	acetone	methanol	2016	III	2016-III	FJI-11 (2016-III)	PFOS	MTM	FJI-11 (2016-III) (MTM)	FJI (2016-III)
Fiji	FJI	11	FJI-11	acetone	methanol	2016	IV	2016-IV	FJI-11 (2016-IV)	PFOS	MTM	FJI-11 (2016-IV) (MTM)	FJI (2016-IV)
Fiji	FJI	11	FJI-11	acetone	methanol	2017	I	2017-I	FJI-11 (2017-I)	PFOS	MTM	FJI-11 (2017-I) (MTM)	FJI (2017-I)
Fiji	FJI	11	FJI-11	acetone	methanol	2017	II	2017-II	FJI-11 (2017-II)	PFOS	MTM	FJI-11 (2017-II) (MTM)	FJI (2017-II)
Fiji	FJI	11	FJI-11	acetone	methanol	2017	III	2017-III	FJI-11 (2017-III)	PFOS	MTM	FJI-11 (2017-III) (MTM)	FJI (2017-III)
Fiji	FJI	11	FJI-11	acetone	methanol	2017	IV	2017-IV	FJI-11 (2017-IV)	PFOS	MTM	FJI-11 (2017-IV) (MTM)	FJI (2017-IV)
Fiji	FJI	11	FJI-11	acetone	methanol	2018	I	2018-I	FJI-11 (2018-I)	PFOS	MTM	FJI-11 (2018-I) (MTM)	FJI (2018-I)
Fiji	FJI	11	FJI-11	acetone	methanol	2018	II	2018-II	FJI-11 (2018-II)	PFOS	MTM	FJI-11 (2018-II) (MTM)	FJI (2018-II)

Set-up of PAS and exchange of PUFs (2)

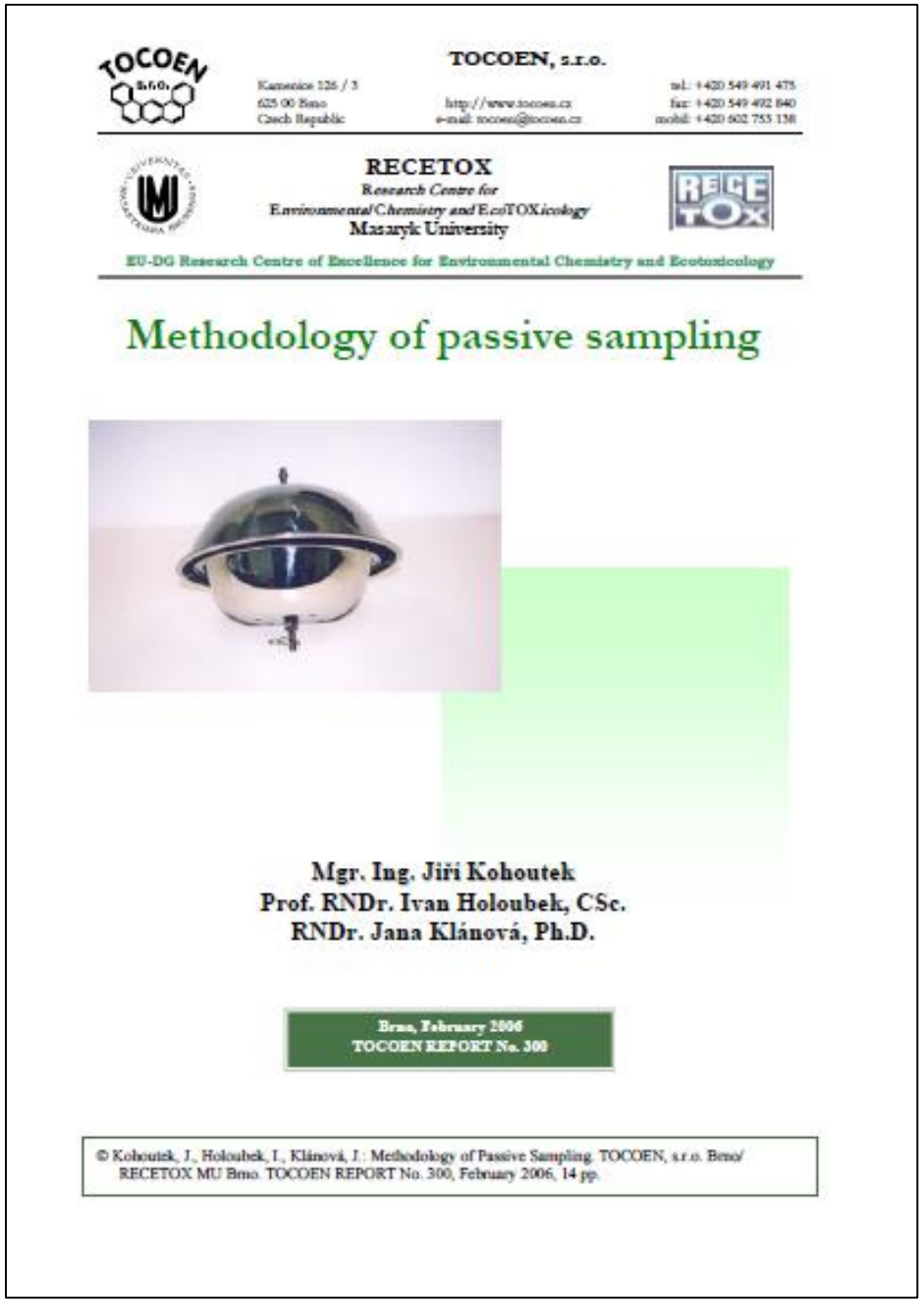
ISO_3	PAS site name	GPS coordinates of site	Year	Season	Time code	Average Temp. (°C)	Name of person who deployed the PUF	Actual exposure start	Actual exposure end	Name of person who collected the	Effective days of	Stored at [place]	Shipped for analysis
FJI	Nausori airport	34° 50´ 13.1"S 56° 13´ 20.8"W	2016	III	FJI-1 (2016-III)	25	John Doe	1-Jul-2016	1-Oct-2016	John Doe	92	Address	8-Jan-2017
FJI			2016	IV	FJI-1 (2016-IV)	30	John Doe	1-Oct-2016	31-Dec-2016	John Doe	91	Address	8-Jan-2017
FJI			2017	I	FJI-1 (2017-I)	28	John Doe	1-Jan-2017	1-Apr-2017	John Doe	90	Address	8-Jan-2017
FJI			2017	II	FJI-1 (2017-II)		John Doe	1-Apr-2017	1-Jul-2017	John Doe	91	Address	8-Jan-2017
FJI			2017	III	FJI-1 (2017-III)		John Doe	1-Jul-2017	1-Oct-2017	John Doe	92	Address	8-Jan-2017
FJI			2017	IV	FJI-1 (2017-IV)		John Doe	1-Oct-2017	31-Dec-2017	John Doe	91	Address	8-Jan-2017
FJI			2018	I	FJI-1 (2018-I)		John Doe	1-Jan-2018	1-Apr-2018	John Doe	90	Address	8-Jan-2017
FJI			2018	II	FJI-1 (2018-II)		John Doe	1-Apr-2018	30-Jun-2018	John Doe	90	Address	8-Jan-2017

