Emerging Contaminants

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Introduction

- Emerging contaminants – who decides what and when does it matter?
  - The Product Police – when the new substance used in a product appears to have harmful side effects REACH Regs;
  - Environmental Regulators - when evidence accumulates to suggest the substance may be harmful to health or the environment;
  - NGOs – who may collect the evidence of harm to the environment, or see emerging effects;
  - Business – who develop new substances, but don’t spot the negative effects until its too late.

Definitions

- Emerging contaminants = Contaminants of emerging concern?
- Properties
  - Persistence (PCBs, PFAS);
  - Bioaccumulation (mercury, DDT);
  - Toxicity (arsenic, PFAS?);
  - Gestation period (asbestos);
- Acceptable concentration change – Drinking Water Standards, GACs etc;

The product perception cycle

- Formulate and test a compound – say DDT;
- Use as pesticide – mosquitos on low lying land in 1940/50s;
- Discover additional uses – soak military underwear in DDT to kill body lice parasites;
- Benefit from desired effects – reduced nuisance/harm from mosquitos and improved health of troops without body lice;
- Discover increasing deaths of birds of prey;
- Test and find bioaccumulation in food chain and toxicity for birds;
- Silent Spring by Rachel Carson raises concerns massively;
- Ban DDT, but still have to deal with residual effects.

What concerns us today?

- The old chestnuts:
  - Lead;
  - Asbestos;
  - Mercury;
  - Phthalates (?);
- The new chestnuts:
  - PFAS;
  - Microplastics;

Lead

- In use for many thousands (Romans and earlier) of years;
- Use in coins, household ware, pipes etc;
- UK - dissolution into water supplied to houses in lead pipes since Victorian times;
- Main impact from dissolved lead is neuro-cognitive effects in children;
- As recently as 2015, GAC for lead in soil in residential sites reduced from 450mg/kg to 250mg/kg due to emerging data on toxicity;
- Exposure to particulates in air may also be an exposure route of concern.

Asbestos

- Europe wide review of approach to asbestos in soils by NICOLE Working Group led by Simon Cole;
- Increasing awareness and low risk tolerance from stakeholders
- Found in circa 10% of all soil samples submitted to UK laboratories (on average);
- Generally agreed mass removal of visible asbestos;
- Very variable approach to dispersed asbestos in soils across Europe;

Asbestos

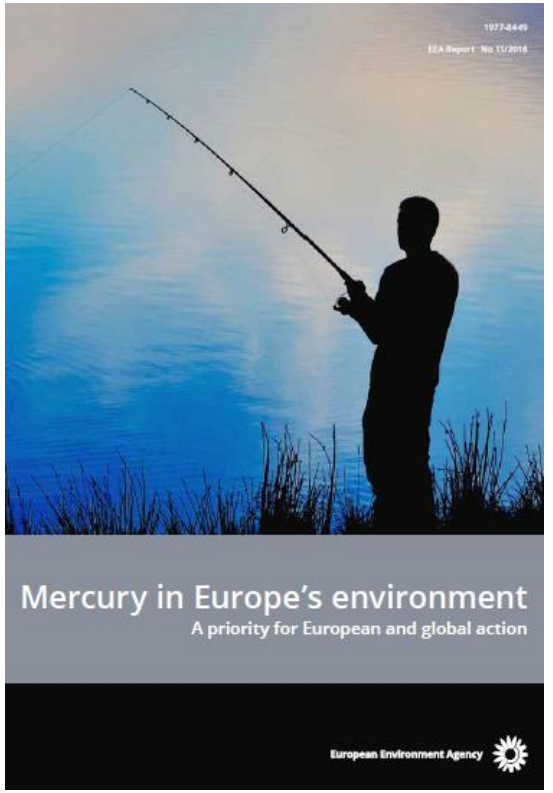
- Which of the following countries doesn't have published guidance on asbestos in soils?
  - UK
  - Belgium
  - Netherlands
  - France
  - Spain
  - Italy
  - Germany
  - Poland
  - Hungary

Deaths from mesothelioma per year?*	
UK	2500
Belgium	200
Netherlands	500
France	2000
Spain	300
Italy	?
Germany	800
Poland	2600
Hungary	?
Global	200,000 to 300,000

- Very approximate numbers

Mercury - Minamata Convention

- Minmata disease first recognised in 1956;
- Its taken 61 years for a total ban to come into place in Europe;
- The Minamata Convention on Mercury will restrict and ban the use of mercury in both products and industrial processes as of 2020;
- EEA report September 2018 ‘Mercury in Europe’s environment;



This EEA report aims to increase understanding and knowledge of global mercury pollution among both policymakers and the general public.

