Sharing knowledge on emerging contaminants and PFAS

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Theorem

It takes too long before emerging contaminants are incorporated in our environmental approaches.

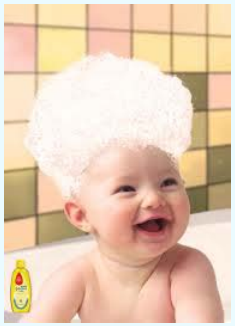
What are emerging contaminants?

- Different names and definitions:
  - US EPA: contaminants of emerging concern
  - NORMAN: emerging pollutants
  - US GS: emerging contaminants
  - UN EP: persistent organic pollutant

- In general:
  - chemicals; on a large scale applied
  - assumed risks and effects at low concentrations
  - presence is not regular monitored
  - complexity and lack of data => no awareness

Why do we need to address?

- Sources - pathways - receptor

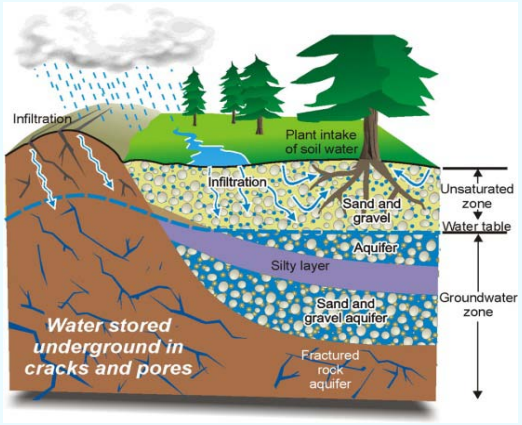






Why do we need to address?

- Sources – pathways – …
  - Wastewater treatment
  - Landfills
  - Soil and groundwater
  - Air
  - Waterways



Why do we need to address?

- Sources – pathway – receptor
  - Bioaccumulate
  - Persistent
  - Toxic
  - Long range transport

- What is the ‘real’ problem?
  We don’t know exactly what to do …..,

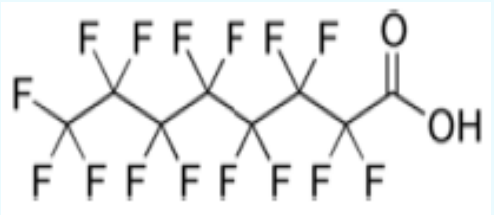
  (doubts about: to take action or to wait)

An example: PFAS

- Poly- and Perfluoroalkyl substances
  - Unique stability and surface tensions
  - Repels in water and in oil
  - Non-degradable / low volatility

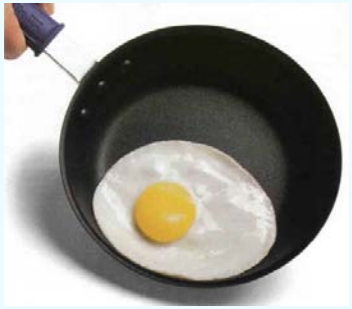
  - Perfluorooctane sulfonate (PFOS) ($C_8F_{17}SO_3H$)

  - Perfluorooctanoic acid (PFOA) ($C_7F_{15}CO_2H$



- It’s made to last long, and it does!

PFOS is used in:



Regulation PFOS

- Stockholm Convention lists PFOS (2009)
- Protein binding effects human blood, liver and kidneys
- EU 756/2010 and EU 757/2010 use forbidden

- Environmental Quality Standards (WFD)

Name of substance	AA – EQS [1] (ng/l)		MAC-EQS [2] (µg/l)		EQS (µg/kg)
	Inland surface waters	Other surface waters	Inland surface waters	Other surface waters	Biota
Perfluoro octane sulfonate and its derivates (PFOS)	0,65	0,13	36	7,2	9,1

[1] AA: Annual average

[2] MAC: Maximum allowable concentration

[EU Directive 2013/39/EC]

Is there a problem?