PAS/PUFs: Actions to be taken by each country

- Identify ”air coordinator”
  - Send address details for correspondence and shipment
- Air coordinator
  - Identify site for air sampling and send GIS coordinates and street address
  - Upon contact from Recetox, agree on shipment/delivery date;
  - Secure site and place samplers to start sampling on 1 July 2016;
  - Take a photo of the samplers and a photo from the air coordinator (with samplers);
  - Fill out the MsExcel form to record activities at the national site;
  - Exchange PUFs and ship to laboratory as appropriate (see time table of workplan);

Send all information to UNEP (Jacqueline) and MTM (Heidi)

Recetox will ship PAS and PUFs



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Research Centre for
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Methodology of passive sampling

Mgr. Ing. Jiří Kohoutek
Prof. RNDr. Ivan Holoubek, CSc.
RNDr. Jana Klánová, Ph.D.

Brno, February 2006
TOCOEN REPORT No. 300

© Kohoutek, J., Holoubek, I., Klánová, J.: Methodology of Passive Sampling. TOCOEN, s.r.o. Brno/ RECETOX MU Brno. TOCOEN REPORT No. 300, February 2006, 14 pp.

Georeferences – PAS sites

No.	Country name	ISO_3	Site	Type	Altitude (m)	Latitude (deg)	Longitude (deg)	Latitude (decimal)	Longitude (decimal)
1	Fiji	FJI-SUV	Suva	urban-industrial	13 (6)	18° 08’ S	178° 27’ E	-18.0333	178.55
	Fiji	FJI-NSR	Nausori	rural	7 (30)	18° 02’ S	178° 33’ E	-17.9850	178.5474
	Fiji	FJI-NAN	Nadi	urban-industrial	10 (22)	17° 45’ S	177° 27’ E	-17.7781	177.4169
2	Kiribati	KIR-BET	Betio	urban	xx (2)	01° 21’ N	172° 56’ E	1.35	172.9333
	Kiribati	KIR-BEZ	Beru	rural	xx (2)	01° 21’ S	175° 59' E	-1.35	175.9833
3	Marshall Islands	MHL	Airok, Majuro	urban		7° 05N	171° 23’ E	7.0833	171.3833
4	Niue	NIU	Alofi	urban	65 (59)	19° 04’ S	169° 55’ W	-19.0667	-169.9167
5	Palau	PLW	Koror1	urban	30	7° 21 N	134° 28 E	7.3333	134.4667
6	Samoa	WSM	Apia1	urban	9	13° 50 S	171° 45 W	-13.8333	-171.7400
7	Solomon Islands	SLB-HNR	Honiara	urban	xx (55)	09° 25’ S	159° 58’ E	-9.4167	159.9667
	Solomon Islands	SLB-MD	Munda	rural	xx (4)	08° 20’ S	157° 15’ E	-8.3174	157.2688
	Solomon Islands	SLB-LT	Lata	rural	21 (24)	10° 43’ S	165° 48’ E	-10.7167	165.8
8	Tuvalu	TUV	Funafuti	urban	0 (3)	08° 32’ S	179° 12’ E	-8.5333	179.2
9	Vanuatu	VUT							
Altitude:		numbers are from Google Earth				numbers in parenthesis are from national reports			

Proposed PAS/PUF sampling scheme

Assignment of samplers, PUFs, and analytes according to laboratory per country)			No. analyses per year
Sampler 1:	PUFs 1-4:	For basic POPs pesticides in expert back-up laboratory drins, chlordanes, DDTs, HCHs, heptachlors, mirex, HCB, pentachlorobenzene, endosulfans, toxaphenes, chlordecone	4 toxaphene, annual sample only
Sampler 2:	PUFs 1-4:	For basic POPs in national POPs laboratory drins, chlordanes, DDTs, HCHs, heptachlors, mirex, HCB, pentachlorobenzene, endosulfans, toxaphenes, chlordecone	4 toxaphene, annual sample only
Sampler 3:	PUFs 1-4:	For indicator PCB in expert back-up laboratory 6 indicator PCB	4
Sampler 4:	PUFs 1-4:	For indicator PCB in national POPs laboratory 6 indicator PCB	4
Sampler 5:	PUFs 1-4:	For dioxin-like POPs in expert back-up laboratory (combined into one extract as annual average) 17 PCDD/PCDF, 12 dl-PCB	1
Sampler 6:	PUFs 1-4:	For dioxin-like POPs in national dioxin laboratory (combined into one extract as annual average) 17 PCDD/PCDF, 12 dl-PCB	1
Sampler 7:	PUFs 1-4:	For dioxin-like POPs in expert back-up laboratory (each exposure to generate one seasonal data point; total of 4 per year and country) 17 PCDD/PCDF, 12 dl-PCB	4
Sampler 8:	PUFs 1-4:	For dioxin-like POPs in national laboratory (each exposure to generate one seasonal data point; total of 4 per year and country) 17 PCDD/PCDF, 12 dl-PCB	4
Sampler 9:	PUFs 1-4:	For PBDE in expert laboratory 8 PBDE, HBCD, PBB	4
Sampler 10:	PUFs 1-4:	For PBDE in national laboratory 8 PBDE, HBCD, PBB	4
Sampler 11:	PUFs 1-4:	For PFOS in expert laboratory 6 PFAS	4
Sampler 12:	PUFs 1-4:	For PFOS in national laboratory 6 PFAS	4