The report provides background information and context, before setting out the current status of global and European mercury pollution and the challenges that remain in addressing this global issue.

Phthalates (1)

- Phthalates first came to the attention of Regulators in the US in 2003;
- Studies have shown them to include some substances which have negative health effects;
- Over-arching report produced by the U.S. Consumer Product Safety Commission on phthalates and alternatives:
  - formed the basis for current concerns;
  - wide range of possible health effects

  including damage to liver, kidney,

  lungs and reproductive system

Phthalates (2)

- Moves afoot in the US to ban or reduce the use of a number of phthalates such as Di(2-ethylhexyl) phthalate (DEHP).
- Action is slow to happen with a truly new emerging contaminant;
- Now 15 years on from the first concerns being expressed;
- Still only patchy State and Federal regulations in the US to eliminate the chemicals from some products, but the list is likely to grow.

PFAS (1)

- PFAS - a group of substances which include Perfluorooctane Sulfonate (PFOS) and Perfluorooctane Acid (PFOA).
- Used extensively in the last 30 years to provide food packaging, non-stick surfaces in kitchen ware, and improved fire suppression characteristics in foam used to douse fires.
- Effectiveness due to its persistence - very little biodegradation, and it only changes concentration by dilution.
- The group of substances are linked to several forms of cancer and effects on liver, gastrointestinal system and thyroid hormones.

PFAS (2)

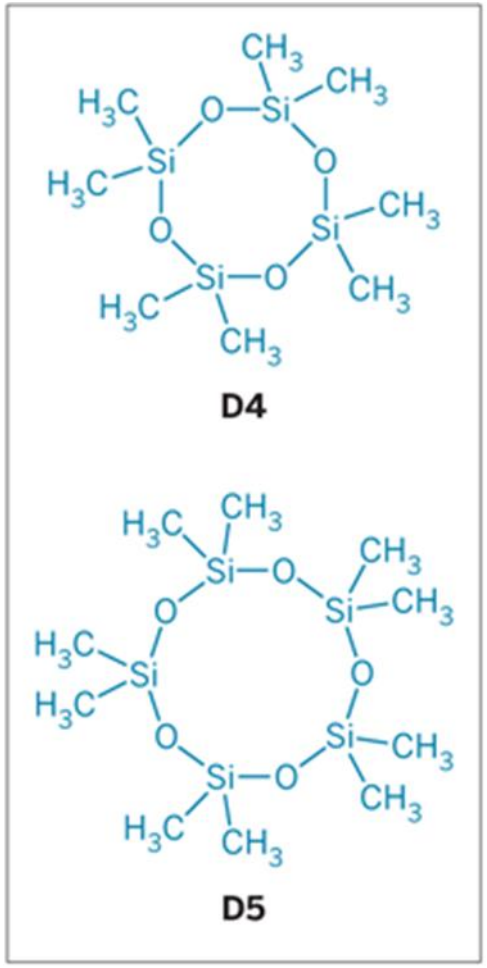
- In 2016, the USEPA announced increasing concern about the group of substances, and reduced the Health Advisory Value to 70 nanograms/litre.
- Result - Water Companies reviewed their abstraction sources on a precautionary basis, with some discovering that their main source of drinking water supply could no longer be used with confidence.
- In the state of Michigan, widespread impacts on surface and groundwater have caused the State to declare localised states of emergency while they find alternative water supplies.
- For sites where fire-suppressant foams have been used (airfields, sites of major fires etc), PFAS also found extensively.