Water treatment plants

[Loos et al, 2009-2010]

Substances	Median concentration (ng/l)	Highest single concentration (ng/l)
PFOS	12,2	2,100,000
PFOA	12,9	15,900,000

European Rivers

[Loos et al, 2009]

River	Country	Maximum PFOS concentration (ng/l)
Krka	Slovenia	1,371
Scheldt	Belgium	154
Scheldt	The Netherlands	110
Seine	France	97
Rhine	Germany	32

EQS (AA): inland surface waters: 0,65 ng/l (= 650 ppt)

Inventory on emerging contaminants

Why

- Little known about presence, risks, approach
- Deal with EC in soil, groundwater and sediments

How

- EU-members: Common Forum, NICOLE, SedNet

What => next sheets

Joint action:

Approach

- Phase 1: What are the experiences in the EU
- What is the best ‘next step’ (phase 2)

Phase 1:

- Website => www.emergingcontaminants.eu
- Questionnaire
- Desk research and interviews experts

- Scope:
  - Insight in presence and practical experience
  - Needs: knowledge, awareness, understanding
  - Not for making (new) policy or legislation

Questionnaire

Focus on curative policy (not prevention)

Broad inventory, 4 pillars:

- Awareness
- Policies and legislation
- Remediation techniques
- Pilot PFOS

Sent to more than 500 experts


EMERGING CONTAMINANTS

Questionnaire on Contaminated Land Management in Europe

Emerging contaminants

AIM OF THIS QUESTIONNAIRE

With increasing frequency countries and organisations are faced with chemicals that have not been considered as 'contaminants' before. Some of these chemicals could be a potential risk to humans and/or the environment. These are the so-called 'emerging contaminants'. Roughly defined by the United States Geological Survey as "any synthetic or naturally occurring chemical that is not commonly monitored in the environment, but has the potential to enter the environment and cause known or suspected adverse ecological and/or human health effects".

Characteristic for emerging contaminants is that too little is known about the occurrence, the actual risks and the approach to formulate appropriate policy and legislation. To properly identify how to deal with emerging contaminants knowledge, awareness and understanding is necessary.

Commissioned by the Ministry of I&M / RWS (Netherlands) and the OVAM (Flanders), this questionnaire has been developed. This questionnaire aims to wrap up available knowledge and experience related to legislation, governance and policy. The focus is on the presence and the curative policy on emerging contaminants that are already present in the soil, groundwater and sediments.

This questionnaire is a first step to decide whether it is necessary to develop an effective approach on how to deal with emerging contaminants. The results of this inventory will be shared and discussed. Based on this discussion a decision is made whether the development of a strategy on how to deal with emerging contaminants is necessary.

APPROACH

The group of emerging contaminants is very diverse in terms of toxicity, behaviour, remediation/treatment technique and so forth. As a consequence, the dimensions of the problem are not clear. Also the current knowledge and especially the actual approaches on how to deal with emerging contaminants in different countries are not well known.

DIOXINS | DDT DDE DDD | HORMONES | PFOS | NANO PARTICLES

Results (draft)

Land	Sessies
	3.234 % van totaal: 100,00% (3.234)
1. United States	1.258 (38,90%)
2. (not set)	615 (19,02%)
3. China	150 (4,64%)
4. Germany	117 (3,62%)
5. Netherlands	106 (3,28%)
6. Japan	103 (3,18%)
7. United Kingdom	94 (2,91%)
8. France	61 (1,89%)

- Website: proven valuable
- Questionnaire: low response
- Interviews provided valuable information

- EU: focuses surface water
- EU: almost no awareness on presence (only in some countries)
- Look at EU regulation (ELD, Landfill Directive)
- Broad interest on EC (industry – policy – science)

Knowledge available, but:
insufficient interface: science <> policy <> practical users

Recommendations

- The best next step:
  - Improve exchange of knowledge and needs (both ways)
  - Support research and innovation in EU
  - Clear uncertainties in liability
- Strategy needed for flexible response
- Discuss Common Forum how to organize this
- Our report: next month on the website!

Role for SedNet

Sediments are an integral part of river systems

- What do you know or need on EC?
- Need for an international working group on EC?
- Which EC deserve your special attention?
- What's the awareness in your country?
- Are you involved in research projects on EC?

Answers, questions or information

- Website:

  www.emergingcontaminants.eu

  ... or ask me thee next days!

  ... or email martijn.van.houten@witteveenbos.com

Special thanks to:

TOGETHER WE MAKE TOMORROW MORE BEAUTIFUL
OVAM

Rijkswaterstaat
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