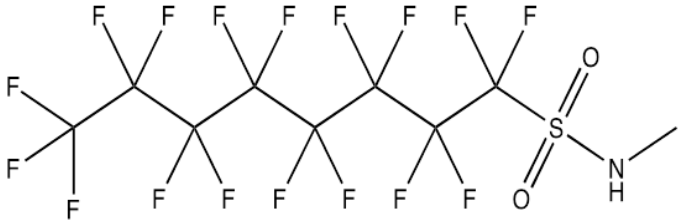
Color codes:

Green Analysis in expert back-up laboratory

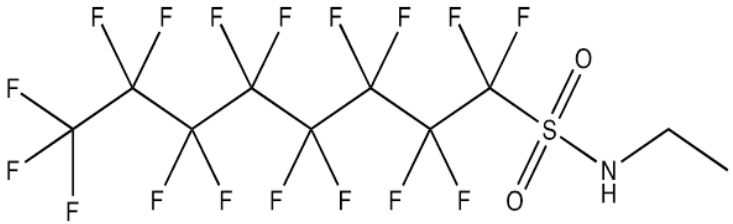
No Fill Analysis in national laboratory

Yellow Groups of chemicals recommended for analysis

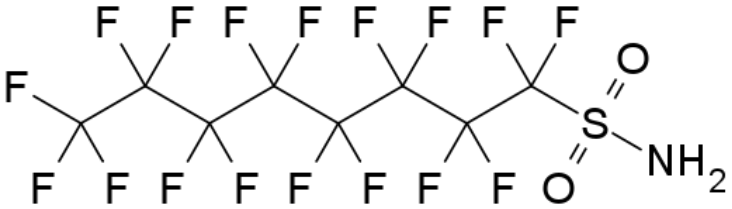
PFOS-related compounds (precursors)



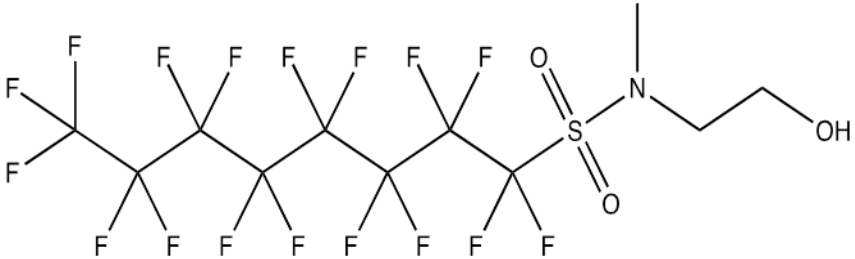
N-methyl perfluorooctane sulfonamide
MeFOSA



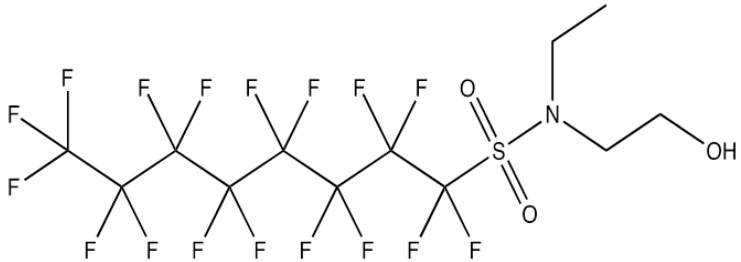
N-ethyl perfluorooctane sulphonamide
EtFOSA



Perfluorooctanesulfonamide
FOSA



N-methyl perfluorooctane sulfonamidoethanol
MeFOSE



N-ethyl perfluorooctane sulfonamidoethanol
EtFOSE

Ambient air samples (PUFs) – Analysis expert labs

By IVM VU University

- PAS 1:
  - 8 quarterly samples analyzed for: aldrin, endrin, dieldrin, chlordanes, DDTs, HCHs, heptachlors, mirex, HCB, pentachlorobenzene, endosulfans, chlordecone
  - 2 annual samples for toxaphene
- PAS 3: 8 quarterly samples analyzed for 6 indicator PCB (PCB_6)
- PAS 7: 8 quarterly samples analyzed for 8 PBDE and HxBB (and 3 HBCD isomers)

By MTM Centre Örebro University

- PAS 5: 2 annual to be analysed for 17 PCDD/PCDF and 12 dl-PCB (dl-POPs)
- PAS 11: 8 quarterly samples to be analyzed for PFOS and 5 precursors

Ambient air samples (PUFs) – Analysis national lab(s)

By USP/IAS University (preliminary plan)

- PAS 2:
  - 8 quarterly samples analyzed for: aldrin, endrin, dieldrin, chlordanes, DDTs, HCHs, heptachlors, mirex, HCB, pentachlorobenzene, endosulfans, chlordecone, **and HxBB (since no PAS 8)**
- PAS 4: 8 quarterly samples analyzed for 6 indicator PCB (PCB_6)
- PAS 12: 8 quarterly samples to be analyzed for PFOS and 5 precursors

- Not used: PAS 7 since no national dioxin laboratory for mirror analysis
  since no national laboratory: PAS 6 and PAS 8 (dl-POPs)
  PAS 10 (PBDE, HBCD)

Human milk

CVUA Freiburg

(State Institute for Chemical and Veterinary Analysis of Food)