PFAS (3)

- . Finding alternative sources to deliver potable water to a State comes with a multi-million dollar bill;
- The only company in the US which manufactured PFAS is being pursued in the courts. Who knows what the outcome will be;
- Extensive investigation and clean-up at fire training sites taking place – particularly airports and military sites, PFAS foams used;
- The added effectiveness of fire foam using PFAS may have saved lives over the years, need to balance the benefits (possible lives saved in fires) with the disbenefits (environmental accumulation and health impacts through drinking water).

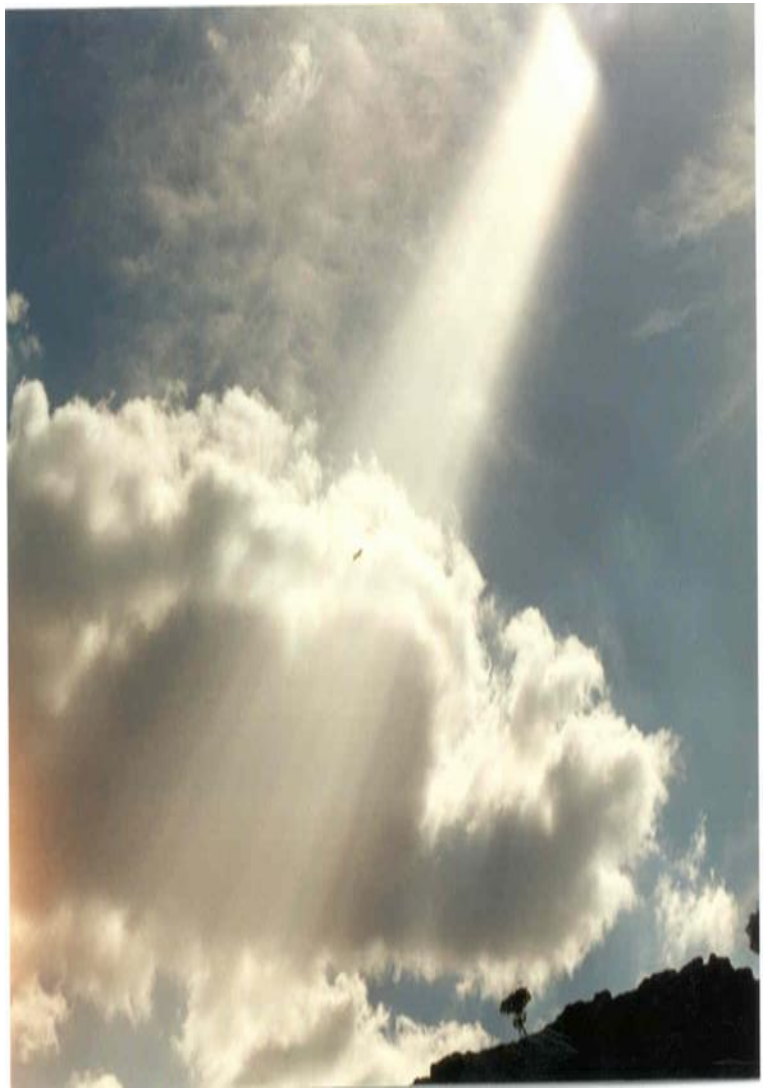
Microplastics

- D4 and D5 are micro-silicones used in hair, skin and cleaning products;
- D4 has been identified as a persistent , bioaccumulative and toxic (PBT) and very persistent, very bioaccumulative (vPvB) substance.
- D5 has been identified as a very bioaccumulative (vPvB) substance.
- D4/D5 have been added to REACH restricted substances list by COMMISSION REGULATION (EU) 2018/35 on 10 Jan 2018.
- EU Commission :
- D4 and D5 shall not be placed on the market in wash-off cosmetic products in a concentration equal to or greater than 0,1 % by weight of either substance, after 31 January 2020.
- It is very important for the industry to show this issue can be managed and presence of D4/D5 reduced in waste water without need for further regulation.



Conclusions

- It's the properties which substances exhibit which are of concern;
- Don't imagine we know everything there is to know about all the substances we see in everyday life;
- Recognise that it often takes 20 years or more for us to see the negative effects that a substance has;
- Be prepared to take a precautionary approach to substances of concern;
- Think carefully about how we balance the precautionary approach with proportionality principle.



Questions