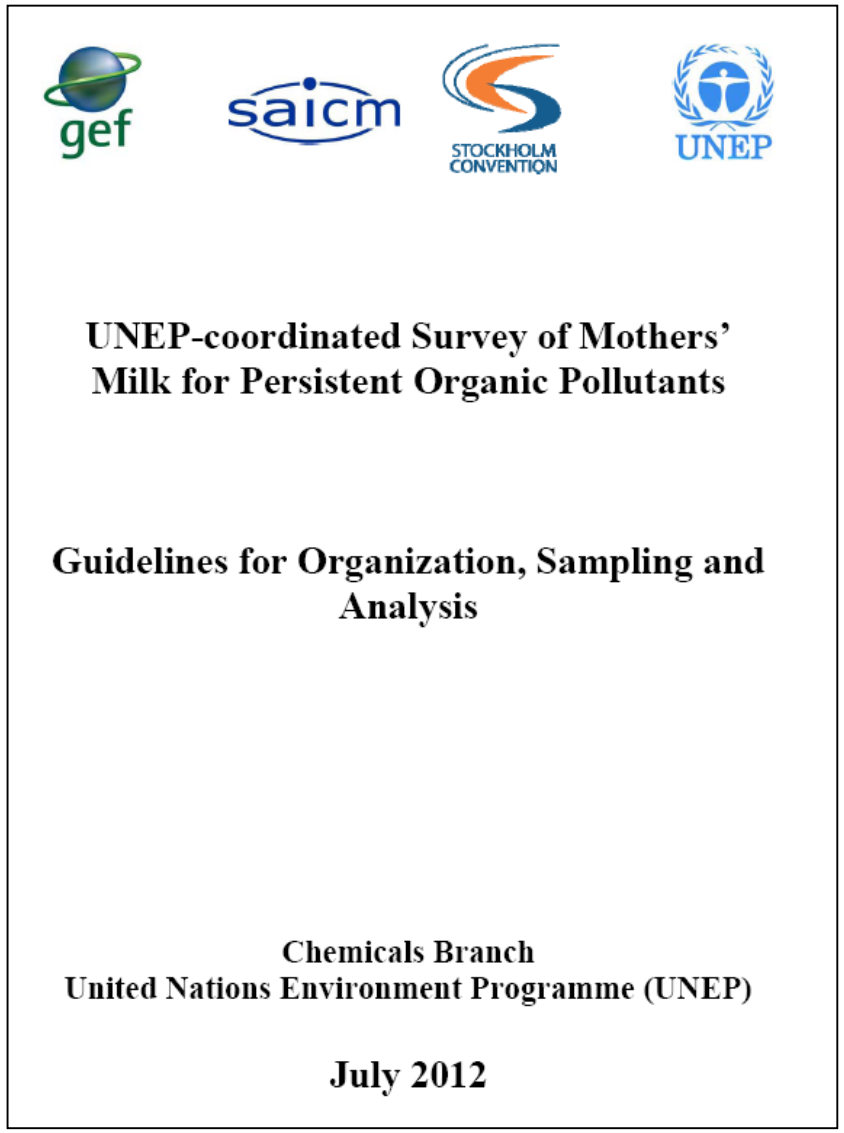
WHO/UNEP Reference Laboratory for dioxins, PCBs and halogenated pesticides (POPs) in human milk

EU Reference Laboratory (EU-RL) for dioxins and PCBs in feed and food

EU-RL for pesticides in food of animal origin and commodities with high fat content

UNEP/WHO Reference Laboratories for POPs in Human Milk at CVUA Freiburg and Örebro University

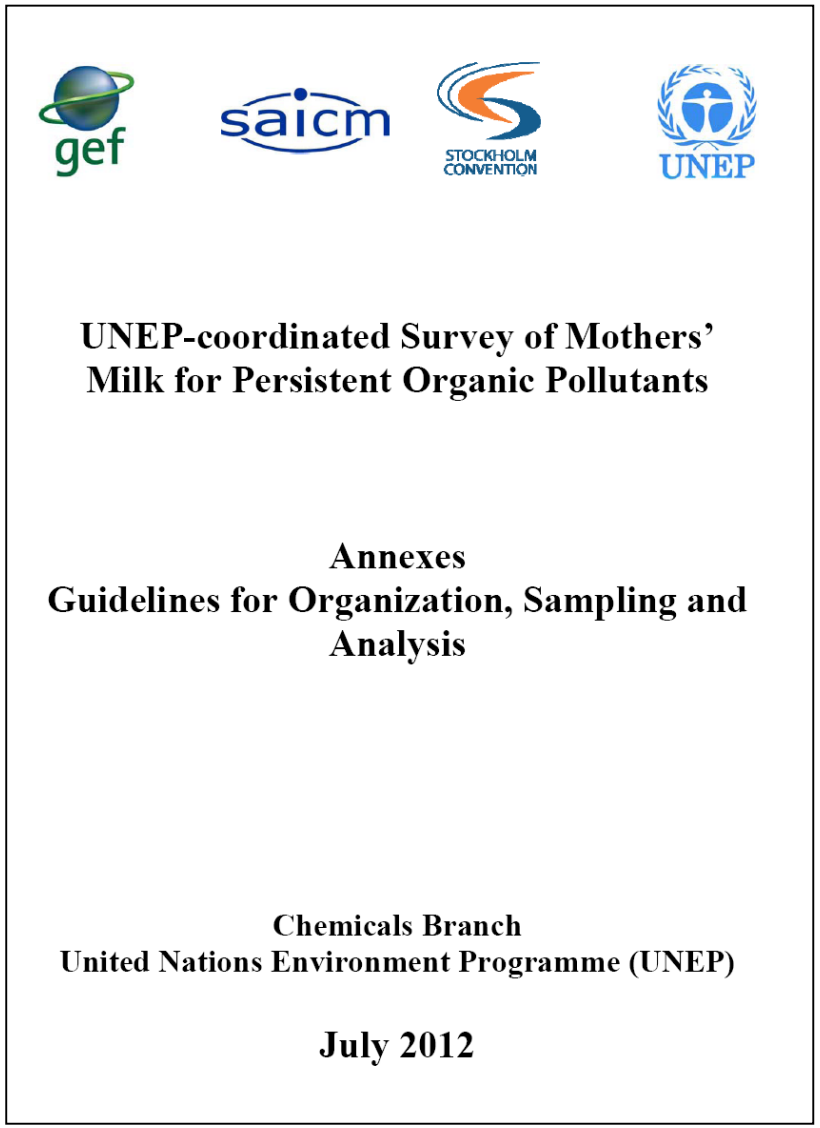
Mothers´ milk for exposure monitoring


UNEP-coordinated Survey of Mothers' Milk for Persistent Organic Pollutants

Guidelines for Organization, Sampling and Analysis

Chemicals Branch
United Nations Environment Programme (UNEP)

July 2012


UNEP-coordinated Survey of Mothers' Milk for Persistent Organic Pollutants

Annexes
Guidelines for Organization, Sampling and Analysis

Chemicals Branch
United Nations Environment Programme (UNEP)

July 2012

Requested amounts:

- Minimum: 50 ml/mother;
- Pooled sample: 1250 ml

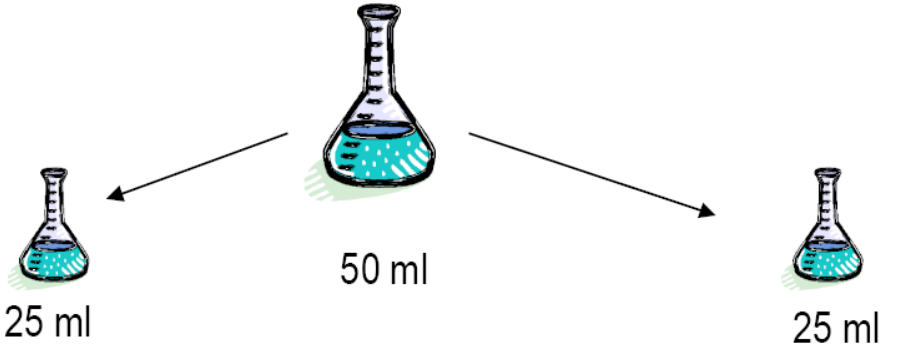
Prepared by: Dr. Karin Malisch and Dr. Heidelore Fiedler

Sample preparation scheme (1)

Collection of 50 individual samples

- Preparation of
  - individual samples for analysis of basic POPs by country
  - pooled (mixed) samples (analysis by Reference Laboratory CVUA)

1. Collection of 50 individual samples of 50 ml each.
   Options for the collection of the individual samples:
   - ✓ if possible, in one collection, or
   - ✓ in portions over time (e.g. on several days), with preservation of the collected portions by freezing
2. These 50 ml have to be split into two portions of 25 ml each:



Individual samples for analysis by country for basic POPs

Pooled sample (prepared of 25 ml of each of the 50 individual samples

Sample preparation scheme (2)

Preparation of individual samples for analysis of basic POPs by country and of pooled (mixed) samples

50 ml

take 25 ml into 2000 ml bottle (50 * 25 ml ea = 1250 ml)

Send the 2000 ml bottle with frozen pooled samples to WHO/UNEP Reference Lab

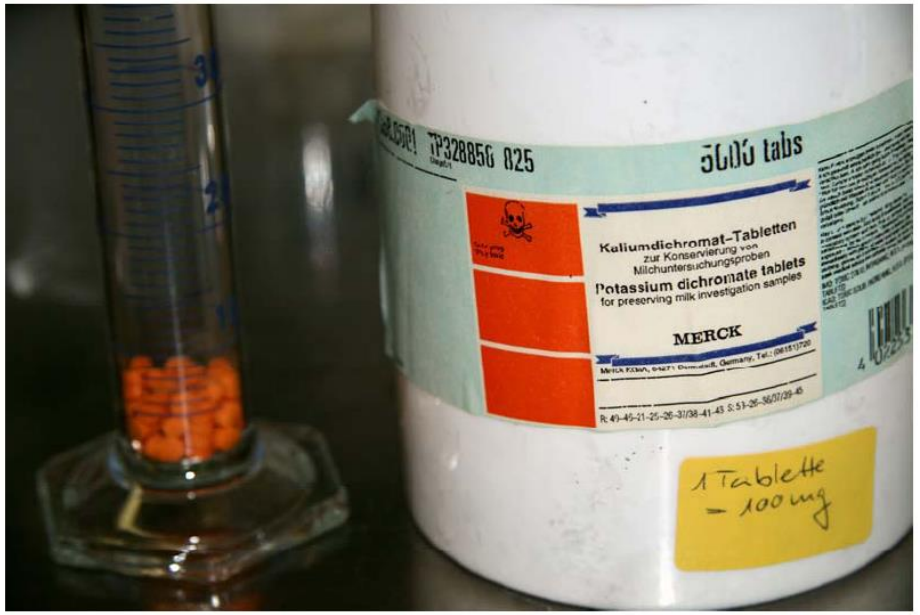
25 ml

Individual samples for analysis by country for basic POPs

For (deep-frozen) storage in and analysis by country. If no analysis in country possible and no storage capacity available, contact UNEP.

Stabilization of human milk samples with dichromate

- If refrigeration not available: Addition of dichromate to milk: 0.1 %:
  - 140 mg potassium dichromate, containing about 100 mg dichromate, to 100 ml milk;
  - absolute accuracy is not important: finally an excess of dichromate in milk (visible as yellow colour) which will be reduced to (green) Cr (III) before analysis.



0.1 % is equivalent to 3 tablets (= 100 mg dichromate) per 100 ml sample

CVUA (through contract with UNEP) will do:

1. Preparation (cleaning) and shipment of glassware containers to countries: 50 x 100 ml
   1 x 2 l

2. Analysis of human milk pools for chlorinated and brominated POPs;

3. Ship aliquots to MTM Örebro for analysis of PFOS;

4. Report results back to the countries and UNEP

Contact: Dr. Karin Malisch
karin.malisch@cvuafr.bwl.de

ÖREBRO UNIVERSITY

QUESTIONNAIRE FOR POTENTIAL HUMAN MILK DONORS[3]		
WHO/UNEP-coordinated Survey of Human Milk for Persistent Organic Pollutants ***CONFIDENTIAL!***		
Section 1: Personal Information		
Name	Phone number e-mail	Today's Date (dd/mm/yyyy)
Address		

Section for National Coordinator	
Individual Identification Code	Pool Identification Code
Based on established criteria, is the participant eligible? Yes ☐ No ☐	
What is the status of donor in regard to the survey? Selected ☐ Reserve ☐ Not Selected ☐ If this mother has been pre-selected to donate a sample (or is designated as an alternate), the top of Section 4 should be completed and detached from this questionnaire. Section 4 should be sent to the clinic to be completed at the time of sample collection.	

6 ANNEX 6: MODEL INFORMED CONSENT FORM

Certificate of Consent[8]

I have been invited to take part in the research on UNEP Global Survey of Human Milk for Persistent Organic Pollutants (POPs). I have been told the purpose and procedures of this survey, in summary--

Purpose of the survey

Official letters to facilitate custom clearance

Chemisches und Veterinäruntersuchungsamt
Freiburg

World Health Organization

WHO/UNEP Reference Laboratory
For determination of Persistent Organic Pollutants (POPs) in human milk

Chemisches und Veterinäruntersuchungsamt Freiburg
Postfach 100462 • 79123 Freiburg

Address of Receiver

Freiburg,
Phone:
Contact: Dr. Karin Malisch
e-mail Karin.Malisch@CVUAFR.BWL.DE
reference: 5477.10-15 CRL-Dioxin

INVOICE 30/07/2010
Invoice No. 5477.10-15 006

Sender	WHO/UNEP-Reference Laboratory
	c/o State Institute for Chemical and Veterinary Analysis of Food Freiburg
	Karin Malisch
Address	Bissierstr. 5 D-79114 Freiburg
Phone No	+49 761 8855 109
Fax No	+49 761 855 100
Sender VAT#	
Receiver	
Address	
Phone No	Tel:593-2-2543588

Dienstgebäude der bearbeitenden Stelle:
Bissierstraße 5 Telefon: (07 61) 88 55-0
79114 Freiburg Telefax: (07 61) 88 55-100
Tram-Linie 3 (Haid): Haltestelle Bissierstraße

E-Mail:
poststelle@cvuafr.bwl.de

Sprechzeiten:
Mo-Do: 9^{00}-11^{45} Uhr
14^{00}-15^{30} Uhr
Fr: 9^{00}-12^{00} Uhr

Bankverbindung:
Landesoberkasse Baden-Württemberg,
Baden-Württembergische Bank
(BLZ 600 501 01), Kto. 746 95341 03

Seite 1 von 2

incoming

Outgoing

UNITED NATIONS ENVIRONMENT PROGRAMME
Programme des Nations Unies pour l'environnement Programa de las Naciones Unidas para el Medio Ambiente
Программа Организации Объединенных Наций по окружающей среде برنامج الأمم المتحدة للبيئة
联合国环境规划署
UNEP

Reference: Date: July 15, 2010

Subject: Statement of non-commercial nature of UN shipment to developing countries for capacity building and training purposes

To Whom It May Concern

Please note that UNEP has asked **CVUA – the WHO Reference Laboratory** in Freiburg, Germany, to prepare and ship to eligible countries and laboratories a box containing glassware and materials to collect national mothers' milk samples and prepare pooled samples for data generation in international context. This glassware and the methodology to collect the samples have been approved by the conference of the parties to the Stockholm Convention on persistent organic pollutants. The glassware is needed for the building of capacity for environmental monitoring of persistent organic pollutants (POPs) as part of the country's obligation under the convention.

The containers and the materials are part of the training materials supplied under the capacity building project GFL 4A77 financed by the Global Environment Facility "Supporting the Implementation of the Global Monitoring Plan of POPs in Latin America and Caribbean States (LAC)" and implemented by the United Nations Environment Programme (UNEP). These materials are a donation from UNEP to the assigned laboratory in your country for the capacity building purposes; they do not have commercial value.

Sincerely yours,

Dr. Heidelore Fiedler
Senior Scientific Affairs Officer
DTIE, Chemicals Branch
United Nations Environment Programme
e-mail: heidelore.fiedler@unep.org

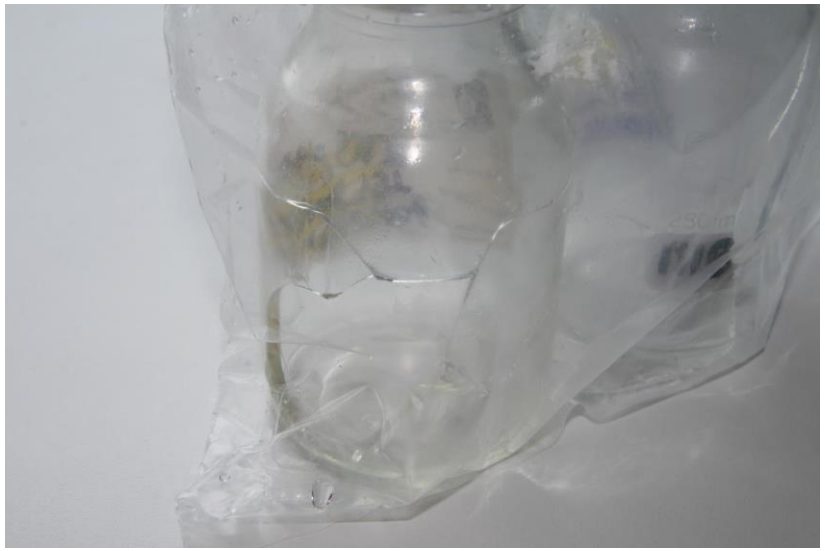
Chemicals Branch, DTIE // Substances chimiques, DTIE
11-13, chemin des Anémones, CH-1219 Châtelaine, Geneva, Switzerland
Facsimile: +41 22 797 34 60 // E-mail: chemicals@unep.ch

Human milk: Actions to be taken by each country

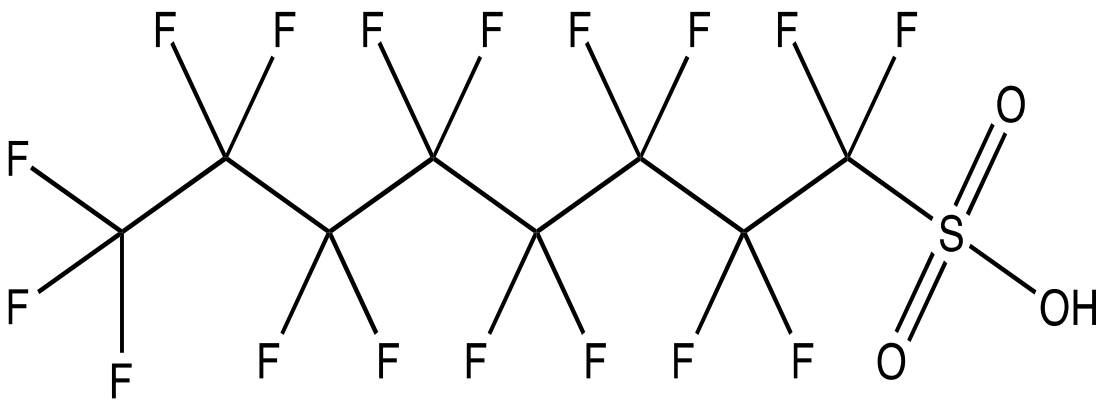
- Identify ”human milk coordinator”
  - Send address details for correspondence and shipment
- Human milk coordinator
  - Initiate process for ethical clearance to collect human samples nationally;
  - Upon contact from CVUA, agree on shipment/delivery date of glass ware;
  - Prepare national protocol for human milk sampling;
  - Prepare the national pool or keep individual samples separate;
  - Ship human milk sample to CVUA (receive shipment number and agree on dates, custom´s clearance);

Send all information to UNEP (Jacqueline) and CVUA (Rainer Malisch) copy to MTM (Heidi)

Packaging and shipment



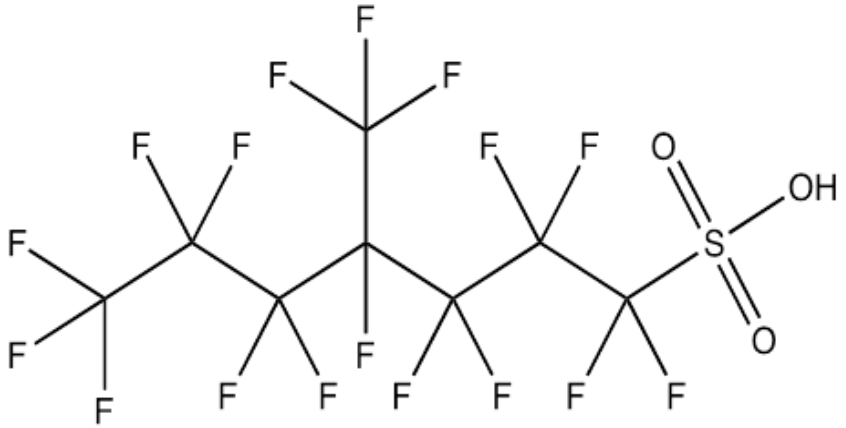
Surface water



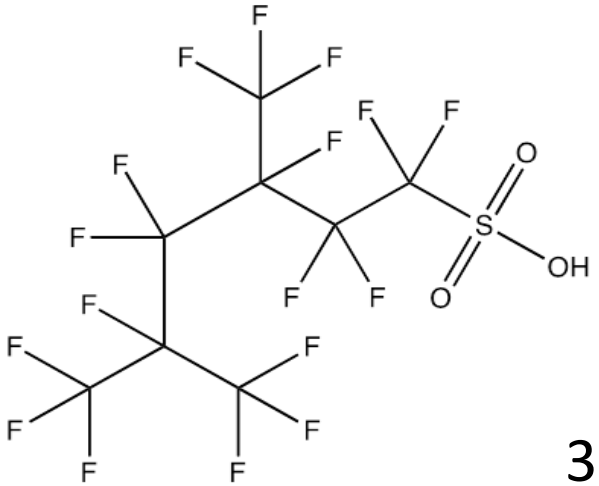
L-PFOS

linear

$C_8F_{17}SO_3H$
isomers



4-PFOS



branched

3,5-PFOS

Set-up

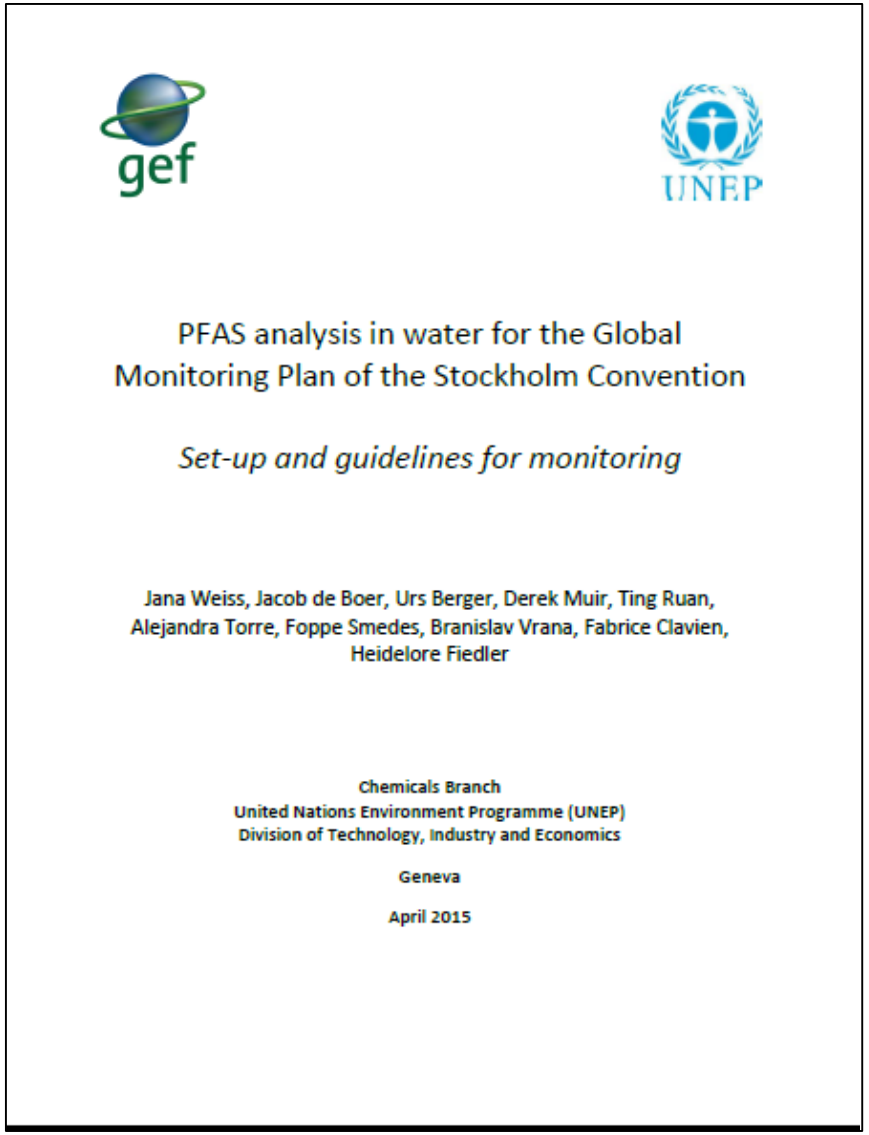
- All water samples will be analysed by MTM Research Centre, Örebro University, Sweden;
- MTM Centre will:
  - Provide containers for sampling of surface water (500 mL) and instructions
  - 8 samples (several dippings) to be taken for one sample
  - Analyse the water samples for L-PFOS and total PFOS

PFOS water guide

- **Estuaries are recommended as sampling sites**, but data from other sites are welcome and should have one of the following characteristics:
  - Estuary and larger tidal rivers and bays
  - River downstream populated area (distant from any influent)
  - Lake with a defined surrounding population
  - Tributary (before entering the main stream)
- Adapt the distance to shore to existing circumstances at the site. Make sure the water sampled is from a zone where it is mixed.
- Sample at a selected site 4 times a year (same site and with the same method);
- Carefully determine the sampling occasions depending on optimal conditions, preferably consistent between years, *e.g.*,:
  - 2 times high-water stage and
  - 2-timed low-water stage,
  - Although avoiding drought conditions or freezing conditions

4. Minimum data to report

- Site ID code
- Location name
- Date
- Names of personnel conducting the sampling
- GPS coordinates of sampling site
- Marine/fresh water
- Distance to shore
- Water depth
- Sampling depth
- Total suspended solid (TSS)
- Conductivity



PFAS analysis in water for the Global Monitoring Plan of the Stockholm Convention

Set-up and guidelines for monitoring

Jana Weiss, Jacob de Boer, Urs Berger, Derek Muir, Ting Ruan, Alejandra Torre, Foppe Smedes, Branislav Vrana, Fabrice Clavien, Heidelore Fiedler

Chemicals Branch
United Nations Environment Programme (UNEP)
Division of Technology, Industry and Economics

Geneva

April 2015

http://www.unep.org/chemicalsandwaste/Portals/9/POPs/Guide%20PFAS%20water_UNEP%202015.pdf

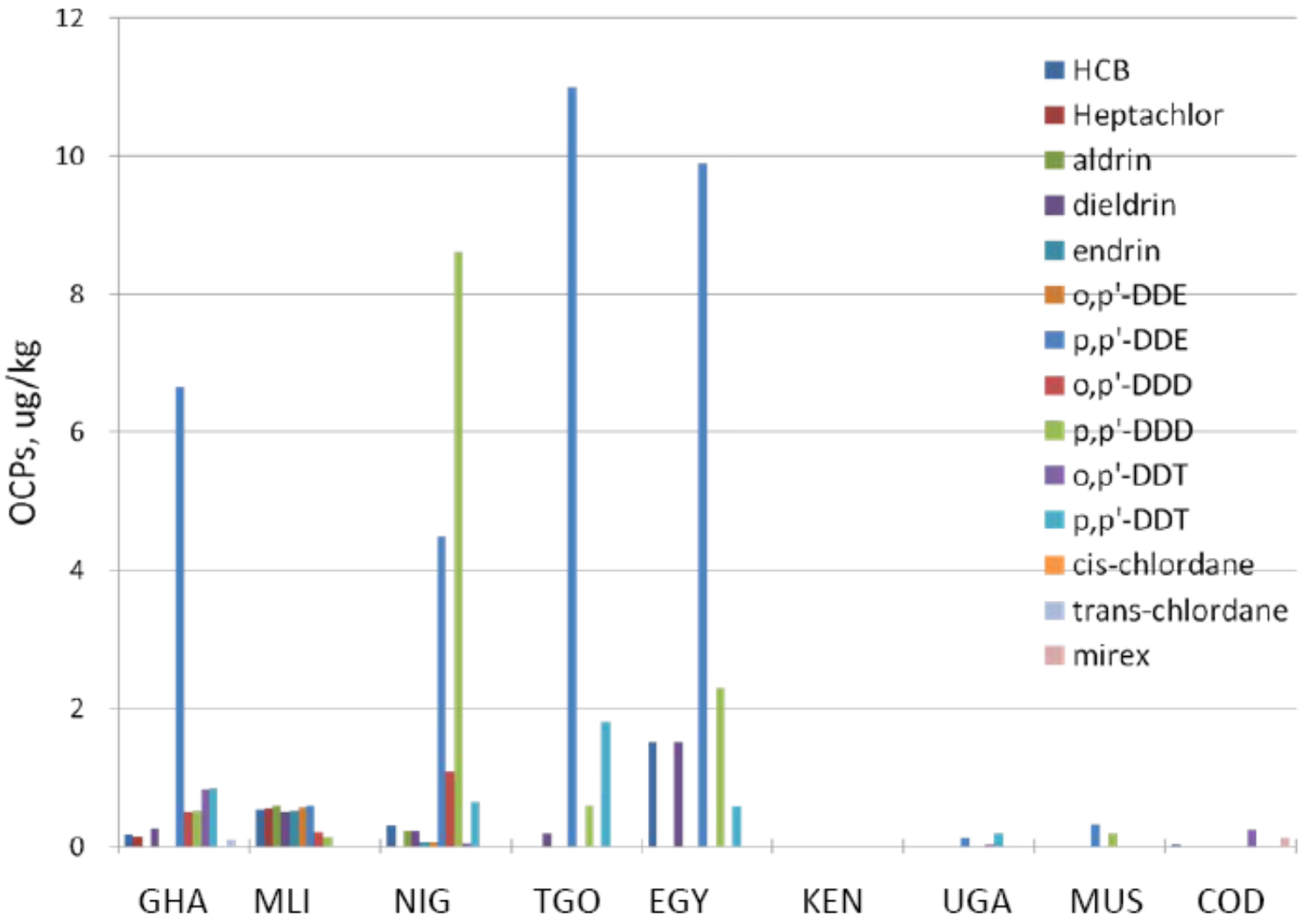
National samples

1. Mirror samples
2. Additional data from countries

Samples of national interest

- Samples other than the core matrices
  - recommended are: fish, sediment, foodstuffs (fatty)
- To be analysed for the four (chemical) groups of POPs
  - by IVM VU University: OCPs/PCB_6 (54 samples) or PBDE/HxBB (45 samples)
  - by MTM Örebro University: dl-POPs (36 samples) or PFOS (45 samples)
- Mirror analysis
  - National laboratory according to own capacities

OCPs in Fish in Africa



Courtesy Heather Leslie, IVM VU Amsterdam